MODULE FOR GRADE XI

JOB ROLE:

MIS DATA ANALYST – FINANCIAL SERVICES

(QUALIFICATION PACK: Ref. Id. BSC/Q4101)

SECTOR: BANKING, FINANCIAL SERVICES AND INSURANCE (BFSI)

PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION
(a constituent unit of NCERT, under MOE, Government of India)
Shyamala Hills, Bhopal- 462 002, M.P., India
http://www.psscive.ac.in

Gandhiji's Talisman

I will give you a talisman. Whenever you are in doubt or when the self becomes too much with you, apply the following test:

Recall the face of the poorest and the weakest man whom you may have seen and ask yourself if the step you contemplate is going to be of any use to him. Will he gain anything by it? Will it restore him to a control over his own life and destiny? In other words, will it lead to Swaraj for the hungry and spiritually starving millions?

Then you will find your doubts and your self melting away.

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FOREWORD

The National Education Policy (NEP) 2020 envisions an education system that is deeply rooted in India's cultural heritage and achievements, while also preparing students to effectively engage with the challenges and opportunities of the 21st century. This aspirational vision is built upon the National Curriculum Framework for School Education (NCF-SE) 2023, which outlines a comprehensive approach to education across various stages. In the early stages, the NCF-SE 2023 fosters the holistic development of students by focusing on the five dimensions of human existence, known as the pañchakoshas, creating a solid foundation for further learning.

High-quality vocational textbooks play a vital role in bridging practical skills and theoretical knowledge.

These textbooks must balance direct instruction with opportunities for hands-on experience, helping students to apply what they learn in real-life settings. The National Council of Educational Research and Training (NCERT) is providing such high-quality teaching-learning resources. A team of experts, educators, and practitioners have collaborated to develop these vocational textbooks to ensure students are well-prepared for the demands of their chosen fields.

The textbook on *MIS Data Analyst – Financial Services* introduces students to essential concepts in the banking, financial services, and insurance sector, with a strong focus on data management, analysis, and reporting. It aims to equip students with practical skills, such as using Excel for financial data management, organising and validating datasets, creating MIS reports, and developing interactive dashboards, so that they are well prepared for the job role of MIS Data Analyst in the BFSI sector. The textbook also emphasises values such as accuracy, data privacy, ethical practices, and attention to detail, which are crucial in financial data handling and decision-making.

In addition to textbooks, it is important to encourage students to explore other learning resources, such as financial journals, industry reports, and live data analysis projects. Teachers play a vital role in guiding students as they apply their learning to real or simulated financial datasets.

I am grateful to all who contributed to the development of this vocational textbook and look forward to feedback from its users to make future improvements.

New Delhi
July, 2025

Dr. Dinesh Prasad Saklani
Director National Council
of Educational Research and Training

ABOUT THE TEXTBOOK

The MIS Data Analyst – Financial Services course is designed to equip students with the essential knowledge and hands-on skills required to collect, analyze, and report financial and operational data using digital tools; primarily Microsoft Excel. In Grade 11, students are introduced to data fundamentals, Management Information Systems (MIS), and Excel-based data analysis techniques, progressing to structured reporting and basic automation. In Grade 12, the focus shifts to advanced financial reporting, budgeting, business analysis and the application of data-driven decision-making, including forecasting, process improvement and KPI monitoring.

The course ensures that students understand how data supports strategic decision-making across financial services by integrating theoretical concepts with practical application. Through case studies, hands-on projects, and report simulations, learners gain real-world insights into operational metrics, profitability analysis, dashboard creation, and automated MIS reporting.

The textbook for the job role of 'MIS Data Analyst – Financial Services' has been developed to impart knowledge and skills through the hands-on learning experience, which forms a part of experiential learning. Experiential learning focuses on the learning process for an individual. Adequate care has been taken to align the textbook's content with the National Occupational Standards (NOSs) for the job role so that the students acquire the necessary knowledge and skills as per the performance criteria mentioned in the respective NOSs of the Qualification Pack (QP). The textbook has been reviewed by experts to ensure that the content is not only aligned with the NOSs but is also of high quality.

This textbook covers five comprehensive Module 1: Banking Sector and Role of MIS Data Analyst, Module 2: Excel for Financial Data Management, Module 3: Data Organization and MIS Report, Module 4: Advanced Excel for Analysis and Dashboards, and Module 5: Automation and Presentation of Reports. It is designed to equip learners with the foundational and advanced skills required for data analysis and reporting in the Banking, Financial Services, and Insurance (BFSI) sector. Beginning with an overview of the BFSI industry, the textbook introduces the role of MIS (Management Information System) and the responsibilities of a data analyst, along with essential knowledge of data privacy and regulatory frameworks. Students are trained in using Excel for managing financial data, covering everything from basic formulas and charts to look up and logical functions.

The textbook further explores techniques for organizing data, creating MIS reports, and visualizing data using Pivot Tables.

Advanced Excel tools for dynamic reporting and dashboard creation are also included. Finally, the textbook covers automation using Macros and VBA, along with techniques for presenting professional analytical reports. With a blend of theoretical understanding and hands-on application, this textbook serves as a valuable resource for students aspiring to work as MIS Data Analysts in the BFSI domain.

Dr. Pravin Narayan Mahamuni
Associate Professor,
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Editorial Team
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CONTENTS

MODULE 1: BANKING SECTOR AND ROLE OF MIS DATA ANALYST

The Banking, Financial Services, and Insurance (BFSI) sector plays a very important role in a country's economic development by ensuring the efficient flow of money, financial stability, and risk management. It acts as the backbone of modern economies by mobilizing savings, facilitating investments, offering credit, and providing protection against unforeseen events through insurance. Over the past few decades, India's BFSI sector has witnessed remarkable growth, driven by reforms, digitization, and financial inclusion initiatives. Institutions such as the Reserve Bank of India (RBI), commercial banks, Non-Banking Financial Companies (NBFCs), and Insurance companies together form a strong and interconnected financial ecosystem that supports individual, corporate, and national financial needs.

In recent years, the BFSI sector has undergone a digital transformation with the emergence of UPI, FinTech companies, mobile banking, and AI-driven financial services, making financial products more accessible, secure, and efficient. Alongside this transformation, the role of data in decision-making, customer insights, regulatory compliance, and operational efficiency has grown significantly. This has led to a rising demand for skilled professionals who can manage, interpret, and analyse data using Management Information Systems (MIS).

As the BFSI sector continues to evolve with rapid digitization and data-driven operations, the role of MIS Data Analysts has become increasingly vital. These professionals support business functions by transforming raw data into actionable insights, generating accurate reports, monitoring Key Performance Indicators (KPIs), ensuring regulatory compliance, and enabling informed decision-making across banking, financial services, and insurance domains.

This module is divided into four sessions. Session 1 covers the basics of the BFSI sector, key financial institutions, and recent trends. Session 2 explains the concept and types of MIS, its role in different banking functions, and how it supports operations, decision-making, reporting, and information flow within BFSI organizations. Session 3 covers the role of an MIS Data Analyst in financial services and reporting KPIs to stakeholders. Session 4 focuses on data privacy, ethics, and regulatory compliance in BFSI.

SESSION 1: OVERVIEW OF THE BFSI SECTOR

INTRODUCTION TO BFSI

The BFSI sector encompasses Banking, Financial Services, and Insurance, referring to the institutions that provide a wide array of financial products. This includes everything from large universal banks offering a full suite of financial solutions to specialized companies that focus on particular areas like investment services, insurance, or digital payment systems.

In simple words, this sector includes a broad array of services from opening personal and business bank accounts and applying for loans to investing in mutual funds, retirement plans, and obtaining life and health insurance. Ultimately, BFSI plays a vital role in enabling people to efficiently manage their finances, grow their assets, and protect their financial future through comprehensive risk management solutions.

The BFSI sector forms a very important part of any Indian economy. It impacts nearly every individual and business, playing an essential role in daily financial activities, wealth creation, risk protection, and overall economic progress. Whether someone is opening a bank account, taking a loan, investing in a mutual fund, or securing their future through insurance, the BFSI sector acts as a trusted partner in helping people and businesses handle their finances more efficiently and responsibly.

Over the years, the BFSI sector has evolved expressively. In the past, banking and insurance were seen as slow-moving, paperwork-heavy services that often felt bureaucratic and intimidating. But today, digital technology, regulatory reforms, and increased financial awareness have transformed the landscape. What once required standing in long queues can now be done with a few taps on a smartphone. More importantly, BFSI is no longer just about storing money—it's about enabling growth, supporting dreams, and ensuring financial well-being.

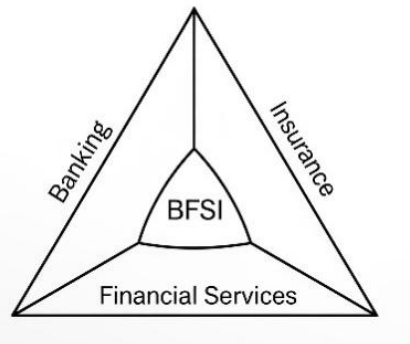


Fig. 1.1: The Triangle of BFSI

1. **Banking:** Banking is the core of the BFSI sector. It involves accepting deposits, providing loans, and enabling money transfers. Banks help

people save their money safely, offer credit for personal and business needs, and support everyday transactions through ATMs, UPI, and mobile banking. Public sector banks, private banks, and rural banks together form a strong network that supports the country's financial needs and economic development.

This sector not only provides a safe place for people to keep their money but also fosters financial inclusion by granting access to credit for individuals who might not otherwise qualify.

2. **Financial Services:** Financial services refer to a wide range of non-banking services that help people manage, invest, and grow their money. These include mutual funds, stock broking, credit rating, insurance brokerage, and wealth management. Financial service providers, such as NBFCs and investment firms, play an important role in creating financial awareness and offering customized financial solutions to individuals and businesses.
3. **Insurance:** Insurance is an essential part of the BFSI sector that provides financial protection against unexpected risks and losses. It helps individuals and businesses manage uncertainties related to life, health, property, vehicles, and travel.

   There are two main types of insurance: life insurance, which offers financial security to a person's family after their death, and general insurance, which covers health, vehicles, travel, and property. Companies like LIC, HDFC Life, New India Assurance, and ICICI Lombard help individuals and businesses manage uncertainty and gain peace of mind.

OVERVIEW OF THE INDIAN BANKING SYSTEM

The Indian banking system is the backbone of the country's economy. It helps people and businesses save money, borrow loans, transfer money, and also supports the growth of the nation by funding various development activities. All banks in India work under the rules set by the Reserve Bank of India (RBI), which acts as the central authority to regulate and monitor their activities.

The Reserve Bank of India (RBI) is India's central bank and the bedrock of its financial system

The Reserve Bank of India (RBI) was established in 1935 and is the central bank of India. It has many important roles. It issues currency notes (except ₹1 coins and notes), controls inflation, and manages interest rates in the country. It also takes care of India's foreign exchange reserves and works as a bank for the government and for all other banks in India. RBI makes rules to ensure that all banks work safely and fairly.

TYPES OF BANKS IN INDIA

India has a well-structured banking system to serve the different needs of people in urban and rural areas. All banks in India are regulated by the Reserve Bank of India (RBI). Broadly, banks in India are divided into two main categories i.e. Scheduled Banks and Non-Scheduled Banks.

Scheduled Banks are simply banking that are included in the Second Schedule of the Reserve Bank of India Act, 1934.These banks must follow the rules and regulations made by the Reserve Bank of India (RBI). They must also maintain a certain amount of money as reserves with the RBI. Scheduled Banks are eligible to borrow money from RBI and take part in the clearinghouse (a system where banks settle payments between one another). These banks are considered safer and more trustworthy. Scheduled Banks in India encompass a wide range of financial institutions, including major public sector banks like the State Bank of India (SBI), leading private sector banks such as HDFC Bank and ICICI Bank, and also Regional Rural Banks (RRBs). This classification signifies their inclusion in the Second Schedule of the Reserve Bank of India Act, 1934.

Non-Scheduled Banks are not listed in the Second Schedule of the RBI Act. These banks are usually small, local banks and do not follow all the rules set for scheduled banks. They cannot borrow money from the RBI for regular banking operations and are not allowed to be part of the clearinghouse. Because they are smaller and less regulated, they are less secure than scheduled banks. They still offer basic banking services like accepting deposits and giving small loans, but on a much smaller scale.

Most banks that people use fall under the Scheduled Banks category. Below are the major types of banks in India:

1. ***Commercial Banks:*** Commercial banks are profit-making institutions that provide services like accepting deposits, giving loans, and offering credit and debit cards. These banks can be public, private, or foreign.
   - *Public Sector Banks* are owned mainly by the Government of India. ***Example:*** State Bank of India (SBI), Bank of Baroda.
   - *Private Sector Banks* are owned by private companies and individuals. ***Example:*** HDFC Bank, ICICI Bank.
   - *Foreign Banks* have their head offices outside India but operate in the country. ***Example:*** Citibank, HSBC.
2. ***Regional Rural Banks (RRBs):*** RRBs were created to serve the rural population, especially farmers, small businesses, and poor people. These banks provide essential financial services, such as savings accounts and small loans, primarily to customers in rural and semi-urban areas. These

banks are jointly owned by the Central Government, State Government, and a sponsoring Public Sector Bank.

Example: Maharashtra Gramin Bank, Prathama UP Gramin Bank etc.

3. ***Cooperative Banks:*** Cooperative banks are owned and run by their members, who are usually small farmers, local businesses, or traders. These banks are based on the principle of mutual help and mostly provide short-term credit. Cooperative banks operate in both rural and urban areas. They are of two types:
   - *Urban Cooperative Banks:* Work in towns and cities
   - *Rural Cooperative Banks:* Provide services to farmers and villagers
4. ***Small Finance Banks:*** Small finance banks are created to provide basic banking services to the under-served sections of society, such as small farmers, street vendors, and small businesses. They accept deposits and provide loans, just like regular banks, but focus more on financial inclusion.

   Example: This category specifically includes institutions like AU Small Finance Bank and Equites Small Finance Bank.
5. ***Payments Banks:*** Payments banks are special banks that offer basic banking services like accepting deposits (up to ₹2 lakhs per customer), online payments, and mobile wallets, but they cannot provide loans or credit cards. They are meant to make banking easier for people who don't have access to full-service banks.

   Example: Paytm Payments Bank, India Post Payments Bank, Airtel Payments Bank.

ROLES OF RBI, COMMERCIAL BANKS, NBFCS, AND INSURANCE COMPANIES

The financial ecosystem in India comprises several key players, including the Reserve Bank of India (RBI), Commercial Banks, Non-Banking Financial Companies (NBFCs), and Insurance companies. Each of these entities plays a distinct and crucial role in facilitating economic growth, ensuring financial stability, and providing various services to individuals and businesses.

1. **Reserve Bank of India (RBI)**

   The RBI, set up in 1935, is the central bank of India and the highest authority in the financial system. It manages the supply of money, sets interest rates, and controls inflation to keep the economy stable. It is the only institution allowed to print Indian currency and also regulates the flow of foreign currency.

Apart from this, the RBI monitors and regulates all banks to ensure they follow rules and protect depositors' money. It also manages the government's finances by issuing bonds and maintaining accounts. In short, RBI acts as the "guardian" of India's money and ensures that the financial system runs smoothly.

2. Commercial Banks

Commercial banks are the banks we commonly use, such as SBI, HDFC, and ICICI. Their main job is to accept deposits from people and businesses and provide interest on them. They also give out loans for homes, cars, education, or business purposes, which helps individuals achieve goals and supports economic growth.

Besides lending and saving, banks provide services like online banking, bill payments, money transfers, credit/debit cards, and investment options. They are an essential part of daily life because they make saving, spending, and borrowing money safe and convenient.

3. Non-Banking Financial Companies (NBFCs)

NBFCs are financial institutions that function like banks in many ways but do not have a full banking license. This means they cannot accept normal savings deposits, but they still provide loans for vehicles, housing, education, and small businesses, often serving customers in areas where banks may not be available.

They also offer financial products like leasing, hire purchase, mutual funds, and wealth management services. Because NBFCs are less strict than banks in their procedures, they are able to provide quicker, more flexible services. They play an important role in reaching more people and supporting economic development.

4. Insurance Companies

Insurance companies provide financial protection against risks like accidents, illness, death, or property damage. Customers pay a small regular amount called a premium, and in return, the insurance company pays compensation when an insured event occurs. This helps people avoid big financial losses in difficult times.

Different types of insurance include life insurance (supporting families after a death), health insurance (covering medical bills), vehicle insurance (covering car damage/accidents), and property or business insurance. Some policies also combine protection with savings. In this way, insurance companies act as a safety net, helping people and businesses manage risks and feel secure.

RECENT TRENDS IN BFSI

The Banking, Financial Services, and Insurance (BFSI) sector in India has been undergoing significant transformations, largely driven by technological advancements, changing consumer behaviors, and regulatory reforms. Below are some of the most notable trends shaping the industry:

Digital Banking

Digital banking has significantly streamlined and accelerated banking processes for everyone. Now, people can do most of their banking through their phones or computers. You can check your balance, transfer money, pay bills, or even apply for a loan without going to the bank! Some banks don't even have buildings; they are called neo-banks, and they work fully online through apps. Banks also use technology to understand what customers want and give them personalized offers. This makes banking smarter and more helpful for each person.

1. ***Unified Payments Interface (UPI)***

   Unified Payments Interface (UPI) has transformed the way money is sent and received in India. Developed by the National Payments Corporation of India (NPCI), UPI enables instant money transfers through mobile phones. There is no need to visit banks or carry cash, and the system works 24/7, including holidays.

   UPI is simple to operate even on basic smartphones, making digital payments accessible to a wider population and strengthening financial inclusion. It is now widely used for payments such as groceries, mobile recharges, online shopping, and many other services, often by simply scanning a QR code.

2. ***FinTech Innovations***

   FinTech stands for Financial Technology, and it means using technology to make financial services better. New platforms now help people borrow money online (called lending platforms) or invest using smart computer programs called robo-advisors. These tools suggest where to invest money based on your goals and budget. There's also something called blockchain, a secure way to share information, which is slowly being used in banking. Some individuals are also exploring cryptocurrencies like Bitcoin, although these remain largely unregulated in India. In the insurance world, InsurTech companies make it easier to buy policies online and get claims processed quickly.

3. ***Regulatory Changes***

   As new financial tools grow, the government and regulatory bodies such as the RBI and IRDAI ensure that systems remain safe and fair. Rules are

created to protect personal data and safeguard money in online transactions. One major development is Open Banking, which allows companies to build apps that connect with banks (with customer permission) to provide better money management options. These measures balance innovation with security, ensuring protection while enabling the benefits of digital finance.

PRACTICAL EXERCISE

Activity 1: Digital Banking Tool Demo.

Materials Required:

- Smartphones or tablets (if available)
- Printed screenshots of banking apps (UPI, mobile wallets)
- Mock account information

Procedure:

1. Begin with a discussion on what digital banking means and why it is important for people who can't easily access banks.
2. Show how mobile banking or UPI works using printed examples or demo apps (login screen, money transfer, QR code payment, etc.).
3. Explain how these tools help people in rural areas or without access to physical banks.
4. Demonstrate what happens when people don't have digital access, how they face delays, travel costs, or lack of information.
5. Let students interact with the printed/digital examples and ask questions.
6. End with a short recap about how these tools make banking more inclusive.
7. Student will prepare report and submit it to the teacher.

Activity 2: Chart Creation on BFSI Institutions and their Functions.

Materials Required:

- Chart paper or whiteboard
- Markers or pens
- Reference notes or textbooks on BFSI

Procedure:

1. Divide students into small groups.
2. Each group lists key BFSI institutions such as RBI, Commercial Banks, NBFCs, and Insurance Companies.
3. Discuss and write down the main functions of each institution (e.g., RBI regulates money supply, banks provide loans, NBFCs offer credit, insurance companies manage risk).

4. Groups create a visual chart organizing institutions and their roles clearly.
5. Each group presents their chart to the class.
6. Discuss the key points and clarify any doubts.
7. Submit chart to the teacher to display in the class.

Activity 3: Presentation on Recent Trends in BFSI.

Materials Required:

- Computer/Laptop
- Access to internet or textbooks (for research)
- Presentation tools (PowerPoint, chart paper, or whiteboard)
- Markers or pens

Procedure:

1. Divide class into small groups of 3-4 students.
2. Assign each group to research one or more recent trends in BFSI, such as:
   a) Digital Banking
   b) UPI and Mobile Payments
   c) FinTech Innovations
   d) Financial Inclusion
   e) Cybersecurity
   f) Regulatory Changes
3. Each group will research their assigned topic.
4. Each group will prepare a short presentation covering:
   - Explanation of the trend
   - Its impact on customers and the BFSI sector
   - Examples or case studies
5. Each group will give presentation to the class.
6. Teacher will evaluate presentation and provide feedback.
7. After all presentations, conduct a brief Q&A session to encourage discussion.
8. Summarise about how these trends are shaping the future of BFSI.
9. Presentation will be submitted to the teacher.

CHECK YOUR PROGRESS

A. Fill in the Blanks

1. The full form of BFSI is _____, Financial Services, and Insurance.

2. In India, the main body that controls and regulates banks is the _____.
3. Banks that give services like savings accounts, loans, and credit cards to the public are called _____ banks.
4. The RBI is also known as the _____ bank of India because it controls money flow and interest rates.
5. Companies that offer financial services but don't hold a banking license are called _____.

B. Multiple Choice Questions

1. What does BFSI stand for?
   a) Bank Funding and Security Institution
   b) Banking, Financial Services, and Insurance
   c) Banking for Savings and Investments
   d) Business, Finance, and Stock Insurance
2. Which organization acts as the central bank of India?
   a) SBI
   b) HDFC
   c) RBI
   d) ICICI
3. What is the main role of NBFCs?
   a) Printing currency
   b) Managing foreign exchange
   c) Providing financial services without being a bank
   d) Issuing government bonds
4. UPI is an example of which trend in BFSI?
   a) Insurance regulation
   b) Foreign trade
   c) Digital banking
   d) Cash withdrawal services
5. What is the main job of insurance companies?
   a) Take deposits
   b) Provide loans
   c) Offer protection against risk
   d) Regulate banks

C. State whether the following statements are True or False

1. The RBI, which stands for Reserve Bank of India, is the central authority responsible for controlling the country's money supply and regulating banks.

2. Commercial banks are not allowed to give loans to companies or businesses, and they only serve individual customers.
3. UPI (Unified Payments Interface) is a digital system that lets people easily send and receive money using their mobile phones without needing to go to the bank.
4. Insurance policies are only meant to provide protection for life-related events and cannot be used to cover health expenses or damage to property.
5. NBFCs (Non-Banking Financial Companies) are allowed to take deposits in savings accounts from the public just like regular banks.

D. Match the following

Column A		**Column B**	
1	PAN Card	**A**	Helps manage money risks
2	UPI	**B**	Identity proof required for tax-related purposes
3	NBFC	**C**	Central bank of India
4	Insurance	**D**	Financial services without banking license
5	RBI	**E**	Digital payment method

E. Short Answer Questions

1. What does BFSI stand for and what are its main components?
2. Mention any two recent digital trends in the BFSI sector.
3. What is the role of the RBI in the Indian banking system?
4. How do the three components of BFSI (Banking, Financial Services, and Insurance) work together to enhance financial well-being?
5. Name two specific types of financial services that NBFCs often provide to underserved sectors.

F. Long Answer Questions

1. Explain the functions of Commercial Banks, NBFCs, and Insurance Companies in the BFSI sector. Give one example for each.
2. Describe how digital banking and platforms like UPI are helping in financial inclusion in India. Why are these trends important in today's economy?
3. Beyond regulating monetary policy, what other key roles does the Reserve Bank of India (RBI) play in the Indian banking system?

4. How is the Indian banking system actively promoting financial inclusion, and what is one notable initiative mentioned?

G. Check Your Performance

1. Imagine you live in a remote village with no nearby bank branch. Explain how digital banking tools like UPI and mobile wallets can help you manage your finances and why this is important for financial inclusion.
2. The Reserve Bank of India (RBI) plays a crucial role in regulating the banking system. Describe two key functions of RBI and how they impact commercial banks and NBFCs in India.

SESSION 2: MIS IN BFSI

In the dynamic BFSI (Banking, Financial Services, and Insurance) sector, the symbiotic relationship between organizational structure and Management Information Systems (MIS) is crucial.

ORGANIZATIONAL STRUCTURE IN BFSI

The organizational structure of institutions within the BFSI (Banking, Financial Services, and Insurance) sector is designed to support efficiency, compliance, and service delivery. The implementation of Management Information Systems (MIS) further enhances decision-making, operational efficiency, and strategic planning. Below is an overview of the typical organizational structures in BFSI, along with the role of MIS.

The organizational structure in the Banking, Financial Services, and Insurance (BFSI) sector is crucial for its efficient functioning. In India, this structure typically includes various levels, starting from top management, like the CEO and board of directors, down to middle management, such as department heads, and then to operational staff. Each level plays a specific role: top management sets the strategic direction, middle management implements policies, and operational staff handles day-to-day tasks.

In the BFSI (Banking, Financial Services, and Insurance) sector, organizations often have a hierarchical structure. This means that there are different levels of authority, starting from the highest-ranking officials like the CEO, down to various teams and employees. The following points will help elaborate and highlight the key aspects of each structure.

1. **Hierarchical Structure**: This is the way organizations are arranged, with clear lines of authority. The top-level management makes important decisions, while lower levels follow these directives.
2. **Functional Divisions**: BFSI companies are divided into different functional areas, each specializing in a specific aspect of the business, such as banking, finance, or insurance.
   - Financial Services Division: This helps to focuses on offering various financial products, like loans and investment options, to help customers manage their money.
   - Insurance Division: Enables in providing insurance products to protect people and businesses against potential risks, like accidents or natural disasters.
3. **Regional and Branch Structure**: Many BFSI companies operate through branches across different regions. Each branch serves local customers and helps the company reach a wider audience.
4. **Regulatory Compliance and Risk Management**: Since the BFSI sector is heavily regulated, organizations must follow strict rules set by the

government. They also have dedicated teams to manage risks and ensure that they operate safely and responsibly.

MANAGEMENT INFORMATION SYSTEM (MIS)

MIS play a crucial role in the Banking, Financial Services, and Insurance (BFSI) sector, where efficient decision-making is paramount. MIS encompasses the processes and technologies that gather, process, and analyze data to provide timely and relevant information to management. This enables organizations to streamline operations, enhance customer service, and improve compliance with regulatory requirements. By integrating various data sources, MIS helps in the identification of trends, risk assessment, and performance evaluation, ultimately facilitating strategic planning and operational efficiency. By leveraging these systems, BFSI institutions can stay competitive, respond swiftly to market changes, and make informed decisions that drive growth and sustainability.

Components of MIS

A Management Information System (MIS) is a comprehensive framework that integrates various elements to provide managers with timely and accurate information for effective decision-making. These components work together to collect, process, store, and disseminate data, ensuring that leaders have the necessary insights to make informed choices.

The components of MIS: The components of MIS (Data, Information Processing, Information Technology, People, Procedures, and Feedback) collectively work to transform raw data into actionable information, supporting organizational decision-making and continuous improvement. (Fig. 1.2)

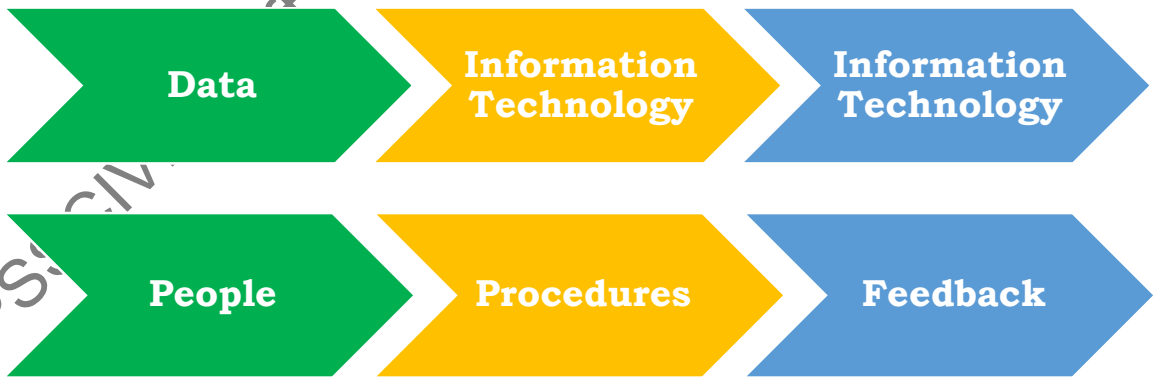


Fig. 1.2: The Components of MIS

- ***Data:*** Raw facts and figures from various sources, like numbers and text.
- ***Information Processing:*** Organizing and analyzing data to create useful information.

- ***Information Technology***: Tools and systems, like computers and software, used to manage data.
- ***People:*** Users of the MIS, including managers and employees who interpret information.
- ***Procedures***: Rules and steps to ensure data is collected and processed correctly.
- ***Feedback:*** Information about how well the system is performing, used for improvements.

Types of MIS

MIS are not a single; it is a monumental entity but rather a collection of specialized systems designed to meet distinct information needs across an organization. Fundamentally, they can be categorized into types such as:

MIS types span from Transaction Processing Systems (TPS) handling daily operations to ERP, SCM, and CRM systems integrating core business functions, and MRS, DSS, and EIS providing structured, analytical, and strategic insights for various management levels. (Fig. 1.3)

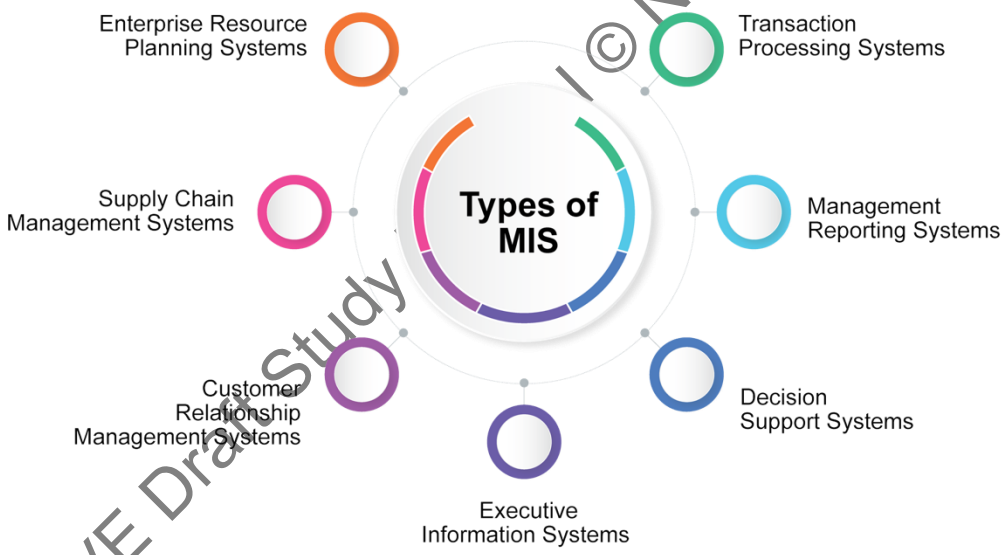


Fig. 1.3: The Types of MIS

- ***Transaction Processing Systems (TPS):*** These systems handle daily transactions like sales and withdrawals, ensuring accurate records.
- ***Management Reporting Systems (MRS):*** Compile data into reports for managers to understand business performance.
- ***Decision Support Systems (DSS):*** Assist in decision-making by analyzing data and providing options based on forecasts.
- ***Executive Information Systems (EIS):*** Provide top executives with easy access to key information through user-friendly dashboards.
- ***Customer Relationship Management Systems (CRM):*** Manage customer interactions and data to improve service and sales.

- ***Supply Chain Management Systems (SCM):*** Oversee the flow of goods from suppliers to customers, managing inventory and distribution.
- ***Enterprise Resource Planning (ERP) Systems:*** Integrate various business processes into one system to improve efficiency and data sharing. These systems help organizations operate more efficiently and make informed decisions!

FUNCTIONAL AREAS

1. **Retail Banking:** The domain of retail banking, alternatively termed consumer banking, is dedicated to furnishing banking solutions for individual patrons, distinguishing itself from services offered to businesses. Its portfolio of provisions extends to deposit accounts (savings and checking), personal credit facilities (loans and mortgages), payment instruments (credit and debit cards), and wealth management products.
2. **Corporate Banking:** Corporate banking serves the financial needs of businesses, from small-scale enterprises to large multinational corporations. It provides specialized financial services such as business loans, credit facilities, treasury and cash management, trade finance, and corporate investment services.
3. **Risk Management:** Risk management involves identifying, assessing, and mitigating financial risks that an organization may face. Banks must manage several types of risks that financial institutions need to manage carefully. Credit risk refers to the chance that a borrower might not repay their loan. Market risk involves the possibility of financial loss due to changes in market conditions like interest rates or stock prices. Operational risk comes from internal issues such as system failures or human error. Lastly, liquidity risk is the risk that a bank or company might not have enough readily available cash to meet its short-term financial commitments.

   Effective risk management practices ensure that a bank remains stable and can adapt to changing economic conditions while protecting its assets and reputation.
4. **Compliance:** Compliance means following all applicable laws, regulations, and internal guidelines that govern how banking activities are carried out. This ensures financial institutions conduct their operations responsibly and comply with established authoritative guidelines. This functional area ensures that the bank operates within the frameworks defined by governing bodies and laws, such as anti-money laundering (AML), know your customer (KYC) regulations, and consumer protection laws.
5. **Investment Banking:** Investment banking focuses on providing financial services related to capital markets and helping organizations raise funds. Investment banks facilitate mergers and acquisitions (M&A), underwrite

new debt and equity securities, and assist companies in issuing IPOs (initial public offerings). They also offer advisory services on financial restructuring, valuation, and asset management.

6. **Treasury and Cash Management:** The treasury department is responsible for managing the bank's liquidity, funding, and investment portfolios. It oversees cash flow, manages currency exposure, and invests excess funds in safe and liquid assets. Treasury functions also involve optimizing interest income, managing banking relationships, and ensuring adequate liquidity to meet obligations. Effective cash management strategies enhance a bank's operational efficiency and profitability.
7. **Wealth Management:** The core of wealth management involves delivering extensive financial solutions to high-net-worth clients and their families. It involves services such as investment advice, estate planning, tax-efficient strategies, and preparing for retirement to help individuals manage and grow their wealth effectively, tax optimization, and retirement planning.

ROLE OF MIS IN OPERATIONS, DECISION-MAKING AND REPORTING

Role of MIS in Operations

MIS plays an important role in the smooth functioning of an organization's daily activities. It acts as the central system that collects, processes, and shares vital information to support better decision-making and efficient operations. By automating routine tasks and providing real-time insights, MIS helps organizations improve productivity, reduce waste, and stay organized. Below is some important role of MIS in day to day operations of the business:

- Supports organizations in managing routine work effectively.
- Collects, processes, and shares important business information.
- Reduces manual work by automating data entry, report creation, and transaction tracking.
- Tracks the use of people, machines, and materials to help minimize waste.
- Keeps track of important numbers to assess performance and progress.
- Allows managers to spot issues early and take corrective action promptly.
- Makes it easier for different teams to share information and coordinate tasks.
- Improves the overall speed, efficiency, and structure of business operations.

Role of MIS in Decision-Making

MIS plays a vital role in improving the decision-making process of an organization. It collects and analyses large amounts of data, providing timely

and accurate information to managers. This helps organizations make informed, smart, and future-ready decisions. Below is some important role of MIS in decision-making of the business:

- Provides the right information at the right time.
- Acts as a Helpful Guide for Managers i.e. collects, studies, and presents real-time information about business performance.
- Identifies Patterns and Trends: Helps analyse sales trends, customer behaviour, and potential problem areas.
- Supports Forecasting and Future Planning i.e. uses past data to predict future outcomes, helping in better preparation.
- Assists in Operational and Strategic Decisions i.e. guides decisions such as stock ordering, market entry, and resource allocation.
- Enables Faster and Better Decisions: Helps managers make quick, data-driven decisions with confidence.
- Supports Big-Picture Planning: Provides insights for major initiatives like product launches or business expansion.
- Helps Organizations Stay Smart and Competitive i.e. ensures businesses adapt to changes and make informed decisions to stay ahead.

Role of MIS in Reporting

One of the key functions of MIS is reporting. MIS provides accurate, timely, and customized reports that help different levels of management, teams, and even external agencies to stay informed, monitor progress, and make effective decisions. Below is some important role played by the MIS in the reporting:

- Provides Relevant Information for Decision-Making: Delivers accurate and necessary information to managers, team leaders, and stakeholders.
- Creates reports tailored to specific needs such as financial summaries, progress reports, and performance dashboards.
- Monitors Company Performance: Helps visualize how well the organization is performing through clear and concise reports.
- Ensures Legal and Regulatory Compliance i.e. produces reports that meet industry rules and legal requirements, especially in sectors like banking and healthcare.
- Tracks Key Performance Indicators (KPIs): Compares actual results with company goals to monitor progress and identify areas for improvement.
- Supports Timely and Effective Communication i.e. ensures the right information reaches the right people at the right time.

- Keeps Everyone Informed and Aligned: Helps all stakeholders understand company performance and direction.
- Maintains Transparency and Accountability: Provides clear reporting that promotes responsibility and informed decision-making across the organization.

INFORMATION FLOW AND HIERARCHY IN BANKS

INFORMATION FLOW

In banks, information flow refers to the movement of data and information between different levels and departments within the organization. A clear and efficient information flow is crucial for operational effectiveness, timely decision-making, and customer service. The flow often involves several steps, from data collection to dissemination, involving various stakeholders throughout the hierarchy.

Information flows within an organization either vertically (up and down the hierarchy) or horizontally (between peers and departments at the same level), while external flow involves communication with entities outside the organization, like customers or regulators. (Fig. 1.4)

Types of Information Flow: Below are the types of information flow in the bank/business (Fig. 1.4):

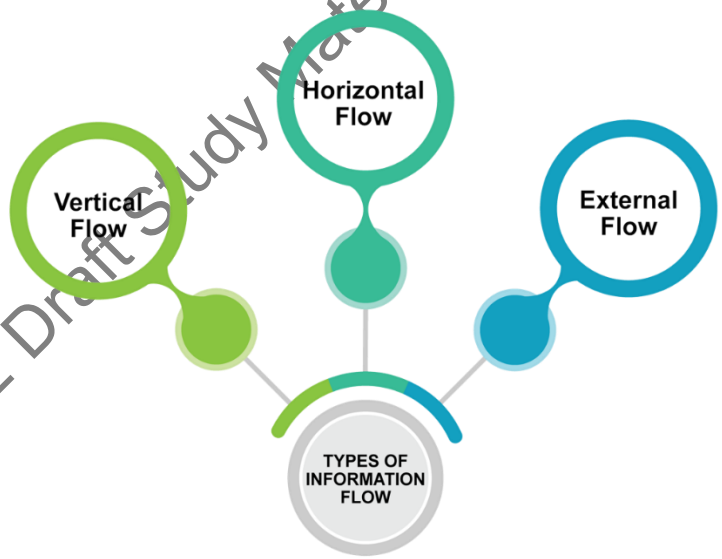


Fig. 1.4: Information Flow

1. **Vertical Flow:** This refers to the flow of information between different hierarchical levels. *For example,* instructions and reports move down from top management to operational staff, while performance reports and data from operations move up to middle and top management.
2. **Horizontal Flow:** Information can also flow laterally between different departments within the same level of hierarchy. For example, the risk

management department may share insights with the compliance department to ensure adherence to regulations and effective risk assessment.

3. **External Flow**: Banks interact with external entities such as regulatory bodies, clients, and partners. Information flow to and from these entities is vital for compliance and service enhancement. This includes regulatory reporting, customer feedback, and market trends.

HIERARCHICAL STRUCTURE IN BANKS

The hierarchy in banks can generally be categorized into three main levels: top management, middle management, and operational staff. Every tier has a unique function in how information is disseminated.

In a bank, there are three main levels of management (i.e. Top Management, Middle Management, and Operational Staff) each plays an important role in making the bank run smoothly.

At the top, we have leaders like the CEO and CFO, who make big decisions about the bank's future, such as expanding to new cities or changing important policies. They depend on summaries and reports to plan wisely.

In the middle are the managers and department heads who oversee areas like customer service, loans, and risk management. They collect information from the staff below them, analyse it, and send important insights to the top leaders. They also help make sure their teams are working toward the bank's goals.

At the bottom level are the operational staff, like people working at bank branches, in IT, or in customer care. These employees handle the bank's day-to-day work by helping customers, processing transactions, and solving problems. They use digital systems and tools to make quick decisions and send beneficial information up the chain.

All three levels work like a team to make sure the bank runs well and keeps improving.

PRACTICAL EXERCISES

Activity 1: Exploring the Components of an E-Commerce Platform.

Materials required:

- Internet-enabled devices (laptop/tablet/smartphone)
- Pen and notebook or worksheet
- Projector (optional, for demonstration)
- component checklist (optional)

Procedure:

1. Briefly explain what an e-commerce platform is and Give a real-life example (e.g., Amazon or Flipkart). Describe how users interact with such systems.
2. Divide students into small groups of 4-5 students.
3. Ask each group to open an e-commerce website or app on their device and explore it.
4. Provide instructions to identify and note down the main components they observe. These may include:
   - Home Page
   - Search Bar
   - Product Listings
   - Product Details Page
   - Add to Cart / Wish list
   - Checkout System
   - User Login/Signup
   - Payment Gateway
   - Order Tracking
   - Customer Support Chat
   - Reviews & Ratings
5. Each group map the components to user needs (e.g., "Search Bar" → helps find products quickly). They can fill this on a worksheet or draw a diagram.
6. Facilitate a discussion by asking to each group:
   - Which component is most essential for a good user experience?
   - What challenges might a user face if any component is missing?
7. Each student writes the identified components neatly in thier notebook or worksheet.
8. Submit write up to the teacher.

Activity 2: Group Discussion on Role of MIS in Operations, Decision-Making and Reporting.

Materials required:

- Whiteboard/Flip Chart or Blackboard
- Markers/Chalk
- Handouts or Printed Notes on MIS Concepts (optional)
- Notebooks and Pens
- Projector/Screen for brief introduction (optional)
- Timer or Stopwatch

Procedure:

1. Divide the class into small groups of 3–4 students per group.
2. Assign discussion points or topics to each group such as:

a) How MIS supports Operations

b) Role of MIS in Decision-Making

c) MIS and Reporting for Management

3. Groups discuss their assigned topic.
4. Encourage sharing of real-life examples (e.g., e-commerce platforms, banks, schools, etc.).
5. Each group presents key discussion points to the class.
6. Teacher writes main points on the board.
7. Ask few students to summarize the session.
8. Teacher summarize the role of MIS in streamlining operations, improving decisions, and generating reports for effective management.

Activity 3: How Banks Use MIS to Approve Loans.

Materials required:

- Chart papers or blank sheets for group work
- Markers or pens for writing
- A simple role card or case handout describing a basic loan process in a bank (e.g., a customer applying for a home loan)
- A classroom projector or board

Procedure:

1. Start with a short explanation of what MIS is and how banks use it for example, to collect customer details, check credit history, approve loans, and monitor repayment.
2. Divide students into small groups of 3–4 student per group.
3. Assign each group the task of role-playing how a bank uses MIS in loan processing.
4. Each group creates a mini-presentation (on chart paper or orally) showing how MIS helps: Collect customer data, check credit score/history, speed up loan approval, Generate reports for the bank manager
5. Each group present their findings in simple language, using examples like a person applying for a car or education loan.
6. Teacher will evaluate the group and each student performance.
7. Ask few students to summarize the session.
8. Each student writes their learning or what they understood.
9. Submit write up to the teacher.

Activity 4: Follow the Data – A Look Inside a Bank's Information Flow.

Materials required:

- Plain A4 sheets or chart paper

- Pencils or pens
- Markers for labelling, and a basic scenario or flow description (e.g., a customer applying for a savings account or loan).

Procedure:

1. Briefly explain what a Data Flow Diagram (DFD) is i.e. a simple drawing that shows how data moves between people, systems, and departments in a bank.
2. Present a simple scenario: A customer visits a bank to apply for a loan. The bank collects the form, sends it to the loan department, checks credit history, gets manager approval, and stores the data in the system.
3. Divide the class into small groups of 4-5 students.
4. Ask them to:
   - Identify the main entities (Customer, Bank Clerk, Loan Department, Manager, Database)
   - Draw arrows to show how data flows between them (e.g., loan form, approval request, credit report)
   - Provide the image for each arrow with what data being transferred
5. Each group can explain the flow of data in the class.
6. Ask few students to summarize the session.
7. Teacher will provide concluding remarks.
8. Each student writes their learning or what they understood.
9. Submit write up to the teacher.

CHECK YOUR PROGRESS

A. Fill in the Blanks

1. In banks, the _____ function of MIS supports daily tasks like customer transactions and account management.
2. One key component of MIS is the _____, which stores and retrieves organizational data.
3. Corporate banking focuses on serving _____ large enterprises.
4. Compliance ensures that banks follow all relevant _____ and internal policies.
5. A _____ report helps bank managers in making strategic decisions.

B. Multiple Choice Questions

1. What does MIS help organizations primarily with?

   a) Social media marketing
   b) Manual record-keeping
   c) Decision-making and operations
   d) Entertainment services

2. Which of the following is a functional area in banking?
   a) Manufacturing
   b) Retail Banking
   c) Event Planning
   d) Agriculture
3. The component of MIS responsible for processing data into information is:
   a) Hardware
   b) Database
   c) Software
   d) Processing Unit
4. Information in banks flows through a structured _____.
   a) Entertainment system
   b) Hierarchy
   c) Website
   d) Advertisement
5. Which of the following refers to managing the risk of borrower default?
   a) Liquidity Risk
   b) Credit Risk
   c) Market Risk
   d) Operational Risk

C. State whether the following statements are True or False

1. MIS systems are used only by IT departments and not by other departments in a bank.
2. In retail banking, MIS helps track individual customer transactions and preferences.
3. Credit risk refers to the possibility of a system failure in bank operations.
4. MIS reports can assist in forecasting, budgeting, and compliance tracking in banks.
5. Decision-making in banks is supported by data and reports generated through MIS.

D. Match the Column

Column A		**Column B**	
1	MIS Report	**A**	Ensures legal and regulatory adherence
2	Retail Banking	**B**	Used for loans, savings, and deposits

3	Corporate Banking	**C**	Supports daily operational tasks
4	Compliance	**D**	Data summary used for analysis and planning
5	Operations	**E**	Handles business-level financial services

E. Short Answer Questions

1. How does MIS benefit both the top-level and operational-level management in a financial institution?
2. Besides providing financial protection against unforeseen events, how do some insurance products also serve as an investment opportunity?
3. In the Lending/Loans department, how does MIS assist in evaluating loan applications and managing risks?
4. How does the Compliance department use MIS to ensure the BFSI organization follows all regulations and rules?
5. What kind of information does MIS provide to the Marketing department to help them attract new customers or offer new products?
6. How does MIS support the Finance/Accounts department in tracking money, managing budgets, and creating financial reports?

F. Long Answer Questions

1. Define Management Information System (MIS). Explain its key components and describe how it supports a bank's day-to-day operations and long-term planning.
2. Discuss the role of MIS in various functional areas of banking such as Retail Banking, Corporate Banking, Risk Management, and Compliance. Use examples to illustrate your points.
3. Explain how MIS enhances operations, decision-making, and reporting in a financial institution. Describe the flow of information within a bank and how it supports managers at different levels.

G. Check Your Performance

1. Consider a small business owner operating in a tier-2 city. Explain how the increased flexibility and specialized loan offerings of Non-Banking Financial Companies (NBFCs) might be more beneficial for their business growth compared to traditional public sector banks.
2. Beyond providing risk coverage, how do insurance companies contribute to the overall financial stability of individuals and the economy, particularly through their investment-linked products and promotion of savings?

SESSION 3: MIS DATA ANALYST IN FINANCIAL SERVICES

Data Analyst plays an important role in helping banks and financial companies make smart decisions by turning complex data into useful information. Their job is to gather and study data and turn it into clear insights that help improve business performance, support planning, and make daily operations more efficient.

JOB DESCRIPTION AND KEY DELIVERABLES

Job Description

In the financial services world, an MIS Data Analyst looks at different sets of data to help leaders make better decisions. This job needs someone who understands how to manage and analyse data, knows about financial products, and is comfortable working with numbers and tools. (Fig. 1.5)

Fig. 1.5: Job Description

The analyst works with many teams across the BFSI sector which includes Banking, Financial Services, and Insurance to solve problems using data and make work smoother and faster.

An MIS Data Analyst is like a behind-the-scenes superhero who helps a company make smart choices using numbers. First, they collect and organize information from both inside the company like sales and customer orders and from the outside world, like news about the market. They make sure everything is neat and accurate. Then, they study the numbers using math and computer tools to spot patterns, like why something sold really well last month or why sales suddenly dropped. To help others understand what they

find, they turn all that data into colourful charts and simple reports that managers can look at quickly. They also work with different teams, like finance and marketing, to explain what the numbers mean and help them make better decisions. These analysts are always watching important performance numbers, called KPIs, to see how the company is doing—and if something's off, they come up with ways to fix it. Best of all, they keep learning new tools and tricks so they can stay ahead and help the company grow smarter and faster.

Key Deliverables

An MIS (Data) Analyst in a bank or finance company is like a "data translator." They take mountains of tricky numbers and turn them into clear stories that help bosses make smart choices about money, loans, and investments. To do this job well, they need three big super-skills:

- Knowing how data is stored and moved around (so nothing gets lost or mixed up).
- Being great at spotting patterns in numbers (that's the analytical part).
- Understanding how money products work (like savings accounts, credit cards, or the stock market).

A **Data Analyst** in a finance company plays a key role in converting large sets of numbers into useful insights that support decision-making. One of the main responsibilities is preparing regular reports that track performance on a weekly or monthly basis, such as identifying whether sales and revenues are rising or falling.

Data Analysts also design dashboards, which display real-time information through charts and graphs, allowing managers to quickly monitor business performance. When specific issues arise, such as a drop in profits, they conduct ad-hoc analysis to investigate the reasons behind the change.

To ensure accuracy, analysts perform data quality checks and correct errors in datasets. They also prepare presentations and visual reports to communicate findings clearly to company leaders, often supported by charts and summaries. In addition, they maintain documentation that explains how the data was collected, processed, and analysed.

Finally, Data Analysts continuously look for process improvements, suggesting new methods or tools that can save time, enhance accuracy, and improve overall efficiency. In this way, they act as an essential link between raw data and smart business decisions.

ESSENTIAL TOOLS FOR FINANCE AND BANKING ANALYSIS

To work well in finance and banking, the right tools are very important. Tools like Excel help in doing calculations and making financial plans. SQL is used

to get and manage large amounts of data. Dashboards and data visualization tools like Power BI or Tableau make it easy to see patterns and trends in data. Risk management tools and regulatory databases help banks follow rules and avoid losses. Also, financial news websites help professionals stay updated with the latest changes. All these tools help in making smart and safe financial decisions. (Fig. 1.7)

Fig. 1.7: Essentials Tools for finance and Banking analysis

The following points help us understand the concepts more clearly:

1. **Excel (Electronic X-Cellence in Computing and Easy Learning):** Think of Excel as a smart digital notebook that helps to work with numbers. It's great for organizing data in rows and columns, doing calculations, and even spotting future trends.

   Example: A bank can use Excel to track how much money it made from different types of loans. It can quickly calculate totals, compare profits, and create a pie chart to see which loan performed best.

2. **SQL (Structured Query Language):** SQL is a language used to communicate with large databases. It helps in finding, organizing, and analysing the required data.

   In BFSI, it's used to pull out important financial data, analyse patterns, and create reports. It can also combine data from different sources so that everything stays up to date.

3. **Dashboards:** Dashboards help turn complicated data into simple visuals like charts and gauges. They show key information in a quick and clear way.

Tools like Tableau, Power BI, or Google Data Studio let users build dashboards to track performance in real time, making it easier to respond to changes or make fast decisions.

4. **Financial Modelling Software:** These tools go beyond basic spreadsheets. They are designed to test different financial scenarios like what would happen if interest rates went up or if customer demand dropped.

   Example: A bank analyst might use this software to model how a new housing policy could impact the bank's home loan business over the next few years, adjusting assumptions and seeing different possible outcomes.

5. **Data Visualization Tools** (e.g., Tableau, Power BI)**:** These tools are like artists for data – turning numbers into pictures. Instead of staring at long tables of data, users see graphs, charts, and maps that help them understand what's happening at a glance.

   Example: A bank might use Tableau to map where new credit card applications are coming from, showing which cities or states have higher or lower interest.

6. **Risk Management Software:** Since banks take on many risks (like loan defaults or market crashes), this software helps them detect and prepare for potential problems.

   Example: Before giving a business loan, a bank can use risk software to check the company's financial background and estimate how likely it is they will repay the loan, suggesting ways to reduce the risk.

7. **Financial News Platforms** (e.g., Bloomberg Terminal, Reuters)**:** These platforms provide real-time updates about stock markets, economic events, and company news. They are like specialized news channels for finance professionals.

   Example: A trader might use Bloomberg to track how a company's stock price reacts after a news story breaks, helping them decide whether to buy or sell quickly.

8. **Regulatory Databases:** Banks have to follow many rules and laws. These databases store all those regulations in one place and help ensure the bank stays compliant.

   Example: If there is a new rule about customer privacy, the compliance team checks the regulatory database to understand the rule and update the bank's practices accordingly.

KPIS, REPORTS, AND COMMUNICATION WITH STAKEHOLDERS IN BFSI

KEY PERFORMANCE INDICATORS (KPIs)

Key Performance Indicators, or KPIs, are like scorecards that help banks and insurance companies check how well they are doing. They are used to measure things like profits, customer happiness, and how smoothly services are running. Below are the KPIs used for Banks and Insurance Companies.

1. **Net Interest Margin (NIM):** Net Interest Margin shows how much profit a bank makes from lending money after paying interest to depositors. A higher NIM means the bank is using its funds smartly and earning more from its core business.
2. **Return on Assets (ROA):** Return on Assets tells how well a bank or insurance company is using its resources like buildings, equipment, and cash to make profits. A higher ROA means the company is efficiently using its assets to generate income.
3. **Loan-to-Deposit Ratio (LDR):** This ratio compares how much money a bank gives as loans to the amount it receives as deposits from customers. It helps check if the bank is lending responsibly while keeping enough funds for safety.
4. **Customer Satisfaction Score (CSAT):** The Customer Satisfaction Score measures how happy customers are with the bank or insurance services. It reflects their experience with staff behaviour, problem-solving, and overall service quality.
5. **Claims Processing Time (for Insurance Companies):** Claims Processing Time tracks how fast an insurance company settles claims. Quick processing builds trust and shows the company cares about its customers during emergencies.
6. **Non-Performing Assets (NPA) Ratio:** The NPA Ratio shows the percentage of loans where borrowers have stopped making payments. A lower NPA ratio means the bank has healthier loans and better financial stability.
7. **Cost-to-Income Ratio:** This ratio compares the bank's expenses to the income it earns. A lower Cost-to-Income Ratio indicates the bank is running efficiently, keeping costs low while earning well.
8. **Retention Rate (Insurance):** Retention Rate measures how many customers renew their insurance policies. A high retention rate means customers trust the company and are satisfied with its services.

So, KPIs are like traffic lights for any business as they signal when things are going great or when something needs fixing.

REPORTS

In banks and insurance companies, reports are like important progress cards that help everyone understand how the business is doing. These reports are

used to share useful information with managers, workers, and sometimes even the government. They show what's working well, what needs to improve, and how to plan for the future. There are different types of reports for different needs such as:

1. **Financial Statements:** Financial Statements show the overall financial health of the company. They include details like how much the company owns (assets), how much it owes (liabilities), profits earned, and how money flows in and out of the business.
2. **Management Reports:** These reports help managers track how different departments, such as loans, sales, or customer service, are performing. They support smart decision-making to improve daily operations and efficiency.
3. **Risk Assessment Reports:** Risk Assessment Reports act like early warning tools. They identify potential problems such as market changes, bad loans, or other risks. They also ensure the company is following legal rules and guidelines.
4. **Market Analysis Reports:** Market Analysis Reports study what competitors are doing and identify market trends. They help businesses discover new opportunities to grow, improve services, or launch new products.

Reports in the BFSI sector are essential tools. They provide clear and accurate information to help people understand the present situation, fix problems, and make plans for the future.

COMMUNICATION WITH STAKEHOLDERS

In banks and financial companies, it is very important to communicate clearly with people who care about the business. These people are called stakeholders. In simple words, stakeholders are the people or groups who are affected by or interested in the company. This includes investors, customers, government regulators, and business partners. Following point should be taken care while communication with the stakeholders:

1. **Clear communication:** It helps stakeholders understand what the company is doing. When they feel informed and included, they are more likely to trust and support the business.
2. **Ways to Communicate:** Companies use emails, meetings, newsletters, and online sessions to share updates. These updates can include company performance, new policies, or future plans.
3. **Custom Communication for Different Groups:** Different groups care about different things. *For example,* investors want to hear about profits, customers care about service quality, and regulators focus on rule compliance. So, companies prepare custom messages for each group.

4. **Collecting Feedback:** Companies also ask for feedback using surveys or suggestion platforms. This shows that the company listens to people's opinions and wants to improve.
5. **Being Honest and Transparent:** The most important part of communication is being honest, even when there are problems. Sharing challenges and risks builds trust and strong relationships with stakeholders.

PRACTICAL EXERCISE

Activity 1: Be the Data Analyst for a Day.

Materials Required:

- Laptop or desktop with Microsoft Excel / Google Sheet
- Sample financial data sheet (e.g., loan details, customer satisfaction ratings, revenue figures)
- Printed handouts of KPI definitions (Net Interest Margin, ROA, etc.)
- Chart paper and markers (for group presentations)
- Projector or screen (optional, for showcasing dashboards)

Procedure:

1. Begin with a discussion by explaining who an MIS Data Analyst is and how they support financial organizations by working with data to make better decisions.
2. Distribute Sample Data Provide students with a simple Excel or Google Sheets file that includes fake but realistic financial data like loan amounts, deposit figures, customer feedback scores, etc.
3. Provide hand out a sheet explaining basic KPIs like Net Interest Margin, Return on Assets, Loan-to-Deposit Ratio, and Customer Satisfaction Score. Explain each one with simple examples.
4. Ask students to calculate at least 2–3 KPIs using the sample data. They can use basic Excel functions (like SUM, AVERAGE, etc.) to find results.
5. Students should then write a brief report highlighting what the numbers show. For example, whether the bank is performing well or if there's a problem area that needs improvement.
6. Group Presentation: Divide students into small groups.
7. Each group presents their findings and suggests one improvement based on their analysis. They can use chart paper or digital slides.
8. Discuss the activity as a class. Talk about how real analysts use similar techniques and tools (like Excel, SQL, and dashboards) to help banks make important decisions.
9. Prepare report or write up on learnings and
10. Submit report or write to the teacher.

Activity 2: Presentation on Job Description and KPIs.

Materials Required:

- Laptop/Desktop with Presentation Software (e.g., PowerPoint)
- Projector and Screen/Smart Board
- Sample Job Description Templates (Printed or Digital)
- Sample KPIs for Different Roles (Printed or Digital)
- Whiteboard/Flipchart and Markers
- Handouts/Notes
- Timer/Stopwatch for Presentation Timing
- Internet Access (optional, for examples or references)

Procedure:

1. Divide class into small groups of 3-5 students per group.
2. Assign each group a specific job role (e.g., Sales Executive, Data Analyst, Customer Support, Teacher, etc.).
3. Each group prepares a short presentation that includes:
    - Job Title and Department
    - Key Roles and Responsibilities (Job Description)
    - Required Qualifications and Skills
    - 4-5 relevant KPIs for the role
4. Each group presents their Job Description and KPIs.
5. Other groups and teacher provide feedback and suggestions.
6. Teacher summarizes key points:
    - Importance of clear job descriptions
    - How KPIs align with job expectations and organizational goals
    - Real-life examples from industries
7. Ask students to share how clear JDs and KPIs can help improve productivity and accountability in their own workplace.
8. Each student writes their learning or what they understood.
9. Submit write up to the teacher.

Activity 3: Preparing a sample report format for a financial metric.

Materials Required:

- Laptop/Desktop with MS Word or MS Excel
- Projector/Smart Board (for demonstration)
- Sample Financial Data (e.g., Sales Revenue, Profit Margin, Expenses)
- Handouts with Key Financial Metrics definitions
- Whiteboard/Flipchart and Markers

- Templates for Report Format (optional)
- Calculator (optional)

Procedure:

1. Teacher explains what financial metrics are (e.g., Revenue, Profit Margin, ROI, Cost of Sales, etc.). Discuss the importance of clear, concise financial reporting for managers and stakeholders.
2. Displays a sample report format, highlighting key components such as:
    - Report Title
    - Period of Reporting
    - Financial Metric(s) being reported
    - Data Table or Summary
    - Graphs/Charts (if applicable)
    - Interpretation or Comments Section
3. Divide class into small groups of 3-5 students per group.
4. Assign each group one financial metric (e.g., Monthly Sales Revenue, Profit Margin %, Cost Breakdown).
5. Groups use provided data to create a simple, clear report format that includes:
    - Title of the Report
    - Time Period Covered
    - Data Table with figures
    - Visual Element (e.g., bar chart, pie chart)
    - Short Interpretation (1-2 lines)
6. Each group present their sample reports.
7. Teacher and other groups provide constructive feedback on format clarity, relevance of data, and presentation style.
8. Summarizes best practices for financial reporting:
    - Keep it concise and visually clear
    - Highlight trends and key figures
    - Use visual tools for better understanding
    - Provide brief insights for decision-makers
9. Each student writes their learning or what they understood.
10. Submit write up to the teacher.

CHECK YOUR PROGRESS

A. Fill in the Blanks

1. An MIS Data Analyst helps financial institutions make decisions by analysing and interpreting _____.
2. One of the key responsibilities of an MIS analyst is tracking _____ to measure business performance.
3. _____ is a common tool used by MIS analysts to create spreadsheets, reports, and dashboards.
4. In the BFSI sector, MIS analysts often work with departments such as finance, compliance, and _____.
5. Dashboards help visualize complex data using elements like charts, graphs, and _____.

B. Multiple Choice Questions

1. What does MIS stand for?
   a) Management Integrated Software
   b) Management Information System
   c) Marketing Information Structure
   d) Monetary Insight System
2. Which tool is commonly used by MIS Analysts for data analysis and reporting?
   a) Photoshop
   b) Excel
   c) AutoCAD
   d) Canva
3. What is one of the main roles of an MIS Data Analyst?
   a) Writing advertising scripts
   b) Analysing market trends
   c) Managing HR payroll
   d) Filing legal documents
4. Which of the following is a Key Performance Indicator (KPI) in financial services?
   a) Customer birthday count
   b) Product colour preference
   c) Net Interest Margin
   d) Employee shoe size

5. What does a dashboard help visualize in MIS reporting?
   a) Employee birthdays
   b) Data and performance metrics
   c) Office seating arrangements
   d) Social media posts

C. State whether the following statements are True or False

1. MIS Data Analysts work only with marketing teams in a financial organization.
2. Dashboards are used to present data in a visually understandable format.
3. Excel cannot be used for financial analysis.
4. A high Return on Assets (ROA) means the company is using its assets efficiently.
5. One of the responsibilities of an MIS Data Analyst is to predict future business trends using data.

D. Match the following

Column A		**Column B**	
1	Net Interest Margin (NIM)	**A**	Helps manage money risks
2	Excel	**B**	Used for presenting KPIs visually
3	Customer Satisfaction Score	**C**	Profit from interest income
4	Power BI	**D**	Tool for creating financial reports
5	Risk Assessment Report	**E**	Helps evaluate potential threats

E. Short Answer Questions

1. Who is an MIS Data Analyst and what do they do in the financial sector?
2. What is the importance of KPIs in financial services?
3. Explain any two common tools used by MIS Data Analysts.
4. What is a dashboard, and why is it used?
5. Name any two departments an MIS analyst might collaborate with in a bank.

F. Long Answer Questions

1. Explain the role of an MIS Data Analyst in the financial services industry. What are their key responsibilities, and how do they contribute to organizational success?
2. Describe the importance of using tools like Excel, Power BI, and SQL in the daily tasks of an MIS Data Analyst. How do these tools help in analysing and presenting financial data?
3. What are Key Performance Indicators (KPIs) in financial services? Choose and explain any three KPIs used by MIS Data Analysts, and describe why tracking them is important for a bank or financial institution.
4. Imagine you are an MIS Data Analyst in a bank. The management wants to improve customer satisfaction and reduce loan processing time. How would you use data to help solve this problem? Explain the steps and tools you would use.

G. Check Your Performance

1. A bank has seen a drop-in customer satisfaction scores over the last two months. The MIS analyst is asked to find the cause. What kind of data should the analyst look at, and which KPI might help solve this issue?
2. A financial institution wants to know which type of loan is bringing in the most interest income. How can an MIS Data Analyst present this information, and what tool might they use to make it easy to understand?

SESSION 4: ETHICS, DATA PRIVACY AND REGULATORY ENVIRONMENT

In today's digital world, the Banking, Financial Services, and Insurance (BFSI) sector deals with massive amounts of sensitive customer information every day. This includes personal details, bank account information, income records, insurance data, and more. That's why it is extremely important to handle this data with care, responsibility, and according to the law.

The reasons why Data Confidentiality, Ethical Practices, Data Privacy, and Regulatory environment or Compliance are essential in the BFSI sector are outlined below:

Ethics in BFSI: The Banking, Financial Services, and Insurance (BFSI) sector depends greatly on customer trust. People expect banks and financial institutions to act honestly and fairly. That's why ethics play a major role. Ethical practices include being open about how things work, explaining financial products clearly, and avoiding any actions that could confuse or harm customers. It also means giving loans responsibly, treating customers with fairness, and making sure all communication is truthful. Inside the organization, ethics also involve strong internal rules, accountability, and avoiding conflicts of interest.

Data Privacy: In BFSI, keeping customer data safe is extremely important. Banks and financial companies handle sensitive information, like personal and financial details, which makes them a common target for hackers. To protect this data, they must use strong security systems. There are also rules like the GDPR (General Data Protection Regulation) and national laws that say how this data should be collected, stored, and used. It is important for companies to ask customers for permission before using their data, be clear about how it's used, and keep it safe from unauthorized access. Protecting customer data builds trust and shows a company's commitment to privacy.

Regulatory Environment: The BFSI industry is closely watched by regulators to make sure everything runs fairly and securely. In India, the Reserve Bank of India (RBI) looks after the banking system, Securities and Exchange Board of India (SEBI) manages the stock market, and Insurance Regulatory and Development Authority of India (IRDAI) regulates insurance companies. These organizations set rules that all financial institutions must follow like doing audits, reporting activities, and following fair practices. Following these rules is important, because breaking them can lead to heavy fines, loss of reputation, and losing customer trust.

DATA GOVERNANCE PRINCIPLES

In the BFSI sector, managing data properly is extremely important because the information handled is sensitive and valuable. Data governance means making sure data is available, accurate, secure, and used responsibly. Below are the key principles that help guide good data governance:

1. **Data Quality**: Good decisions depend on good data. This means the information should be correct, complete, consistent, and reliable. Regular checks and cleaning of data help keep it accurate and trustworthy.
2. **Data Stewardship**: Every important set of data should have someone responsible for it called as a data steward. These individuals help make sure the data is well-managed, safe, and follows the rules.
3. **Data Privacy and Compliance**: Customer data must be handled carefully. BFSI organizations must follow privacy laws (like GDPR) and protect customer information. This includes having clear rules about how data is collected, stored, and used.
4. **Data Security**: Protecting data from hackers or unauthorized access is a top priority. This means using tools like encryption, limiting who can access what, and conducting regular security checks to keep information safe.
5. **Data Accessibility**: While data must be protected, it also needs to be available to the right people at the right time. Clear access rules help employees use data effectively without risking security.
6. **Data Lifecycle Management**: Data has a life, from when it is created to when it is no longer needed. Organizations must decide how long to keep data and when to archive or delete it to stay organized and follow regulations.
8. **Integration and Interoperability**: Data should be able to move smoothly between systems. This means using common formats and processes so that different departments and software tools can easily share and use the same data.
9. **Transparency and Documentation**: Clear records of how data is handled, such as policies and procedures, help everyone understand their roles and responsibilities. Transparency builds trust and ensures everyone is on the same page.
10. **Continuous Improvement**: Data governance isn't a one-time task. It should evolve and improve regularly based on feedback, new technology, and changing laws. Regular updates help organizations stay ready for future challenges.

REGULATORY GUIDELINES IN BFSI

Banks and financial companies must follow important rules to keep the system safe, protect customers, and stop crime. Three key guidelines are:

1. KYC – Know Your Customer

KYC means banks must verify the identity of customers before opening an account or giving financial services (Fig. 1.8).

- They check documents like Aadhaar, PAN Card, or Passport to confirm who you are.
- It helps stop fraud, identity theft, and misuse of banking services.
- Banks also update KYC details regularly to keep records correct.

Example: If you open a bank account, the bank will ask for your ID proof, address proof, and photo.

Fig. 1.8: Know your Customer

2. Anti-Money Laundering (AML)

AML rules help stop criminals from using banks to hide money earned through illegal means. (Fig. 1.9)

- Banks monitor large or suspicious transactions (e.g., sudden huge cash deposits).
- If something looks unusual, they must report it to government agencies like FIU-IND (Financial Intelligence Unit – India).
- Employees are trained to spot suspicious activities and follow the law.

Example: If someone tries to deposit ₹50 lakhs in cash without a clear reason, the bank investigates and reports it.

Fig. 1.9: Anti-Money Laundering

3. Data Protection

Banks handle sensitive customer information, so they must keep it private and secure. (Fig. 1.10)

- They use strong security systems to protect data from hackers and misuse.
- Customers' personal and financial details should only be used with permission.
- Following laws like the Indian Data Protection Act or GDPR (for global companies) builds customer trust.

Example: Your bank details or personal information cannot be shared or used for marketing without your approval.

Fig. 1.10: Data Protection

These guidelines i.e. KYC, AML, and Data Protection which help ensure that banking is safe, fair, and trustworthy for everyone.

ETHICS IN FINANCIAL DATA HANDLING

Handling financial data means dealing with sensitive information like bank account numbers, transaction history, income details, and personal records. It is very important to handle this data with honesty, care, and responsibility. Below are the major points of Ethics in Financial Data Handling:

- **Protect Privacy:** Always keep customer information private and never share it without permission.
- **Be Honest:** Financial data should never be changed or misused for personal or company benefit.
- **Follow Rules:** Handle data according to laws and company policies to avoid mistakes or legal issues.
- **Prevent Misuse:** Do not use financial data to cheat, manipulate records, or mislead customers.
- **Build Trust:** When data is handled ethically, customers trust banks and financial companies more.

Example: If you work in a bank, you cannot look at someone's account details out of curiosity or share that information with anyone. You must only use the data for work purposes and with proper permission.

Ethical handling of financial data keeps customer trust, protects privacy, and ensures fairness in the financial system.

PRACTICAL EXERCISE

Activity 1: Group discussion on ethics in data usage.

Materials Required:

- Whiteboard/Flipchart and Markers
- Small Slips/Sheets with Discussion Questions or Scenarios (optional)
- Notebook and Pen
- Timer/Stopwatch
- Chart displaying key ethics principles (optional)

Procedure:

1. Divide the class into small groups of 4-6 students each.
2. Give each group a situation or question to discuss, such as:
    - Is it okay to use customer data for marketing without permission?
    - What should you do if you see a co-worker sharing private data?
    - How can misuse of data affect customers?
3. Each group discuss the topic among themselves.

4. Encourage everyone to share their thoughts and examples.
5. One member from each group notes down the key points.
6. Each group shares their discussion highlights with the class.
7. Teacher adds additional points or corrects misconceptions.
8. Summarize the importance of ethics in data usage.
9. Each student writes their learning or what they understood.
10. Submit write up to the teacher.

Activity 2: Identify and present risk areas and solutions for data privacy breach.

Materials Required:

- Whiteboard/Flipchart and Markers
- Printed Handouts or Slips with Possible Risk Examples (optional)
- Notebook and Pen
- Chart showing Data Privacy Principles (optional)
- Timer/Stopwatch

Procedure:

1. Divide the class into small groups of 3-5 students per group.
2. Assign each group the task to think of possible risk areas for data privacy breaches in banks or financial institutions.
3. Groups discuss and list at least 3 risk areas where data privacy could be compromised (e.g., weak passwords, phishing emails, unauthorized access). For each risk area, they suggest simple solutions or preventive steps.
4. Each group presents their identified risk areas and solutions to the class.
5. Teacher provides feedback and adds additional important points.
6. Each student writes their learning or what they understood.
7. Submit write up to the teacher.

Activity 3: Create a Privacy Policy Poster.

Materials Required:

- Chart paper or A3 sheets
- Markers, pens, crayons
- Sample privacy policies

Procedure:

1. Divide class into small groups of 3–5 students per group.
2. Assign each group the task of creating a fictional bank or mobile app.

3. Ask them to design a poster for that bank/app's privacy policy. Their poster should include:
   - What personal data is collected (e.g., name, email, phone number, bank account details)?
   - Why the data is collected and how it is used?
   - Who can access the data (e.g., staff, partners, etc.)?
   - How users can manage their data (e.g., opt-out options, data deletion)?
4. Once the posters are ready, each group presents their privacy policy to the class and explains the choices they made.
5. Facilitate a short discussion comparing the posters and highlighting good practices in privacy policy design.
6. Each student writes their learning or what they understood.
7. Submit write up to the teacher.

CHECK YOUR PROGRESS

A. Fill in the Blanks

1. _____ ensures that customer information is kept safe from unauthorized access.
2. Informed _____ must be taken before collecting or using someone's personal data.
3. Ethical practices in BFSI promote _____ and build customer trust.
4. The law that protects digital personal data in India is called the _____ Act.
5. Using sensitive customer data to exploit them is considered _____ behaviour.

B. Multiple Choice Questions

1. What is the main purpose of data privacy laws?
   a) To increase business profits
   b) To advertise customer data
   c) To protect individuals' personal information
   d) To share data freely with partners
2. Which of the following is an example of unethical data handling?
   a) Asking for user consent
   b) Protecting customer data with encryption
   c) Selling user data without informing them
   d) Giving users access to their data
3. What does KYC stand for in the BFSI sector?
   a) Know Your Code
   b) Know Your Customer
   c) Keep Your Card

d) Keep Your Consent

4. Why is regulatory compliance important in financial institutions?
   a) To reduce employee workload
   b) To protect the environment
   c) To follow legal rules and protect customers
   d) To avoid paying taxes
5. What is the first step in ethical data collection?
   a) Selling the data
   b) Encrypting the data
   c) Collecting as much data as possible
   d) Gaining informed consent from the customer

C. State whether the following statements are True or False

1. It is ethical to sell customer data without their knowledge. (True/False)
2. The purpose of regulatory compliance is to ensure safety and legality. (True/False)
3. All customer data collected must be necessary for the service. (True/False)
4. Data privacy laws do not apply to mobile banking apps. –(True/False)
5. Regular employee training is important for ethical data handling. –(True/False)

D. Match the Column

Column A		**Column B**	
1	Data Privacy	**A**	Following legal requirements
2	Ethics in Finance	**B**	Asking users for permission
3	Regulatory Compliance	**C**	Avoiding misuse of customer data
4	Consent	**D**	Right to control personal information
5	Confidentiality	**E**	Keeping customer data protected

E. Short Answer Questions

1. What is meant by data confidentiality? Why is it important in banking?
2. How does informed consent protect users in the digital world?
3. List any three ethical practices a financial institution should follow.
4. What is the role of regulatory compliance in the BFSI sector?
5. Why is it important for financial institutions to train employees on data ethics?

F. Long Answer Questions

1. Describe the key principles of ethical data handling in the BFSI sector.
2. Explain the importance of regulatory compliance with reference to Indian laws like KYC and the Digital Personal Data Protection Act.
3. Discuss how financial institutions can balance customer service and data privacy.
4. What steps can an organization take to ensure responsible use of customer data?

G. Check Your Performance

1. A customer reported suspicious activity on their bank account, but the bank failed to respond for two weeks, leading to continued unauthorized transactions.
   - Discuss the importance of responsibility and accountability in handling customer complaints related to data breaches.
   - Explain what ethical actions the bank should have taken, and how timely communication can protect both the customer and the bank's reputation.
2. After suffering a data breach, a bank delayed informing its customers, which led to multiple fraud cases and public backlash.
   - Evaluate the ethical and regulatory mistakes made by the bank in this scenario.
   - What immediate steps should a financial institution take after discovering a data breach?

MODULE 2: EXCEL FOR FINANCIAL DATA MANAGEMENT

Let's say your weekly pocket money is being tracked. The amounts spent on various items like snacks, transportation, and other items might be written down. But what if the total amount spent, or the category in where most money has been spent, needed to be quickly seen? This is where excel can be used.

Excel is a tool that can be used to perform the daily tasks easily and efficiently. For example, grades and total marks scored by students can easily be tracked and seen. When working on a school project, tasks can be organized, timelines can be set and progress can be tracked easily. Simple calculations can be done, data can be arranged, and results can be shown, making everything easier.

Microsoft Excel is a popular and powerful tool used worldwide to arrange, store, use and interpret information. Excel is a part of Microsoft Office software, which is widely used by students, workers and businesses around the world. Information is stored in the form of rows and columns which helps understand, store and represent data in different types of reports.

An excel file can store different types of data, like, numbers, texts, words or dates. The data can be sorted, arranged and mathematical operations can be performed on them to interpret the data. Excel also helps to make data visually attractive through charts, tables and different types of graphs.

Using excel regularly helps save time and organize data. Instead of papers and notebooks, excel enables users to store information in form of worksheets on a single workbook which helps to make quick decisions.

This module is divided into four sessions. Session 1 deals with the basics of excel. An introduction to the excel interface will be given, showing how data can be entered, edited and saved. Session 2 covers basic formulas and in excel to perform simple calculations like adding numbers, finding averages and percentages. Session 3 focuses on data presentation and how to create basic chart using excel. Finally, Session 4 covers with the important lookup and logical functions which helps to find and organize information more easily.

SESSION 1: EXCEL INTERFACE AND BASIC OPERATIONS

Excel is a software which is developed by Microsoft which was first launched in the year 1985 for Apple Macitosh followed by a release of Windows version in the year 1987. Excel has gone through many updates and versions during the years and is one of the most used software across the world which has features that makes the day-to-day tasks easier. Excel is used for data analysis, financial calculations and creating charts and reports.

Excel is a software that uses spreadsheets to organize data which can be in any form like numbers, texts, dates or logical values. These data types influence how excel handles and interprets data, impacting calculations, formatting and more.

EXCEL USER INTERFACE

The Excel user interface is the part of Excel that displays and provides access to all the tools and features of the program. Understanding the interface plays an important role in using the features effectively and organizing data. The Excel user interface is designed to provide quick access to tools, enable data entry, and perform calculations in a clean and simple worksheet.

To better understand Excel, it is important to learn about the different parts of the interface. The interface includes elements such as cells, rows, columns, workbook, worksheet, ribbon, and formula bar, which facilitate interaction with data and the use of various tools.

Opening a new Excel Workbook

Opening a workbook on the excel is a simple process, and it can be done in a few easy steps. The steps for opening a new workbook are as follows:

Step 1: Open Excel – The excel icon on the desktop should be clicked or the word "Excel" can be searched in the start menu on windows.

Step 2: Creating a new workbook

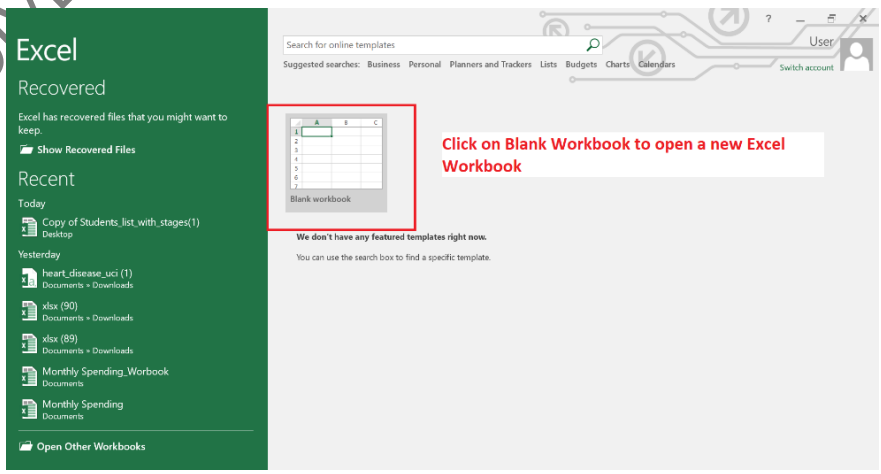


Fig. 2.1: Creating new workbook

Once the excel program has been loaded, the option to open a blank workbook will be visible on the screen. This option can be selected to open a new workbook. (Fig. 2.1)

Opening an existing excel workbook

To open an already saved excel workbook the following steps has to be followed:

Step 1: Open Excel **–** The excel icon on the desktop should be clicked or the word "Excel" can be searched in the start menu on windows.

Step 2: Click on "Open Other Workbook" **–** On the bottom left hand side of the screen an option to "Open Other Workbook" is available. Upon selecting this a list of available files will be displayed and the desired file can be chosen from this list and opened. (Fig. 2.2 and 2.3)

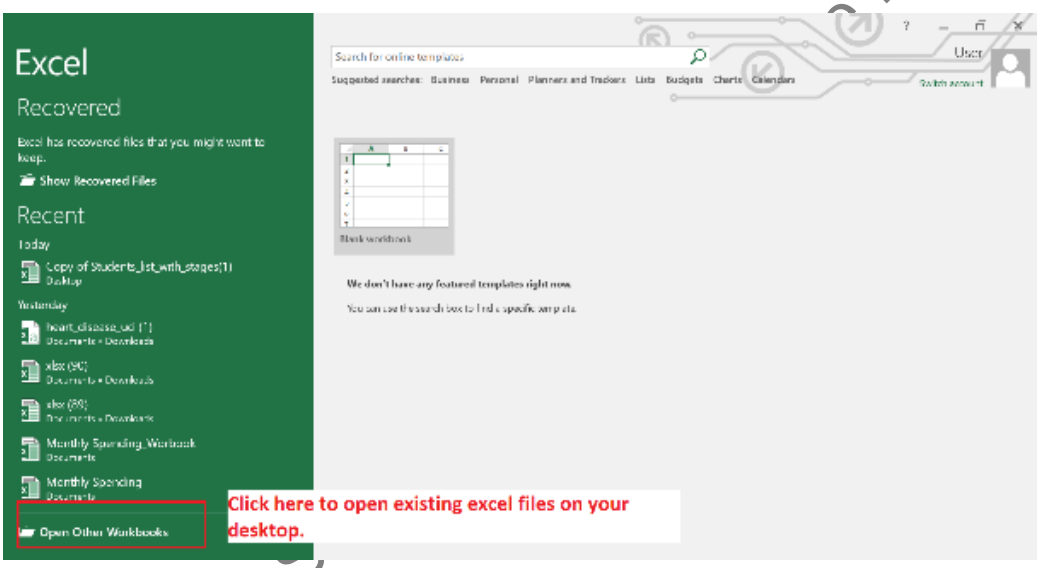


Fig. 2.2: Opening an existing excel workbook

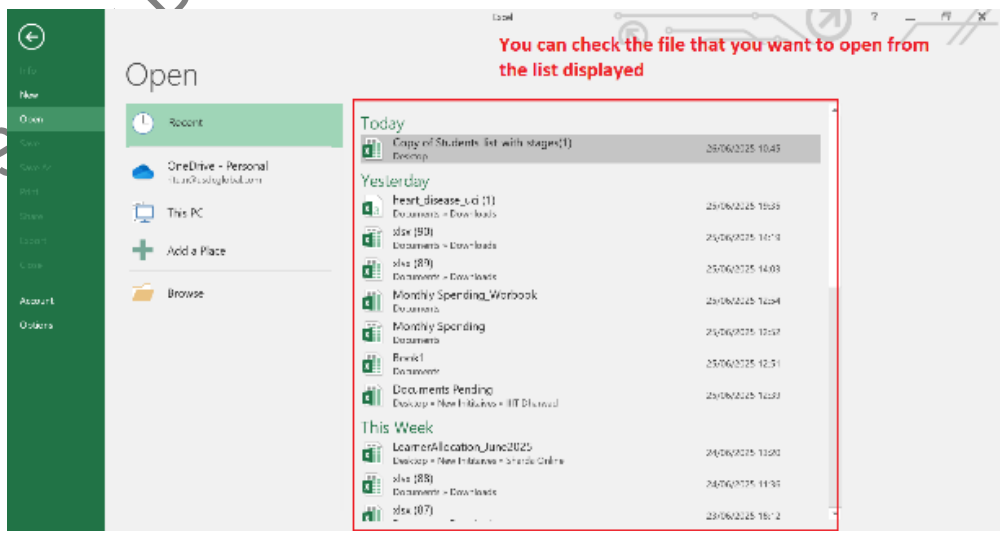


Fig. 2.3: Opening an existing excel workbook

Workbook and Worksheet

A workbook in Excel is a file used to store work. Inside a workbook, multiple worksheets can be created. Each worksheet functions like a page where data can be entered and stored. A workbook can be compared to a notebook that contains many pages, with each page representing a worksheet.

For example, imagine tracking your pocket money for every month. You can start keeping a track of your spending in a workbook called "Monthly Spending" and inside this workbook you can have several sheets like "January", "February" for tracking your expenses on a monthly basis. Refer to the image below for better understanding.

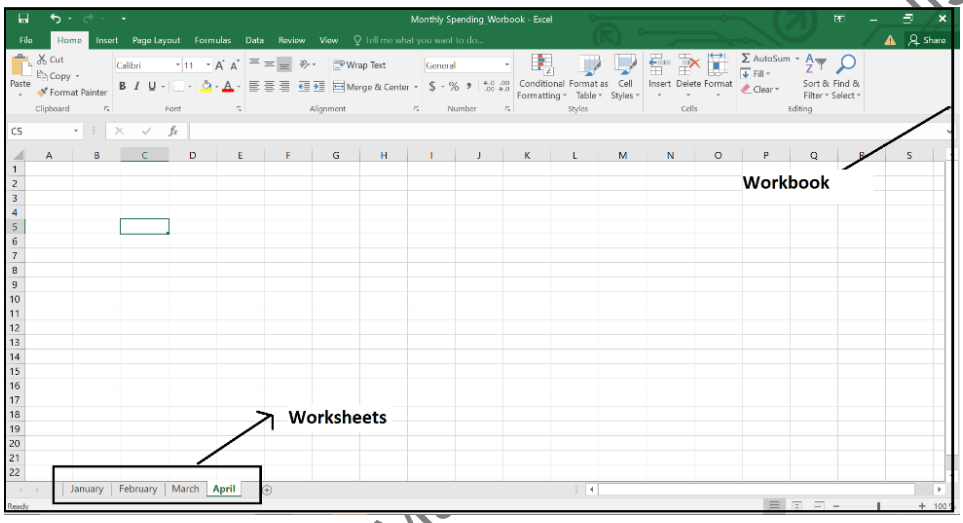


Fig. 2.4: Workbook

Cell: A cell is the smallest part of an Excel worksheet. It is a small box that holds data. Data can be entered in the form of letters, numbers, dates, or formulas in a cell. Each Excel cell is like a blank space, ready to store any kind of data. Every cell has its own name or "address," which is a combination of a column letter and a row number.

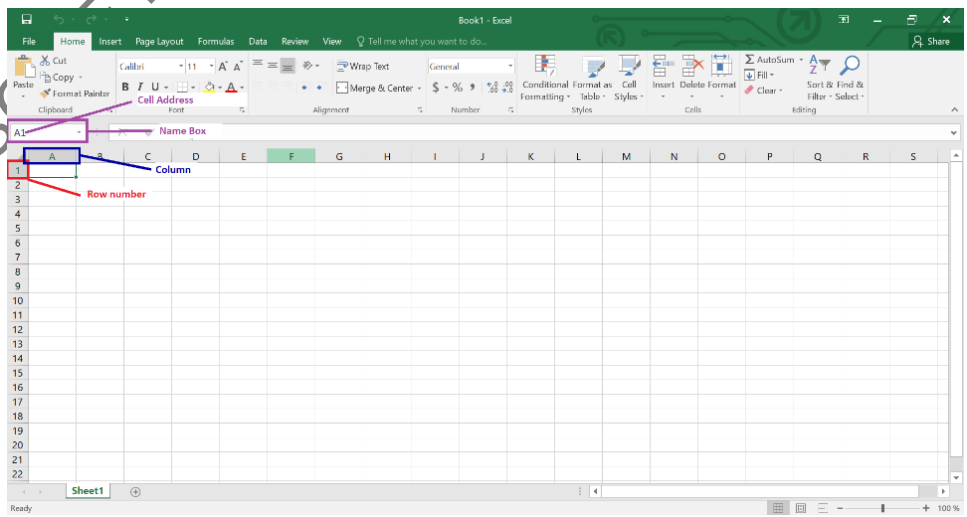


Fig. 2.5: Cell

For example, refer Fig. 2.5, the first column is labelled "A" and the first row is labelled "1" and where the meet is called "A1". The combination of the column letter is called a cell address. In this case, "A1" is the cell address for the first cell on you excel worksheet. Likewise, all the cells on excel worksheet will have a different cell address depending on the column and row number you can easily identify them with the help of the name box.

Row: A row is a horizontal line of cells on the excel worksheet. Each row is identified by a number, which starts with 1 and increases as you move down the worksheet. Like cells, rows can also hold different types of data, including numbers, texts, dates and formulas.

For example, let's take the data of weekly expenses. Rows can be used to list the items that money was spent on each week.

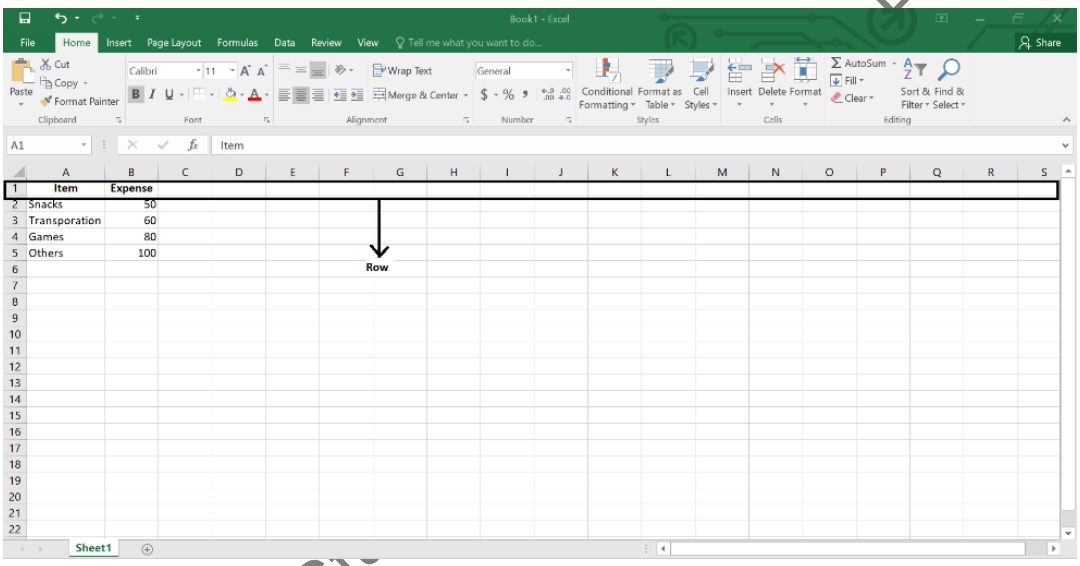


Fig. 2.6: Row

Each row holds information about one item, and more rows can be added to track additional items. In this way, rows are used to organize and store individual pieces of information.

An Excel worksheet can hold up to 1,048,576 rows, allowing large amounts of data to be managed and organized easily. With rows, data can be easily handled and analyzed, whether for school projects, personal budgets, or other tasks.

Column: A column is a vertical line of cells in an Excel worksheet. Each column is identified by a letter, starting from A and continuing across the worksheet. Columns are used to organize data from top to bottom, making it easier to manage and read. An Excel worksheet can have columns ranging from A to XFD.

For example, weekly expenses are being tracked. Columns are used to list the types of expenses and the amounts spent:

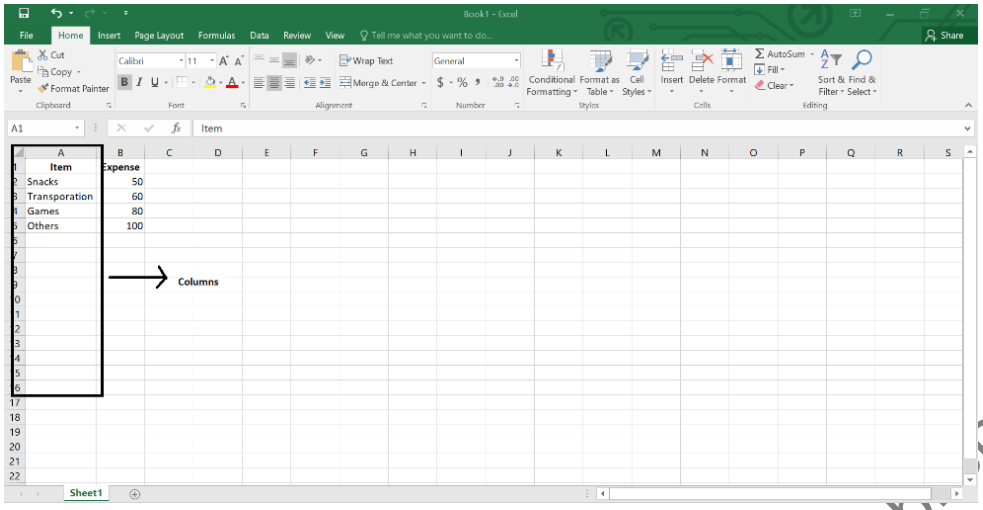


Fig. 2.7: Column

In this table (Fig.2.7), Column A is used for Items, and Column B is used for Amount. The names of the items (such as snacks, transport, and others) are stored in Column A, and the amounts spent are stored in Column B.

Each column is used to store one type of information, and more columns can be added to track additional categories, such as dates or payment methods. In this way, columns are used to separate and organize different types of data.

An Excel worksheet can hold up to 16,384 columns, allowing large amounts of data to be easily separated and managed. With columns, data can be organized, sorted, and analysed efficiently, whether for school projects, personal budgets, or other tasks.

Ribbon: The ribbon in excel is the main tool used to access the various features and commands of the software. It is located at the top of the excel window and divided into several tabs. The ribbon is designed to make excel easy to navigate, allowing users to quickly find and use the tools needed to perform various tasks. (Fig. 2.8)

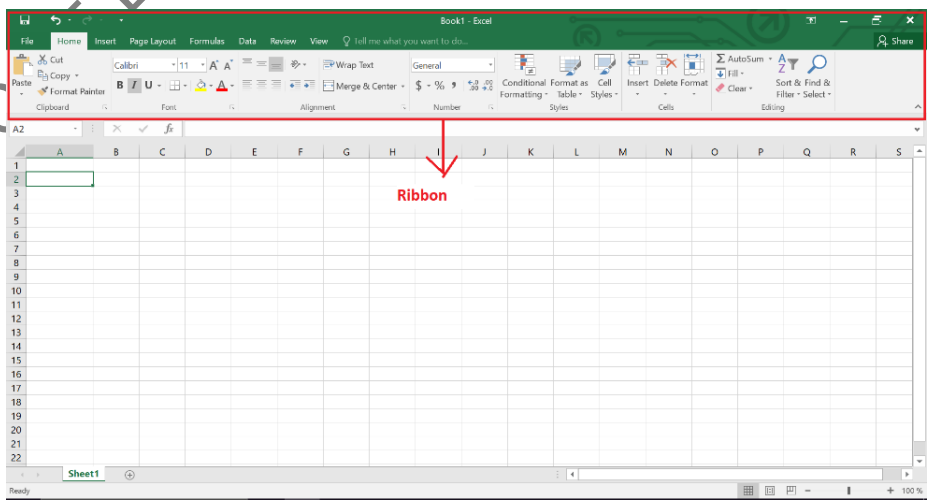


Fig. 2.8: Ribbon

The Ribbon in Excel is the primary tool for entering and formatting data. Before performing specific tasks, it is essential to understand how Excel handles various data types such as numbers, text, dates, and logical values. Once data is entered, Excel provides a range of tools to edit and format it effectively. These include adjusting alignment, applying basic text formatting, and organizing data to ensure clarity. The Ribbon combines all the tools required for these tasks, making it convenient to apply changes and format data. Understanding how to navigate and use the tools on the Ribbon enables efficient work with Excel and helps keep data organized and presentable.

The ribbon is divided into several tabs which makes it easier to access the various tools available. The main tools include (Fig. 2.9):

- ***Home:*** Most commonly used tab. It includes basic commands for formatting and editing.
- ***Insert:*** Used to add objects to worksheet.
- ***Page Layout:*** Helps adjust the appearance of the worksheet for printing.
- ***Formulas:*** Contains tools for working with formulas and functions.
- ***Data:*** Used for working with large amounts of data.
- ***Review:*** Tools for checking and protecting worksheet.
- ***View:*** Adjusts how your worksheet looks on the screen.
- ***File Tab:*** Also called Backstage View, this is the area used to manage files such as opening, saving, printing, and sharing.

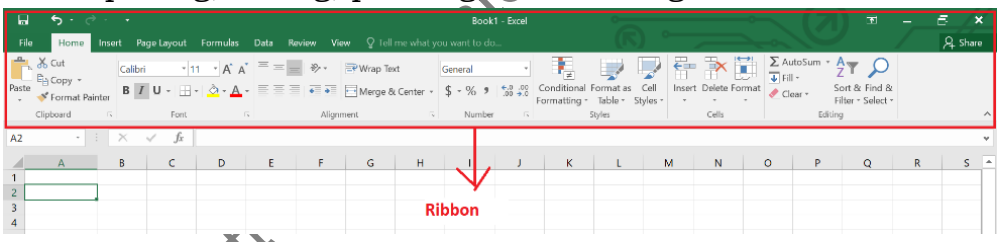


Fig. 2.9: Ribbon Tabs

Each of these ribbon tabs has specific purpose and includes tools for performing specific tasks. Each tab contains several groups with different commands and icons. In some groups, not all commands are visible due to space limitations. However, options can be accessed by clicking the small icon with a downward arrow in the corner of the group. This icon is called the "Dialog Launcher", and when clicked, it opens a new window showing additional commands for that group.

DATA TYPES IN EXCEL

Excel data types are the different kinds of values that can be entered in Microsoft Excel. The four main types of data are Text, Number, Logical (TRUE/FALSE), and Error. Each type is used differently, making it important to understand their functions. Data types may also change automatically

when data is imported or exported, so checking the data after transferring is essential.

1. **Number Data:** Number data includes any type of numeric value, like small numbers, large numbers, money amounts, percentages, dates, and times.

   Remember: Some numbers represent quantity (like price), while others represent time or dates. The correct format must be used so that Excel interprets the data properly.

   Examples of Number Data:

   - Marks or percentages (e.g., 85%)
   - Total amount (e.g., ₹5000)
   - Dates (e.g., 01/07/2025)
   - Time (e.g., 10:30 AM)
   - Phone numbers

2. **Text Data:** Text data includes words, letters, numbers treated as text, or symbols. Text cannot be used for calculations and is often applied for headings, labels, or descriptions.

   Examples of Text Data:

   - Names (e.g., "Shlok Kamane")
   - Addresses
   - Labels like "Total Sales" or "Revenue"
   - Dates or numbers typed in text format

   Note: If Excel doesn't recognize your entry, it may automatically treat it as text.

3. **Logical Data (TRUE or FALSE):** Logical data means the value is either TRUE or FALSE. It is often used to test conditions and make decisions inside formulas.

   Examples of Logical Tests:

   a) Check if marks are greater than 50 → Result: **TRUE or FALSE**
   b) Use logical functions like:

   - **AND:** Checks if all conditions are TRUE
   - **OR:** Checks if at least one condition is TRUE
   - **XOR:** Exactly one condition should be TRUE
   - **NOT:** Reverses the condition (TRUE becomes FALSE, and vice versa)

   Example: =AND(A1>50, B1>50) → Returns TRUE if both values are above 50.

4. **Error Data:** Sometimes, Excel shows an error message when something goes wrong. Errors indicate mistakes in formulas or data and help in identifying and correcting them. Common Error Messages in Excel are as:

Error	What it Means	Example
#NAME?	Typo or missing quotes in formula	=SUMM (A1:A5) instead of SUM
#DIV/0!	Dividing a number by zero	=A1/0
#REF!	Invalid cell reference (deleted cells)	Referring to a deleted cell
#NUM!	Wrong number or result too large	Large calculation beyond limit
#N/A	Value not available or missing	Lookup fails to find a value
#VALUE!	Wrong data type in formula	Adding text to numbers by mistake
#NULL!	Incorrect cell range or missing separator	Wrong range in a formula

BASIC FORMATTING

Formatting in Excel means changing the appearance of data to make it look neat, easy to read, and professional. In simple words, it involves modifying the appearance of cells to improve readability and visual appeal. This includes changing font styles, sizes, colours, alignments, and adding borders and fill colours.

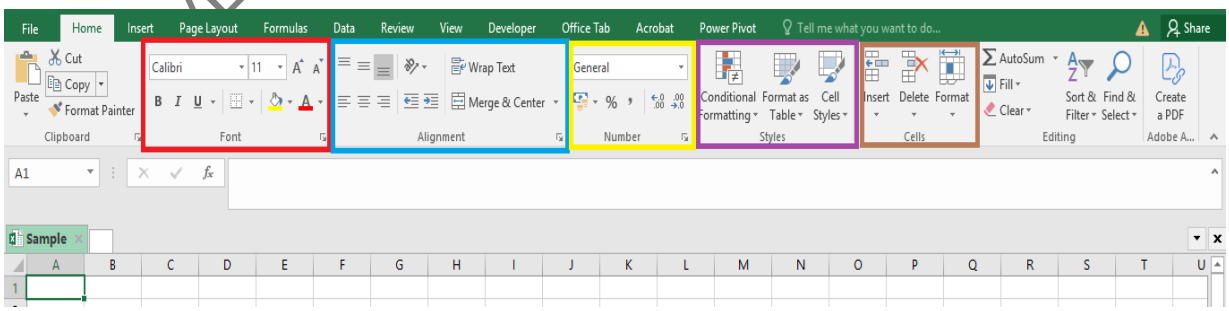


Fig. 2.10: Basic Formatting Options

1. Font Formatting

Font formatting provides options to change the appearance of text within a worksheet. This includes altering the font type, size, colour, and applying

formatting such as bold, italic, or underline. In other words, it changes the appearance of text (words or numbers) in an Excel worksheet. Font formatting makes data easier to read, visually appealing, and more professional. Below are the basic formatting options available in Excel:

Feature	Description	Use	Example
Font Type	Change the style of the letters or numbers.	From the toolbar, select font (e.g., Arial, Calibri, Times New Roman).	Use Calibri for simple look, Times New Roman for formal reports.
Font Size	Make the text bigger or smaller.	Choose size number (e.g., 10, 12, 14, 18).	Increase size to make headings stand out.
Font Color	Change the color of the text.	Use the font color option (A with color underline).	Use red for warnings, green for correct answers.
Bold **(Ctrl + B)**	Makes text thicker and darker to stand out.	Click **B** icon or press Ctrl + B.	Make titles bold: Student Marks Sheet
Italic **(Ctrl + I)**	Slants the text to the right for emphasis.	Click **I** icon or press Ctrl + I.	Italicize comments or instructions.
Underline (Ctrl + U)	Adds a line under the text.	Click **U** icon or press Ctrl + U.	Underline important points.
Strikethrough	Draws a line through the text to show deletion.	Right-click > Format Cells > Font > Strikethrough.	Use to mark incorrect values: ~~Old Price~~

Importance:

- Makes the worksheet look neat and organized.
- Highlights important information such as totals, headings, or warnings.
- Helps readers understand the data quickly.

Exercise: Open a blank Excel sheet and type the following in A1 to A4:

- Student Name
- Total Marks

- Grade
- Remarks

Now:

- Make “Student Name’ bold.
- Make “Total Marks” italic.
- Underline “Grade”.
- Change the font colour of “Remarks” to blue.
- Increase the font size of all headings to 14.

2. Alignment

Alignment means how text or numbers are positioned inside a cell. Good alignment makes Excel sheet neat, easy to read, and professional.

The Alignment group allows to adjust the alignment of text within cells, such as aligning it to the left, center, or right. It also includes tools to control the text orientation and wrap text within a cell. The text in a cell to appear centered, the Center button in the Alignment group can be used. This will align the text in the middle of the cell, both horizontally and vertically.

a) Horizontal Alignment (Left, Center, Right): Aligns the text or numbers **left**, **center**, or **right** inside the cell.

Select the cell → Go to the **Home** tab → Click on Left, Center, or Right align icons

Example: If you write “Total Marks” in a cell:

- Left Align → Text sticks to the left side.
- Center Align → Text stays in the center.
- Right Align → Text moves to the right side.

b) Vertical Alignment (Top, Middle, Bottom): Positions the text at the **top**, **middle**, or **bottom** of the cell (especially useful if the row height is large).

Select the cell → Go to **Home tab** → Look for Vertical Alignment options (Top, Middle, Bottom)

c) Wrap Text: If text is too long to fit in a cell, “Wrap Text” makes it appear on multiple lines within the same cell, ensuring that all content is visible.

Select the cell → Click **Wrap Text** from the toolbar

Example: Without Wrap Text → Only part of the sentence shows. With Wrap Text → Entire sentence appears, even if it takes more lines.

d) Indent: Adds space before the text inside the cell to make it look neat.

Select the cell → Click **Increase Indent** icon from the toolbar

e) Merge & Center: Combines multiple cells into one big cell and centers the content. It is commonly used for headings.

Select the cells to merge → Click **Merge & Center** from the toolbar

Example: To create a big title across columns A, B, and C:

- Type "Student Performance Report" in A1
- Select A1 to C1
- Click **Merge & Center** → Now your title is centered across all three columns.

f) Orientation (Text Rotation): Rotates or tilts the text inside a cell. It is useful for **column headers** when space is tight.

Select the cell → Go to **Orientation** icon in the toolbar → Choose options like **Angle Counter clockwise, Rotate Text Up**, etc.

Example: If your headers are taking too much space, rotate them diagonally to save space.

3. Number Formatting

Number Formatting changes how numbers look in your worksheet, without changing their actual value. It helps make data easier to read and understand. Number group contains tools for formatting numbers in various ways, including currency, percentage, decimal places, and more. This is particularly useful when needed to display data in a specific number format.

- **General (Default):** This is the default format in Excel, where numbers appear exactly as typed. No special symbols or formatting are applied.
- **Number:** Format numbers as currency, percentages, dates, times, fractions, scientific notation, etc.

Select cells → Go to **Home tab** → Select **Number** format from the drop-down list

- **Currency:** Display numbers with currency symbols such as ₹, $, €, etc. and appropriate decimal places. It is used when dealing with money-related data like prices, earnings, or expenses.

> ***Example:*** *Type 5000 → It shows as ₹5,000.00 (if Indian Rupee is selected)*

- **Percentage:** Display numbers as percentages. In short, it converts numbers to percent format. Multiplies by 100 and adds % symbol. It always enters percentages as decimals if not formatting immediately.

> ***Example:*** *Type 0.75 → It shows as 75%.*
> *Type 1 → It shows as 100%*

- **Date/Time:** Format numbers to represent dates and times in various ways. It changes numbers to dates or time formats. Excel stores dates as numbers behind the scenes, but formats them as readable dates/times.

> ***Example:***
>
> - ***Date Formats:*** *Type 01/07/2025 → Shows as 01-Jul-2025 (01/07/2025, 1-Jul-2025, July 1, 2025, etc.)*
> - ***Time Formats:*** *Type 9:30 → Shows as 9:30 AM (9:30 AM, 15:45 (24-hour clock), etc.*

Exercise: Open Excel and type the following in column A:

- 5000
- 0.85
- 7500
- 01/01/2025

Now, apply these formats:

- Make 5000 appear as currency.
- Make 0.85 show as a percentage.
- Add commas to 7500.
- Format 01/01/2025 as a date.

4. Other Formatting Options

These tools help make worksheet organized, attractive, and easier to read.

- **Borders:** It adds lines around cells or groups of cells and helps separate different sections of worksheet.

Example: Put borders around a table of student marks to make it neat.

Select the cells → Go to **Home tab** → Click on the **Borders icon** → Choose options like:

- All Borders
- Outside Borders
- Thick Box Border

- **Fill Colour (Cell Shading):** It adds background colour to cells to highlight them and makes important information stand out.

  Example: Use yellow fill colour for headers, or green for passed students.

Select the cells → Click the **Fill Colour icon** (paint bucket) → Choose your colour

- **Cell Styles:** Ready-made styles that quickly apply multiple formatting options (font colour, fill, borders) at once. It is useful for titles, headings, or emphasis.

Select the cell → Go to **Home tab** → Click **Cell Styles** → Choose styles like:

- Title
- Heading 1
- Good, Bad, Neutral
- Input

- **Conditional Formatting:** Conditional Formatting automatically changes the appearance (such as colour) of cells based on their values. It helps highlight important data, trends, or errors, making your worksheet easier to understand.

  Example: Automatically highlight marks below 40 in red.

- **Format Painter:** It copies formatting from one cell to another quickly and saves time when the same style in multiple places.

  Example: You formatted one heading (bold, blue, 14 size) → Use Format Painter to apply that to other headings.

1. Select the cell with the desired formatting.
2. Click the **Format Painter** (paintbrush icon) in the toolbar.

3. Click on the cell or range where you want to apply the same formatting.

Exercise: Open excel sheet and type following data (Fig. 2.11).

	A	B	C	D
1	Name	Marks	Grade	
2	Arnav	93	A	
3	Bharati	85	B	
4	Ram	92	A	
5	Varun	85	B	
6	Sonali	97	A+	
7				

Fig. 2.11: Sample data set

Task to perform:

- Add borders around the table.
- Fill the header row with yellow colour
- Use Cell Style: Heading 1 for the header row
- Use Format Painter to apply the same style to another heading elsewhere

SAVING AND OPENING WORKBOOKS

In Excel, file is called a Workbook, and each workbook can have many sheets (like pages in a book). It is important to know how to save your work and open existing files.

To Save a New Workbook

Following steps to be followed for to save a new workbook.

Step 1: After the work has been completed, click on the File tab (top-left corner).
Step 2: From the options that appear, Save As should be selected.
Step 3: Choose the location where the file should be saved must be chosen (e.g., Computer, Desktop, Documents or another folder).
Step 4: A name for the file must be entered in the File Name box.
Step 5: Select the file type (Excel Workbook (*.xlsx) → Default format
Step 6: Excel 97-2003 Workbook (*.xls) → For older versions)
Step 7: Click Save

To Save an Existing Workbook: If the workbook has already been saved before, clicking on the Save button/icon in the Quick Access Toolbar (at the top-left) will save the changes made OR Press Ctrl + S on the keyboard.

To Save in a Different Format:

Step 1: If the workbook needs to be saved in a different format (for example, as a PDF), the File tab should be clicked, and then Save As should be selected.

Step 2: The required file format can then be chosen from the available options.

It is recommended that work is saved frequently to prevent data from being lost. Excel also provides an AutoSave feature for cloud-based files, which saves work automatically as changes are made.

Opening an Existing Workbook

Following steps to be followed for opining an existing workbook.

Step 1: Click the **File tab**.

Step 2: Click **Open**.

Step 3: Browse computer or recent files.

Step 4: Select the workbook want to open.

Step 5: Click **Open**.

Did you know?

Excel's interface might seem simple at first, but it is packed with powerful tools to make your work easier and faster! For example, Excel can handle over a million rows and more than 16,000 columns in a single worksheet. That's a lot of data! The Ribbon in Excel isn't just a navigation tool; it is designed to save you time by grouping similar functions together, whether it's formatting, inserting charts, or performing calculations. Also, did you know that you can freeze panes in Excel to keep your headers visible while scrolling through large datasets? This feature is incredibly helpful when you're working with long lists. Excel even lets you format numbers as currency with just one click and automatically adjust cell sizes to fit the data. With these tools, you're not just organizing data; you're setting the foundation for efficient data analysis and presentation.

PRACTICAL EXERCISE

Activity 1: Familiarize with the Excel interface and its various components.

Materials Required:

- Computer or Laptop with Microsoft Excel installed

- Printed/Displayed diagram of the Excel interface (optional)
- Practice worksheet (blank Excel workbook)

Procedure:

1. Gather in the computer lab.
2. Open a new Excel workbook.
   - Launch Microsoft Excel on computer
   - Open a new blank workbook
3. Identify Components: Students will explore and point out the following on their screen

Component	Description
Title Bar	Displays the name of the workbook (e.g., Book1).
Ribbon	Contains Tabs with groups of tools and commands.
Tabs	Home, Insert, Page Layout, Formulas, Data, Review, View, etc.
Quick Access Toolbar	Located at the top-left; contains Save, Undo, Redo buttons.
Name Box	Shows the cell address (e.g., A1).
Formula Bar	Displays the contents or formula of the selected cell.
Worksheet Area	Main area where you enter data (Rows & Columns).
Columns	Vertical sections labelled A, B, C, etc.
Rows	Horizontal sections labelled 1, 2, 3, etc.
Cell	Intersection of a Row and Column (e.g., B2).
Sheet Tabs	At the bottom, shows different sheets (Sheet1, Sheet2, etc.).

4. Quick Tasks
   - Click on different Tabs (Home, Insert, etc.) to see the groups of tools.
   - Click inside different cells (like A1, B2) and notice the address in the Name Box.

- Type your name in a cell and check the Formula Bar.
- Locate the Sheet Tab, rename Sheet1 to “Practice”.
- Use the Save icon on the Quick Access Toolbar to save your workbook.

5. Conduct discussion with the class considering the following questions.
   - What happens when you click different Tabs?
   - How can you tell which cell is currently active?
   - Where do you type or edit data for a cell?
6. Ask 2-3 students to summarize the discussions.

Activity 2: Practice data entry and basic formatting in Excel.

Materials Required:

- Computer or laptop with Microsoft Excel installed
- Practice worksheet (Excel file or blank sheet)
- Instructions sheet (can be printed or shown on screen)

Procedure:

1. Gather in the computer lab.
2. Open a new Excel workbook.
3. Enter the data as below:
   - In **cell A1**, type: Student Name
   - In **cell B1**, type: Math Marks
   - In **cell C1**, type: Science Marks
   - In **cell D1**, type: Total Marks
   - Enter the following student data:

A2	B2	C2
Arnav	78	85
Bharati	88	90
Varun	67	72
Sonali	95	98

4. Basic formatting as below:
   - **Bold** the header row (A1 to D1)
   - Apply a **yellow fill colour** to the header row
   - Change the font size of the header row to **14**
   - Center-align all the text in columns A to D
   - Add **borders** to the entire table (A1 to D5)
   - Format numbers in columns B, C, D as **Number with 2 decimal places**
   - Use **Merge & Center** on cells A6 to D6 to add a title: "Student Performance Report"
5. Save the workbook with the name: BasicFormattingPractice.xlsx

6. Show to the teacher for review and feedback.

CHECK YOUR PROGRESS

A. Fill in the Blanks:

1. A cell in Excel is identified by the combination of a column _____ and row _____.
2. A worksheet in Excel is similar to a _____ of a notebook.
3. The part of the Excel interface that helps to access all tools and features is called the _____.
4. Excel allows users to store different types of data like _____, _____, _____, and _____.
5. The Excel worksheet can hold up to _____ rows and _____ columns.

B. Multiple Choice Questions (MCQs):

1. What is the function of the "Ribbon" in Excel?

   a) It stores your data
   b) It allows access to Excel's features and commands
   c) It controls the printing settings
   d) It tracks changes in the worksheet

2. What is the default format for numbers in Excel?

   a) Currency
   b) Text
   c) General
   d) Percentage

3. Which part of the Excel interface helps you enter data or formulas into a cell?

   a) Formula Bar
   b) Ribbon
   c) Status Bar
   d) Workbook

4. How can you quickly center-align text in Excel?

   a) Use the Insert Tab
   b) Use the Center button in the Alignment group
   c) Use the Font group
   d) Use the Page Layout Tab

5. What does the "Find & Select" option under the Editing group do?

   a) It copies data
   b) It locates and selects specific data
   c) It sorts data alphabetically

d) It deletes selected data

C. State whether the following statements are True or False

1. Excel can only store numerical data and not text or dates.
2. The "Page Layout" tab in Excel is primarily used for formatting and printing.
3. In Excel, a workbook can contain multiple worksheets, but each worksheet can only hold 100 rows.
4. The "Home" tab in Excel contains frequently used commands for formatting and editing.
5. Excel allows users to track changes and add comments in a shared worksheet.

D. Short Answer Questions

1. What is a workbook in Excel, and how does it differ from a worksheet?
2. Explain the difference between a row and a column in Excel.
3. What is the purpose of the "Insert" tab in Excel?
4. What is the function of the "Formula Bar" in Excel?
5. Explain the significance of the "Cell" feature in Excel and how it contributes to organizing data.

E. Long Answer Questions

1. Explain the key features of the Excel interface, including the Ribbon, Formula Bar, and Worksheet, and describe how they help users in managing data.
2. Describe how the "Cell" feature in Excel works and explain how cell references are used to perform calculations.
3. Discuss the different components of the Excel interface, including the Ribbon, Formula Bar, and Worksheet, and explain how they contribute to data management and analysis.
4. Describe how the "Ribbon" and the tools within the "Home" tab assist users in formatting, editing, and organizing data in Excel.

F. Check Your Performance

1. You have to do data formatting.

Enter the Data:

- Open a new Excel workbook.
- Enter the following data into the worksheet:

Item	**Amount**	***Date***
Snacks	50	01/02/2023
Transport	100	02/02/2023
Books	200	03/02/2023
Movies	150	04/02/2023
Clothes	75	05/02/2023

Format the Data:

- Bold the headers in row 1 (Item, Amount, Date).
- Center-align the data in columns A, B, and C (for Item, Amount, Date).
- Format the Amount column to display numbers as currency (₹).
- Format the Date column to display dates in dd/mm/yyyy format.
- Save the file as "Weekly Expenses".

2. In a new worksheet, enter the following:

A1	**B1**	**C1**
Name	Age	Date of Birth

Then, enter this data:

A2	**B2**	**C2**
Rahul	24	01-07-2000

- What data types have you entered in columns A, B, and C?
- Edit the value in **B2** to 25.

In the same worksheet:

- Make the headers (Row 1) **bold** and increase font size to 14.
- Apply a **yellow fill colour** to the header row.
- Center-align the contents in columns A to C.
- Change the number format of **B2** to show **2 decimal places**.
- Format the **Date of Birth** (C2) to display as "01-Jul-2005".

Saving and Opening Workbooks

- Save your workbook with the name "ExcelPractice1.xlsx" on your desktop
- Close Excel
- Re-open Excel and open the saved file

SESSION 2: BASIC FORMULAS AND FUNCTIONS IN EXCEL

In Excel, formulas and functions are tools that make it easier to perform calculations and manage data. A formula is a way to do simple maths calculations within Excel, such as adding numbers, subtracting, multiplying, or dividing. *For example,* if you want to add up a list of numbers, you can write a formula in Excel to automatically calculate the total.

Functions, on the other hand, are pre-made formulas that perform more complex calculations, like finding the average of a group of numbers, or identifying the highest or lowest value in a list. These functions are built into Excel, so you don't have to write them from scratch.

Using formulas and functions helps work faster, especially when dealing with large amounts of data. Instead of doing calculations by hand or manually typing in the results, Excel can perform the calculations automatically.

INTRODUCTION TO EXCEL FORMULAS

In Excel, formulas are used to perform calculations automatically on data. Formulas start with an equal sign (=) followed by the calculation to be perform. Excel uses operators to carry out basic mathematical operations. These operators are symbols that represent different types of calculations, such as addition, subtraction, multiplication, and division.

The most commonly used operators in Excel are:

For Addition (+), Subtraction (-), Multiplication (*) and for division (/).

Below are examples of how these operators can be used, based on a simple dataset.

Consider:

Item	Quantity	Price
Apple	5	20
Banana	7	15
Orange	4	30

1. Addition (+)

This operator is used to add two or more numbers together.

For example, to add the quantities of apples, bananas, and oranges, the formula would be:

=B2 + B3 + B4

This adds the values in cells B2, B3, and B4, giving the total quantity of fruits.

Result: 5 (Apple) + 7 (Banana) + 4 (Orange) = 16

2. Subtraction (-)

The subtraction (-) operator is used to subtract one number from another.

For example, to find the difference in price between apples and bananas, you can subtract the price of bananas from the price of apples.

To subtract the price of bananas from the price of apples, the formula would be: =C2 - C3

This subtracts the value in C3 (Banana Price) from C2 (Apple Price).

Result: 20 (Apple) - 15 (Banana) = 5

3. Multiplication (*)

The multiplication (*) operator is used to multiply two numbers.

For example, if you want to find the total cost of apples (where the quantity is multiplied by the price), you can use the multiplication operator.

To calculate the total cost of apples, the formula would be: =B2 * C2

This multiplies the quantity of apples (B2) by the price of apples (C2).

Result: 5 (Quantity of Apple) * 20 (Price of Apple) = 100

4. Division (/)

The division (/) operator is used to divide one number by another.

For example, if you want to find out the average price per fruit for apples, the formula would divide the total price of apples by the quantity.

To calculate the average price per apple, the formula would be: =C2 / B2

This divides the price of apples (C2) by the quantity of apples (B2).

Result: 20 (Price of Apple) / 5 (Quantity of Apple) = 4

EXCEL FUNCTIONS

In Excel, functions are pre-built formulas that allow users to perform various calculations without needing to manually write out the calculations. Functions like SUM, AVERAGE, COUNT, MIN, and MAX are particularly helpful for analysing and managing data quickly and accurately. These basic functions can be used to calculate totals, averages, counts, and other important values. Understanding how to use these functions is essential when working with data, especially when handling multiple numbers or a large dataset.

Now explore how to use basic Excel functions using an example related to marks. Both basic arithmetic operators and functions like SUM, AVERAGE, COUNT, MIN, and MAX can be used to calculate total marks, average, percentage, and other important values for student data.

Student Name	English	Maths	Science	History
Arjun	70	75	80	85
Disha	60	65	55	70
Maya	90	85	80	95
Deepak	55	50	60	45
Vidya	80	85	90	100

Method 1: Using Basic Operators for Calculations

To calculate the total marks for each student, the + operator can be used. For Arjun, the total marks are calculated as follows:

- Formula: =B2 + C2 + D2 + E2
- This adds the marks from all four subjects for Student A.

The total marks for Arjun would be: 70 + 75 + 80 + 85 = 310.

To calculate the percentage, divide the total marks by the maximum possible marks (in this case, 400 for 4 subjects, each out of 100):

- Formula: =F2 / 400 * 100
- For Student A, the percentage is: (310 / 400) * 100 = 77.5%

Method 2: Using Functions

SUM: The SUM function is one of the most widely used functions in Excel. It adds up all the numbers in a selected range of cells. This is particularly useful for calculating the total of a set of values, such as total sales, total expenses, or total marks.

In the given data set follow the steps below to find the total marks of Arjun using the sum function.

Step 1: Formula: =SUM (B2:E2)

Step 2: This formula automatically adds up the marks in cells B2 to E2 (the 1marks for all 4 subjects). The total marks for Arjun will be automatically calculated as 310.

Step 3: Double click on the corner of the cell and the same function will be performed for all the other students.

AVERAGE: The AVERAGE function is used to calculate the average value of a range of numbers.

Step 1: To calculate the average marks for each student:

Formula: =AVERAGE (B2:E2)

Step 2: This formula will calculate the average of the marks for Student A across all 4 subjects. The result for Student A would be:

(70 75 + 80 + 85) / 4 = 77.5

Step 3: Double click on the corner of the cell and the same function will be performed for all the other students.

COUNT: The COUNT function is used to count the number of cells in a range that contain numbers.

To count how many subjects are being considered for each student:

Step 1: Formula: =COUNT (B2:E2)

Step 2: This formula will count how many numbers (marks) are in the range B2 to E2, which will return 4 (since there are 4 subjects for each student).

Step 3: Double click on the corner of the cell and the same function will be performed for all the other students.

MIN: The MIN function is used to find the smallest value in a range of numbers. To find the lowest marks scored by each student in the subjects:

Step 1: Formula: =MIN (B2:E2)

Step 2: For Student A, this function will find the lowest marks among the four subjects (70, 75, 80, and 85). The result will be 70, which is the minimum score.

Step 3: Double click on the corner of the cell and the same function will be performed for all the other students.

MAX: The MAX function is used to find the largest value in a range of numbers.

To find the highest marks scored by each student in any subject:

Step 1: Formula: =MAX (B2:E2)

Step 2: For Student A, this function will find the highest marks among the four subjects (70, 75, 80, and 85). The result will be 85, which is the highest score.

Step 3: Double click on the corner of the cell and the same function will be performed for all the other students.

AutoSum: The AutoSum function in Excel is used to quickly add up a range of numbers. Instead of manually typing the SUM function, AutoSum is used to automatically select and sum a group of numbers. This feature is especially helpful when large datasets are worked with, as it saves time and minimizes errors.

In the following dataset, the AutoSum function can be used to calculate the total sales:

Item	Quantity Sold	Price per Item	Total Sales
Apple	5	20	100
Banana	7	15	105
Orange	4	30	120
Mango	6	25	150
Grapes	8	18	144

To calculate the total sales, the following steps should be followed:

The cell below Grapes' total sales (for example, D7) should be selected.

The AutoSum button (∑) in the Home tab should be clicked.

Excel will automatically highlight the cells D2 to D6 (representing the total sales for each item). If the selection is correct, Press Enter key.

Result: The sum of 100 + 105 + 120 + 150 + 144 will be automatically calculated, and the total sales will be shown as 619 in cell D7.

CELL REFERENCES

In Excel, cell references are used to point to specific cells or ranges of cells, allowing data from one part of the worksheet to be used in formulas and functions. These references are crucial for performing calculations and organizing data, as they help Excel understand where to get the information from.

There are two types of cell references in Excel: relative and absolute. Each type behaves differently when formulas are copied or moved within the worksheet.

The following data set is used to understand the different types of cell references.

Item	Price (₹)	Quantity	Tax Rate (%)
Apple	50	2	10
Banana	30	3	12
Orange	40	1	15

1. **Relative Cell Reference:** A relative reference is the most common type of reference. When a formula is copied or moved, the reference changes based on the new location of the formula. This is helpful when performing calculations on different rows or columns without having to manually adjust the references.

   Calculate the total price for each item,

   Formula: = Price * Quantity

   this can be done using relative references, which change as the formula is copied down.

   Formula for Cell E2 (Apple): =B2 * C2

   Where,

   B2 is the Price (₹50 for Apple)

   C2 is the Quantity (2 for Apple)

   When this formula is copied down, Excel automatically adjusts the cell references for each row.

   Result for Apple (Fig. 2.12): = 50 * 2 = 100

	A	B	C	D	E
1	**Item**	**Price (₹)**	**Quantity**	**Tax Rate (%)**	**Total Price**
2	Apple	50	2	10	=B2*C2
3	Banana	30	3	12	
4	Orange	40	1	15	
5					

Fig. 2.12: Calculation Total Price using Cell Referencing

2. **Absolute Reference:** An absolute reference locks a specific cell, so the reference does not change when the formula is copied or moved. Absolute references are created by adding dollar signs ($) before the column letter and row number (e.g., $A$1).

   Step 1: Using an Absolute Reference for a Fixed Tax Rate

   In this example, let's assume that the Tax Rate (10% for Apple) is the same for all items and is stored in cell D1. This is a scenario where absolute references are useful, as the Tax Rate needs to remain fixed while copying the formula to other rows.

   The formula to calculate the Total Price with Tax is:

   = (Price * Quantity) + ((Price * Quantity) * Tax Rate / 100)

   However, in this case, the Tax Rate will always be in cell D1, so instead of using a relative reference to D2 (which would change when copied), use absolute references to keep the tax rate fixed.

Formula (Fig. 2.13): = (B2 * C2) + ((B2 * C2) * $D$1 / 100)

Where,

B2 is the Price

C2 is the Quantity

$D$1 is the absolute reference to the Tax Rate (fixed at D1)

Explanation of Absolute Reference:

$D$1 is an absolute reference because both the column (D) and the row (1) are locked with dollar signs ($). This means that when the formula is copied to other cells, the reference to D1 will stay fixed.

	A	B	C	D	E	F
1	**Item**	**Price (₹)**	**Quantity**	**10**	**Total Price**	
2	Apple	50	2	=(B2*C2)+(B2*C2)/$D$1		
3	Banana	30	3			
4	Orange	40	1			
5						

Fig. 2.13: Absolute references to keep the tax rate fixed

Step 2: Applying the Formula for All Items

Let's now apply the formula for each item in the dataset:

For Apple (in E2):

= (B2 * C2) + ((B2 * C2) * $D$1 / 100)

This formula calculates the total price with tax for Apple using the price in B2, quantity in C2, and the tax rate in D1.

Result: (50 * 2) + ((50 * 2) * 10 / 100) = 100 + 10 = 110

For Banana (in E3), the same formula is used:

= (B3 * C3) + ((B3 * C3) * $D$1 / 100)

The formula automatically adjusts the Price and Quantity values for Banana, but the Tax Rate still refers to $D$1 (which remains fixed).

Result: (30 * 3) + ((30 * 3) * 10 / 100) = 90 + 9 = 99

For Orange (in E4), the formula is the same:

= (B4 * C4) + ((B4 * C4) * $D$1 / 100)

Result: (40 * 1) + ((40 * 1) * 10 / 100) = 40 + 4 = 44

Step 3: Apply formula for all items (Fig. 2.14)

Now that the formula is in E2 (for Apple), it can be dragged down to apply to E3 (Banana) and E4 (Orange). Even though the formula is copied to

other rows, the Tax Rate reference ($D$1) stays fixed and does not change, because it is an absolute reference.

	A	B	C	D	E	F	G	H
1	**Item**	**Price (₹)**	**Quantity**	**10**	**Total Price**			
2	Apple	50	2		110	=(B2*C2)+(B2*C2)/$D$1		
3	Banana	30	3		99	=(B3*C3)+(B3*C3)/$D$1		
4	Orange	40	1		44	=(B4*C4)+(B4*C4)/$D$1		
5								

Fig. 2.14: Absolute references to calculate Total Price

Did you know?

Excel isn't just for storing data, it can help to analyse, calculate, and organize it automatically! For example, the SUM function adds up numbers in a selected range in seconds, and the AVERAGE function can help you quickly find the mean of your data. Excel's ability to work with relative and absolute references means, it can copy a formula across a range of cells and adjust the calculations dynamically. Absolute references lock specific data points, such as tax rates or constants, so they don't change when it copies formulas. With these tools, it can save lots of time and no more manual calculations for large data sets!

PRACTICAL EXERCISES

Activity 1: Basic Arithmetic Operations and Functions.

Materials Required: Computer or Laptop with Microsoft Excel installed

Procedure:

1. Enter the following in worksheet starting from Cell A1:

	A	B	C	D
1	**Item**	**Quantity**	**Price**	**Total Cost**
2	Apple	5	40	
3	Banana	7	10	
4	Orange	4	30	
5				

2. Calculate Total Cost for Each Item
   In Cell D2, type: =B2 * C2, Press Enter.
   Copy the formula down for Banana and Orange (D3 and D4).
3. Calculate Total Quantity and Total Sales
   In any empty cell (for example, B6), calculate total quantity: =SUM (B2:B4)
   In another empty cell (for example, D6), calculate total sales: =SUM (D2:D4)
4. Calculate Average Price
   In any empty cell (for example, C6), calculate average price per item: =AVERAGE (C2:C4)

5. Save the workbook with the name: “Fruit Sales Analysis.xlsx”
6. Show to the teacher for review and feedback.

Activity 2: Using Functions for Student Data.

Material Required: Computer or Laptop with Microsoft Excel installed

Procedure:

1. In a new Excel worksheet, type the following starting from Cell A1:

	A	B	C	D	E
1	**Student Name**	**English**	**Maths**	**Science**	**History**
2	Arjun	70	65	80	85
3	Disha	60	68	55	70
4	Maya	90	95	80	95
5	Deepak	55	80	60	45
6	Vidya	80	70	90	100

2. Calculate Total Marks for Each Student

   In Cell F1, type Total Marks.

   In Cell F2, enter the formula: =SUM (B2:E2)

   Copy the formula down for all students (F3 to F6).

3. Calculate Average Marks for Each Student

   In Cell G1, type Average Marks.

   In Cell G2, enter the formula: =AVERAGE (B2:E2)

   Copy the formula down for all students.

4. Find the Highest and Lowest Marks

   In Cell H1, type Highest Marks.

   In Cell H2, enter the formula: =MAX (B2:E2)

   In Cell I1, type Lowest Marks.

   In Cell I2, enter the formula: =MIN(B2:E2)

   Copy both formulas down for all students.

5. Count the Number of Subjects

   In Cell J1, type Subjects Count.

   In Cell J2, enter the formula: =COUNT (B2:E2)

   Copy the formula down for all students.

6. Save the workbook with the name: "Student Marks Analysis.xlsx"
7. Show to the teacher for review and feedback.

CHECK YOUR PROGRESS

A. Fill in the Blanks

1. A formula in Excel begins with the _____ sign.
2. The formula =B2 + C2 uses the _____ operator to add two values.
3. The function _____ in Excel is used to calculate the average of a set of numbers.
4. The function _____ is used to find the highest number in a range.
5. The formula =B2 * C2 is an example of using the _____ operator in Excel.

B. Multiple Choice Questions (MCQs)

1. Which of the following functions is used to add a range of numbers in Excel?
   a) AVERAGE
   b) SUM
   c) COUNT
   d) MIN
2. What is the result of the formula =B2*C2 if B2 is 5 and C2 is 20?
   a) 25
   b) 100
   c) 15
   d) 10
3. Which operator is used for division in Excel?
   a) *
   b) +
   c) -
   d) /
4. What function will return the smallest value in a range of numbers?
   a) MIN
   b) MAX
   c) SUM
   d) COUNT
5. Which of the following functions would you use to count the number of numerical values in a given range of cells?
   a) COUNTIF
   b) COUNT
   c) AVERAGE
   d) SUM

C. State whether the following statements are True or False

1. The formula =B2 + C2 adds the values in cells B2 and C2.
2. The AVERAGE function in Excel calculates the total of numbers in a range.
3. The MAX function finds the highest value in a set of numbers.

4. You must manually write out calculations for the SUM function.
5. The formula =COUNT (B2:B6) counts the number of non-empty cells in the range B2 to B6, regardless of the type of data.

D. Short Answer Questions

1. What is the purpose of the SUM function in Excel?
2. Explain how the COUNT function works in Excel.
3. How does the AVERAGE function in Excel calculate the mean?
4. What is the difference between the MIN and MAX functions in Excel?
5. How do you use Excel to multiply two numbers? Provide an example.
6. What is the role of absolute cell references in Excel?

E. Long Answer Questions

1. Describe the difference between a formula and a function in Excel. How can both be used together to simplify calculations? Provide examples for both.
2. How would you use Excel to analyse student performance using functions like SUM, AVERAGE, MAX, and MIN? Explain step-by-step how each function can help evaluate student data.
3. What are the benefits of using relative and absolute references in Excel when performing calculations? Provide examples where each type of reference would be useful.
4. Explain how Excel's AutoSum feature works and provide an example where it can save time when working with large data sets.

F. Check Your Performance

1. In a blank worksheet, enter the following marks:

	A	B	C	D	E
1	**Student**	**English**	**Maths**	**Science**	**History**
2	Arjun	70	65	80	85

Perform following basic functions and cell referencing.

- In F1, type "Total Marks" and calculate total using: =SUM(B2:E2)
- In G1, type "Average Marks" and use: =AVERAGE(B2:E2)
- In H1, type "Highest" and use: =MAX(B2:E2)
- In I1, type "Lowest" and use: =MIN(B2:E2)
- In J1, type "Subjects Count" and use: =COUNT(B2:E2)

SESSION 3: DATA PRESENTATION AND BASIC CHARTS IN EXCEL

In Excel, data is often presented in tables and rows, but sometimes the information can be difficult to understand just by looking at numbers alone. This is where charts are used. Charts are powerful tools in Excel that allow raw data to be transformed into a visual format, making it easier to interpret, compare, and analyse. By using charts, trends and patterns in the data can be seen more clearly, which helps decisions to be made more effectively.

ADVANCED FORMATTING OPTIONS

Excel offers many advanced formatting techniques that help make data easier to understand and look more professional. These techniques are used to highlight important information, make the data more readable, and improve the overall appearance of worksheets. The three most useful advanced formatting techniques are Conditional Formatting, Number Formatting, and Cell Styles.

1. Conditional Formatting

Conditional formatting is one of the most powerful tools of excel that helps apply formatting based on the conditions that are defined. It automatically adjusts the formatting when the values in the cells meet specific criteria, making it easier to spot trends, outliers and important data points.

Excel offers several advanced options under Conditional Formatting, including Highlight Cells Rules, Top/Bottom Rules, Data Bars, Color Scales, and Icon Sets.

It is necessary to understand all the components of conditional formatting by performing certain function on the data set given below:

Item	Price (₹)	Quantity	Total Sales (₹)
Apple	50	2	100
Banana	30	3	90
Orange	40	1	40
Mango	60	4	240
Grapes	45	5	225

a) **Highlight Cell Rules:** The Highlight Cells Rules allow specific cells to be highlighted when they meet certain conditions, such as when

values are greater than, less than, equal to, or between certain numbers.

How to apply:

- Select the range of cells you want to format.
- Go to the Home tab and click on Conditional Formatting.
- Choose Highlight Cells Rules and select an option like Greater Than, Less Than, or Between.
- Set the value or range and choose the formatting style (e.g., background color.

To highlight the Total Sales greater than ₹200 follow the following steps:

Step 1: Select the cells in the Total Sales column (D2 to D6).
Step 2: Click on Conditional Formatting → Highlight Cells Rules → Greater Than.
Step 3: In the dialog box, enter 200 and choose a format (e.g., green fill).
Step 4: The Mango and Grapes rows will be highlighted in green, since their sales are greater than ₹200.

Also try: Highlight the Total Sales lesser than ₹100.

b) Top/Bottom Rules: The Top/Bottom Rules allow highlighting the top or bottom values in a range. This feature is useful for quickly identifying the best or worst performers in a data set.

How to Apply:

- Select the range of cells to apply the formatting.
- Go to Conditional Formatting → Top/Bottom Rules.
- Choose an option like Top 10 Items, Bottom 10 Items, or Above Average.
- Set the number or percentage and apply formatting.

To highlight the top 2 sales, follow the following steps:

Step 1: Step 1: Select the Total Sales column (D2 to D6).
Step 2: Step 2: Click on Conditional Formatting → Top/Bottom Rules → Top 10 Items.
Step 3: Step 3: Set the number to 2 and choose a format (e.g., bold text and yellow fill).
Step 4: Step 4: The Mango and Grapes rows will be highlighted as the top 2 sales.

c) Data Bars: Data Bars are used to display a bar within each cell, representing the value relative to the rest of the cells. Larger values are shown with longer bars, making it easy to compare values visually.

How to Apply:

- Select the range of cells to be formatted.
- Go to Conditional Formatting → Data Bars.
- Choose a colour for the data bars (either gradient or solid fill).

To add data bars to the Total Sales column, follow the steps below:

Step 1: Select the cells in the Total Sales column (D2 to D6).
Step 2: Click on Conditional Formatting → Data Bars.
Step 3: Choose a colour (e.g., green fill with a gradient).
Step 4: The cells will show a bar that represents the value of total sales, making it easy to see which items have the highest and lowest sales.

d) Colour Scales: Colour Scales apply a colour gradient to the cells based on their values. A colour gradient is applied from one colour to another, with the colours representing the lowest, middle, and highest values.

How to Apply:

- Select the range of cells to apply the formatting.
- Go to Conditional Formatting → Colour Scales.
- Choose a colour scale, like green to red or blue to white.

To apply a colour scale to show the performance of sales, follow the steps below:

Step 1: Select the cells in the Total Sales column (D2 to D6).
Step 2: Click on Conditional Formatting → Colour Scales → select a colour scale, like green to red.
Step 3: Cells with higher sales (e.g., Mango and Grapes) will be shaded green, and cells with lower sales (e.g., Orange) will be shaded red.
Step 4: This helps easily identify the best and worst performing sales figures visually.

e) Icon Sets: Icon Sets are used to display icons (like arrows, traffic lights, stars, etc.) in cells based on the value in each cell. This is useful for showing trends like growth, decline, or status visually**.**

How to Apply:

- Select the range of cells to apply the formatting.
- Go to Conditional Formatting → Icon Sets.
- Choose the preferred icon set (e.g., 3 Arrows, 3 Traffic Lights, etc.).

To apply icons based on the sales values follow the following steps:

Step 1: Select the cells in the Total Sales column (D2 to D6).

Step 2: Click on Conditional Formatting → Icon Sets → select 3 Arrows.

Step 3: Excel will automatically assign green (up arrow) for high sales, yellow (side arrow) for moderate sales, and red (down arrow) for low sales.

- Mango and Grapes would receive a green arrow (because their total sales are high).
- Orange would receive a red arrow (since its sales are low).

2. Number Formatting

Number Formatting in Excel is used to control how numbers are displayed. Numbers can be shown in different formats such as Currency, Percentage, Decimal Numbers, Date, and more. Proper number formatting ensures that data is presented clearly and consistently, especially when dealing with financial data, percentages, or large datasets.

Let's explore the different types of number formats that can be applied to data, using the following example dataset:

Item	Price (₹)	Quantity	Total Sales (₹)
Apple	50.45	2	100.9
Banana	30.99	3	92.97
Orange	40.5	1	40.5
Mango	60.75	4	243
Grapes	45.25	5	226.25

Below are the different types of number formatting:

a) Currency Formatting: Currency Formatting is used to display numbers with a currency symbol (like, $, €) and two decimal places. This format is commonly used when working with financial data such as prices, salaries, or sales figures.

Steps to apply currency in the data set:

Step 1: Step 1: Select the range of cells containing the numbers (e.g., the Price (₹) or Total Sales (₹) columns).
Step 2: Step 2: Go to the Home tab.
Step 3: Step 3: In the Number group, click on the Currency button (₹) from the dropdown menu.
Step 4: Step 4: The numbers will now be displayed with the currency symbol.

Result: The Price (₹) and Total Sales (₹) columns will display values like ₹50, ₹30, ₹40, ₹60, and ₹45 for prices, and ₹100, ₹90, ₹40, ₹240, and ₹225 for total sales.

b) Percentage Formatting: Percentage Formatting is used to display numbers as percentages, meaning the value is multiplied by 100 and followed by a percent sign (%). It is commonly used for calculating profit margins, growth rates, and other percentage-based data.

Steps to Apply Percentage Formatting:

Step 1: Select the range of cells that contains the decimal numbers or results to be converted into percentages (e.g., Tax Rate or Profit Margin).
Step 2: Go to the Home tab
Step 3: In the Number group, click on the Percentage button (%).
Step 4: The number will be displayed as a percentage.

c) Decimal Formatting: Decimal Formatting allows control over the number of decimal places displayed for a number. This is useful for presenting numbers with a specific level of precision, such as in measurements, calculations, or any other data requiring decimal values.

Steps to Apply Decimal Formatting:

Step 1: Select the range of cells containing numbers (e.g., Price (₹) or Total Sales (₹)).
Step 2: Go to the Home tab.
Step 3: In the Number group, click on the Increase Decimal or Decrease Decimal buttons to adjust the number of decimal places shown.

Results: If the Total Sales (₹) for Apple is calculated as 100 but displayed with two decimal places, it will appear as 100.00.

d) Date and Time Formatting: Date and Time Formatting is used to display dates and times in a variety of formats. This is helpful when tracking events, deadlines, or project timelines.

Steps to Apply Date and Time Formatting:

Step 1: Select the cells that contain the date or time values.

Step 2: Go to the Home tab.

Step 3: In the Number group, choose Short Date or Long Date from the dropdown.

Step 4: Excel will display the date in your chosen format.

- Short Date will display as 03/12/2023.
- Long Date will display as Monday, December 3, 2023.

3. Cell Styles in Excel

Cell Styles (Fig. 2.15) in Excel are predefined sets of formatting options (such as font, size, colour, and borders) that can be applied to cells quickly and consistently. They eliminate the need to manually adjust individual formatting settings like font style, color, or alignment. Cell Styles are helpful in maintaining a consistent look across a worksheet, especially when working with large datasets or creating professional reports.

Excel provides many built-in cell styles, and users can also create custom styles to meet their specific needs.

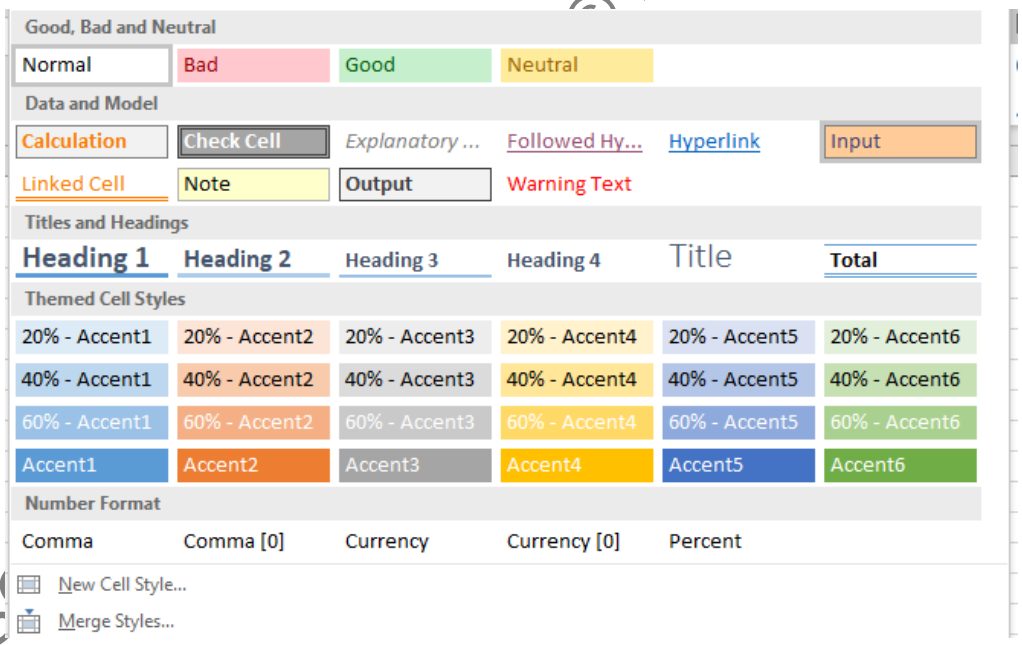


Fig. 2.15: Cell Styles

Components of Cell Styles

A Cell Style can include a combination of the following formatting options:

- Font Type (e.g., bold, italic, underline)
- Font Size (e.g., large or small)
- Font Colour (e.g., red, green, blue)
- Fill Colour (e.g., light yellow, blue, grey)
- Borders (e.g., no borders, thick borders, dashed borders)

- Text Alignment (e.g., center, left-aligned, right-aligned)

WORKING WITH TABLES

Tables in Excel helps to organize data efficiently. When data is converted into a table, Excel offers many powerful features that allow you to sort, filter, and perform calculations easily. Tables provide a structured way to store data and make worksheets more readable and manageable.

A Table in Excel is a range of data that is formatted to make it easier to manage. Tables automatically include special features such as:

- Headers for each column
- Automatic filtering and sorting options
- Total Row for calculating sums, averages, and other statistical measures
- The ability to automatically expand when new rows are added

Following are the steps to create a table:

Step 1: Select Your Data Range

Select the data range to be converted into a table (including headers). *For example,* if you have data from A1 to D6, select this range.

Step 2: Insert Table

Go to the Insert tab on the ribbon and click on the Table button in the Tables group.

Step 3: Confirm Table Range

In the Create Table dialog box, Excel will automatically detect your data range. Make sure the box that says My table has headers is checked, so the top row of the selection is used as the headers for the columns.

Step 4: Click OK

After confirming the range, click OK. Data will now be converted into a table, and Excel will apply a default table style.

Filter and Sort

Data can be sorted and filtered to organize and analyse it more effectively. These features are useful when working with large datasets, as they help data to be arranged in a specific order or allow certain data to be viewed based on specific conditions.

1. Sorting Data

Data can be sorted in ascending or descending order to make it easier to analyse. Sorting can be done alphabetically, numerically, or by date, depending on the type of data.

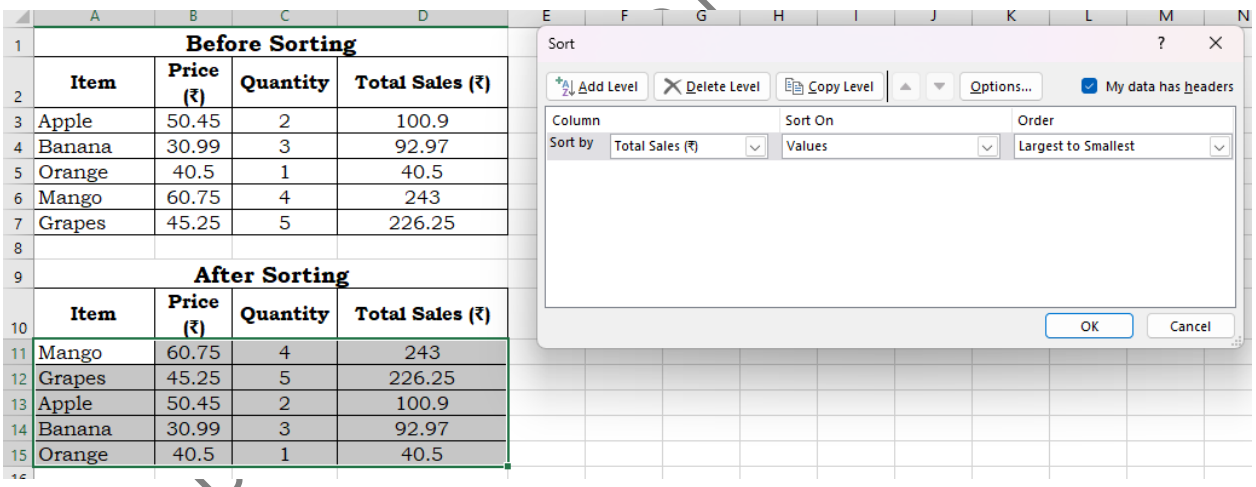
Steps to be following to apply Sorting:

A cell in the column to be sorted should be selected (e.g., Total Sales (₹)).

Step 1: The Data tab on the ribbon should be clicked.
Step 2: Either Sort A to Z (for ascending order) or Sort Z to A (for descending order) should be clicked.

If the Total Sales (₹) column needs to be sorted in descending order to see the highest sales first: (Fig. 2.16)

- Any cell in the Total Sales (₹) column (e.g., D2) should be selected.
- The Data tab should be clicked, and Sort Z to A should be selected.
- The data will be sorted so that the highest sales values, such as Mango (₹243.00), will appear at the top.



Before Sorting

Item	Price (₹)	Quantity	Total Sales (₹)
Apple	50.45	2	100.9
Banana	30.99	3	92.97
Orange	40.5	1	40.5
Mango	60.75	4	243
Grapes	45.25	5	226.25

After Sorting

Item	Price (₹)	Quantity	Total Sales (₹)
Mango	60.75	4	243
Grapes	45.25	5	226.25
Apple	50.45	2	100.9
Banana	30.99	3	92.97
Orange	40.5	1	40.5

Fig. 2.16: Sorting of Data (Before and After)

2. Filtering Data

Filtering allows data to be hidden temporarily based on specific criteria, so only relevant data can be viewed at any time.

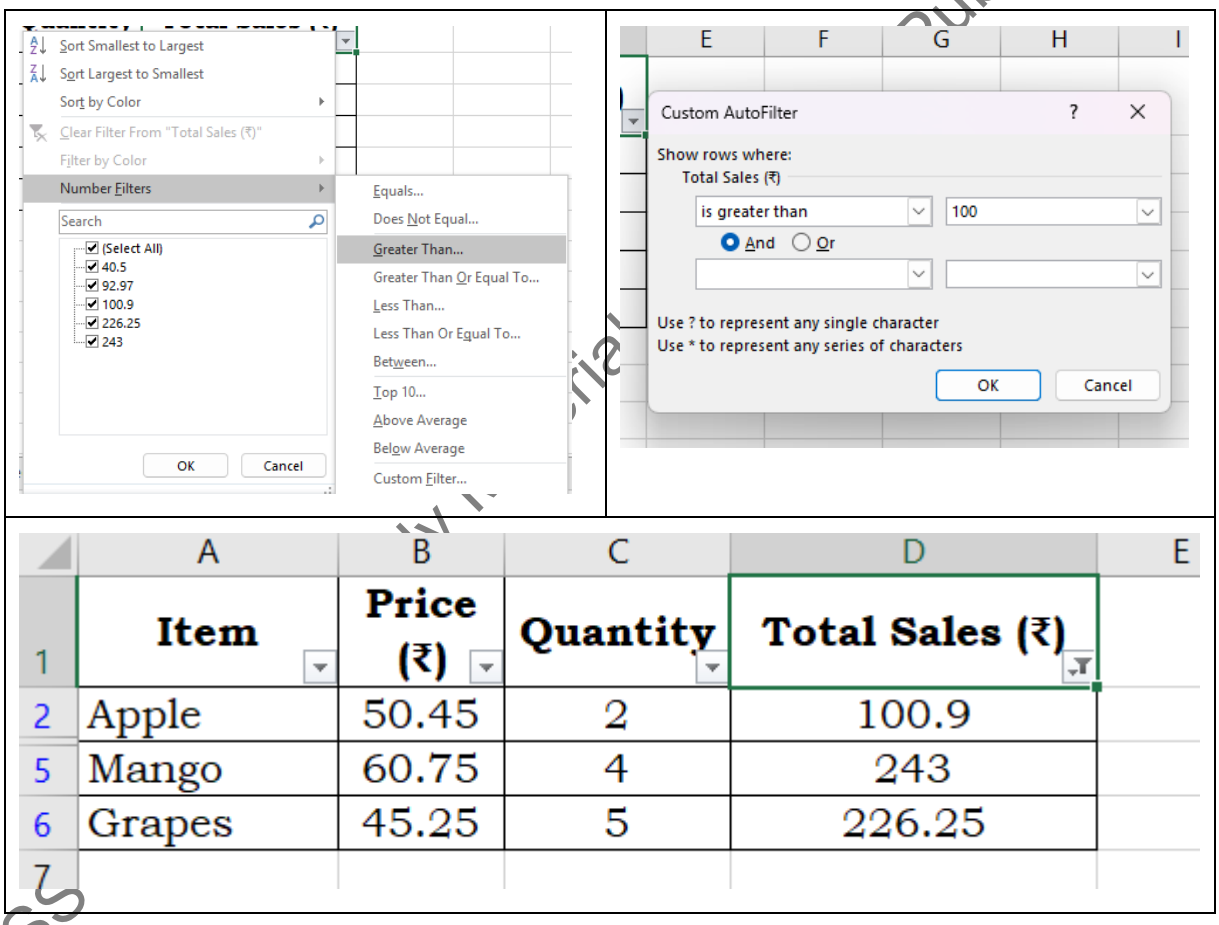
Steps to be following to apply Filtering:

Step 1: The table should be selected.
Step 2: The Data tab should be clicked, and the Filter button in the Sort and Filter group should be selected.
Step 3: Once filtering is applied, drop-down arrows will appear next to each column header.
Step 4: The drop-down arrow in the column to be filtered should be clicked.

Criteria for filtering should be selected (e.g., “greater than”, “less than”, or selecting specific items).

If the Total Sales (₹) values need to be filtered to show only values greater than ₹100: (Fig. 2.17)

- The drop-down arrow in the Total Sales (₹) column (e.g., D1) should be clicked.
- Number Filters → Greater Than should be selected.
- In the dialog box, 100 should be entered, and OK should be clicked.
- Only the rows where Total Sales (₹) are greater than ₹100, such as Apple, Mango, and Grapes, will be displayed. Rows for Banana and Orange will be hidden.



	A	B	C	D	E
1	Item	Price (₹)	Quantity	Total Sales (₹)	
2	Apple	50.45	2	100.9	
5	Mango	60.75	4	243	
6	Grapes	45.25	5	226.25	
7					

Fig. 2.17: Filtering of Data

Filtering helps in focusing on specific data without permanently altering the worksheet. Multiple filters can be applied on different columns to narrow down the data further.

BASIC CHART CREATION

Charts in excel is a tool that allow data to be presented visually, making it easier to understand and analyse. Column, Bar, and Line charts are some of the most commonly used types of charts in Excel. These charts allow trends

to be identified, comparisons to be made, and data to be displayed in an easily understandable format.

1. **Column Chart:** Column Charts are used to represent data with vertical bars. Each bar in the chart represents a data point, and the height of the bar shows the value of that data. Column charts are often used to compare data across categories.

   Steps to create column chart:

   Step 1: A range of data should be selected (for example, the Item and Total Sales (₹) columns).
   Step 2: The Insert tab on the ribbon should be clicked.
   Step 3: In the Charts group, the Column or Bar Chart button should be clicked.
   Step 4: From the dropdown, Clustered Column (the most common type of column chart) should be selected.
   Step 5: Excel will create a Column Chart based on the selected data.

   Example: Sales data for different items are shown as below, a Column Chart can be used to compare the sales for each item.

Item	Total Sales (₹)
Apple	100.9
Banana	92.97
Orange	40.5
Mango	243
Grapes	226.25

The chart shows vertical bars representing the total sales for each item, making it easy to compare sales values. (Fig. 2.18)

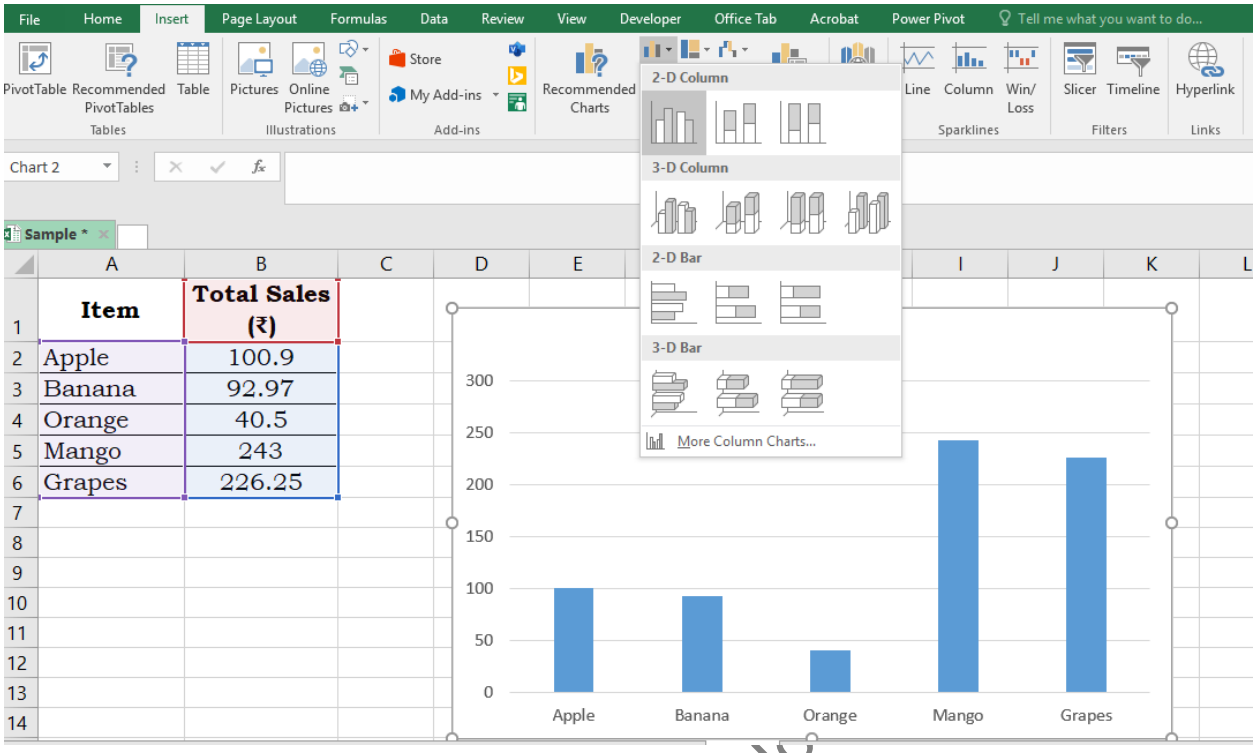


Fig. 2.18: Column Chart

2. Bar Chart: Bar Charts are similar to Column Charts but use horizontal bars instead of vertical ones. They are useful when category names are long or when comparing items with large differences in values.

Steps to create bar chart:

Step 1: A range of data should be selected (for example, the Item and Total Sales (₹) columns).

Step 2: The Insert tab on the ribbon should be clicked.

Step 3: In the Charts group, the Column or Bar Chart button should be clicked.

Step 4: From the dropdown, Clustered Bar should be selected.

Step 5: Excel will create a Bar Chart based on the selected data.

Use the data set of Column chart to create the bar chart.

The bar chart shows (Fig. 2.19) the sales for each item he sales for each item will be represented by horizontal bars, making it easier to read when dealing with long item names or if there are significant differences in sales.

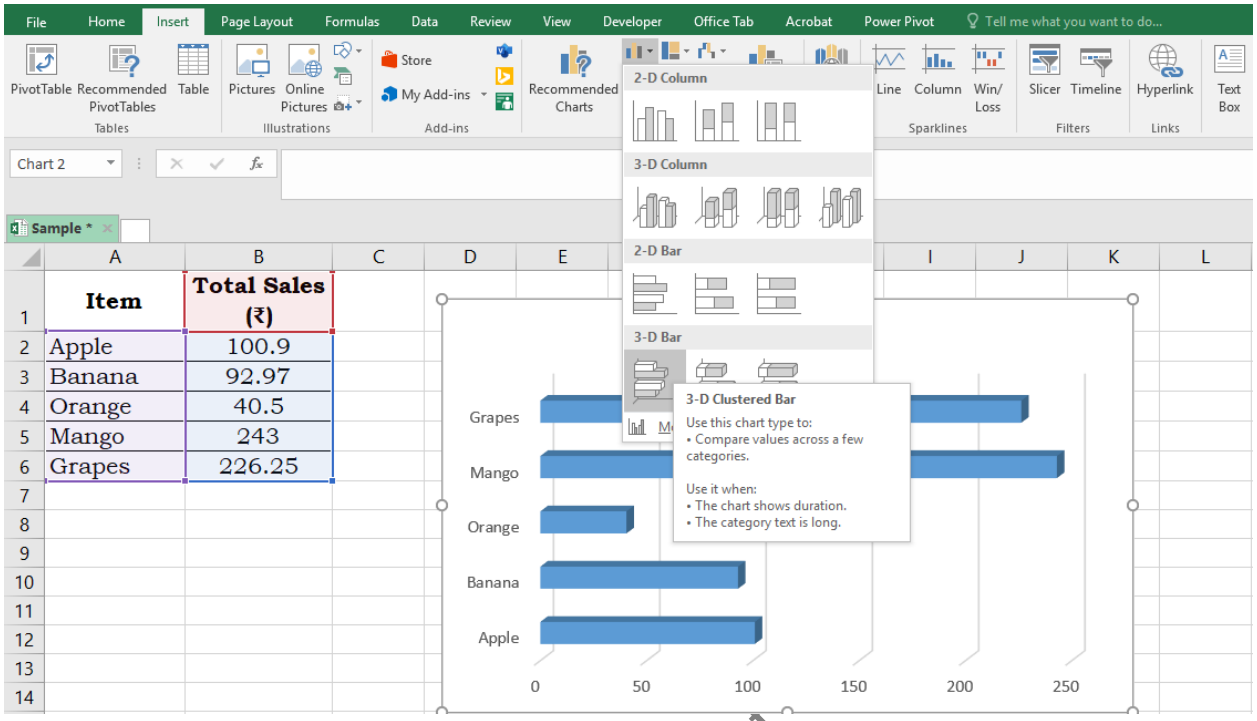


Fig. 2.19: 3-D Clustered Bar Chart

3. Line Chart

Line Charts are used to display trends over time. They are especially useful for showing how data changes across a continuous variable like months, years, or any other time-related data.

Steps to create line chart:

Step 1: A range of data should be selected (for example, the Month and Sales Data columns).
Step 2: The Insert tab on the ribbon should be clicked.
Step 3: In the Charts group, the Line Chart button should be clicked.
Step 4: From the dropdown, the desired type of line chart, such as Line with Markers, should be selected.
Step 5: Excel will create a Line Chart based on the selected data.

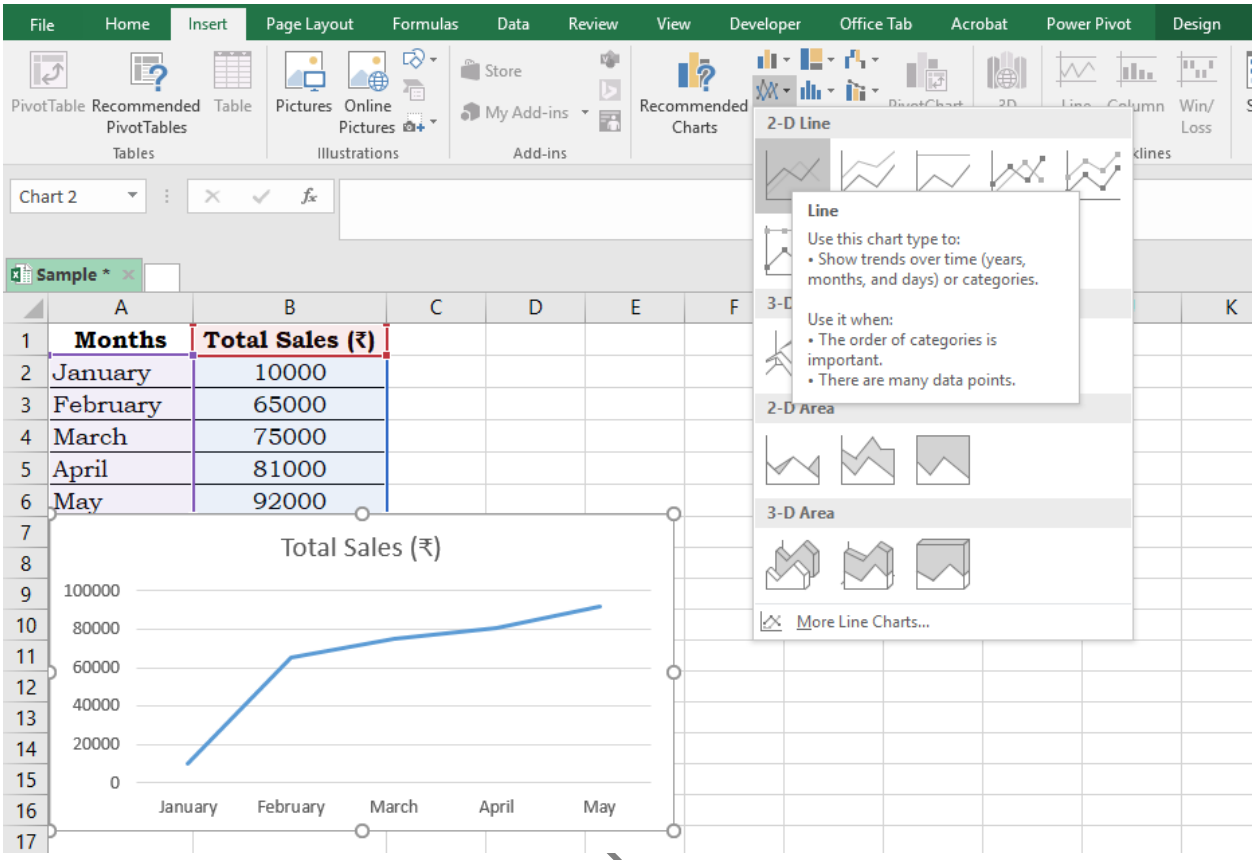


Fig. 2.20: Line Chart

The line chart shows (Fig. 2.20) how sales changed over the five months. The months are placed on the X-axis, and the sales values on the Y-axis. A line is drawn to connect the data points, making it easy to visualize trends (e.g., sales increasing from January to May).

Did you know?

Excel's charts aren't just for making data pretty. They can help you understand and analyse data much faster! For example, the Conditional Formatting tool allows you to highlight key data points based on specific criteria, helping trends and outliers stand out. Excel also provides Data Bars, Colour Scales, and Icon Sets to visualize data's performance. These tools help to identify areas needing attention or improvement. And when it comes to presenting data, charts like bar charts, line charts, and pie charts allow you to compare values and spot trends easily, so decision-making process is quicker and more effective!

PRACTICAL EXERCISES

Activity 1: Conditional Formatting.

Material Required: Computer or Laptop with Microsoft Excel installed

Procedure:

1. Enter the Following Data in an Excel worksheet starting from Cell A1, enter:

Item	Price (₹)	Quantity	Total Sales (₹)
Apple	50	2	100
Banana	30	3	90
Orange	40	1	40
Mango	60	4	240
Grapes	45	5	225

2. Apply Conditional Formatting as below:
   a) Highlight Total Sales Greater than ₹200:
      - Select cells D2 to D6
      - Go to Home tab → Conditional Formatting → Highlight Cells Rules → Greater Than
      - Enter 200
      - Choose a formatting style (e.g., green fill)
   b) Highlight Total Sales Less than ₹100:
      - Select cells D2 to D6
      - Go to Conditional Formatting → Highlight Cells Rules → Less Than
      - Enter 100
      - Choose a formatting style (e.g., red fill)
   c) Apply Data Bars for Visual Effect:
      - Select cells D2 to D6
      - Go to Conditional Formatting → Data Bars
      - Choose a colour gradient or solid fill
3. Save the file with the name as "Conditional Formatting Exercise.xlsx"
4. Show to the teacher for review and feedback.

Activity 2: Creating Basic Charts.

Material Required: Computer or Laptop with Microsoft Excel installed

Procedure:

1. Enter the Following Data in an Excel worksheet starting from Cell A1, enter:

Item	Total Sales (₹)
Apple	100
Banana	90
Orange	40
Mango	240
Grapes	225

2. Create Charts
   a) **Bar Chart:**
      - Select the range **A1:B6**
      - Go to the **Insert** tab
      - Click on **Bar Chart** → Choose **Clustered Bar**
   b) **Pie Chart:**
      - Select the range **A1:B6**
      - Go to the **Insert** tab
      - Click on **Pie Chart** → Choose **2-D Pie**
      - Add a title to the chart: "Total Sales by Item"
   c) **Line Chart:**
      - Select the range **A1:B6**
      - Go to the **Insert** tab
      - Click on **Line Chart** → Choose **Line with Markers**
3. Save the workbook with the name as "Basic Charts.xlsx"
4. Show to the teacher for review and feedback.

CHECK YOUR PROGRESS

A. Fill in the Blanks

1. Conditional Formatting in Excel allows users to apply _____ based on cell values.
2. A _____ chart is best used to compare data across categories with vertical bars.
3. In a pie chart, each slice represents a _____ of the whole data.
4. To show the best-performing items visually, you can use _____ formatting with data bars.

5. The _____ function in Excel is used to highlight cells based on specific conditions.

B. Multiple Choice Questions (MCQs)

1. Which of the following Excel charts is best for visualizing trends over time?
   a) Bar Chart
   b) Line Chart
   c) Pie Chart
   d) Column Chart
2. What does the Top/Bottom Rules in conditional formatting allow you to do?
   a) Sort data
   b) Highlight cells based on a fixed range
   c) Identify the highest or lowest values in a range
   d) Display data bars
3. Which of the following conditional formatting features helps in comparing data values visually with coloured bars?
   a) Icon Sets
   b) Data Bars
   c) Colour Scales
   d) Highlight Cells Rules
4. Which of the following chart types should be used to compare the sales of different items in a single view?
   a) Pie Chart
   b) Line Chart
   c) Column Chart
   d) Bar Chart
5. Which of the following chart types is best suited for comparing the proportions of different categories in relation to the whole?
   a) Line Chart
   b) Column Chart
   c) Pie Chart
   d) Bar Chart

C. State whether the following statements are True or False

1. Conditional formatting can only be applied to numbers in Excel.
2. In Excel, pie charts are useful for showing proportions and percentages of a whole.
3. You cannot apply multiple conditional formatting rules to a single cell in Excel.
4. A line chart is suitable for comparing data points across categories.
5. You can apply multiple conditional formatting rules to a single cell in excel, and all rules will be applied simultaneously.

D. Short Answer Questions

1. What is conditional formatting in Excel, and how does it enhance data analysis?
2. Why would you pie chart in Excel?
3. What type of data is best represented using bar chart?
4. How do data bars in excel help to visualize data?
5. What is the purpose of using data bars in excel, and how do they enhance the visual representation of data?

E. Long Answer Questions

1. Explain the process of creating a pie chart in Excel. What type of data would you use a pie chart for, and how can it be customized for better clarity?
2. Describe the role of advanced formatting techniques like Conditional Formatting, Cell Styles, and Number Formatting in improving the presentation of data in Excel.
3. Explain how Conditional Formatting in Excel can be used to highlight key data points, and give examples of how it can be applied to improve data analysis.
4. Describe the process of creating and customizing a column chart in Excel to compare sales data for different items. What are some key customization options you can apply to make the chart clearer and more visually appealing?

F. Check your Performance

1. You are provided with the following sales data. Enter the data in Excel and perform the tasks below:

Product	Category	Units Sold	Unit Price (₹)	Total Sales (₹)
Laptop	Electronics	5	40,000	
Headphones	Electronics	10	2,500	
Chair	Furniture	15	3,000	
Desk	Furniture	8	5,000	
Mouse	Electronics	20	500	

a) Calculate Total Sales: In the "Total Sales" column, use the formula: =Units Sold * Unit Price.

b) Apply Conditional Formatting:
   - Highlight Total Sales greater than ₹30,000 with green fill.
   - Highlight Total Sales less than ₹5,000 with red fill.

c) Use Number Formatting: Format Total Sales and Unit Price columns to show currency (₹) with 2 decimal places.
d) Apply Cell Styles: Apply a bold header style to the top row.
e) Convert Data to Table: Select the data range and insert a Table with filters.
f) Sort and Filter Data:
    - Sort the table by Category in alphabetical order.
    - Filter to show only "Electronics" items.
g) Create a Chart:
    - Insert a Column Chart showing Product vs. Total Sales.
    - Add a chart title: "Sales by Product".
h) Save the File as "Sales Data Analysis.xlsx".

SESSION 4: LOOKUP AND LOGICAL FUNCTIONS

Lookup and logical functions are tools that allow tasks to be completed more efficiently by searching for specific values and performing calculations based on certain conditions.

Lookup Functions are used to search for a particular value within a range of data and return a related value. Large datasets are easier to work with when these functions are used. *For example,* VLOOKUP () can be used to search for data vertically in a table, while HLOOKUP () searches horizontally across rows.

With Lookup Functions, searching for information is simplified, and values can be retrieved automatically, reducing the need for manual effort. This feature is particularly useful in tables, where quick access to related data is often required.

Logical Functions are used to perform actions based on specific conditions. The most common logical function, IF (), is used to check if a condition is true or false. Depending on the result, a specific value will be returned for true or false conditions. More complex decisions can be made by combining logical functions like AND (), OR (), and NOT ().

Logical functions allow decisions to be automated based on multiple conditions. They help to streamline calculations and make analysis more efficient by handling data-driven decisions without manual intervention.

LOOKUP FUNCTIONS

1. VLOOKUP

The VLOOKUP function in Excel is one of the most widely used functions to search for a value in a table and return a corresponding value from another column. The name VLOOKUP stands for Vertical Lookup, as it searches for the value vertically in a table, looking down a column.

This function is very useful when working with large datasets, where specific data points need to be found quickly. *For example,* you may have a list of students with their names and marks, and you want to find the marks of a particular student without manually searching through the entire list.

The syntax of the VLOOKUP function is:

=VLOOKUP (lookup value, table array, col_index_num, [range lookup])

- **lookup value:** The value that is searched for in the first column of the table.
- **table array:** The range of cells that contains the data (including the column with the lookup value and the column with the data to return).

- **col_index_num:** The column number from which the matching value will be returned (the first column is 1, the second is 2, and so on).
- **[range lookup]:** This is optional. TRUE (default) finds an approximate match, and FALSE finds an exact match.

Let us understand with the help of an example, below is the data set of student marks.

Sheet 1

S.N.	A	B
1	**Student Name**	**Marks**
2	Jay	85
3	Manisha	92
4	Anant	78
5	Bhim	65
6	Lila	90

Sheet 2

S.N.	A	B
1	**Student Name**	**Marks**
2	Anant	
3	Bhim	
4	Jay	
5	Lila	
6	Manisha	

Now, the marks of the students have been fetched in Sheet2 by applying the VLOOKUP function.

Steps to find out the marks of Anant using VLOOKUP:

1. **Lookup Value:** The lookup_value will be Student Name e.g. “Anant” as we want to find his marks.
2. **Table Array:** The table_array will be the range that includes the Student Name and Marks columns. In this case, the table range is A2:B6.
3. **Column Index Number:** The col_index_num will be 2 because the Marks column is the second column in the table.
4. **Exact Match:** Use FALSE for the range_lookup argument to ensure an exact match for Manisha’s name.

   Formula: =VLOOKUP (“Anant”, A2:B6, 2, FALSE)

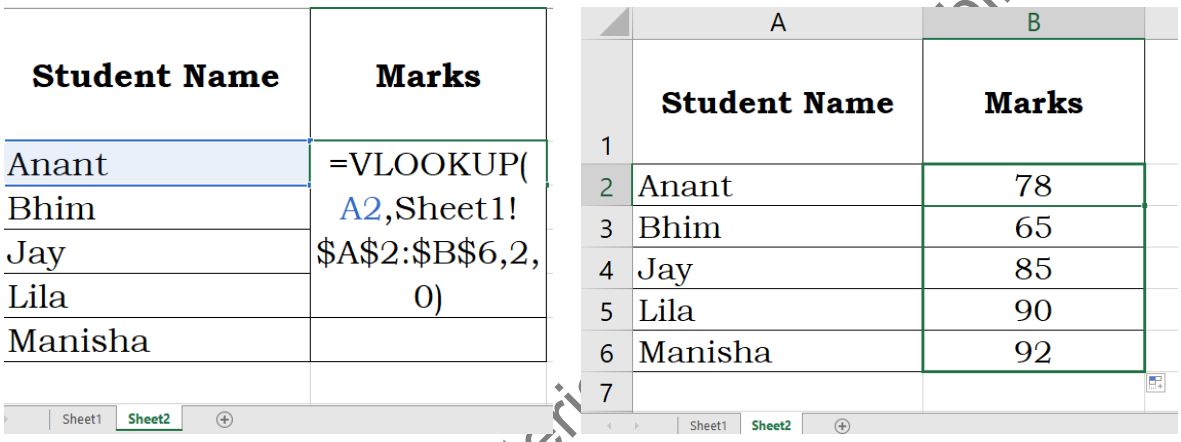
   Once the formula is entered, Excel will look for Manisha in the Student Name column (Column A). When it finds Anant in A3, it will return the value in the second column (Column B), which is 78.

   Result: The value 92 (Manisha's marks) will be returned by the formula.

Now if we have to match the exact value (Marks of the Students) from another excel file of sheet, then follow steps as below: (Fig. 2.21)

1. **Lookup Value:** A2 or A2:A6 → Student name(s) to be matched
2. **Table Array:** Sheet1! $A$2: $B$6 → The range containing the names and marks from Sheet1 (Select the range and press F4 to fix it with $ signs)
3. **Column Index Number:** 2 → Column number from the table array that has the marks
4. **Exact Match:** Enter FALSE or 0 to ensure only exact matches are returned

=VLOOKUP (A2, Sheet1!$A$2:$B$6,2,0)



Enter VLOOKUP formula **Result after dragging Fill Handle**

Fig. 2.21: VLOOKUP

Once the VLOOKUP formula in the first cell (e.g., B2) as shown in Fig. 2.21.

Next Step: Use the Fill Handle

- Place the cursor at the bottom-right corner of the cell with the formula (you will see a small "+" sign called the fill handle). Click and drag the fill handle down to cover all required rows (up to the last student's name).
- This copies the VLOOKUP formula to all selected cells, fetching marks for all students in Sheet2 automatically.

Importance of VLOOKUP:

The VLOOKUP function is helpful for searching through large datasets to find related information quickly. Instead of manually searching for data, VLOOKUP allows it to be automated, saving both time and effort. It is particularly useful in tasks like:

- Looking up prices in a product list.
- Finding scores in an exam results sheet.
- Searching for specific information in large records.

2. HLOOKUP

The HLOOKUP function in Excel is similar to VLOOKUP, but it is used to search for a value in the first row of a table and return a corresponding value from another row. HLOOKUP stands for Horizontal Lookup because it searches for data horizontally across rows, rather than vertically down columns.

This function is useful when data is organized horizontally, such as in situations where the headings are placed in the top row and the related data is stored in rows below.

The syntax of the HLOOKUP function is:

=HLOOKUP (lookup_value, table_array, row_index_num, [range_lookup])

- **lookup_value:** The value to be searched for in the first row of the table.
- **table_array:** The range of cells containing the data (including the row with the lookup value and the row with the data to return).
- **row_index_num:** The row number from which the corresponding value will be returned (the first row is 1, the second row is 2, and so on).
- **[range_lookup]:** This is optional. TRUE (default) will return an approximate match, and FALSE will return an exact match.

Let us understand the HLOOKUP function with the help of a simple example. Below is the dataset showing Monthly Sales, where the months are listed in the first row, and the corresponding sales figures are listed in the second row:

January	February	March	April	May
1500	2000	1800	2200	2100
1300	2500	1900	2400	2200

Now, to find the sales for March in the first row of the data.

Steps to find out the sales for the month of march

1. **Lookup Value:** The lookup_value will be “March”, as to find the sales for March.
2. **Table Array:** The table_array will be the range that includes all the sales data, i.e., A1:E2.
3. **Row Index Number:** The row_index_num will be 2 because the sales data is in the second row.
4. **Exact Match:** FALSE will be used for the range_lookup to find an exact match for “March”.

HLOOKUP Formula: =HLOOKUP("March", A1:E2, 2, FALSE)

Result: The formula will return 1800, which is the sales for March.

Importance of HLOOKUP

- The HLOOKUP function is helpful when data is arranged in rows rather than columns. This can be particularly useful in situations where:
- Data headings are in the first row (e.g., months, years, or product names).
- Use to search for a value in the first row and retrieve information from rows below it.
- Useful for analysing large datasets with horizontal data, where automated searches save time.

LOGICAL FUNCTIONS

Logical Functions in Excel are used to test conditions and return results based on whether those conditions are true or false. These functions are essential when it is needed to make decisions automatically based on specific criteria. By using logical functions, the analysis can be simplified, and data-driven decisions can be automated.

The most commonly used logical functions in Excel are IF (), AND (), OR (), and NOT (). These functions help to test one or more conditions and perform actions based on the results.

1. IF () Function

The IF () function is the most commonly used logical function. It checks if a condition is true or false, and depending on the result, it returns one value if true and another value if false.

Syntax of the IF () function:

=IF (logical_test, value_if_true, value_if_false)

- logical_test: The condition to be tested (e.g., checking if a number is greater than 100).
- value_if_true: The value returned if the condition is true.
- value_if_false: The value returned if the condition is false.

Example: Imagine a student marks dataset. You want to check if a student has passed or failed based on their marks.

Student Name	Marks
Jay	85

Manisha	55
Anant	45

If the passing marks are 50, the following IF function can be used to check whether the student has passed or failed:

=IF(B2 >= 50, “Pass”, “Fail”)

This function checks if the marks in cell B2 are greater than or equal to 50. If true, it returns “Pass”; if false, it returns “Fail” (Fig. 2.22).

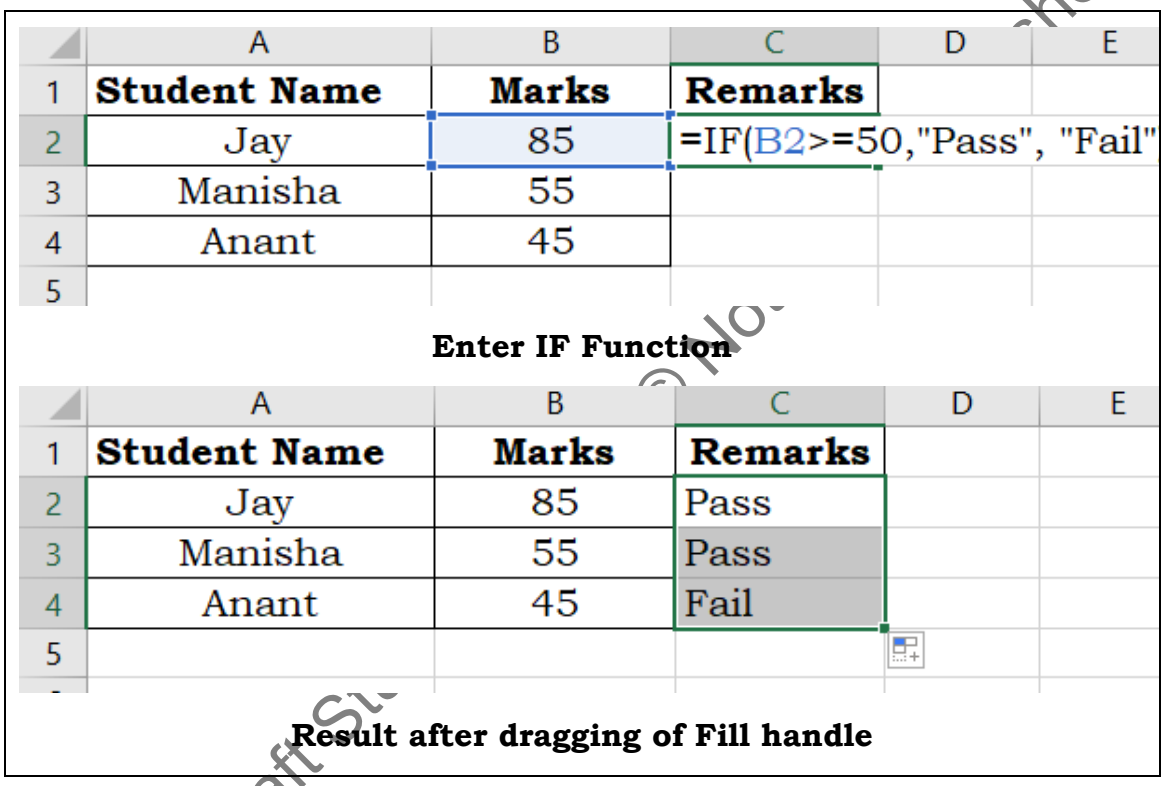


Fig. 2.22: IF Function

2. AND () Function

The AND () function checks if multiple conditions are true. It returns TRUE only if all conditions are true; otherwise, it returns FALSE.

Syntax of the AND() function:

=AND(condition1, condition2, ...)

- condition1, condition2, ...: The conditions to be tested (e.g., checking if a value is between two numbers).

Example: Imagine you want to check if a student’s marks are greater than 50 and if they have completed all assignments. Assume “Yes” means assignments are completed, and “No” means assignments are not completed.

Student Name	Marks	Assignments Completed
Jay	85	Yes
Manisha	55	No
Anant	45	Yes

To check if a student has both passed and completed assignments, use the following AND function: (Fig. 2.23)

=AND(B2 > 50, C2 = "Yes")

	A	B	C	D	E
1	**Student Name**	**Marks**	**Assignments Completed**	**Remark**	
2	Jay	85	Yes	=AND(B2	
3	Manisha	55	No	> 50, C2 =	
4	Anant	45	Yes	"Yes")	
5					

Fig. 2.23: AND () Function

This checks whether the marks are greater than 50 and if the Assignments Completed cell is "Yes".

3. OR () Function

The OR () function is similar to the AND () function, but it returns TRUE if any of the conditions are true. If all conditions are false, it returns FALSE.

Syntax of the OR () function:

=OR (condition1, condition2, ...)

condition1, condition2, ...: The conditions to be tested (e.g., checking if a value is either greater than or less than a certain number).

Example: If a student has either marked greater than 60 or has completed all assignments, they should be considered eligible.

Student Name	Marks	Assignments Completed
Jay	85	Yes
Manisha	55	No
Anant	45	Yes

To check if a student is eligible using OR: (Fig. 2.24)

=OR (B2 > 60, C2 = “Yes”)

	A	B	C	D	E
1	**Student Name**	**Marks**	**Assignments Completed**	**Remark**	
2	Jay	85	Yes	=OR(B2 >	
3	Manisha	55	No	60, C2 =	
4	Anant	45	Yes	"Yes")	
5					

Fig. 2.24: OR () Function

This formula checks if the marks are greater than 60 or if the Assignments Completed cell is “Yes”.

4. NOT () Function

The NOT () function is used to reverse the result of a logical function. If a condition is TRUE, NOT () will return FALSE, and if the condition is FALSE, it will return TRUE.

=NOT (condition)

condition: The condition to be tested.

Example: If you want to check if a student has not passed (marks less than 50), you can use the NOT () function.

Student Name	Marks
Jay	85
Manisha	45
Anant	60

To check if a student has not passed:

=NOT (B2 >= 50)

This formula will return TRUE if the marks are less than 50 (indicating a failure) and FALSE if the marks are 50 or above (indicating a pass).

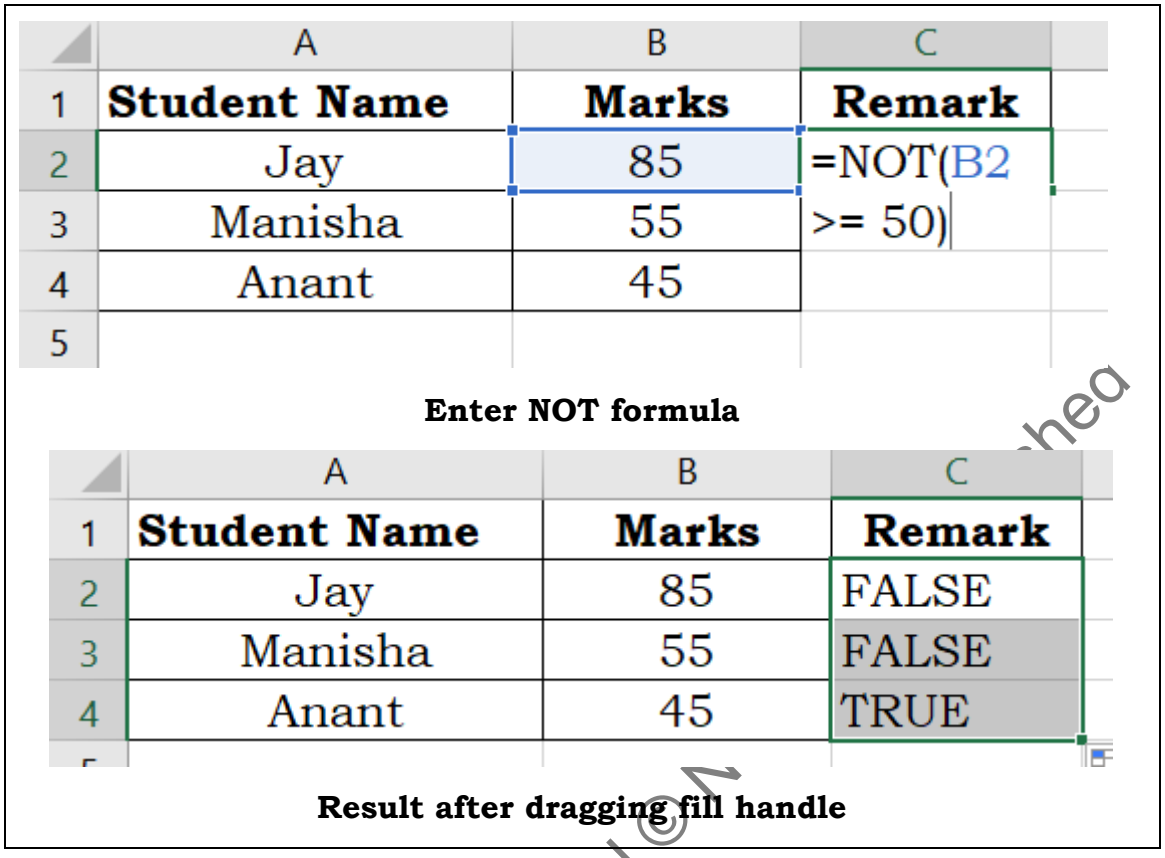


Fig. 2.25: NOT() Function

COMBINING FUNCTIONS IN FORMULAS

In Excel, functions are incredibly powerful tools for performing specific tasks, such as calculations or logical tests. When different functions are combined in a single formula, more complex calculations can be performed, enabling users to analyse data more effectively.

Combining functions in formulas is useful when multiple conditions need to be checked or multiple operations need to be performed on the data. By combining functions, users can solve problems that require more than one task to be done in a single step.

Combining functions allows for:

- **More complex calculations:** Multiple steps can be included in a single formula.
- **Conditional logic:** Multiple conditions can be checked at once.
- **Automated decision-making:** If certain conditions are met, specific actions or calculations can be performed automatically.

Functions can be combined by using one function inside another. The function inside the parentheses of another function is often referred to as a nested function.

For example:

- The IF () function can be used with other functions like SUM () or AVERAGE () to make decisions based on the results of these functions.
- The AND () or OR () functions can be combined with the IF () function to evaluate multiple conditions.

1. Combining IF () with SUM ()

The IF () function can be combined with SUM () to apply conditions to the sum of a range of numbers.

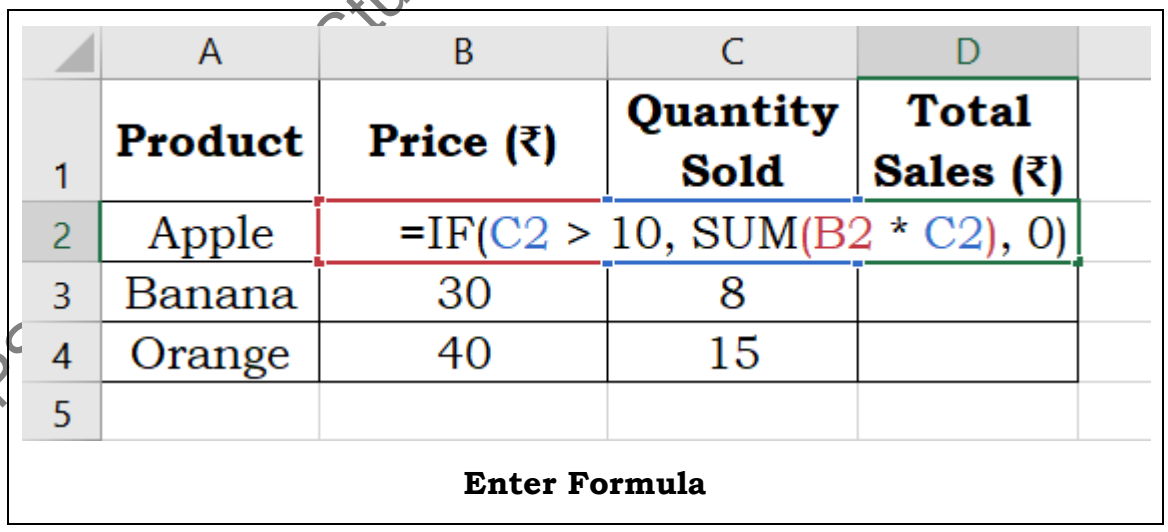
Example: Let's say you want to calculate the total sales of a product, but only if the quantity sold is greater than 10. If the condition is true, the total sales should be calculated; otherwise, the result should show 0.

Product	Price (₹)	Quantity Sold
Apple	50	12
Banana	30	8
Orange	40	15

To calculate Total Sales (₹) only if the Quantity Sold is greater than 10, the following combined formula can be used: (Fig. 2.26)

=IF (C2 > 10, SUM (B2 * C2), 0)

This formula checks if the quantity sold is greater than 10 (in C2). If TRUE, it multiplies the Price (₹) (in B2) by Quantity Sold (C2). If FALSE, it returns 0.



	A	B	C	D
1	**Product**	**Price (₹)**	**Quantity Sold**	**Total Sales (₹)**
2	Apple	50	12	600
3	Banana	30	8	0
4	Orange	40	15	600
5				

Result after dragging fill handle

Fig. 2.26: Combining IF () with SUM ()

2. Combining IF () with AND ()

The AND () function can be used inside the IF () function to check multiple conditions.

Example: Suppose you want to give a bonus to employees only if they have worked more than 100 hours and have a performance rating greater than 4.

Employee Name	Hours Worked	Performance Rating
Jay	120	5
Manisha	95	4
Anant	110	3

To check both conditions, the following combined formula can be used: (Fig. 2.27)

=IF(AND(A2>100, B2>4),” Yes”, “No”)

This formula checks if both conditions are TRUE: if the Hours Worked (in B2) is greater than 100, and the Performance Rating (in C2) is greater than 4. If both conditions are met, it returns “Yes”; otherwise, it returns “No’.

	A	B	C	D	E
1	**Employee Name**	**Hours Worked**	**Performance Rating**	**Bonus Eligible**	
2	Jay	120	=IF(AND(A2>100,B2>4),"Yes","No'		
3	Manisha	95	4		
4	Anant	110	3		

Enter Formula

	A	B	C	D	E
1	**Employee Name**	**Hours Worked**	**Performance Rating**	**Bonus Eligible**	
2	Jay	120	5	Yes	
3	Manisha	95	4	Yes	
4	Anant	110	3	Yes	
5					

Result after dragging fill handle

Fig. 2.27: Combining IF () with AND ()

3. Combining AVERAGE () with IF ()

Sometimes, you may need to calculate the average of values based on a condition. This can be done by combining the AVERAGE () function with the IF () function.

Example: Let's say you want to calculate the average sales only for products with sales greater than ₹500.

Product	Sales (₹)
Apple	600
Banana	240
Orange	600
Mango	150
Grapes	750

To calculate the average sales for products with sales greater than ₹500, the following combined formula can be used: (Fig. 2.28)

=AVERAGEIF (B2:B6,">500")

This formula calculates the average of all values in the Sales (₹) column that are greater than 500.

	A	B	C	D
1	**Product**	**Sales (₹)**		
2	Apple	600		
3	Banana	240		
4	Orange	600		
5	Mango	150		
6	Grapes	750		
7	Average	468		
8	**=AVERAGEIF(B2:B6,">500")**			
9	AVERAGEIF(range, criteria, [average_range])			

Enter Formula

	A	B
1	**Product**	**Sales (₹)**
2	Apple	600
3	Banana	240
4	Orange	600
5	Mango	150
6	Grapes	750
7	Average	468
8	**AverageIF**	**650**
9		

Result

Fig. 2.28: Combining AVERAGE () with IF ()

Did you know?

Excel's VLOOKUP and HLOOKUP functions are like your personal search assistant! They help you quickly find a piece of data in large tables without scrolling or manually searching. And with logical functions like IF, AND, and OR, Excel can make decisions for you based on certain conditions, saving you time and reducing errors. Whether you are checking if a student passed or calculating bonuses based on hours worked, these functions can automate tasks and make data management much easier.

PRACTICAL EXERCISES

Activity 1: Perform VLOOKUP and HLOOKUP to retrieve data from tables.

Materials Required:

- Computer or Laptop with Microsoft Excel installed
- Sample data for VLOOKUP and HLOOKUP exercises

Procedure:

Part A: VLOOKUP

1. Enter the following Data in an Excel Sheet 1 starting from Cell A1:

Student	Marks
Arjun	85
Disha	78
Maya	92
Deepak	65
Vidya	88

2. Enter the following Data in an Excel Sheet 2 starting from Cell A1:

Student	Marks
Arjun	
Disha	
Maya	
Deepak	
Vidya	

3. Retrieve Marks of Students in Excel Sheet 2 using VLOOKUP.
   - Apply VLOOKUP Formula in B2 of Sheet 2
   - Drag the fill handle down to apply the formula for all students and fetch their marks

Part B: HLOOKUP

4. Enter the following data in the same or new sheet:

A1	B1	C1	D1	E1
Month	Jan	Feb	Mar	Apr
Sales (₹)	1500	2000	1800	2200

5. Apply HLOOKUP Formula in any empty cell to get March sales.
5. Save the file with the name as "Lookup Function.xlsx"
6. Show to the teacher for review and feedback.

Activity 2: Perform Logical Functions.

Materials Required: Computer or Laptop with Microsoft Excel installed

Procedure:

1. Enter the following Data in an Excel Sheet starting from Cell A1:

Student Name	Marks	Assignment Completed
Rahul	72	Yes
Sneha	48	No
Kunal	65	Yes
Priya	55	No
Isha	40	Yes

2. Use the following logical functions:
   - IF: Check if the marks are greater than or equal to 50 to determine if the student has passed.
   - Formula: =IF (B2 >= 50, "Pass", "Fail")
   - AND: Check if the student has passed and completed the assignment.
   - Formula: =AND (B2 >= 50, C2 = "Yes"
   - OR: Check if the student has either passed or completed the assignment.
   - Formula: =OR (B2 >= 50, C2 = "Yes")
3. Save the File as "Logical Functions Example.xlsx".

4. Show to the teacher for review and feedback.

CHECK YOUR PROGRESS

A. Fill in the Blanks

1. The VLOOKUP function searches for a value _____ in the first column of a table.
2. The IF function returns one value if a condition is _____ and another value if it is _____.
3. HLOOKUP stands for _____ Lookup, which searches for data _____ across rows.
4. The AND function returns TRUE if _____ conditions are met.
5. Logical functions in Excel can be used to perform actions based on _____ conditions.

B. Multiple Choice Questions (MCQs)

1. What is the purpose of the VLOOKUP function in Excel?
   a) To search for a value horizontally across rows
   b) To search for a value vertically in a table and return a corresponding value
   c) To calculate the sum of a range of numbers
   d) To check if a condition is true or false
2. What does the IF () function do in Excel?
   a) It adds numbers
   b) It searches for data in a table
   c) It combines multiple conditions
   d) It checks if a condition is true or false and returns one value if true, another if false
3. Which of the following functions checks if all given conditions are true?
   a) IF ()
   b) AND ()
   c) OR ()
   d) NOT ()
4. In the formula =HLOOKUP ("March", A1:E2, 2, FALSE), what does the number 2 represent?
   a) The row index number from which the corresponding value will be returned
   b) The row number where "March" is located
   c) The lookup values
   d) D) The table arrays
5. Which of the following Excel functions is used to search for a value horizontally across rows?
   a) IF
   b) SUM
   c) VLOOKUP

d) HLOOKUP

C. State whether the following statements are true or false:

1. The VLOOKUP function can only return values from the first column in the table.
2. The HLOOKUP function is used to search data vertically across columns.
3. The AND function returns TRUE if at least one condition is met.
4. The IF function can be used to check for multiple conditions by combining it with AND or OR functions.
5. The VLOOKUP function can return approximate matches by using TRUE for the range_lookup argument.

D. Short Answer Questions

1. What is the main purpose of the VLOOKUP function in Excel?
2. Explain the difference between VLOOKUP and HLOOKUP in Excel.
3. How does the IF function work in Excel?
4. What is the use of the AND function in Excel?
5. What does the NOT function do in Excel?

E. Long Answer Questions

1. Describe how the VLOOKUP function works, and explain how it can be used in large datasets. Provide an example of a situation where it would be beneficial.
2. How can the HLOOKUP function be used to retrieve data from horizontal tables? Provide an example where this function would be more effective than VLOOKUP.
3. Describe how combining logical functions like IF (), AND (), OR (), and NOT () can be helpful in decision-making tasks within Excel. Provide a scenario where multiple conditions need to be evaluated to make a decision.
4. Explain how you would use the AND() and OR() functions in Excel. Provide a practical example of how these functions can be combined with the IF () function.

F. Check your Performance

1. You are managing student performance records. Enter the following data in Excel and perform the steps below:

Student Name	Marks	Assignment Completed
Riya	78	Yes
Amit	45	No

Sneha	60	Yes
Karan	52	No
Neha	85	Yes

Additional Data for VLOOKUP (Sheet2 or different area of same sheet):

Student	**Grade**
Riya	B
Amit	D
Sneha	C
Karan	C
Neha	A

Perform the following:

a) Fetch the Grade for each student using VLOOKUP
b) In a new column, check if the student has passed (Marks ≥ 50) using Logical IF Function
c) Check if the student has passed and completed assignments using AND Function (Combined Check)
d) In another column, display "Eligible" if the student has passed or completed assignments, else "Not Eligible" using OR Function with IF (Combined Example).

MODULE 3: DATA ORGANIZATION AND MIS REPORT

In today's data-driven world, organizing and presenting information in a clear, structured manner is essential for effective decision-making. Whether in business, education, or personal tasks, poorly managed data can lead to errors and confusion. Microsoft Excel offers powerful tools to help users organize, analyze, and present data accurately and efficiently. One key application is the preparation of MIS (Management Information System) Reports, which transform raw data into meaningful information for daily operations or strategic planning.

This module focuses on building essential skills to handle data professionally. Learners will gain practical experience in creating structured tables, applying data validation, using advanced aggregate functions, and developing clear MIS reports supported by charts and pivot tables.

Further this module is divided into four sessions. Session 1 deals with organizing raw data into structured tables, applying validation rules to ensure accuracy, and exploring how to import and export data between formats like CSV and TXT.

Session 2 focuses on using aggregate functions such as SUMIF, COUNTIF, AVERAGEIF and their multiple-criteria versions to derive meaningful insights from data, supporting better analysis and decision-making.

Session 3 introduces the concept and importance of MIS Reports, covering different report types (daily, weekly, monthly, etc.), key elements of an effective report, and structured report formats for clear presentation.

Session 4 enables learners to use Pivot Tables and Charts to summarize, analyse, and visually present large datasets. Students will apply filters, slicers, and pivot visuals to develop interactive and informative MIS reports.

SESSION 1: DATA ORGANIZATION AND VALIDATION

In Excel, **Data Organization** refers to the process of arranging and structuring information so that it is easy to understand, manage, and analyse. **Data Validation** is used to ensure that only correct and accurate information is entered into the worksheet by applying specific rules to maintain consistency and proper formatting.

When dealing with large amounts of data, working with unorganized or inaccurate information can cause errors and confusion. Proper organization and the use of data validation help maintain accuracy, reduce mistakes, and make the information reliable for effective decision-making.

Suppose you are recording the names of cities in India for a project. However, some of the city names have been entered incorrectly due to spelling mistakes. ***For example,*** consider the following list of cities with errors in the spelling:

City Name
Mumbai
Banglore
Delih
Kolkatta
Bhopal

In this example:

"Banglore" is a misspelling of "Bangalore".

"Delih" should be "Delhi".

"Kolkatta" should be "Kolkata".

These errors could cause problems when you try to search or analyse the data. For example, when you want to look up all the records for Delhi, the misspelled version Delhi will not match, leading to missing data.

These errors can cause problems when searching or analysing data. *For example*, when looking up all records for Delhi, a misspelled version such as "Delih" will not match, resulting in missing data.

With data validation, you can ensure that only the correct city names are entered.

Follow the steps below to apply data validation:

Step 1: Select the City Name column where data will be entered.
Step 2: Go to the Data tab in Excel and click Data Validation.
Step 3: In the Data Validation dialog box, select List under Allow.
Step 4: In the Source box, select the range containing the valid city names (e.g., A2:A6).

Result: Now, only the names from the valid list can be entered. If someone tries to enter a misspelled name like “Banglore” or “Delih”, Excel will show an error message, asking the user to select a valid name from the list.

PRINCIPLES OF DATA ORGANIZATION

Data Organization refers to the process of arranging the data in an organized manner which can be easily understood, accessed and analysed. When raw data is collected, it is rarely in a format which can be understood easily. Organized data avoids errors, saves time and enables faster decision making.

The following are the key principles of data organization that ensures data is structured accurately:

1. **Clarity:** Clarity in data organization means that the data is easy to read and understand. Every column and row should have clear headings that describe the type of data it stores. This helps anyone looking at the data to immediately understand what information is being presented.

   For example, consider a table for tracking monthly expenses:

Expense	Amount	Date	Payment Method
Rent	10000	01/05/2022	Cash
Groceries	2000	03/05/2022	Card
Utilities	1500	05/05/2022	Cash
Petrol	800	06/05/2022	Debit

   The headings in this table, Expense, Amount, Date, and Payment Method are clear and describe exactly what data is in each column. This clarity makes it easier to understand the dataset. As it is easy to see how much was spent on Rent and how it was paid.

2. **Consistency:** Consistency ensures that similar types of data are placed in the same column, and that each row represents a single record. It’s important to make sure the same format is used for all data entries.

   Consider the same table given above, the amount column has numbers only, the date column has consistent data follows the same format throughout i.e., DD/MM/YYYY. This consistency ensures that operations like summing totals or filtering by payment method can be done without issues.

3. **Structure:** Structure refers to the arrangement of data into rows and columns. In Excel, each row should represent one record, and each column should represent one characteristic of that record.

   In the above table, each row represents one transaction. Each column has a specific characteristic i.e. Expense, Amount, Date, and Payment Method.

This structure makes it easy to perform operations like sorting by Date or calculating the total amount spent using the SUM () function.

4. **Simplicity:** Data should be kept as simple as possible. Avoid adding unnecessary complexity or columns that aren't needed. The simpler the data, the easier it is to understand and work with.

   This table is simple, as it includes only necessary data like Expense, Amount, Date, and Payment Method. Including extra information (e.g., Item descriptions, Customer IDs) could complicate the data and make it harder to manage. Keeping only the essential columns helps maintain focus.

5. **No Blank Rows or Columns:** Blank rows or columns within the data can break the continuity of the dataset, leading to incorrect calculations or confusion. Blank rows disrupt the flow of the data and can cause Excel to skip over rows when performing calculations or generating reports. Always make sure that there are no unnecessary blank rows or columns in your data.

CREATING STRUCTURED TABLES

Creating structured tables in Excel is an essential skill when working with data. A structured table allows data to be organized in a clear and manageable format, making it easier to read, analyse, and update. It not only organizes the data in rows and columns, but also helps in sorting, filtering, and performing calculations efficiently. Excel provides various tools to make working with data much simpler by converting a range of data into a table. Creating structured tables on excel helps in the following ways:

1. **Automatic Formatting**: Excel tables are automatically formatted with alternating row colours for easy readability.
2. **Sorting and Filtering:** It can easily sort and filter data within a table.
3. **Structured References:** When working with Excel functions and formulas, structured references (table names and column headers) can be used instead of cell addresses.
4. **Dynamic Range**: When new data is added to a table, the table will automatically expand to include the new data, without having to adjust the range manually.

Steps to create Tables:

Step 1: Select the Data Range
Step 2: Convert the Data into a Table
Step 3: Go to the Insert tab on the Excel Ribbon
Step 4: Click on Table. A dialog box will appear
Step 5: If data includes headers, make sure the table has headers checkbox is selected

Step 6: Click OK, and Excel will convert the selected range into a table.

Example: The following data is of monthly expenses:

Expense Type	Amount	Date	Payment Method
Rent	10000	44562	Cash
Groceries	2000	44566	Credit Card
Utilities	1500	44571	Debit Card
Petrol	800	44573	Cash

Let's convert the given data to a structured excel table.

Step 1: Enter the data on the excel worksheet.

Step 2: After selecting the data and clicking Insert > Table, Excel will automatically format the data. (Fig. 3.1)

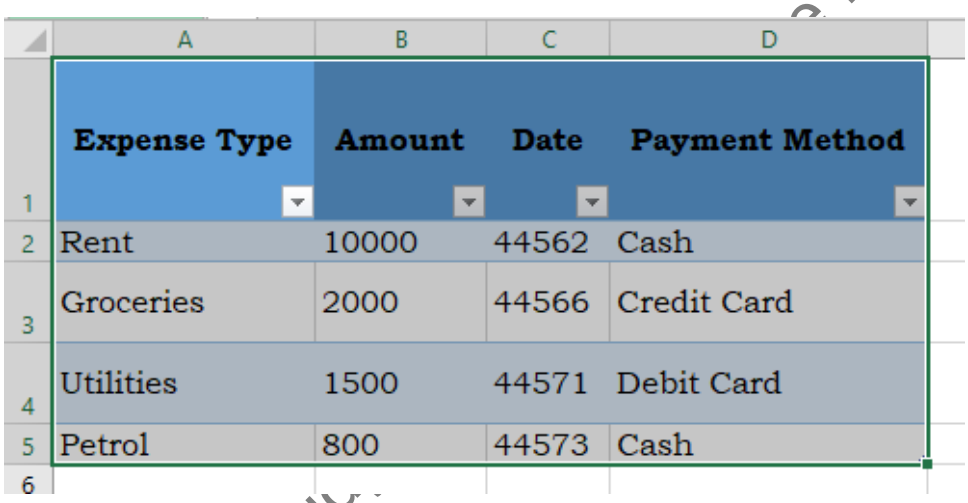


Fig. 3.1: Structured Excel Table

Result:

1. The data is now easier to read with alternating row colours.
2. Filter drop-downs have been added to each column header, allowing for easy sorting and filtering.
3. The table is automatically formatted to stand out.

Advantages of Structured Tables

- **Easy Sorting and Filtering:** Quickly sort or filter data based on any column, such as Amount or Date.
- **Automatic Expansion:** Tables automatically expand when new data is added, keeping calculations and charts updated.
- **Table Design Options:** Built-in styles, alternating row colours, bold headers, and borders enhance table appearance.
- **Total Row Feature:** Add a Total Row to calculate sums, averages, or counts automatically.

- **Rename or Remove Tables:** Table names can be changed or removed from the Table Tools tab.

DATA VALIDATION TECHNIQUES

Data Validation is the process of defining rules to control the type of data entered into a cell. It helps ensure that only correct, consistent, and relevant data is entered, reducing the chances of errors. Without data validation, users might enter incorrect values like text in a numerical field or dates in the wrong format. This can lead to mistakes, incorrect calculations, and wasted time trying to find and fix errors. By applying data validation rules, data entered can be restricted to follow a specific pattern, range, or criteria.

There are several types of data validation rules that can apply, depending on the nature of the data. Below are the common types:

- **Whole Number:** Restricts the cell to only allow whole numbers within a specified range.
- **Decimal:** Allows only decimal values (numbers with a decimal point) within a specified range.
- **Date:** Ensures that only valid dates are entered within a given range.
- **Text Length:** Restricts the length of the text entered (e.g., to limit a name to 20 characters).
- **List:** Provides a dropdown list of acceptable values, so users can only select from a predefined set of options.
- **Custom:** Allows for more complex validation rules, such as using formulas to define conditions.

Example: Below is the financial transactions for a small business, and let's see how certain rules can be applied to ensure that certain rules are followed when entering the financial data into excel:

Expense Type	Amount (₹)	Payment Method	Date of Transaction
Rent	10000	Cash	01/05/2022
Groceries	3000	Card	03/05/2022
Utilities	1500	Debit Card	05/05/2022
Petrol	2000	Cash	06/05/2022

Task 1: Validating Expense Amounts Between 0 and 100,000

Follow below steps to ensure that expense amounts are valid and don't exceed a reasonable range, for example, between ₹0 and ₹100,000.

Step 1: Select the Amount (₹) column.

Step 2: Go to Data > Data Validation.

Step 3: In the Settings tab, choose Whole Number from the dropdown menu.

Step 4: In the Data section, select between, then enter 0 for the minimum and

100000 for the maximum.

Step 5: Click OK.

Result: If someone tries to enter an amount greater than ₹100,000 or less than ₹0, Excel will display an error message, ensuring that only valid expense amounts are entered.

Task 2: Ensuring Valid Payment Methods (Dropdown List)

Follow below steps to ensure that only valid payment methods are entered, such as Cash, Card, or Debit Card, you can create a dropdown list for the Payment Method column.

Step 1: Select the Payment Method column.

Step 2: Go to Data > Data Validation.

Step 3: In the Settings tab, select List from the dropdown.

Step 4: In the Source box, type: Cash, Card, Debit Card.

Step 5: Click OK.

Result: Now, when someone clicks on a cell in the Payment Method column, a dropdown list will appear with only the options Cash, Card, and Debit Card. This will prevent any errors, like entering incorrect payment methods (e.g., Cheque or UPI).

Task 3: Ensuring Valid Transaction Dates

Follow below steps to ensure that the transaction dates fall within a valid range (e.g., January 1, 2022, to December 31, 2022).

Step 1: Select the Date of Transaction column.

Step 2: Go to Data > Data Validation.

Step 3: In the Settings tab, select Date from the dropdown.

Step 4: In the Data section, select between, and enter 01/01/2022 for the start date and 31/12/2022 for the end date.

Step 5: Click OK.

Result: If someone tries to enter a date outside this range (for example, 01/01/2023), Excel will show an error message, preventing incorrect data from being entered.

Task 4: Text Length for Expense Type

Follow below steps to ensure that the Expense Type is entered with a reasonable text length. *For example,* the Expense Type should not exceed 20 characters.

Step 1: Select the Expense Type column.

Step 2: Go to Data > Data Validation.

Step 3: In the Settings tab, choose Text Length from the dropdown.

Step 4: In the Data section, select less than or equal to and enter 20.

Step 5: Click OK.

Result: Any Expense Type longer than 20 characters will trigger an error. This ensures that only short, clear labels are used for expense categories (like Rent, Groceries, Utilities, etc.).

Custom Validation with Formulas

Custom validation rules using formulas is used to ensure more complex conditions. *For example,* to ensure the expense amount is greater than ₹0 and a value is selected in the Payment Method column, formula-based validation can be applied.

Example Formula: Ensure Amount > 0 and Payment Method is not empty.

Step 1: Select the Amount (₹) column.

Step 2: Go to Data > Data Validation.

Step 3: In the Settings tab, select Custom from the dropdown.

Step 4: In the Formula box, enter the following formula:

Step 5: =AND(A2>0, NOT(ISBLANK(B2)))

(Assuming A2 is the Amount column and B2 is the Payment Method column).

Step 6: Click OK.

Result: This formula ensures that amount is greater than ₹0 and that a payment method is entered in the corresponding cell. If either condition is not met, an error message will appear.

Error Alerts and Input Messages

Excel also allows to add input messages and error alerts to provide helpful guidance or error messages when users enter invalid data.

- **Input Message:** Appears when the user selects a cell, explaining the type of data to be entered.
- **Error Alert**: Displays a message when the entered data does not meet the validation rule.
- Example:
- **Input Message:** "Enter a valid payment method (Cash, Card, Debit Card)".
- **Error Alert:** "Invalid Payment Method! Please select from Cash, Card, or Debit Card."

IMPORTING AND EXPORTING DATA

In Excel, data can be imported and exported in various formats. Two of the most commonly used file formats are CSV (Comma Separated Values) and TXT (Text). Understanding how to work with these formats allows you to easily share easy sharing data between different applications and systems, and ensures compatibility with software that may not support Excel's native .xlsx format.

Comma Separated Values (CSV)

CSV is a simple file format used to store tabular data, such as spreadsheets or databases. Each line in a CSV file corresponds to a row of data, and each field within the row is separated by a comma. This makes it easy to transfer data between different software applications. Below are some advantages of CSV file:

- **Compatibility:** CSV files can be opened by almost any text editor or spreadsheet software.
- **Simplicity:** CSV files are plain text, meaning they don't contain formatting or formulas, only raw data.

Text (TXT)

A TXT file is a simple text file that stores data as plain text without any special formatting. It can be used to store a wide range of information but doesn't have the structure of a spreadsheet like Excel. A TXT file can store data in a simple tabular format or plain lists, and it can also be opened in any text editor. Below are some advantages of TXT:

- **Universal Compatibility:** Can be opened by any text editor and is compatible with many applications.
- **Simplicity:** It is ideal for storing plain data without needing complex formatting.

Import Data into Excel (CSV/TXT Files)

Follow below steps to import data in to Excel (CSV/TXT Files).

Step 1: Importing a CSV or TXT File into Excel:
Step 2: Open Excel and go to the File tab.
Step 3: Select Open and then choose Browse to locate the CSV or TXT file on your computer.
Step 4: Once the file is selected, click Open.
Step 5: Excel will automatically recognize the data format and display a preview of how the data will be arranged in cells.
Step 6: Follow the Text Import Wizard if needed. This wizard allows you to select the correct delimiters (such as commas or tabs) to ensure the data is correctly arranged in columns.

Step 7: After completing the import steps, click Finish, and the data will appear in your Excel worksheet.

Exporting Data as a CSV or TXT File

After working with data in Excel, it can be saved in CSV or TXT format to make it compatible with other applications.

Step 1: Click on File > Save As.
Step 2: Choose a location to save the file.
Step 3: In the Save as type dropdown menu, select either CSV (Comma delimited) (*.csv) or Text (Tab delimited) (*.txt).
Step 4: Enter a name for the file and click Save.

Following points to consider before importing and exporting data (CSV/TXT):

- **Data Formatting:** Only raw data is saved in CSV or TXT files. Formulas, charts, or colours are not included; only the final values appear. Complete all calculations before exporting.
- **Delimiter Issues:** CSV files use commas to separate data; TXT files may use tabs or spaces. Wrong delimiter settings can mess up the data layout. Always check delimiter settings.
- **Data Compatibility:** CSV and TXT files are plain text and cannot store advanced features like formulas or multiple sheets. Only the active sheet gets saved.
- **Data Integrity:** Special characters may not appear correctly if file encoding is wrong. Choose the right encoding (like UTF-8) to keep data accurate.
- **File Size Limits:** These formats work well for small to medium data. Very large datasets or complex files should be saved in formats like Excel (.xlsx) for better handling.

PRACTICAL EXERCISE

Activity 1: Group discussion on importing and exporting data between different file formats.

Materials Required:

- Computer or Laptop with Microsoft Excel installed
- Sample Excel files containing data
- Internet or textbook reference (optional)
- Whiteboard/Notebook for noting key points

Procedure:

1. Divide class into small groups.

2. Each group opens a sample Excel file with basic data (e.g., sales records or student details).
3. Discuss the purpose of importing and exporting data i.e. why it is done and where formats like CSV and TXT are used.
4. Each group export the Excel file to CSV and TXT formats.
5. Observe what happens to formulas, formatting, and layout during export.
6. Import the CSV or TXT file back into Excel and check the data.
7. Each group discuss:
   - What changes were noticed?
   - Advantages and limitations of each format
   - Importance of delimiter settings and data compatibility
8. Each group shares their findings with the class.
9. Teacher will summarise the discussions.

CHECK YOUR PROGRESS

A. Fill-in-the-Blank Questions

1. Data organization ensures that information is arranged in a _____ way, making it easier to _____ and interpret.
2. The _____ function in Excel ensures that only valid data, such as numbers, dates, or text within a range, is entered into cells.
3. To create a table in Excel, you can select the data range and click on the _____ tab, then choose the Table option.
4. In Excel, _____ refers to arranging data into rows and columns where each row represents one record and each column represents one characteristic
5. Data _____ in Excel refers to the process of organizing and formatting data to ensure consistency and clarity.

B. Multiple Choice Questions

1. Which of the following is a key principle of data organization in Excel?
   a) Complexity
   b) Clarity
   c) Irregularity
   d) Disorganization
2. What is the main advantage of using structured tables in Excel?
   a) Automatically formats numbers
   b) Automatically expands when new data is added
   c) Discards invalid data
   d) Limits data entries to specific columns
3. Which of the following is NOT a type of data validation in Excel?
   a) Whole Number
   b) Date

c) Formula
d) Graphic

4. When creating a table in Excel, what does the "Total Row" feature do?
   a) Automatically calculates sums and averages
   b) Adds a new column
   c) Sorts the table alphabetically
   d) Sets headers for each column
5. What type of data validation rule would you use to ensure a date is entered in a valid range, like between 01/01/2022 and 12/31/2022?
   a) Text Length
   b) Whole Number
   c) Date
   d) List

C. State whether the following statements are True or False

1. Data validation rules in Excel can only be applied to text-based data.
2. Data organization is important for making data easier to read and analyses.
3. Structured tables in Excel automatically add new rows when new data is entered.
4. Excel tables allow you to create custom formatting for rows and columns, but it does not support sorting or filtering.
5. Excel allows you to validate data entries such as the date range or the length of text, but it cannot prevent duplicates from being entered.

D. Short Answer Questions

1. What is the purpose of data validation in Excel?
2. What are the benefits of organizing data into structured tables in Excel?
3. How do you apply a rule in Excel to restrict the amount entered to be between ₹0 and ₹100,000?
4. What is the difference between relative and absolute cell references in Excel?
5. Why is clarity important in data organization?
6. How can you prevent users from entering invalid payment methods in Excel?

E. Long Answer Questions

1. Explain the process of applying data validation in Excel to restrict the entries in the "Amount" column to only whole numbers between ₹0 and ₹100,000.
2. Describe the key principles of data organization in Excel and how they help in making better decisions.
3. What are the advantages of using structured tables in Excel? Provide an example.
4. Explain how you can use data validation to create a dropdown list for payment methods, and why this is important in data entry.

F. Check Your Performance

1. Data Validation and Organization:
   a) Organize the following Monthly Expense data into a structured Excel table with clear headings.
   b) Apply Data Validation to ensure:
   c) Amount (₹) must be a number greater than 0.
   d) Date of Transaction must be within June 2023.
   e) Payment Method can only be one of: Cash, Credit Card, Debit Card.

Expense Type	Amount (₹)	Date of Transaction	Payment Method
Rent	8000	01/06/2023	Cash
Groceries	3500	02/06/2023	Credit Card
Electricity	1500	03/06/2023	Debit Card
Petrol	2000	04/06/2023	Cash
Groceries	2500	05/06/2023	Debit Card
Rent	8000	06/06/2023	Cash
Groceries	2200	07/06/2023	Credit Card
Rent	8000	08/06/2023	Debit Card
Electricity	1600	09/06/2023	Cash
Petrol	2100	10/06/2023	Credit Card

2. Importing and Exporting Data:
   a) Import the given CSV data of an Online Store into Excel.
   b) Organize the data into a structured table with proper headings and formatting.
   c) Export the organized table as a CSV file for sharing purposes.

Product ID	Product Name	Category	Price (₹)	Quantity Sold	Total Sales (₹)
101	T-shirt	Clothing	499	25	12475
102	Jeans	Clothing	799	20	15980
103	Headphones	Electronics	1500	15	22500
104	Phone	Electronics	19999	10	199990
105	Shoes	Footwear	2999	30	89970
106	Jacket	Clothing	2999	18	53982
107	Socks	Footwear	500	40	20000
108	Smartwatch	Electronics	4999	12	59988
109	Camera	Electronics	12000	5	60000
110	Sunglasses	Accessories	1499	50	74950

SESSION 2: AGGREGATE ANALYSIS

Aggregate analysis is the process of summarizing and analysing large amounts of data to make it easier to understand. It helps in quickly finding important information, such as total amounts, averages, or counts, based on certain conditions. In simple terms, it is like organizing and calculating data so we can see patterns or trends more clearly.

In Excel, special tools called aggregate functions such as SUMIF, AVERAGEIF, COUNTIF, and others can be used to perform calculations. These functions help us quickly add up numbers, calculate averages, or count items based on one or more conditions.

By using aggregate functions, patterns and trends within large datasets can be identified quickly and efficiently. These functions help in summarizing data points, performing calculations, and generating key metrics such as totals, averages, and counts, all of which are crucial for decision-making processes. In Excel, these tools are widely used to streamline the analysis of data, allowing users to focus on relevant information without manually sifting through rows of raw data.

AGGREGATE FUNCTIONS

Aggregate functions are special formulas in Excel that help add up, count, or summarize many numbers at once. Instead of looking at each number separately, these functions combine data to give useful results like totals, averages, or highest and lowest values. They make it easier to understand and analyse large amounts of information quickly.

There are several types of aggregate functions in Excel, and they can be used to perform calculations either with a single condition or multiple conditions.

1. SUMIF and SUMIFS

The SUMIF and SUMIFS function allow summing values in a range that meet a specific condition or criteria. They are used to add numbers based on a given condition, such as all sales made by a particular employee or all expenses of a certain type.

Syntax: =SUMIF(range, criteria, [sum_range])

- **range:** The range of cells to which the criteria will be applied.
- **criteria:** The condition that must be met for the cells to be included in the sum (it can be a number, text, expression, or even a cell reference).
- **sum_range (optional):** The actual cells to sum. If omitted, Excel will sum the range.

Consider the following data set for example:

Date	Expense Type	Amount (₹)	Payment Method
01/06/2022	Rent	10000	Bank Transfer
02/06/2022	Groceries	5000	Cash
03/06/2022	Utilities	1500	Credit Card
04/06/2022	Petrol	800	Debit Card
05/06/2022	Groceries	2000	Cash
06/06/2022	Rent	10000	Bank Transfer
07/06/2022	Utilities	1200	Credit Card
08/06/2022	Groceries	2500	Debit Card
09/06/2022	Petrol	1200	Cash
10/06/2022	Rent	10000	Bank Transfer

Apply SUMIF with single criteria for "Groceries"

Formula: =SUMIF (B2:B11, "Groceries", C2:C11)

- **Range:** B2:B11 (Expense Type column)
- **Criteria:** "Groceries" (we are interested in all rows where the expense type is Groceries)
- **Sum_range:** C2:C11 (Amount column)

Result: ₹5000 (on 02/06/2022) + ₹2000 (on 05/06/2022) + ₹2500 (on 08/06/2022) = ₹10,500

So, the sum of all Groceries expenses is ₹10,500.

Apply SUMIF with Multiple Criteria (SUMIFS)

Formula: =SUMIFS (C2:C11, B2:B11, "Rent", D2:D11, "Bank Transfer")

- **Sum_range:** C2:C11 (Amount column)
- **Criteria_range1:** B2:B11 (Expense Type column)
- **Criteria1:** "Rent"
- **Criteria_range2:** D2:D11 (Payment Method column)
- **Criteria2:** "Bank Transfer"

Result: ₹10000 (on 01/06/2022) + ₹10000 (on 06/06/2022) + ₹10000 (on 10/06/2022) = ₹30,000

So, the total for Rent paid via Bank Transfer is ₹30,000.

Apply SUMIF with Different Criteria (Multiple Criteria)

Formula: =SUMIFS (C2:C11, B2:B11, "Groceries", D2:D11, "Cash")

- **Sum_range:** C2:C11 (Amount column)
- **Criteria_range1:** B2:B11 (Expense Type column)
- **Criteria1:** "Groceries"
- **Criteria_range2:** D2:D11 (Payment Method column)
- **Criteria2:** "Cash"

Result: ₹5000 (on 02/06/2022) + ₹2000 (on 05/06/2022) = ₹7000

So, the total for Groceries paid via Cash is ₹7000.

2. AVERAGEIF and AVERAGEIFS

The AVERAGEIF and AVERAGEIFS function in Excel is used to calculate the average of the values in a range that meet a specific condition or criteria. It is useful for finding the average of numbers that match a given condition, such as finding the average price of products above a certain amount or calculating the average sales made by a particular employee.

Syntax: =AVERAGEIF(range, criteria, [average_range])

- **range:** The range of cells to which the criteria will be applied.
- **criteria:** The condition that must be met for the cells to be included in the average (it can be a number, text, expression, or even a cell reference).
- **average_range (optional):** The actual cells to average. If omitted, Excel will average the range.

Apply AVERAGEIF with Single Criteria

Formula: =AVERAGEIF (B2:B11, "Groceries", C2:C11)

- **range:** B2:B11 (Expense Type column)
- **criteria:** "Groceries" (All rows where the expense type is Groceries)
- **average_range:** C2:C11 (Amount column)

Result: The formula will add up all the values in the Amount (₹) column where the Expense Type is Groceries, and then divide by the number of matching rows.

- 5000 (on 02/06/2022)
- 2000 (on 05/06/2022)
- 2500 (on 08/06/2022)

Average:

$$\frac{5000 + 2000 + 2500}{3} = \frac{9500}{3} = 3166.67$$

The average expense for Groceries is ₹3166.67.

Apply AVERAGEIF with Multiple Criteria (AVERAGEIFS)

Formula: =AVERAGEIFS (C2:C11, B2:B11, "Rent", D2:D11, "Bank Transfer")

- **average_range:** C2:C11 (Amount column)
- **criteria_range1:** B2:B11 (Expense Type column)
- **criteria1:** "Rent"
- **criteria_range2:** D2:D11 (Payment Method column)
- **criteria2:** "Bank Transfer"

Result:

10000 (on 01/06/2022)

10000 (on 06/06/2022)

10000 (on 10/06/2022)

Average:

$$\frac{10000 + 10000 + 10000}{3} = \frac{30000}{3} = 10000$$

The average Rent paid via Bank Transfer is ₹10,000.

Apply AVERAGEIF with Different Criteria (Multiple Criteria)

Formula: =AVERAGEIFS (C2:C11, B2:B11, "Groceries", D2:D11, "Cash")

- **average_range:** C2:C11 (Amount column)
- **criteria_range1:** B2:B11 (Expense Type column)
- **criteria1:** "Groceries"
- **criteria_range2**: D2:D11 (Payment Method column)
- **criteria2:** "Cash"

Result: 5000 (on 02/06/2022) and 2000 (on 05/06/2022)

Average:

$$\frac{5000 + 2000}{2} = \frac{7000}{2} = 3500$$

The average expense for Groceries paid via Cash is ₹3500.

3. COUNTIF and COUNTIFS

COUNTIF and COUNTIFS are Excel functions used to count the number of cells that meet one or more specific conditions. These functions are valuable for analysing data and determine how many times a certain condition is met.

COUNTIF: The COUNTIF function is used to count the number of cells that meet a single condition.

Syntax: =COUNTIF (range, criteria)

- range: The range of cells to which the criteria will be applied.
- criteria: The condition that must be met for the cells to be counted (it can be a number, text, expression, or even a cell reference).

Apply COUNTIF with Single Criteria:

Formula: =COUNTIF (B2:B11, "Rent")

- **range:** B2:B11 (Expense Type column)
- **criteria:** "Rent" (Count of how many times "Rent" appears in the Expense Type column.)

Result: The formula will count the number of times Rent appears in the Expense Type column.

Rent appears in the list 3 times (on 01/06/2022, 06/06/2022, and 10/06/2022). So, the count of Rent is 3.

Apply COUNTIF with Different Criteria (Multiple Criteria) - Using SUMIF and COUNTIF together:

Formula: =COUNTIF (D2:D11, "Cash")

- **range:** D2:D11 (Payment Method column)
- **criteria:** "Cash" (Count of how many times Cash was used as the payment method)

Result: The formula will count the number of times Cash appears in the Payment Method column

Cash appears in the list 4 times (on 02/06/2022, 05/06/2022, 09/06/2022).

So, the count of Cash payment method is 4.

COUNTIFS: The COUNTIFS function is used to count the number of cells that meet multiple conditions.

Syntax: =COUNTIFS (range1, criteria1, range2, criteria2, …)

- range1, range2, ...: The ranges of cells that you want to apply the criteria to.
- criteria1, criteria2, ...: The conditions that must be met for the cells to be counted.

Apply COUNTIFS with Multiple Criteria:

Formula: =COUNTIFS (B2:B11, "Groceries", D2:D11, "Cash")

- **range1:** B2:B11 (Expense Type column)
- **criteria1:** "Groceries" (Count of how many times Groceries appears)
- **range2:** D2:D11 (Payment Method column)
- **criteria2:** "Cash" (Count of Cash payments specifically for Groceries)

Result: Groceries appears twice (on 02/06/2022 and 05/06/2022).

Cash was used for Groceries on both occasions.

So, the count of Groceries paid via Cash is 2.

Apply COUNTIFS with Multiple Criteria:

Formula: =COUNTIFS (B2:B11, "Utilities", D2:D11, "Credit Card")

- **range1:** B2:B11 (Expense Type column)
- **criteria1:** "Utilities" (we are counting how many times Utilities appears)
- **range2:** D2:D11 (Payment Method column)
- **criteria2:** "Credit Card" (we are counting only Credit Card payments for Utilities)

Result: Utilities appears twice (on 03/06/2022 and 07/06/2022).

Credit Card was used to pay for Utilities on both occasions.

So, the count of Utilities paid via Credit Card is 2.

PRACTICAL EXERCISE

Activity 1: Use SUMIF to calculate the total salary of all HR department employees.

Employee Name	Department	Salary (₹)	Gender
John	HR	30000	Male
Mary	Finance	45000	Female
Mike	HR	28000	Male
Sarah	Marketing	35000	Female

Emma	Finance	42000	Female
David	Marketing	37000	Male
Lisa	HR	31000	Female
Peter	Finance	48000	Male
Diana	Marketing	36000	Female
James	HR	29000	Male

Material Required:

- Computer/Laptop with Microsoft Excel installed
- Excel worksheet (students will enter the given employee data)
- Calculator (for manual verification, optional)
- Pen and notebook for noting down formulas (optional)
- Projector/Screen (if teacher is demonstrating the activity)

Procedure:

1. Open Excel and enter the following columns: Employee Name, Department, Salary, Gender and fill in the data for all 10 employees as given in the table.
2. In a blank cell below or beside the data, type the formula.
3. Press Enter, and Excel will show the total salary for HR employees.
4. Verify the result by manually adding HR salaries.
5. Teacher explains the parts of the formula and encourages questions.
6. Teacher summarises the use of SUMIF in real-life scenarios like salary reports, sales analysis, etc.

Activity 2: AVERAGEIF – Find Average Salary of Finance Department Employees.

Material Required:

- Computer/Laptop with Microsoft Excel installed
- Excel worksheet with employee data (Data set of Activity 1)
- Pen and notebook for noting down formulas (optional)

Procedure:

1. Students enter the same employee data (if not already done).
2. In a blank cell, type the formula.
3. Press Enter to get the average salary of Finance department employees.
4. Teacher explains each part of the formula and answers student doubts.

Activity 3: Apply COUNTIF and COUNTIFS formula.

Material Required:

- Computer/Laptop with Microsoft Excel installed
- Excel worksheet with employee data (Data set of Activity 1)
- Pen and notebook for noting down formulas (optional)

Procedure:

1. Enter COUNTIF Formula.
   a. In a blank cell, type the formula.
   b. Press Enter to get the count of female employees.
2. Teacher introduces COUNTIFS, which is used to count based on multiple conditions. Example: Count the number of male employees in the HR department.
3. Enter COUNTIFS Formula.
   a. In a blank cell, type the formula.
   b. Press Enter to get the count of female employees.
4. Teacher explains real-life uses of COUNTIF and COUNTIFS, like:
   - Counting employees by gender
   - Counting by department and gender together
   - Filtering specific groups based on multiple conditions

CHECK YOUR PROGRESS

A. Fill in the Blanks

1. The SUMIF function in Excel is used to sum the values in a range that meet a _____ condition.
2. The AVERAGEIFS function is used to calculate the average of values in a range that meet _____ conditions.
3. The COUNTIF function is useful for counting the number of cells that meet _____ condition.
4. SUMIFS is used when you want to sum values based on _____ criteria.
5. COUNTIFS allows you to count cells that meet _____ criteria.

B. Multiple Choice Questions

1. What does the SUMIF function do in Excel?
   a) Counts the number of cells
   b) Averages the values in a range
   c) Sums values based on a single condition
   d) Finds the maximum value
2. What is the primary difference between SUMIF and SUMIFS?
   a) SUMIF can handle multiple criteria, while SUMIFS can only handle one

b) SUMIFS can handle multiple criteria, while SUMIF can only handle one

c) SUMIF is faster than SUMIF

d) SUMIF requires more memory than SUMIFS

3. Which function would you use to calculate the average of all values in a range that meet a single condition?

a) SUMIF

b) AVERAGEIF

c) COUNTIF

d) MAXIFS

4. Which of the following is true for the COUNTIFS function?

a) It can only count cells based on one condition

b) It works only with numeric data

c) It can count cells based on multiple conditions

d) It calculates averages

5. When using AVERAGEIFS, what do you need to define?

a) A sum_range and its criteria

b) An average_range and its criteria

c) Only a sum_range

d) Only a criteria_range

C. State whether the following statements are True or False

1. SUMIF can only sum values in a range based on one condition.
2. COUNTIF allows you to count cells that meet multiple criteria.
3. The AVERAGEIFS function requires only one condition to be specified.
4. SUMIFS can handle multiple criteria for summing values.
5. The COUNTIFS function can only be used to count values in a single column.

D. Short Answer Questions

1. What is the difference between SUMIF and SUMIFS?
2. Explain how to use the AVERAGEIF function with an example.
3. What do you need to specify when using the COUNTIF function?
4. How does COUNTIFS handle multiple criteria?
5. When would you use SUMIFS over SUMIF?
6. What will the COUNTIFS function return when used with multiple criteria?

E. Long Answer Questions

1. Describe the steps to use SUMIF for calculating the total of a specific type of expense in a dataset. Include an example where you sum the expenses for Groceries.
2. Explain how AVERAGEIF and AVERAGEIFS differ. Provide a real-world example where you calculate the average of expenses based on different payment methods.
3. How does COUNTIF work? Give an example where you count the number of times Rent appears in an expense list.
4. Discuss how SUMIFS and COUNTIFS are useful when analysing data with multiple criteria. Provide an example where you sum and count data based on multiple conditions such as Rent payments made via Bank Transfer.

F. Check Your Performance

1. A store sells different products in various categories. The manager wants to analyse the sales data using Excel aggregate functions.

   Below is part of the sales data:

Product	Category	Price (₹)	Quantity Sold	Region
Laptop	Electronics	50000	15	North
Phone	Electronics	20000	25	South
TV	Electronics	30000	10	North
Shirt	Clothing	1500	50	South
Jeans	Clothing	2000	35	North
Shoes	Footwear	3000	20	South
Jacket	Clothing	2500	40	North
Socks	Footwear	500	55	South
Headphones	Electronics	2500	18	North
Gloves	Clothing	800	60	South

   Using appropriate aggregate functions, answer the following:

   i) What is the total quantity sold of Clothing products using SUMIF?

   ii) What is the average price of Electronics products using AVERAGEIF?

   iii) How many products were sold in the North region with quantity greater than 20, using COUNTIFS?

SESSION 3: CREATING MIS REPORTS

In today's fast-paced world, businesses rely heavily on data to make informed decisions. The data collected from various departments needs to be analysed and presented in a way that helps managers understand how the organization is performing. This is where MIS Reports (Management Information System Reports) come into play. These reports summarize important information and help decision-makers monitor performance, track progress, and identify areas for improvement.

An MIS report is typically used to present data on a regular basis, such as weekly, monthly, or quarterly. The information in the report could include sales figures, production data, customer feedback, and other key performance indicators (KPIs). These reports are often used by top management to make decisions regarding resource allocation, strategies, and business goals.

The process of creating an MIS report involves gathering data from different sources, organizing it in a structured format, and presenting it in a clear and meaningful way. Tools like Excel are often used to organize the data, perform calculations, and create charts or tables that visually present the information. Excel makes it easy to manipulate data, summarize it, and highlight trends or key figures that need attention.

IMPORTANCE OF MIS REPORTS

MIS is designed to provide timely and relevant information to managers and decision-makers, enabling them to assess the performance of different business functions. The importance of MIS reports can be understood in several ways:

Informed Decision Making: MIS reports provide managers with a snapshot of the organization's performance, allowing decisions to be made based on real-time data. Without these reports, decisions might be based on assumptions or outdated information, leading to poor outcomes.

1. ***Data Summarization:*** The data collected across different departments can be complex and overwhelming. MIS reports help to summarize this information in an easy-to-understand format. Through tables, charts, and graphs, the important data is presented in a way that is visually appealing and simple to interpret.
2. ***Tracking Key Performance Indicators (KPIs):*** MIS reports track important metrics or KPIs such as sales performance, production levels, inventory status, and customer satisfaction. By monitoring these KPIs regularly, management can identify trends, successes, and areas that need attention. This helps in setting future goals and improving operational efficiency.

3. ***Identifying Problems Early:*** With regular MIS reporting, any issues or discrepancies can be detected early. *For example,* if sales figures are lower than expected, it can be identified through an MIS report, allowing corrective actions to be taken before the situation worsens.
4. ***Resource Allocation:*** MIS reports provide insight into where resources (like finances, materials, or human resources) are being utilized most effectively. This helps management in allocating resources efficiently, ensuring that the organization is working optimally and that resources are being used where they are needed the most.
5. ***Support for Strategic Planning:*** In strategic planning, MIS reports provide the necessary data to develop long-term goals. By analysing trends and patterns from the reports, organizations can plan for future growth, assess market conditions, and ensure that all aspects of the business are aligned with the overall objectives.
6. ***Improved Communication:*** MIS reports help in improving communication within the organization. By providing a consistent format for sharing information, the reports ensure that everyone from managers to staff is on the same page. This promotes transparency and understanding across all levels of the organization.
7. ***Cost Control:*** Through MIS reports, managers can keep track of spending in various areas, such as production costs, marketing expenses, and employee salaries. This helps in identifying areas where cost-cutting measures can be taken without affecting overall productivity.
8. ***Performance Evaluation:*** Regular MIS reports make it easier to evaluate the performance of individuals, departments, and the organization as a whole. This allows managers to recognize areas of improvement, celebrate successes, and identify training or development needs.

TYPES OF REPORTS

In Management Information Systems (MIS), different types of reports are generated based on the needs and frequency of information required by the organization. These reports can vary in terms of the time period they cover and the purpose they serve. Each type of report has its own format and structure, which helps in organizing data in a way that suits the intended purpose. Below are the types of reports commonly used:

1. Daily Reports

Daily reports help track activities and operations that occur on a day-to-day basis. These reports allow managers to identify immediate issues and assess the short-term performance of the business. In the case of banks or financial institutions, daily reports can track the number of customer visits, new accounts opened, loan disbursements, and cash flow on a daily basis.

A daily report for visits and cash flow will typically include:

- ***Date:*** The date for which the report is being created.
- ***Key Metrics:*** Specific data for the day, such as new accounts, cash flow, loans disbursed, etc.
- ***Summary:*** A brief explanation of important activities or any deviations from the normal.

Example:

Date	Number of New Accounts Opened	Loan Disbursement (₹)	Cash Flow In (₹)	Cash Flow Out (₹)
01/12/2022	20	1,000,000	2,500,000	2,000,000
02/12/2022	15	500,000	1,800,000	1,200,000
03/12/2022	25	1,500,000	3,000,000	2,500,000

- ***Number of New Accounts Opened:*** This column tracks how many new customer accounts were opened on a given day.
- ***Loan Disbursement:*** This column records the total loan amount disbursed by the bank on that specific day.
- ***Cash Flow In:*** This column shows the total cash inflows for the day, which may include deposits, loan repayments, etc.
- ***Cash Flow Out:*** This column records the cash outflows for the day, such as payments to vendors, employee salaries, or loan disbursements.

Use of Daily Report in Financial Context

- ***Tracking New Accounts:*** By monitoring the number of new accounts opened, managers can assess customer acquisition efforts and make adjustments to marketing or outreach strategies as necessary.
- ***Loan Disbursement Status:*** The daily report on loan disbursement ensures that there is proper monitoring of the bank's lending activities. This data helps understand the volume of loans being processed daily and can indicate whether there is an increase in demand for loans.
- ***Cash Flow Monitoring:*** The cash flow in and out of the organization is crucial for understanding liquidity. Monitoring daily cash inflows and outflows ensures that the business maintains the necessary funds for daily operations, helping to prevent liquidity problems.

2. Weekly Reports

Weekly reports provide an overview of the activities and performance over a week. These reports are essential for assessing the short-term progress of the business, identifying trends, and making necessary adjustments for the upcoming week. In a financial context, weekly reports help track

customer visits, new accounts opened, loan disbursements, and cash flows throughout the week.

A weekly report for visits and cash flow typically includes:

- ***Week Ending Date:*** The end date of the week for which the report is generated.
- ***Key Metrics:*** Data points like new accounts opened, loan disbursements, cash inflows, and cash outflows.
- ***Comparison to Previous Week:*** A brief comparison to the previous week's data to identify trends or changes.
- ***Key Insights or Issues:*** Any important observations or issues encountered during the week.
  ***Example*:**

Week Ending	Number of New Accounts Opened	Loan Disbursement (₹)	Cash Flow In (₹)	Cash Flow Out (₹)	Week-over-Week Change
05/12/2022	85	5,000,000	15,000,000	12,000,000	+10% Sales, +5% Loan Disbursed
12/12/2022	90	4,500,000	14,500,000	13,000,000	+5% Sales, -10% Loan Disbursed
19/12/2022	110	6,000,000	16,000,000	14,500,000	+22% Sales, +20% Loan Disbursed

- ***Number of New Accounts Opened:*** This column tracks the number of new customer accounts opened during the week. An increase or decrease in new accounts is a key metric for understanding customer acquisition efforts.
- ***Loan Disbursement:*** This column records the total loan amount disbursed during the week, providing a snapshot of the loan activity within the organization.
- ***Cash Flow In:*** This column shows the total cash inflows for the week, such as customer deposits, loan repayments, and other income.
- ***Cash Flow Out:*** This column tracks the cash outflows for the week, which could include loan disbursements, expenses, and other payments.
- ***Week-over-Week Change:*** This column shows the percentage change from the previous week in terms of sales, loan disbursements, and other metrics. This helps identify trends and evaluate performance improvements or setbacks.

Use of Weekly Report in Financial Context

- ***Tracking New Accounts:*** By observing the number of new accounts opened each week, it becomes easier to evaluate the effectiveness of marketing campaigns, promotions, or customer service initiatives.
- ***Loan Disbursement Status:*** Weekly monitoring of loan disbursements helps ensure that the bank or financial institution is meeting its lending targets. It also helps to identify any gaps or opportunities in the loan process.
- ***Cash Flow Monitoring:*** The cash flow in and out of the organization is tracked weekly to monitor liquidity and ensure that enough funds are available for operations. Significant fluctuations in cash flow can help identify potential issues, such as unpaid loans or high operational costs.
- ***Performance Comparison:*** Comparing the data to the previous week helps managers to assess whether the business is moving in the right direction or if adjustments are needed to improve performance.

3. Monthly Reports

Monthly reports provide a comprehensive overview of the business performance over the course of a month. These reports are essential for understanding long-term trends, evaluating the effectiveness of strategies, and planning for the next month. In the context of financial operations, monthly reports allow managers to track customer visits, new accounts opened, loan disbursements, and cash flow, offering insights into the overall performance of the business.

A monthly report typically includes:

- ***Month Ending Date:*** The date marking the end of the month for which the report is generated.
- ***Key Metrics:*** Data for new accounts opened, loan disbursements, cash inflows, and cash outflows for the entire month.
- ***Comparison to Previous Month:*** A comparison to the performance of the previous month, allowing managers to see trends and changes.
- ***Key Insights or Issues:*** Any notable trends, challenges, or opportunities identified during the month.

***Example*:**

Month Ending	Number of New Accounts Opened	Loan Disbursement (₹)	Cash Flow In (₹)	Cash Flow Out (₹)	Month-over-Month Change
November 2022	300	20,000,000	60,000,000	55,000,000	+5% Sales, +10% Loan Disbursed
December 2022	350	22,500,000	65,000,000	58,000,000	+16.6% Sales, +12% Loan Disbursed

January 2023	400	25,000,000	70,000,000	60,000,000	+14.3% Sales, +11% Loan Disbursed

- ***Number of New Accounts Opened:*** This column tracks the total number of new customer accounts opened during the month. This metric helps assess customer acquisition efforts and determine if marketing or outreach strategies are effective.
- ***Loan Disbursement:*** This column records the total loan amount disbursed during the month. By comparing loan disbursements over several months, trends can be identified, and decisions can be made to adjust lending strategies if needed.
- ***Cash Flow In:*** This column shows the total cash inflows for the month, such as deposits, loan repayments, and other sources of income.
- ***Cash Flow Out:*** This column tracks the cash outflows for the month, which could include loan disbursements, operational expenses, vendor payments, and other costs.
- ***Month-over-Month Change:*** This column compares the data from the current month to the previous month. For example, if the number of new accounts opened increases by 16.6% from November to December, this indicates a positive trend. This comparison helps managers understand the direction in which the business is moving.

Use of Monthly Report in Financial Context

- ***Tracking New Accounts:*** The number of new accounts opened each month is a key indicator of the growth and success of marketing or customer engagement efforts. If the number of new accounts opens significantly increases or decreases, it can indicate the success of current strategies or the need for adjustments.
- ***Loan Disbursement Status:*** By tracking loan disbursements over the month, the performance of the lending department is easily monitored. If there is an increase in loans disbursed, it may indicate higher demand or effective marketing efforts. Conversely, a decrease may highlight an area that requires attention.
- ***Cash Flow Monitoring:*** Monitoring cash flow for the month ensures that the organization remains financially stable. By analyzing the cash inflows and outflows, managers can ensure that sufficient funds are available for daily operations, loan disbursements, and other expenses.
- ***Performance Comparison:*** Comparing the data with the previous month helps track business growth. Positive growth in metrics like sales, loan disbursements, and cash flow can show that the organization is on the right track. On the other hand, negative growth can help identify areas where corrective action is needed.

4. Quarterly Reports

Quarterly reports provide a comprehensive view of a company's performance over three months (a quarter). These reports help organizations assess the progress toward their long-term goals and identify any areas that need improvement. Quarterly reports are crucial for evaluating trends and making strategic decisions for the next quarter. In the context of financial institutions, these reports help track key metrics such as customer visits, new accounts opened, loan disbursements, and cash flow, offering a broader perspective on the organization's performance.

A quarterly report typically includes:

- ***Quarter Ending Date:*** The end date of the quarter, *for example,* 31st March for Q1 or 30th June for Q2.
- ***Key Metrics:*** Data for new accounts opened, loan disbursements, cash inflows, and cash outflows over the entire quarter.
- ***Quarter-over-Quarter Comparison:*** A comparison of the data from the current quarter to the previous quarter to understand growth or decline.
- ***Key Insights or Issues:*** Highlights of significant achievements, issues, or opportunities observed during the quarter.

Quarter Ending	Number of New Accounts Opened	Loan Disbursement (₹)	Cash Flow In (₹)	Cash Flow Out (₹)	Quarter-over-Quarter Change
Q1 - March 2022	1000	30,000,000	100,000,000	90,000,000	+5% Sales, +8% Loan Disbursed
Q2 - June 2022	1200	35,000,000	110,000,000	95,000,000	+20% Sales, +16.7% Loan Disbursed
Q3 - September 2022	1150	33,000,000	105,000,000	92,000,000	-4.2% Sales, -5.7% Loan Disbursed

- ***Number of New Accounts Opened:*** This column tracks the total number of new accounts opened during the quarter. An increase in new accounts is a good indicator of growth and the effectiveness of marketing or customer outreach efforts.
- ***Loan Disbursement:*** This column records the total loan amount disbursed during the quarter. A rise in disbursements indicates a higher demand for loans, which could be due to better financial conditions or successful promotional efforts.
- ***Cash Flow In:*** This column shows the total cash inflows for the quarter, which may include customer deposits, loan repayments, and other sources of income.

- ***Cash Flow Out:*** This column tracks the cash outflows for the quarter, such as loan disbursements, operational costs, and other expenses.
- ***Quarter-over-Quarter Change:*** This column compares the data of the current quarter to the previous quarter. *For example,* an increase of +20% in sales from Q1 to Q2 would indicate significant improvement in the business performance.

Use of Quarterly Reports in Financial Context

- ***Tracking New Accounts:*** By tracking the number of new accounts opened every quarter, businesses can measure the effectiveness of their marketing strategies. A rise in new accounts indicates growth, while a decline may prompt further investigation.
- ***Loan Disbursement Status:*** Quarterly reports help in understanding the lending activity of an institution. By monitoring loan disbursements, businesses can assess whether the demand for loans is increasing or decreasing and adjust their strategies accordingly.
- ***Cash Flow Monitoring:*** Monitoring cash flow on a quarterly basis helps ensure that the business maintains healthy liquidity. A significant drop in cash inflows or a rise in cash outflows could indicate potential financial issues that need immediate attention.
- ***Performance Comparison:*** Comparing the data from one quarter to another helps businesses evaluate the progress toward annual goals. This analysis helps in identifying trends and making strategic decisions for the upcoming quarter.

5. Annual Reports

An Annual Report provides a comprehensive overview of the organization's performance over the course of an entire year. It is a key document used by businesses to evaluate their annual achievements, assess financial performance, and plan for the future. Annual reports help decision-makers, stakeholders, and managers understand the long-term trends, challenges, and successes of the organization. In a financial context, annual reports track customer visits, new accounts, loan disbursements, and cash flow over a year, providing a broader view of the organization's overall performance.

An annual report typically includes:

- ***Year Ending Date:*** The date marking the end of the year (e.g., December 31)
- ***Key Metrics:*** Data for new accounts opened, loan disbursements, cash inflows, and cash outflows throughout the entire year.
- ***Year-over-Year Comparison:*** A comparison of the data with the previous year, showing how the business has progressed.

- ***Key Insights and Achievements:*** Highlights of significant milestones, successes, or challenges faced during the year.
- ***Future Goals:*** Goals or strategies for the coming year based on the performance and data from the current year.

Year Ending	Number of New Accounts Opened	Loan Disbursement (₹)	Cash Flow In (₹)	Cash Flow Out (₹)	Year-over-Year Change
2022	5000	120,000,000	450,000,000	400,000,000	+10% Sales, +12% Loan Disbursed
2023	5500	135,000,000	500,000,000	420,000,000	+10% Sales, +13% Loan Disbursed

- ***Number of New Accounts Opened:*** This column tracks the total number of new customer accounts opened throughout the year. An increase in the number of new accounts from 2022 to 2023 indicates growth and effective customer acquisition strategies.
- ***Loan Disbursement:*** This column records the total loan amount disbursed over the year. An increase in disbursements suggests a higher demand for loans and could be indicative of an effective lending strategy or improved market conditions.
- ***Cash Flow In:*** This column shows the total cash inflows for the year, which may include customer deposits, loan repayments, and other income sources. A steady increase in cash inflows indicates good liquidity management.
- ***Cash Flow Out:*** This column tracks the cash outflows for the year, such as loan disbursements, operational expenses, and other costs. Maintaining a balance between inflows and outflows is essential for the organization's financial health.
- ***Year-over-Year Change:*** This column compares the data from the current year to the previous year. *For example*, an increase of 10% in sales from 2022 to 2023 indicates positive growth, and the loan disbursement has also increased by 13%, showing that the organization is lending more and experiencing higher demand.

Use of Annual Report in Financial Context

- ***Tracking Growth:*** The annual report is an important tool for evaluating the growth of the business. By comparing key metrics such as new accounts opened and loan disbursements, the report helps measure progress and success in achieving business goals.
- ***Financial Health:*** The cash flow data in the annual report gives a clear picture of the financial health of the organization. Positive cash inflows

and controlled cash outflows suggest that the organization is managing its finances well and has enough liquidity to support its operations and future growth.

- ***Year-over-Year Comparison:*** By comparing the data of the current year with the previous year, trends can be identified, and management can assess how well the business has performed in different areas, such as sales, customer acquisition, and loan disbursements.
- ***Strategic Planning:*** The annual report provides key insights that are useful for strategic planning in the coming year. It helps in setting future goals and objectives, planning for expansion, and adjusting based on the performance of the current year.

6. Ad-hoc Reports

Ad-hoc reports are reports that are created on demand, as needed, to address specific questions or problems that arise unexpectedly. Unlike daily, weekly, monthly, or quarterly reports, which are regularly scheduled, ad-hoc reports are generated to fulfil specific requirements that cannot be predicted in advance. These reports are flexible and can be tailored to include only the data necessary to answer a particular query or support decision-making. In many organizations, these reports are used for problem-solving, investigating issues, or responding to urgent requests.

The format of an ad-hoc report is highly flexible and depends on the specific need or request. However, typical elements of an ad-hoc report include:

- ***Report Request:*** A clear description of the issue or question that needs to be addressed.
- ***Data Summary:*** Relevant data gathered and analysed to answer the specific query.
- ***Findings/Recommendations:*** Insights derived from the data, along with possible solutions or recommendations.
- ***Conclusions:*** Summary of the report's findings, often with action points or decisions.

Example: Imagine you work at a financial institution, and there is an ad-hoc request to understand the loan disbursements for the last month, specifically to see how they compare with the previous month's data. An ad-hoc report can be created with the following data:

Month	Loan Disbursement (₹)	Month-over-Month Change
Nov-22	25,000,000	-
Dec-22	28,500,000	14%

- ***Report Request:*** The request is made to compare the loan disbursements of November 2022 and December 2022 to identify if there was an increase or decrease in loan activity.
- ***Data Summary:*** The data for both months is gathered, showing the total loan disbursement for each month.
- ***Findings/Recommendations:*** The data is analysed, and it is found that loan disbursements increased by 14% in December. This suggests a possible growth in demand or successful marketing strategies during the holiday season.

Use of Ad-hoc Reports in Financial Context

- ***Responding to Urgent Requests:*** Ad-hoc reports are generated to answer specific and urgent questions that arise unexpectedly. *For example,* if there is a sudden inquiry about the loan performance or cash flow of a particular customer, an ad-hoc report can be created to address this need immediately.
- ***Problem Solving:*** These reports are often used to analyse problems or investigate issues. *For example,* if a sudden drop in sales or customer satisfaction is noticed, an ad-hoc report can be created to analyse the underlying causes and recommend solutions.
- ***Data Customization:*** Since ad-hoc reports are flexible, the data included can be tailored to address a particular question or concern. This makes these reports valuable when specific, detailed information is needed, without the need for a full, structured report.
- ***Actionable Insights:*** Ad-hoc reports help generate insights that can lead to immediate actions. *For example,* an ad-hoc report identifying poor loan disbursement rates for a particular branch can prompt an investigation into operational issues or allow management to implement corrective measures quickly.

KEY ELEMENTS OF AN MIS REPORT

An MIS (Management Information System) report provides valuable information that helps in the decision-making process within an organization. These reports are generated regularly to summarize data, track key metrics, and help management understand the performance of the business. To ensure the report is effective, certain key elements must be included.

1. **Title:** The title of an MIS report clearly indicates what the report is about. It should be specific and descriptive to give the reader an immediate understanding of the report's content. *For example,* a report titled “Monthly Sales Report” immediately lets the reader know that the report will focus on sales data for that particular month.
2. **Executive Summary:** The executive summary provides a brief overview of the main findings and highlights of the report. It is usually written after

the report is completed but placed at the beginning. This section should give a quick insight into the most important data and conclusions for top management or decision-makers, allowing them to understand the key points without reading the entire report.

3. **Objectives:** The objectives of the report state the reason for its creation. It explains what the report intends to achieve, such as tracking sales performance, analysing customer satisfaction, or reviewing financial expenses. The objective sets the tone for the report and ensures that the data presented aligns with the purpose of the report.
4. **Data and Metrics:** This section includes the raw data collected and the Key Performance Indicators (KPIs) being tracked. It provides the core of the report, often presented in tables, graphs, or charts. The data could include sales figures, customer feedback, financial expenses, or production numbers, depending on the objective of the report. This data must be accurate, relevant, and organized in a way that is easy to understand.
5. **Analysis and Interpretation:** After the data is presented, an analysis is done to explain what the data means. This section discusses trends, patterns, and insights observed from the data. The analysis may compare the current data to previous periods, set goals, or highlight areas for improvement. The purpose of this section is to help decision-makers understand the significance of the data and how it can be used to make decisions.
6. **Conclusions:** The conclusions section summarizes the main findings from the report. It reflects on the analysis and presents a summary of the results. This section helps the reader to focus on the most important takeaways from the report and draws attention to any significant outcomes or issues.
7. **Recommendations:** Based on the conclusions, recommendations are made to improve performance or address any issues identified. Recommendations should be clear, actionable, and based on the data and analysis. *For example,* if the report finds that sales are lower than expected, a recommendation might be to improve marketing strategies or focus on specific customer segments.
8. **Appendices:** Appendices contain supplementary information that supports the report but is not included in the main body. This may include detailed data tables, extra charts, or information on the methodology used. Appendices allow the main report to remain concise while still providing all the necessary information for those who need it.
9. **References:** If external sources have been used in preparing the report, references should be provided. This could include books, research papers, or other reports that were used to gather information. Proper referencing is important for acknowledging the original sources and avoiding plagiarism.

PRACTICAL EXERCISE

Activity 1: Group discussion on how to identify Types of Reports.

Material Required:

- Chart Paper or Whiteboard
- Markers/Pens
- Printed or Displayed Sample Reports (can be simple examples showing Daily, Weekly, Monthly, etc.)
- Table or chairs arranged for group seating

Procedure:

1. Divide students into small groups of 3-4 members each.
2. Provide each group with sample reports (can be printed or displayed).
3. Each group observes the report's time frame, content, and structure.
4. Groups discuss the following questions:
   - What type of report is this? (Daily, Weekly, etc.)
   - How do you know? (Based on date range, frequency, or headings)
   - Why is this type of report useful?
5. Each group shares their observations with the class.
6. Teacher provides feedback, clarifies doubts, and summarizes how to identify different types of reports.
7. Student prepare individual write up on what they understood by highlighting their learnings.
8. Submit write to the teacher.

Activity 2: Prepare a Simple Daily or Monthly Report.

Material Required:

- Excel Sheet (or plain paper if computers are not available)
- Dataset for practice (provided below)
- Pen/Pencil
- Chart paper (optional for handwritten reports)

Sample Dataset:

Date	New Accounts Opened	Loan Disbursed (₹)	Cash Inflow (₹)	Cash Outflow (₹)
01-07-2025	10	5,00,000	15,00,000	10,00,000
02-07-2025	15	7,00,000	18,00,000	12,00,000
03-07-2025	12	6,00,000	16,00,000	11,00,000
04-07-2025	8	4,50,000	13,00,000	9,00,000
05-07-2025	20	8,00,000	20,00,000	14,00,000

Procedure:

1. Option A (Daily Report): Students can copy the table as it is, organize it neatly in Excel or paper, and add a small summary below.
2. Option B (Monthly Report): Students should:
   - Calculate the Total New Accounts, Total Loan Disbursed, Total Cash Inflow, and Total Cash Outflow for all days combined.
   - Present it in a Monthly Report format:

Month	New Accounts Opened	Loan Disbursed (₹)	Cash Inflow (₹)	Cash Outflow (₹)

3. Students present their reports (verbally or submit for checking).
4. Discuss and correct common mistakes if any.
5. Teacher summarises the key points and learnings.

Activity 3: Class Discussion on Spot the Errors – Elements of an Effective Report.

Material Required:

- Sample Report with intentional errors (provided below with intentional errors)
- Whiteboard/Blackboard
- Markers or Chalk
- Printed or projected copy of the report for students (optional)

Sample Report with Errors:

Daily Report – Apana Sapana Bank Branch
Date: 5th July 2025

New Accounts	Loan Disbursed	Cash Inflow	Cash Out Flow
12	750000	1800000	1700000

Summary: Today's performance was good. Cash inflow and out flow is balanced.

Procedure:

1. Show the sample report to the class.
2. Ask students to observe carefully and find errors.
3. Encourage students to raise their hands and share the errors they notice.
4. Write the spotted errors on the board.
5. Correct the report:
   - Correct spellings
   - Add currency symbols (₹)

- Format numbers properly (7,50,000)
- Improve the summary with clear, short sentences

6. Quick Recap – Elements of an Effective Report.
   - Accurate headings and labels
   - Correct spelling and grammar
   - Use of currency/unit symbols
   - Proper number formatting
   - Clear, short summary or conclusion
   - Neat structure and alignment

CHECK YOUR PROGRESS

A. Fill in the Blanks

1. MIS reports help decision-makers make _____ decisions based on real-time data.
2. In an MIS report, data is summarized and presented in the form of _____, charts, and graphs.
3. A _____ report helps track daily activities and operations in businesses like banks or financial institutions.
4. _____ reports compare the performance of the current week to the previous week to track progress.
5. The _____ section of an MIS report provides a brief overview of the main findings and highlights.

B. Multiple Choice Questions (MCQs)

1. What is the primary purpose of an MIS report?
   a) To entertain employees
   b) To summarize data and help in decision-making
   c) To track employee attendance
   d) To write company policies
2. Which of the following is NOT typically included in a daily MIS report?
   a) Number of new accounts opened
   b) Cash flow in and out
   c) Sales performance
   d) Year-over-year change
3. What type of report helps in evaluating long-term trends and making strategic decisions?
   a) Daily report

b) Monthly report

c) Quarterly report

d) Annual report

4. Which of the following is NOT a key element of an MIS report?

a) Title

b) Executive Summary

c) Detailed company policies

d) Recommendations

5. What is the most important function of a weekly MIS report?

a) To evaluate employee performance

b) To track day-to-day activities

c) To assess short-term progress and trends

d) To compare with monthly data

C. State whether the following statements are True or False

1. MIS reports are generated to track historical data and provide insights for future planning.
2. Monthly reports are used to evaluate short-term progress, typically over the last few days.
3. Quarterly reports are mainly used for immediate operational adjustments and do not track long-term goals.
4. An annual report compares performance from one year to the next and helps in setting long-term goals.
5. Ad-hoc reports are created on a regular basis and follow a set schedule.

D. Short Answer Questions

1. What are the key elements that must be included in an MIS report?
2. Why is the "Executive Summary" section important in an MIS report?
3. What is the difference between daily and weekly MIS reports in terms of content?
4. How do quarterly reports help in tracking the performance of a company?
5. What is the purpose of including recommendations in an MIS report?
6. How can ad-hoc reports benefit an organization in times of urgent decision-making?

E. Long Answer Questions

1. Explain the role of MIS reports in decision-making and how they help organizations in strategic planning.

2. Discuss the different types of MIS reports and provide examples of situations where each type would be used.
3. Describe the process of creating an MIS report using Excel. What features of Excel make it an effective tool for MIS reporting?
4. How can a company use data from weekly and monthly MIS reports to improve its business operations and performance?

F. Check your Performance

1. Imagine you are working at a bank. Every day, new accounts are opened, cash is deposited, and loans are given. Your manager needs to check this information every day to make quick decisions. Which type of report will help your manager track this daily activity, and why is it important?
2. The bank's head office suddenly asks your branch to submit a report showing loan disbursements in the last 15 days because they noticed a drop-in loan number. What type of report should you prepare, and what key element should be included to make it effective?

SESSION 4: DATA VISUALISATION AND PIVOT TABLES

Data visualization is an essential skill that allows complex data to be presented in a way that is easy to understand and analyse. In Excel, one of the most powerful tools used for this purpose is the Pivot Table. A Pivot Table is used to summarize, organize, and analyse large datasets, making it easier to observe trends, patterns, and insights.

With Pivot Tables, data can be quickly grouped, filtered, and aggregated to create meaningful reports. Instead of manually calculating totals, averages, or percentages, Pivot Tables allow these operations to be done automatically. This makes it possible to work with large amounts of data in a way that would otherwise be time-consuming and complex.

Pivot Tables are commonly used in various fields such as business, finance, and education to create Management Information System (MIS) reports, analyse sales performance, track inventory, and much more. They can be used to answer key questions like "Which products have the highest sales?", "What is the average score of students across subjects?", or "How is the cash flow performing over different months?"

CREATING PIVOT TABLES

A Pivot Table in Excel is a tool that allows large amounts of data to be summarized and analysed easily. With just a few clicks, a dataset can be transformed into an interactive report, making it easier to view and understand the data. In this section, we will look at how to create a Pivot Table step by step.

Steps to Create a Pivot Table

1. **Select the Data Range:** The first step in creating a Pivot Table is to select the data range that needs to be analysed. The data should be organized into rows and columns, and each column should have a clear heading that describes the data it contains. *For example,* if the data contains information about sales, the columns could be labelled as "Product", "Sales Amount", "Date", etc.

Product	Sales Amount (₹)	Region	Date
Product A	10,000	North	01/01/2023
Product B	5,000	South	01/01/2023
Product C	8,000	East	02/01/2023

2. **Insert a Pivot Table:** After selecting the data, the next step is to insert the Pivot Table. This can be done by following these steps:
   - Click on the Insert tab in Excel's ribbon.
   - In the Tables group, click on PivotTable.

- A dialog box will appear asking for the range of data. The selected range will be automatically filled in the dialog box. The Pivot Table can be placed either in a new worksheet or in an existing one.

3. **Choose Pivot Table Fields:** After inserting the Pivot Table, the PivotTable Field List will appear on the right side of the screen. The field list contains all the column headings from the selected data. These fields can be dragged and dropped into the four areas of the Pivot Table:
   - ***Rows:*** Data placed here will be shown as rows in the Pivot Table.
   - ***Columns:*** Data placed here will be shown as columns in the Pivot Table.
   - ***Values:*** Data placed here will be summarized (e.g., summed, averaged, counted) in the Pivot Table.
   - ***Filters:*** Filters allow users to view specific data based on certain criteria.

   Example: Drag Product into the Rows area to see sales by product.

   Drag Sales Amount into the Values area to calculate total sales.

   Drag Region into the Columns area to see the sales in each region.

4. **Customize the Pivot Table:** Once the Pivot Table is created, it can be customized:
   - ***Summarize Data:*** The Values field can be changed to display data in different ways. For example, the default setting is to sum the data, but it can also be changed to show the average, count, or percentage.
   - ***Sort Data:*** The Pivot Table data can be sorted in ascending or descending order to help highlight the most important data.
   - ***Filter Data:*** Add filters to the Pivot Table to view only the data that meets certain criteria.

CREATING AN MIS REPORT WITH PIVOT TABLES AND VISUALS

Step 1: Set Up the Data

Consider a dataset that contains sales data, including product names, sales amounts, regions, and dates. The following dataset can be used as an example:

Product	Sales Amount (₹)	Region	Date
Product A	10,000	North	01/01/2023
Product B	5,000	South	01/01/2023
Product C	8,000	East	02/01/2023
Product A	15,000	North	03/01/2023
Product B	12,000	South	03/01/2023
Product C	10,000	East	04/01/2023

Product A	20,000	West	05/01/2023
Product B	18,000	West	06/01/2023
Product C	25,000	North	07/01/2023

Step 2: Create a Pivot Table

a) ***Select the Data:*** Highlight the entire dataset, including column headings.

b) ***Insert Pivot Table:*** Go to the Insert tab on the Excel ribbon and click on PivotTable. Select the option to create the Pivot Table in a new worksheet.

c) ***Choose Fields for Pivot Table:***

- *Rows:* Drag the Product field into the Rows section to group the data by product.
- *Columns:* Drag the Region field into the Columns section to see the data by region.
- *Values:* Drag the Sales Amount (₹) field into the Values section to calculate the total sales for each product in each region.

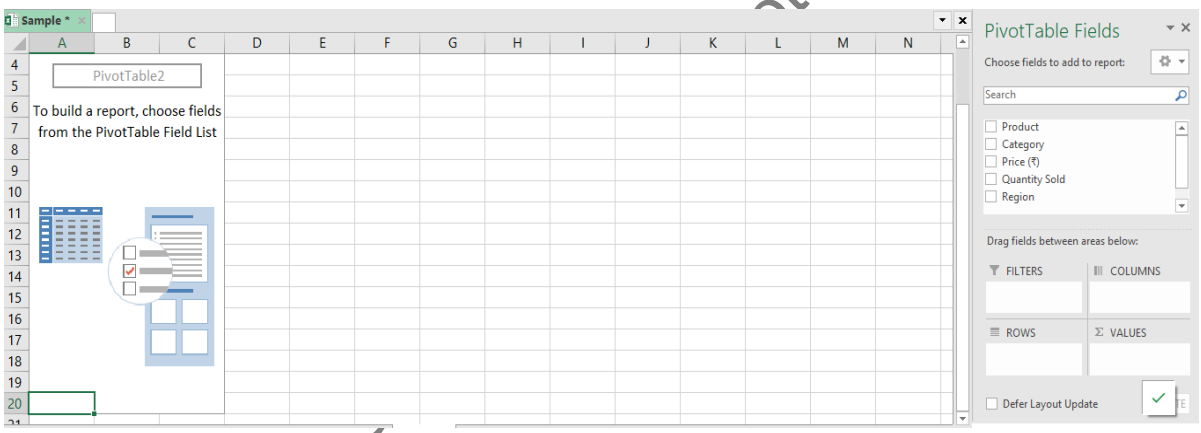


Fig. 3.2: Sample pivot table

Step 3: Customize the Pivot Table

- ***Summarize by Sum:*** The default setting will sum the sales values. If it doesn't, right-click the Values field, select Summarize Values By, and choose Sum.
- ***Formatting:*** The numbers can be formatted to display in currency format for better readability.

Step 4: Add a Pivot Chart for Visual Representation

- ***Select Pivot Table:*** Click anywhere inside the Pivot Table.
- ***Insert Pivot Chart:*** Go to the Insert tab, and select a Pivot Chart from the Charts section. Choose a Column Chart, which is suitable for comparing sales across regions.
- ***Customize the Chart:*** The chart will appear next to the Pivot Table. You can format the chart to enhance readability:

- ***Add chart titles***, such as "Sales Performance by Product and Region".
- ***Label the axes*** (e.g., "Regions" for the X-axis and "Sales (₹)" for the Y-axis).
- ***Use different colors*** for each region to make the chart visually appealing.

Step 5: Visualize and Interpret the Data

The Pivot Chart will help visualize the sales data for each product across different regions. Based on our dataset:

- Product A has the highest sales in North and West regions.
- Product B has a significant presence in the West region.
- Product C has a balanced performance between North and East.
- The total sales for each product across all regions can also be analyzed in the Pivot Table, providing an overall picture of sales performance.

Step 6: Apply Filters or Slicers (Optional)

Filters and slicers can be used to interact with the Pivot Table and Pivot Chart dynamically:

- ***Filters:*** Drag the Date field into the Filters area. This allows to filter the data by a specific month or time period.
- ***Slicers:*** Add Slicers by clicking on the Insert tab, selecting Slicer, and choosing fields like Product or Region. Slicers provide buttons that allow interactive filtering of the data.

ANALYZING AND SUMMARIZING DATASETS

Example 1: Analysing Sales Data by Region and Product

Dataset: Let's consider a sales data set containing sales transactions for different products in various regions:

Product	Sales Amount (₹)	Region	Date
Product A	10,000	North	01/01/2023
Product B	5,000	South	01/01/2023
Product C	8,000	East	02/01/2023
Product A	15,000	North	03/01/2023
Product B	12,000	South	03/01/2023
Product C	10,000	East	04/01/2023
Product A	20,000	West	05/01/2023
Product B	18,000	West	06/01/2023
Product C	25,000	North	07/01/2023

Insert a Pivot Table:

- Rows: Add Product

- Columns: Add Region
- Values: Add Sales Amount and set it to Sum to calculate total sales by region and product

Interpretation:

- Product A is the highest-grossing product in both the North and West regions.
- Product B has low sales in the South, but higher sales in the West.
- Product C has strong sales in the North and East, showing a balanced performance across these regions.
- The Total Sales across all regions and products amounts to ₹141,000.

Insights:

- Product A has the highest overall sales, but it's particularly successful in the North.
- Product C performs well in multiple regions, indicating it may have a broader market appeal.
- The South region seems to be underperforming in comparison to the other regions, especially for Product B.

Example 2: Analysing Student Marks by Subject and Class

Dataset: Let's assume a student marks dataset from a school for different subjects and students across two classes.

Student Name	Math Marks	English Marks	Science Marks	Grade
Jay	85	90	88	11A
Mahesh	92	88	91	11B
Ali	80	85	90	11A
Baban	75	78	80	11B
Karan	90	87	95	11A
Dhavan	82	83	89	11B

Insert a Pivot Table:

- Rows: Add Student Name
- Columns: Add Subject
- Values: Add Math Marks, English Marks, and Science Marks and set them to Average to calculate the average marks for each student across the subjects
- Filters: Add Grade to see the data by Grade

Interpretation:

- Mahesh has the highest average marks, followed by Karan
- Baban has the lowest average marks, particularly in Math and English.
- Jay and Ali have relatively balanced scores across all subjects, with slightly better marks in English and Science

Insights:

- Mahesh seems to be performing exceptionally well in all subjects, achieving the highest average.
- The lowest-performing student is Baban, whose marks in Math and English seem to be dragging his overall average down.
- Based on the class filter, teachers can look at overall class performance in each subject and identify areas of improvement.

APPLYING FILTERS AND SLICERS IN PIVOT TABLES

Filters and slicers are used in Pivot Tables to help make the data more interactive. By applying filters and slicers, users can focus on specific parts of the data without altering the entire dataset. This makes it easier to analyse certain segments of data based on different criteria.

Filters in Pivot Tables: Filters in a Pivot Table allow users to select specific data to be displayed. This can help in focusing on particular details, such as filtering data for a specific region or time period.

Apply Filters:

- After creating a Pivot Table, the PivotTable Field List will appear
- Drag a field (e.g., Region, Date, or Product) into the Filters area
- The Filter will appear above the Pivot Table.
- Click on the drop-down arrow in the filter box and select the data you want to see.

Steps:

- To filter the sales data by Product B, drag Product into the Filters area.
- Click the drop-down arrow in the filter box, and select Product B.
- The Pivot Table will now show only the sales data related to Product B.

Slicers in Pivot Tables: Slicers provide a more visual way to filter data. Slicers allow users to select categories directly from a button interface, making it easier to filter the data interactively. Slicers are especially useful for filtering data by multiple categories while keeping the structure of the Pivot Table unchanged. They provide an interactive way to quickly narrow down information, making analysis faster and more intuitive.

Apply Slicers:

- Click anywhere inside the Pivot Table.

- Go to the Insert tab on the Ribbon.
- In the Filters group, click on Slicer
- In the Slicer dialog box, select the field (e.g., Product, Region) you want to create a slicer for.
- Click OK.
- A slicer box will appear with buttons for each category in the selected field. You can click these buttons to filter the data

Example: Applying a Slicer to Filter by Region:

- Using the previous sales data, a Region slicer can be added to the Pivot Table. This slicer will allow the user to quickly filter data by region.
- A slicer will be created with buttons like North, South, East, and West.
- Clicking on any button (e.g., North) will instantly filter the Pivot Table to show only the sales data for the North region.
- Multiple regions can also be selected at the same time to compare them.

Benefits of Using Filters and Slicers:

- **Interactivity:** Filters and slicers allow users to focus on specific parts of the data, making the analysis more interactive. They provide a quick way to explore data without changing the layout.
- **Clear and Visual:** Slicers provide a more visual and user-friendly way to filter data compared to traditional filters. They can be particularly useful for presentations or when sharing reports with others.
- **Enhanced Decision-Making:** Filters and slicers allow managers or decision-makers to view specific segments of data, making it easier to identify trends or spot issues in a specific area.

PRACTICAL EXCERCISE

Activity: Develop MIS Reports with Pivot Visuals.

Material Required:

- Computer or Laptop with MS Excel installed
- Sample dataset (e.g., Sales data with Product, Region, Sales Amount)
- Projector (optional, for class demonstration)
- Pen and notebook for taking notes

Procedure:

1. Provide the Dataset i.e. share a ready-made Excel sheet with data such as Product, Region, Sales Amount, and Date.
2. Ask students to open the dataset in Excel.
3. Create a Pivot Table:
    - Highlight the entire dataset.

- Go to the Insert tab, click on PivotTable, and select New Worksheet.
- Drag relevant fields:
  Product → Rows
  Region → Columns
  Sales Amount → Values (to sum total sales)

4. Insert Pivot Chart: With the Pivot Table selected, go to the Insert tab, choose Pivot Chart (e.g., Bar Chart or Column Chart) to visualize the data.
5. Customize the Report:
   - Add filters like Date if needed.
   - Format the chart (add titles, labels).
6. Ask students to observe trends in sales by product and region using the chart.
7. Discuss how such visuals help in decision-making.

CHECK YOUR PROGRESS

A. Fill in the Blanks Questions

1. Pivot Tables allow users to _____ data based on multiple fields like rows, columns, and values.
2. A _____ allows the data to be analyzed dynamically by grouping and summarizing it.
3. _____ are used in Pivot Tables to filter data and display only relevant information.
4. A _____ chart is often used in conjunction with a Pivot Table to visually represent the data.
5. The _____ section in a Pivot Table is used to place the fields you want to summarize, like totals or averages.

B. Multiple Choice Questions (MCQs)

1. What is the main purpose of a Pivot Table in Excel?
   a) To create formulas automatically
   b) To summarize and analyse large datasets
   c) To format cells and make them look visually appealing
   d) To create custom charts and graphs
2. Which of the following is NOT a typical feature of a Pivot Table?
   a) Summarizing data
   b) Creating automated reports
   c) Filtering data by specific criteria

d) Performing data entry tasks

3. How can Pivot Tables help businesses?
   a) By manually entering data for analysis
   b) By summarizing key metrics and trends for decision-making
   c) By only providing visualizations
   d) By storing large datasets
4. Which chart is commonly used to visualize Pivot Table data?
   a) Line chart
   b) Column chart
   c) Scatter plot
   d) Pie chart
5. What is the first step in creating a Pivot Table?
   a) Inserting a Pivot Chart
   b) Selecting the data range
   c) Filtering the data
   d) Grouping the data

C. State whether the following statements are True or False

1. Pivot Tables automatically update when new data is added to the dataset.
2. You can only summarize data in Pivot Tables by summing the values.
3. Filters and slicers allow you to view only specific parts of the data in a Pivot Table.
4. Pivot Tables can only be used for numerical data and cannot be used for text-based fields.
5. Once a Pivot Table is created, you cannot change the layout or add/remove fields.

D. Short Answer Questions

1. How do Pivot Tables help in summarizing large datasets?
2. What is the difference between a row and column in a Pivot Table?
3. What are the key steps involved in creating a Pivot Table in Excel?
4. How do you apply filters to a Pivot Table, and why is it useful?
5. How can a Pivot Chart enhance the visual representation of data in a Pivot Table?
6. What is the use of slicers in Pivot Tables, and how do they improve user experience?

E. Long Answer Questions

1. Explain the process of creating a Pivot Table in Excel and how you can use it to analyze sales data by product and region.
2. Discuss the advantages of using Pivot Tables over traditional manual data analysis techniques in business decision-making.
3. How can Pivot Tables be used in a school setting to analyze student performance across different subjects and classes? Provide an example of how this would be set up.
4. Describe the steps to create a comprehensive MIS report using Pivot Tables and Pivot Charts. Include how filters and slicers enhance the report's interactivity.

F. Check Your Performance

1. You are given a sales dataset of different products sold across various regions with the following columns:

Product	Region	Sales Amount (₹)	Quantity Sold
Laptop	North	75,000	5
Phone	South	40,000	10
TV	East	55,000	4
Laptop	West	80,000	6
Phone	North	42,000	9
TV	South	60,000	5

a) You need to create a Pivot Table to: Summarize the total Sales Amount for each Product by Region.
   - Apply a Filter to display only the "North" and "South" regions.
   - Add a Slicer to filter data by Product.

b) How can the Pivot Table and Slicer help you quickly analyse sales trends for specific regions and products?

MODULE 4: ADVANCED EXCEL FOR ANALYSIS AND DASHBOARDS

Excel is one of the most widely used tools for working with data, from simple calculations to complex data analysis. While basic Excel skills can help manage and manipulate data, advanced Excel features are crucial for analysing complex data sets and creating professional reports. As students begin working with more data in school projects or real-life scenarios, they may encounter large volumes of data that need to be analysed and presented effectively. This is where advanced Excel techniques become essential.

Advanced Excel for Analysis and Dashboards helps users take their Excel skills to the next level by introducing more powerful tools for data analysis and visualization. This module will focus on advanced Excel functions and tools that allow users to gain insights from their data, summarize complex information, and present it in visually appealing dashboards. Dashboards are a combination of charts, tables, and data that are used to track key performance indicators (KPIs) and make decision-making easier for managers, analysts, and businesses.

In today's world, data is collected in vast amounts every day. Businesses, governments, and other organizations are constantly gathering data to make informed decisions. With Excel's advanced features, users can quickly summarize large amounts of data and transform it into useful insights. For example, financial data, sales performance, student grades, and market trends can all be organized and analysed using advanced tools in Excel. This allows businesses and organizations to make data-driven decisions that are based on facts, rather than guesses or assumptions.

This module is divided into four session viz; Session 1 deals with advanced lookup functions such as VLOOKUP, HLOOKUP, INDEX, and MATCH to perform comprehensive data searches and analysis. Session 2 focuses on the development of daily and weekly MIS reports using Excel functions, formatting tools, and visual representation techniques. Session 3 introduces advanced pivot table functionalities and the foundational concepts of dashboard design. Lastly, Session 4 culminates in the preparation of monthly MIS reports and the creation of basic interactive dashboards using charts, tables, and slicers in Excel.

SESSION 1: ADVANCED LOOKUP AND DYNAMIC FUNCTIONS

In Excel, Lookup functions are essential tools used to search for specific data within large datasets. While basic lookup functions like VLOOKUP are commonly used, advanced functions provide more flexibility and accuracy, helping users retrieve data from multiple tables or ranges. These functions are especially useful in complex data analysis tasks, where quick and reliable data retrieval is needed.

The functions (VLOOKUP, HLOOKUP, INDEX, and MATCH) allow users to search for information across rows and columns and return corresponding data. For example, VLOOKUP is used to search for a value in the vertical column of a dataset, while HLOOKUP is used for horizontal searches. On the other hand, INDEX and MATCH can be combined for more flexibility, allowing for lookups in both rows and columns and even handling more complex scenarios.

ADVANCED VLOOKUP AND HLOOKUP

In Excel, VLOOKUP and HLOOKUP are commonly used functions to search for a specific value in a range and return related information. These functions can perform an exact match or an approximate match. When performing an approximate match, Excel finds the closest value that is less than or equal to the lookup value. This type of match is useful when working with ranges, such as tax brackets, grading systems, or commission tables.

A. Advanced VLOOKUP

The VLOOKUP function in Excel is a versatile tool used to search for a specific value in the first column of a dataset and return corresponding data from another column in the same row. While the basic usage of VLOOKUP is effective for straightforward lookups, several advanced techniques can enhance its flexibility and performance. These advanced features allow for dynamic column references, error handling, approximate matching, and integration with forms and data validation tools.

Let's explore these advanced features of VLOOKUP with step-by-step examples. Consider the dataset given below:

Student Name	Math Score	Grade
Jay	85	B
Era	92	A
Vijay	76	C
Lila	88	B
Manu	95	A
Raju	80	B

1. ***Approximate Match (TRUE):*** By default, VLOOKUP searches for an exact match. However, it can also be used to find an approximate match when the values in the first column are sorted. This approach is useful in scenarios such as grading scales or tax brackets, where data is organized into defined ranges.

   Example: Find the grade of a student with a Math Score of 80, using the approximate match to find the closest lower score.

   Formula: =VLOOKUP (80, B2:C7, 2, TRUE)

   - 80: The score that needs to be searched.
   - B2:C7: The range of data (Math Score and Grade columns).
   - 2: The column number (Grade column) from which the result will be returned.
   - TRUE: This tells Excel to find the closest match that is less than or equal to 80.

   In a table with student scores, this formula would return B for Raju since 80 is closest to his score, and he has a grade B.

2. ***Dynamic Column Index Using MATCH:*** When the column from which data must be retrieved changes frequently, the MATCH function can be used to determine the column number dynamically. This approach eliminates the need to manually update the column index in the VLOOKUP function, ensuring greater flexibility and accuracy in data retrieval.

   Example: Find the Grade of a student using a dynamic column index (if the column header changes).

   Formula: =VLOOKUP ("Era", A2:C7, MATCH ("Grade", A1:C1,0), FALSE)

   - "Era": The student's name that needs to be searched.
   - A2:C7: The range to search through.
   - MATCH ("Grade", A1:C1, 0): This function finds the column index of the "Grade" column by matching the header name.
   - FALSE: Exact match for the student name.

   This formula will return A because it looks up Era's grade in the Grade column.

3. ***Error Handling with IFERROR / IFNA:*** When using VLOOKUP, an error such as #N/A may appear if the lookup value is not found. This can be avoided by wrapping the formula with IFERROR or IFNA to return a custom message (like "Not Found") instead of showing the error.

   Example: If a student named Ravi is not found, display "Student Not Found" instead of an error.

Formula: = IFERROR (VLOOKUP ("Ravi", A2:C7,2, FALSE), "Student Not Found")

- VLOOKUP ("Ravi", A2:C7,2, FALSE): The basic VLOOKUP to search for David's grade.
- IFERROR: If the VLOOKUP returns an error (because Ravi isn't found), it will display "Student Not Found".

This formula will return "Student Not Found" if Ravi is not in the dataset.

4. ***Using Named Ranges for Flexibility:*** Named ranges make formulas easier to understand and manage by assigning a meaningful name to a group of cells.

Example: Use Named Ranges to make your VLOOKUP formula simpler.

Create a Named Range: (Fig. 4.1)

- Select the range of cells (e.g., A2:B6).
- Go to the **Formulas** tab → click **Define Name**.
- Type a name (e.g., Student Data) and click OK.

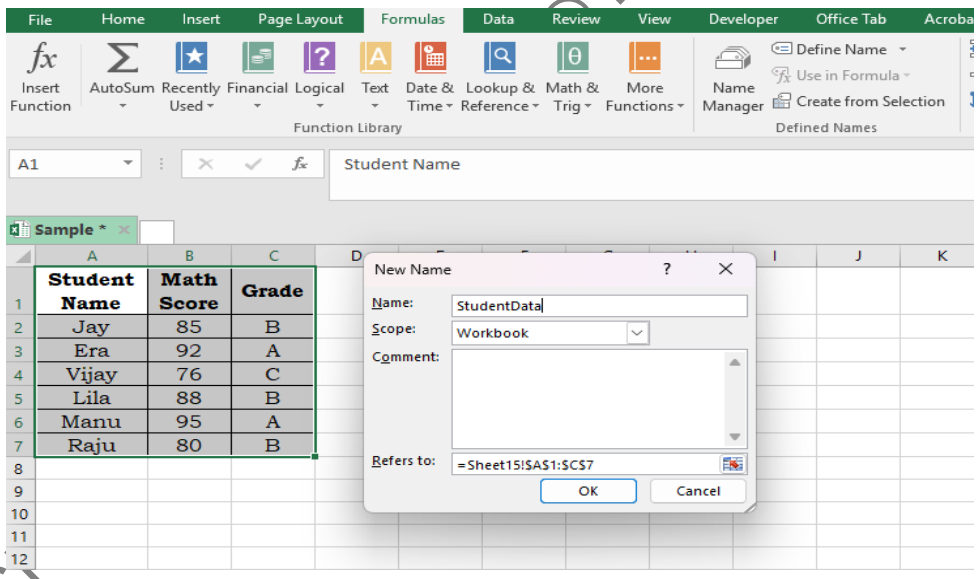


Fig. 4.1: Create a Named Range

Formula: =VLOOKUP ("Lila", StudentData,2, FALSE)

- Student Data: This is the name of the range assigned to the table A2:C7.
- "Lila": The student's name being searched.
- 3: The column number where the grade is located.
- FALSE: Exact match for Lila's name.

This formula will return B, which is Lila's grade.

5. ***Embedding VLOOKUP in Data Validation / Forms:*** VLOOKUP can be combined with Data Validation to create drop-down lists that change

dynamically based on another cell's value. This is helpful when building interactive forms or dashboards where choices depend on earlier selections.

Example: Use VLOOKUP in Data Validation to create a dynamic drop-down list for students based on the selected category.

Create a Drop-Down List (Data Validation): (Fig. 4.2)

- Select a cell (e.g., D2) for student selection.
- Go to **Data → Data Validation → List**.
- In the source box, enter: =A2:A6.

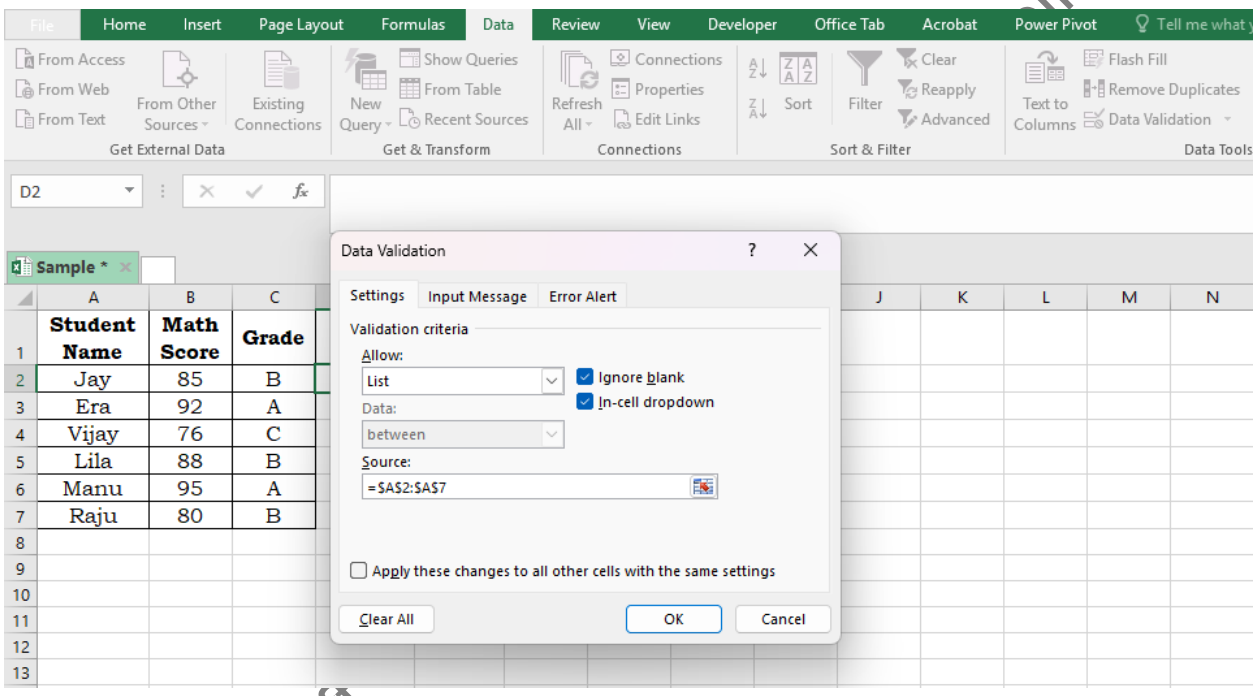


Fig. 4.2: Create a Drop-Down List (Data Validation)

Formula: =VLOOKUP (D2, A2:C7,3, FALSE)

- D2: The cell used to select the category (e.g., a student's name).
- A2:C7: The range containing data (Student Names and Grades).
- 3: The column index to return the grade.

This formula helps to create a drop-down list where you select a student, and the corresponding grade is automatically filled in.

6. ***VLOOKUP with Wildcards:*** Wildcards allow VLOOKUP to perform partial matches. The asterisk (*) represents any number of characters, and the question mark (?) represents a single character.

Example: Find a student whose name contains the letter **L**.

Formula: =VLOOKUP ("*L*", A2:C7, 3, FALSE)

- "*L*": The asterisk * allows any number of characters before and after the letter L, so it will match any name with "L" in it.
- A2:C7: The range to search.
- 3: The column index for Grade.
- FALSE: Exact match for the letter "L".

This formula will return B for Lily, since her name contains the letter L.

B. Advanced HLOOKUP in Excel

The HLOOKUP function in Excel works similarly to VLOOKUP, with the key difference being the direction of the search. While VLOOKUP searches down columns, HLOOKUP searches across rows to locate a specific value and return data from a specified row.

Beyond basic lookups, HLOOKUP offers several advanced features that improve its flexibility and functionality. These include approximate matches, dynamic row references using formulas like MATCH, error handling with IFERROR, and integration with named ranges for easier management. These techniques are particularly useful when working with horizontal data layouts.

Let's consider the following dataset:

Student Name	Jay	Era	Vijay	Lila	Manu	Raju
Math Score	85	92	76	88	95	80
Grade	B	A	C	B	A	B

1. ***Approximate Match in Graded Scenarios:*** The HLOOKUP function can be used for approximate matches, especially when working with graded data like score bands, tax brackets, or rating systems organized horizontally across rows. When the data is sorted in ascending order, HLOOKUP can return the best fit based on the closest lower value.

Example: Find the grade for a score of 80, using the approximate match to find the closest lower score, but applied across rows.

Formula: =HLOOKUP (80, B2:G3,2, TRUE)

- 80: The score that needs to be searched.
- B2:G3: The range of data (with scores in the first row and corresponding grades in the second row).
- 2: The row number (Grade row) from which the result will be returned.
- TRUE: This tells Excel to find the closest match that is less than or equal to 80.

If you have a table where the first row contains different scores and the second row contains corresponding grades, this formula will return B for a score of 80.

2. ***Dynamic Row Index Using MATCH:*** The MATCH function can be combined with HLOOKUP to dynamically identify the row number from which to retrieve data. This is especially helpful when working with large datasets or when the structure changes frequently. Using MATCH avoids hardcoding the row index in the HLOOKUP formula.

   Example: Find the Grade of a student using a dynamic row index (if the row header changes).

   Formula: =HLOOKUP ("Era", B1:G3, MATCH ("Grade", A1:A3,0), FALSE)

   - "Era": The student's name that needs to be searched in the row.
   - B1:G3: The range to search through.
   - MATCH ("Grade", A1:A3,0): This function dynamically finds the row index where the "Grade" is located by matching the header name.
   - FALSE: Exact match for the student name.

   This formula will return the grade for Era by searching across rows and matching her name to the Grade row.

3. ***IFERROR with HLOOKUP:*** The HLOOKUP function can return errors like #N/A when the lookup value is not found. To manage these situations more effectively and avoid confusing error messages in a report or dashboard, the IFERROR function can be used.
   IFERROR allows defining a fall-back message or value if the lookup fails.
   Example: If a student named Ravi is not found, display "Student Not Found" instead of an error.

   Formula: =IFERROR (HLOOKUP ("Ravi", B1:G3,3, FALSE), "Student Not Found")

   - HLOOKUP ("Ravi" A1:G3,3, FALSE): The basic HLOOKUP function to search for Ravi's grade across rows.
   - IFERROR: If the HLOOKUP returns an error (because David isn't found), it will display "Student Not Found".

   This formula will return "Student Not Found" if Ravi is not found in the dataset.

INTRODUCTION TO INDEX AND MATCH FUNCTIONS

In Excel, the INDEX and MATCH functions are powerful tools used for data lookup and retrieval. While VLOOKUP and HLOOKUP are commonly used to search for values in rows and columns, INDEX and MATCH offer greater flexibility and versatility. These two functions are often used together, but they can also be used separately to perform complex lookups and data retrieval.

INDEX Function

The INDEX function returns the value of a cell in a specific row and column within a range. Unlike VLOOKUP or HLOOKUP, the INDEX function does not require the lookup value to be in the first row or column, making it more flexible in dealing with large datasets.

Syntax: = INDEX (array, row num, [column num])

- **array:** The range of cells containing the data.
- **row_num:** The row number from which to retrieve the value.
- **[column_num]:** (optional) The column number from which to retrieve the value. This is required if the array contains multiple columns.

The MATCH Function

The MATCH function searches for a specified value in a range and returns the relative position of that value within the range. It can be used to find the row number or column number of a value within a range, which can then be used in combination with the INDEX function.

Syntax: =MATCH (lookup value, lookup array, [match type])

- **lookup_value:** The value to search for.
- **lookup array:** The range of cells to search within.
- **[match type]:** This can be set to 1 for an approximate match (largest value less than or equal to the lookup value), 0 for an exact match, or -1 for the smallest value greater than or equal to the lookup value.

Advantages of INDEX and MATCH Functions

- ***Flexibility:*** Unlike VLOOKUP or HLOOKUP, INDEX and MATCH can search for values in any column or row, even when the lookup value is not in the first column or row of the dataset.
- ***Efficiency:*** INDEX and MATCH are often faster and more efficient, especially when working with large datasets. This is because they do not need to search the entire range from left to right (or top to bottom).
- ***More Control:*** With INDEX and MATCH, users can specify exactly which row and column to retrieve data from, giving them more control over the lookup process.
- ***Avoiding Limitations:*** VLOOKUP is limited in that it can only search for values in the leftmost column of the table. INDEX and MATCH do not have this limitation, which makes them more versatile for complex data analysis tasks.

Using INDEX Function (Without MATCH)

Let's start by using the INDEX function alone to retrieve a value from a specific cell in a dataset.

Product	Price (₹)	Quantity
Product A	50	100
Product B	30	200
Product C	40	150

To retrieve the Price of Product B using INDEX, apply the following formula:

=INDEX (B2:B4, 2)

- B2:B4 is the array containing the price values.
- 2 is the row_num where Product B's price is located (the second row in the range).
- Result: The formula will return 30, which is the price of Product B.

Using MATCH Function (Without INDEX)

The MATCH function can be used to find the position of a value within a range. For example, to find the position of Product C in the Product column, apply the following formula:

=MATCH (“Product C”, A2:A4, 0)

- “Product C” is the lookup_value.
- A2:A4 is the lookup array where the product names are listed.
- 0 indicates that we are looking for an exact match.
- Result: The formula will return 3, which means Product C is in the third position in the range.

Combining INDEX and MATCH Functions

While the INDEX and MATCH functions can be used separately, they are often combined for more flexible lookups. The MATCH function can return the row number (or column number) that is then used by the INDEX function to retrieve the value.

Let’s use the INDEX and MATCH functions together to retrieve the Price of Product C from the table:

=INDEX (B2:B4, MATCH ("Product C", A2:A4, 0))

- MATCH (“Product C”, A2:A4, 0) will return 3, which is the row number where Product C is located.
- INDEX (B2:B4, 3) will then retrieve the value from the third row of the Price column, which is 40.
- Result: The formula will return 40, which is the price of Product C.

PRACTICAL EXERCISE

Activity 1: Perform advanced applications of VLOOKUP and HLOOKUP in Excel.

Material Required:

- Computer or Laptop with Microsoft Excel installed
- Pen and notebook (for noting formulas if required)
- Excel Worksheet containing the following two datasets:

Dataset 1: Student Scores and Grades

Student Name	Math Score	English Score	Science Score	Grade
Jayesh	85	78	92	B
Era	92	89	94	A
Sanjay	76	81	70	C
Lily	88	85	90	B
Mahesh	95	94	98	A
Vinay	80	82	88	B

Dataset 2: Monthly Region-Wise Performance

Month	North	South	East	West	Central
January	75	82	68	90	85
February	78	85	72	88	87
March	80	90	75	92	89
April	85	88	80	95	90

Procedure:

1. Open Excel and type the Student Scores and Grades (Dataset 1) in the cells from A1 to E7.
2. Click on any empty cell and enter the VLOOKUP formula to find Vinay's Math Score.
3. Type Monthly Region-Wise Performance (Dataset 2) in the cells from A9 to F13.
4. Click on an empty cell and enter the HLOOKUP formula to find the performance for East Region in March.
5. Create a drop-down for Student Names in cell G1.
6. Display Math Score of selected students: Enter the formula in G2.
7. Display performance in March for that student's row index. Enter the formula in G3.
8. Show it to the teacher.

Activity 2: Find the Price of a Product using INDEX and MATCH.

Material Required:

- Computer or laptop with MS Excel installed

- Pen and notebook for rough work (optional)
- Excel worksheet with the following table:

Product Name	Price (₹)
Product A	150
Product B	200
Product C	300
Product D	250

Procedure:

1. Open Excel and enter the data in two columns:
   - Column A: Product Name (A2 to A5)
   - Column B: Price (B2 to B5)
2. In any empty cell (e.g., D2), type the formula using MATCH to find the row number of Product C.
3. In the next cell (e.g., D3), use INDEX to find the price using the row number.
4. Now, combine INDEX and MATCH in a single formula to make it dynamic.
5. Press Enter.
6. Try changing "Product C" to another product name in the formula to test different results.
7. Show it to the teacher.

Activity 3: Find the Department of an Employee using INDEX and MATCH.

Material Required:

- Computer or laptop with MS Excel installed
- Pen and notebook for rough work (optional)
- Excel worksheet with the following table:

Employee Name	Department	Salary (₹)
Aman	HR	50,000
Baban	IT	60,000
Charan	Finance	70,000
Dhavan	Marketing	55,000

Procedure:

1. Open Excel and enter the data into three columns:
   - Column A: Employee Name (A2 to A5)

- Column B: Department (B2 to B5)
- Column C: Salary (C2 to C5)

2. To find the department of *Baban*, we will use MATCH to find the row number of his name.
3. In an empty cell (e.g., E2), type the formula.
4. Now use the INDEX function to retrieve the department from Column B.
5. Now, combine the two functions in a single formula.
6. Press Enter.
7. Try changing "Baban" to another employee's name in the formula to test different results.
8. Show it to the teacher.

CHECK YOUR PROGRESS

A. Fill in the Blanks Questions

1. The function _____ is used to search for a value in the first column of a table and return a corresponding value from a different column.
2. In the INDEX function, the _____ argument refers to the row number from which to retrieve the value.
3. The _____ function searches for a value in the first row of a table and returns a corresponding value from a different row.
4. The _____ function can be combined with INDEX to provide a more flexible way to perform lookups in Excel.
5. The VLOOKUP function with an approximate match requires the _____ argument to be set to TRUE.

B. Multiple Choice Questions

1. Which function can be used to find the position of a value within a range?

   a) VLOOKUP

   b) INDEX

   c) MATCH

   d) HLOOKUP

2. What does the range lookup argument in VLOOKUP do when set to TRUE?

   a) Performs an exact match

   b) Performs an approximate match

   c) Returns an error

   d) Ignores the match

3. Which function would you use to retrieve a value based on a specific row and column from a range?
   a) INDEX
   b) MATCH
   c) VLOOKUP
   d) HLOOKUP
4. Which function allows you to perform a lookup in a horizontal table?
   a) VLOOKUP
   b) HLOOKUP
   c) INDEX
   d) MATCH
5. What is the advantage of using INDEX and MATCH together?
   a) They only work with vertical data
   b) They allow more flexibility than VLOOKUP or HLOOKUP
   c) They are slower than VLOOKUP and HLOOKUP
   d) They require fewer arguments than VLOOKUP and HLOOKUP

C. State whether the following statements are True or False

1. VLOOKUP can only perform lookups in vertical columns, not horizontal rows.
2. HLOOKUP is used to find a value in the first column of a table.
3. INDEX and MATCH can be used together to perform more complex lookups than VLOOKUP.
4. The MATCH function returns the actual value of the matched item, not its position.
5. VLOOKUP with approximate match can return values that are greater than the lookup value.

D. Short Answer Questions

1. What is the difference between VLOOKUP and HLOOKUP in Excel?
2. How can you use the MATCH function to find the row number of a specific item?
3. What are the advantages of combining INDEX and MATCH over using VLOOKUP?
4. What does the range lookup argument in VLOOKUP do, and when should it be set to TRUE?
5. How can INDEX and MATCH functions be used together to perform a lookup across both rows and columns?

E. Long Answer Questions

1. Discuss the steps to perform an approximate match lookup using VLOOKUP and HLOOKUP with examples. Include a scenario where this feature would be helpful.
2. Compare and contrast the VLOOKUP and HLOOKUP functions. Discuss their limitations and how INDEX and MATCH can be used to overcome these limitations.
3. Explain how the INDEX and MATCH functions can be used together to look up data from non-adjacent columns. Provide an example scenario where this would be beneficial.
4. Describe a business scenario where you would use VLOOKUP with approximate match, and how it could simplify your data analysis. Explain the formula used in this case.

F. Check Your Performance

1. You are working with the following dataset of employees and their monthly bonuses. Use your knowledge of Advanced VLOOKUP/HLOOKUP, INDEX and MATCH, and their combination to answer the question.

Employee ID	Name	Department	Bonus (₹)
E101	Arya	HR	5,000
E102	Bharat	IT	6,000
E103	Charu	Finance	7,000
E104	Dinesh	Marketing	5,500

Using Excel, retrieve the Bonus amount for the employee named Charu using:

a) Advanced VLOOKUP (with dynamic column index)
b) INDEX and MATCH combination

SESSION 2: MIS REPORTS USING EXCEL

Management Information Systems (MIS) reports are essential tools used by businesses and organizations to collect, organize, and analyse data. These reports help decision-makers by presenting key metrics and performance indicators in a clear and structured format. In today's data-driven world, MIS reports are vital for monitoring business performance, making informed decisions, and planning future strategies.

KEY PERFORMANCE INDICATORS FOR DAILY AND WEEKLY REPORTS

Key Performance Indicators (KPIs) are metrics used to measure the performance of a specific activity, process, or goal. They help track progress, identify trends, and make data-driven decisions. In an MIS report, KPIs provide a quick snapshot of how well a business, department, or team is performing.

Daily Reports - Key Performance Indicators

For daily reports, KPIs help track activities that need to be measured every day, providing a snapshot of how things are progressing. Daily reports are often used to track short-term goals and monitor day-to-day operations.

Common KPIs for Daily Sales Reports might include:

- **Total Sales:** The total revenue generated from all sales on that specific day.
- **Number of Transactions:** The total number of sales made during the day.
- **Average Sale Value:** The average amount spent per customer transaction.
- **Sales by Product or Category:** The sales performance of individual products or categories on that day.
- **New Customers Acquired:** The number of new customers added or signed up.

Part 1: Creating the Daily Sales Report

Step 1: Open Excel

Open Microsoft Excel and start with a new worksheet.

Name the worksheet as "Daily Sales Report".

Step 2: Enter the Sample Data

In cells A1 to D1, enter the headers for the dataset: Product, Quantity Sold, Unit Price (₹), and Total Sales (₹).

Fill in the data below the headers (rows 2 to 5) based on the following sample data:

Product	Quantity Sold	Unit Price (₹)	Total Sales (₹)
Product A	10	100	1000

Product B	15	150	2250
Product C	5	200	1000
Product D	12	120	1440

Calculate Total Sales per Product

In Column D (Total Sales), the formula should multiply the Quantity Sold by the Unit Price.

For Product A, enter the formula in D2:

=B2*C2

Drag the formula down to fill the Total Sales for the other products.

Step 3: Create a Pivot Table to Summarize Data

Select the entire data range (A1 to D5).

Go to the Insert tab in the Ribbon and click on PivotTable.

In the Create PivotTable dialog box, select New Worksheet and click OK

In the PivotTable Field List, drag the following:

Product to the Rows area.

Total Sales to the Values area. This will automatically sum the sales for each product.

Step 4: Create a Bar Chart to Visualize Sales

Select the Pivot Table.

Go to the Insert tab and click on Bar Chart.

Choose a Clustered Bar Chart.

Format the chart by adding a Chart Title like “Total Sales by Product”.

Step 5: Final Touches

Make sure all the data and charts are neatly aligned.

Review the Pivot Table and ensure that it is summarizing the total sales per product correctly.

Part 2: Creating the Weekly Performance Report

A. Open a New Worksheet

Open a new worksheet and name it “Weekly Performance Report”.

B. Enter the Sample Data

In Cells A1 to E1, enter the following headers: Week, Sales (₹), Customers Acquired, Expenses (₹), and Employee Rating.

Fill in the data from the following sample dataset:

Week	Sales (₹)	Customers Acquired	Expenses (₹)	Employee Rating
Week 1	50,000	200	20,000	4.5
Week 2	55,000	220	22,000	4.7
Week 3	45,000	180	18,000	4.6
Week 4	60,000	250	25,000	4.8

C. Calculate Weekly Sales Growth

In column F (Weekly Sales Growth), calculate the growth in sales compared to the previous week. The formula for Week 2 would be:

= (B3-B2)/B2

Format the result as a percentage. Copy the formula for the other weeks.

D. Calculate Customer Retention Rate (Optional)

In column G (Customer Retention), you can calculate the retention rate by comparing the current week's customers with the previous weeks. The formula could be:

=C3/C2

This will give the percentage of customers retained compared to the previous week.

E. Create a Pivot Table to Summarize Data

Select the data range (A1 to E5).

Insert a Pivot Table to summarize sales, customers, and expenses.

In the PivotTable Field List:

Drag Week to the Rows area.

Drag Sales (₹), Customers Acquired, and Expenses (₹) to the Values area.

This will give you the totals for each metric for each week.

F. Create a Line Chart to Show Sales Growth

Select the data range for Sales (₹) and Weekly Sales Growth.

Go to the Insert tab and select Line Chart.

Format the chart by adding a Chart Title, such as "Weekly Sales Growth" or "Sales and Growth Overview".

EXCEL FORMULAS AND FUNCTIONS TO CALCULATE KPIS

Microsoft Excel is a powerful tool for calculating and analysing Key Performance Indicators (KPIs) in both daily and weekly reports. By using built-in formulas and functions, businesses can turn raw data into meaningful insights. Excel helps in automating calculations, summarizing large datasets, and presenting performance metrics clearly. Whether it's tracking sales, monitoring employee attendance, or measuring productivity, Excel functions like SUM, AVERAGE, COUNTIF, IF, and VLOOKUP make it easier to calculate and display KPIs efficiently. These tools support data-driven decisions and improve overall operational performance. Below is the example to understand:

Product	Quantity Sold	Unit Price (₹)	Total Sales (₹)	Week 1 Sales (₹)	Week 2 Sales (₹)
Product A	10	100	1000	20,000	22,000
Product B	15	150	2250	25,000	27,000
Product C	5	200	1000	10,000	12,000

1. **Total Sales:** Total Sales is a KPI that shows the total revenue generated from all products. It is calculated by multiplying the Quantity Sold by the Unit Price for each product.

   Formula: = Quantity Sold * Unit Price

   For Product A:

   = B2 * C2

   = 10 * 100 = 1000

   The Total Sales for Product A is calculated by multiplying the Quantity Sold (10) with the Unit Price (₹100), resulting in ₹1000.

   For the rest of the products, follow the same process.

2. **Sales Growth Rate:** Sales Growth Rate measures the percentage change in sales between Week 1 and Week 2. It tells you how much sales have increased or decreased over a specific period.

   Formula: = (Week 2 Sales - Week 1 Sales) / Week 1 Sales * 100

   For Product A: = (E2 - D2) / D2 * 100

   = (22,000 - 20,000) / 20,000 * 100

   = 10%

The formula calculates the difference between Week 2 Sales and Week 1 Sales, divides that by Week 1 Sales, and multiplies by 100 to get the percentage growth.

For other products, the same formula can be used to calculate the Sales Growth Rate.

Average Sales: The Average Sales KPI helps measure the mean of the Total Sales over a given period. This is useful to understand how sales are performing on average for each product.

Formula: =AVERAGE (Sales Data Range)

For all products: =AVERAGE (D2:D4)

= (1000 + 2250 + 1000) / 3

= 1,083.33

The AVERAGE function calculates the average of Total Sales values for Product A, Product B, and Product C.

3. **Customer Retention Rate:** Customer Retention Rate is used to track how many new customers continue to buy from you in the following period. This KPI is often used in businesses to understand customer loyalty.

   Formula: = (Retained Customers / Total Customers) * 100

   For Product A: = (C2 / D2) * 100

   = (150 / 350) * 100

   = 42.86%

   The Customer Retention Rate is calculated by dividing the number of retained customers (150) by the total number of customers (350), then multiplying by 100 to get a percentage.

4. **Profit Margin:** Profit Margin is a KPI that indicates the percentage of profit generated from sales. It is calculated by dividing the Net Profit by the Revenue and multiplying by 100.

   Formula: = (Net Profit / Revenue) * 100

   For Product A: = (5000 / 25000) * 100

   = 20%

   The Profit Margin for Product A is calculated by dividing Net Profit (₹5000) by Revenue (₹25000) and multiplying by 100 to get the percentage.

5. **Employee Performance:** This KPI measures how well an employee or team has performed against their targets. It is calculated by dividing Completed Tasks by Total Tasks.

Formula: = (Tasks Completed / Total Tasks) * 100

For Employee A: = (B2 / C2) * 100

= (18 / 20) * 100

= 90%

The Employee Performance is calculated by dividing the completed tasks (18) by the total tasks assigned (20), then multiplying by 100 to get a percentage of performance.

6. **Count of Transactions:** This KPI counts how many transactions or sales have occurred, helping businesses track the number of purchases or sales made. We can use the COUNT function for this.

   Formula: =COUNT (Sales Data Range)

   For Total Transactions: =COUNT (D2:D4)

   The COUNT function counts the number of numeric values in the Total Sales column to get the number of transactions.

Developing a Weekly Performance report for a department:

Week	Sales (₹)	New Customers	Returning Customers	Total Customers	Employee Rating (Out of 5)	Expenses (₹)	Weekly Growth (%)
Week 1	50,000	100	50	150	4.2	10,000	-
Week 2	55,000	120	60	180	4.5	12,000	10%
Week 3	45,000	90	70	160	4	11,000	-18%
Week 4	60,000	130	80	210	4.7	14,000	33%

Step 1: Enter the Data in Excel

Open Excel and create a new worksheet.

Label the columns as shown in the sample dataset: Week, Sales (₹), New Customers, Returning Customers, Total Customers, Employee Rating, Expenses (₹), and Weekly Growth (%).

Enter the weekly data for each column.

Step 2: Calculate Weekly Growth Rate

The Weekly Growth Rate KPI tracks the change in sales from one week to the next. It is calculated as:

Formula: = (Current Week Sales - Previous Week Sales) / Previous Week Sales * 100

For Week 2: = (B3 - B2) / B2 * 100

= (55,000 - 50,000) / 50,000 * 100

= 10%

Repeat this calculation for the subsequent weeks (Week 3, Week 4).

Step 3: Calculate Total Customers

The Total Customers KPI shows the sum of New Customers and Returning Customers each week.

Formula: = New Customers + Returning Customers

For Week 1: = C2 + D2

= 100 + 50 = 150

Repeat this calculation for all other weeks.

Step 4: Calculate Employee Performance (Average Rating)

The Employee Rating KPI evaluates the performance of sales employees based on the weekly rating. For each week, input the Employee Rating on a scale from 1 to 5

No formula is needed here, but ensure the ratings reflect the performance.

Step 5: Create the Pivot Table for Summary

Select the entire data range (A1:H5).

Go to the Insert tab and click on Pivot Table.

In the PivotTable Field List, add:

Week to the Rows section.

Sales (₹), Total Customers, Weekly Growth (%), and Employee Rating to the Values section.

This will summarize the key data for each week and allow you to quickly compare performance.

Step 6: Create a Chart to Visualize Data

Highlight the Sales (₹) and Weekly Growth (%) data.

Go to the Insert tab and select a Line Chart or Column Chart.

Add a Chart Title such as "Weekly Sales Performance and Growth" to give context to the chart.

Summary of Weekly Performance Report:

- ***Sales Growth:*** The Weekly Growth Rate KPI shows how sales increased (or decreased) compared to the previous week. *For example,* Week 2 had a 10% increase, while Week 3 experienced an 18% decrease.

- ***Customer Metrics:*** The Total Customers KPI shows the growth in customers over the weeks. The sales team is acquiring more customers, but Week 3 had fewer new customers compared to Week 2.
- ***Employee Rating:*** The Employee Rating KPI reflects the performance of sales employees based on their ratings. A high rating of 4.7 in Week 4 shows that employee performance is improving.
- ***Expenses:*** The Expenses data helps monitor how much the department is spending each week. Expenses in Week 4 were the highest, so it's important to check if they align with sales growth.

FORMATTING AND PRESENTATION OF DATA

When preparing reports in Excel, clarity and organization are key to ensuring the information is easily understood and useful for decision-making. Properly formatted reports help users quickly extract meaningful insights, identify trends, and make informed decisions.

Formatting Reports for Clarity

Formatting Excel reports properly makes the data more readable and helps highlight key information. Clear formatting also prevents confusion and makes it easier for the reader to understand the data. Following points should have considered at the time of formatting.

- ***Use Proper Headings:*** Always include clear headers for each column and row. The headings should be brief but descriptive enough for users to understand what data is in each section.
  Example: Instead of "Product 1", use "Product Name".
- ***Bold Headers:*** Bold the headers so they stand out and make it easier for users to identify the sections.
- ***Align Text Properly:*** Align numeric data to the right and text to the left. This is the standard format in Excel, making it easier to read.
- ***Use Borders:*** Add borders around the data to distinguish between different sections and improve readability.
- ***Apply Cell Shading:*** Use shading to highlight important data or differentiate between different sections. *For example,* use light grey to highlight totals or subtotals.
- ***Font Size and Colour:*** Use a readable font size (usually 10 or 12) and avoid using too many different font styles. Use colour sparingly to highlight key data.

  For example:

Product	Units Sold	Price (₹)	Total Sales (₹)
Product A	10	100	1000
Product B	15	150	2250

Product C	20	200	4000
Total	**45**		**7250**

In the above sample table:

The headers are bold.

The Total Sales row is highlighted with a bold font and shaded background for clarity.

The total units sold is placed in the last row to summarize the data.

Presenting Data in Tables

Tables are one of the best ways to organize data because they help to structure it neatly and clearly. Excel allows users to create structured tables, which provide built-in functionalities like sorting, filtering, and better organization.

Creating a Table in Excel:

- Select the data range to be converted into a table.
- Go to the Insert tab in the ribbon and click on Table.
- Ensure that the "My table has headers" box is checked.
- Excel will automatically apply a table format making the data easier to manage and analyse.

Benefits of Using Tables:

- ***Easier Data Management:*** Tables help manage large datasets and perform calculations more easily using structured data.
- ***Automatic Formatting:*** Excel automatically applies alternating row colours (banded rows), making it easier to read.
- ***Sorting and Filtering:*** Data within a table can be easily sorted and filtered, allowing quick analysis of specific data points.

Using Appropriate Charts:

Charts are powerful tools for presenting data visually, helping to identify trends, patterns, and comparisons easily. Choosing the right chart is important, as it directly affects how well the data is communicated. Below are the types of charts and their appropriate uses:

a) ***Column or Bar Charts:*** Use to compare categories, such as sales across different products or performance metrics.
Example: A Column Chart to compare the total sales of different products.

b) ***Line Charts:*** Best for showing trends over time (e.g., sales growth over several months).
Example: A Line Chart to show the monthly sales trend.

c) ***Pie Charts:*** Great for showing the proportion of each category in relation to the whole (e.g., market share of different products).

Example: A Pie Chart to show the distribution of sales among different products.

d) ***Scatter Charts:*** Use when comparing two sets of data to find relationships or correlations.

Example: A Scatter Chart to show the relationship between units sold and total sales.

Example: Using a Column Chart to Show Sales by Product.

- Select the data to be used for the chart. (for example, Product Name and Total Sales).
- Go to the Insert tab, and under Charts, select Column Chart.
- A Column Chart will appear, showing the total sales for each product.
- Customize the chart by adding a title, adjusting axis labels, or changing the colours for better presentation.

Final Formatting Touches

- To ensure your report is professional and easy to understand:
- Adjust column widths to make sure all data is visible.
- Align text properly (e.g., numbers to the right, text to the left).
- Add borders to distinguish different sections of the report.
- Use bold font for key figures like totals and averages.
- Use clear chart titles that describe what the chart represents.
- Ensure that all axes are labelled clearly for better readability.

PRACTICAL EXERCISE

Activity 1: Group Discussion on Creating a Sample Daily Sales Report in Excel.

Material Required:

- Computers/laptops with MS Excel installed
- Sample sales data (e.g., product names, units sold, sales amount, date)
- Pen and notebook for notes (optional)
- Projector or whiteboard (for group sharing and presentation)

Procedure:

1. Divide class into small groups of 3–5 students.
2. Distribute or display sample sales data, including:
    - Date
    - Product Name
    - Quantity Sold
    - Unit Price

- Total Sales

3. Discuss within the group how to create a daily sales report that includes:
    - Total sales for the day
    - Best-selling product
    - Total quantity sold
    - Use of basic formulas like SUM, MAX, and IF
    - Creating a summary table and chart (bar or column chart)
4. Use Excel to create the report layout with:
    - A summary section for KPIs
    - A table for raw data
    - A chart to visualize performance
5. Each group will present their approach, formulas used, and design of their daily sales report.
6. Save excel file and show it to the teacher.
7. Teacher summarises a class discussion on the different formats and features used.

Activity 2: Develop a weekly performance report for a specific department.

Material Required:

- Computer or laptop with MS Excel installed
- Sample dataset for a department (e.g., Sales, HR, IT, etc.) including:
    a) Employee names
    b) Tasks completed
    c) Targets achieved
    d) Working hours
    e) Sales or output figures (if applicable)
- Pen and notebook (optional)
- Internet or reference materials (for chart ideas or formatting)

Procedure:

1. Assign a department (e.g., Sales Department).
2. Open Excel and enter sample weekly data such as:
    - Employee Name
    - Days of the week (Mon to Sat)
    - Tasks Completed / Sales / Attendance
    - KPIs like Total Sales, Productivity Score, etc.

3. Use Excel formulas to calculate:
    - Total output or sales per employee
    - Weekly average performance
    - Highest and lowest performers
    - Achievement against weekly targets
4. Create a summary section with KPIs like:
    - Total Department Output
    - Average Productivity
    - Best Performer of the Week
5. Insert charts (bar/column/pie) to visualize:
    - Daily performance trends
    - Individual contribution
    - Task completion rates
6. Format the report for clarity using:
    - Bold headings
    - Borders
    - Conditional formatting (e.g., highlight underperformers)
7. Save and share the report as a print-ready or email-ready Excel file.

Activity 3: Present Report Data Using Appropriate Charts in Excel.

Material Required:

- Computer or laptop with MS Excel installed
- A completed daily or weekly report (containing summarized data such as totals, averages, comparisons, etc.)
- Sample dataset (sales, productivity, attendance, etc.)
- Pen and notebook for rough sketching (optional)

Procedure:

1. Open your Excel file containing the completed daily or weekly report.
2. Review the key data that needs to be visualized, such as:
    - Total sales per day
    - Performance per employee
    - Task completion or attendance over time
3. Select the data range that you want to convert into a chart.
4. Go to the Insert tab in Excel and choose an appropriate chart type:

- Column Chart for comparing totals (e.g., sales by product or employee)
- Line Chart for trends over time (e.g., sales across the week)
- Pie Chart for showing parts of a whole (e.g., percentage of sales per product)
- Bar Chart for horizontal comparisons
- Combo Chart to show two types of data together (e.g., sales and target)

5. Insert the chart and place it near the data or on a new sheet.
6. Customize the chart:
   - Add chart title, axis labels, and data labels
   - Change colours or styles for better visibility
   - Use legends to explain categories clearly
7. Review the chart to ensure it matches the data and communicates clearly.
8. Save the file and prepare to explain how the chart supports the report during a presentation.

CHECK YOUR PROGRESS

A. Fill in the Blanks

1. _____ are metrics used to measure the performance of a specific activity, process, or goal within an organization
2. The _____ function in Excel is used to summarize data by creating an interactive report with rows and columns.
3. The formula used to calculate weekly sales growth is _____.
4. In Excel, you can create a _____ chart to visually compare sales across different categories like products or regions.
5. The _____ report is typically used to track short-term goals and monitor day-to-day operations.

B. Multiple Choice Questions

1. Which of the following is a Key Performance Indicator (KPI) used in daily sales reports?
   a) Total Sales
   b) Employee Rating
   c) Weekly Growth Rate
   d) None of the above
2. In Excel, which chart type is best used to show trends over time?
   a) Column Chart

b) Line Chart

c) Pie Chart

d) Scatter Chart

3. What does a Pivot Table in Excel allow you to do?

a) Summarize and analyse large datasets

b) Perform calculations

c) Create charts

d) All of the above

4. When formatting an Excel report, what is the recommended way to highlight totals or subtotals?

a) Use italics

b) Use bold font and shaded background

c) Use a smaller font size

d) Use underlining

5. Which of the following functions is used to calculate the Average Sales in Excel?

a) AVERAGE

b) SUM

c) COUNT

d) MAX

C. State whether the following statements are True or False

1. Sales Growth Rate is calculated by dividing the sales difference between two weeks by the sales of the previous week.
2. In Excel, the COUNT function is used to calculate the total sales amount.
3. The Employee Rating KPI reflects the performance of sales employees based on their ratings, and is calculated by dividing completed tasks by total tasks.
4. A Pie Chart is best used for showing proportions, such as the share of total sales per product.
5. Weekly performance reports are used to track short-term goals and immediate business activities.

D. Short Answer Questions

1. What is the importance of KPIs in MIS reports?
2. How do you calculate Weekly Sales Growth in Excel?

3. What is the purpose of using a Pivot Table in Excel when creating MIS reports?
4. Why is it recommended to use a Line Chart to visualize sales data over time?
5. What is the formula used to calculate Customer Retention Rate in Excel?
6. How can you format a report in Excel to ensure clarity and professionalism?

E. Long Answer Questions

1. Explain the steps involved in creating a Daily Sales Report in Excel. Discuss how Pivot Tables, formulas, and charts are used to generate and visualize KPIs in this report.
2. Describe the process of calculating Weekly Sales Growth, Customer Retention Rate, and Employee Performance for a Weekly Performance Report. Explain how each of these KPIs is useful for business analysis.
3. Compare the different types of charts in Excel. When would you use a Column Chart, Line Chart, Pie Chart, and Scatter Chart to present business data? Provide examples of each.
4. Discuss the importance of formatting in Excel when preparing MIS reports. What is some formatting best practices to make reports clearer and more professional for decision-makers?

F. Check Your Performance

1. You are working as a trainee analyst in a retail company. Your manager has asked you to prepare a weekly sales performance report. The report must include Key Performance Indicators (KPIs) such as total sales, average daily sales, and best-selling product. You are also expected to use Excel formulas to calculate these KPIs, format the report for clarity, and present the data using appropriate tables and charts.

   Explain the steps you would take to:

   a) Identify and calculate the required KPIs using Excel formulas.
   b) Format the report so it is easy to read and understand.
   c) Present the key data visually using tables and charts.

SESSION 3: PIVOT TABLES AND DASHBOARDS

Let us start with a simple example. Imagine your local kirana store (Grocery Shop) owner who writes every sale in a notebook. If someone asks, "How much was spent on soaps last month?", the shopkeeper has to check each page and add up the amounts. This is time-consuming. Now think of a computer that can read all these records and give the answer in seconds. This is what tools like Pivot Tables and Dashboards help us do, they make it easy to understand big amounts of data.

In banks, insurance companies, and financial services, a lot of data is collected every day. Without the right tools, it is difficult to make use of this data. Pivot Tables and Dashboards tools help us to summarize, organize, and show data in a form that is easy to understand.

PIVOT TABLE

A Pivot Table is a data summarization tool in Excel that helps to organize, calculate, and analyse data in a clear and flexible way. It allows rearranging (or "pivoting") rows and columns to view data from different perspectives without altering the original dataset. It is commonly used to generate quick summaries, totals, averages, and comparisons from large tables of information.

Let's take a *real-life example*. Imagine your mother runs a small home tiffin service. She keeps a notebook of who ordered what and how much they paid. At the end of the month, she wants to know how much she earned from each customer. If she uses a Pivot Table, she can find this out in seconds!

The word "pivot" means to turn or rotate. A Pivot Table allows data to be viewed from different angles. ***For example,*** spending can be analysed by category, by date, or by payment method all within the same table.

The original data remains unchanged. A Pivot Table simply provides a different view of the same information. It is similar to looking into different mirrors, the person stays the same, but the reflection changes.

Pivot Tables are among the most powerful tools in Microsoft Excel, widely used in fields like finance, banking, marketing, and small business management.

Even with basic Excel knowledge, Pivot Tables are easy to use due to their drag-and-drop interface. No formulas are required.

In short, a Pivot Table serves as a data summarizer, report generator, and decision-making aid i.e. all in one.

Functions of a Pivot Table

A Pivot Table offers several useful functions that help in analysing large amounts of data easily.

1. ***Summarization:*** The primary function is summarization, which allows quick calculation of totals, counts, or averages from extensive datasets. ***For example,*** from a list of 500 sales records, a Pivot Table can display the number of sales in each city or the count of payments made through UPI.
2. ***Filtering:*** Another key function is filtering, which displays only specific portions of the data such as sales made in March or transactions completed via cash. This is helpful when working with large datasets.
3. ***Grouping:*** This function organizes data into defined blocks or ranges. ***For example,*** age data can be grouped into ranges like 18–25 or 26–35, and dates can be grouped by months or years.
4. ***Sorting:*** It is also supported, allowing data to be arranged in order from smallest to largest, or alphabetically. This helps in quickly identifying top-performing items or the lowest values.
5. ***Calculated Fields:*** Pivot Tables also allow the creation of calculated fields, which are custom fields that perform calculations like tax, discount, or profit, based on the available data.
6. ***Multiple Data Views:*** Another important function is the ability to create multiple views from the same dataset. One Pivot Table can show expenses by category, while another can show totals by month without duplicating the data.
7. ***Non-Destructive Analysis:*** Pivot Tables perform analysis and summarization without changing the original data, ensuring data integrity while enabling flexible reporting.

All of these actions are performed without altering the original data. Pivot Tables generate summaries for analysis without changing the underlying dataset. Due to these powerful functions, Pivot Tables are widely used in workplaces, educational institutions, banks, and retail environments. Even with thousands of rows, Excel efficiently manages data through Pivot Tables, making data analysis fast and effective**.**

Uses of Pivot Tables

Pivot Tables are used to summarize, analyse, and explore large sets of data quickly and efficiently. They are widely applied in real-life scenarios for better decision-making. Here are key uses:

1. ***Data Summarization:*** Quickly calculate totals, counts, averages, or percentages from large datasets.
   Example: Summing up total sales by product or region.
2. ***Comparing Data:*** Compare values across categories such as departments, dates, or customer groups.
   Example: Comparing sales in January vs. February.

3. ***Filtering and Sorting:*** Focus on specific data using filters (e.g., a particular date range, product, or location).
   Example: Viewing only sales from the "Electronics" category.
4. ***Grouping Data:*** Organize data into ranges (like age or price bands) or group by time (months, quarters).
   Example: Grouping dates into months to show monthly revenue.
5. ***Creating Reports:*** Build professional reports that highlight key metrics for presentations or management.
   Example: Weekly performance reports for a department.
6. ***Trend Analysis:*** Track changes over time using date fields and line charts from Pivot Tables.
   Example: Analysing monthly growth in website traffic.
7. ***Creating Dashboards:*** Combine Pivot Tables with charts and slicers to make interactive dashboards.
   Example: Sales dashboard showing revenue by product and region with filters.
8. ***Custom Calculations:*** Use calculated fields to add new metrics like profit margin or discount.
   Example: Creating a column that shows Sales – Cost = Profit.

Advantages of Pivot Tables

Pivot Tables are one of the most valuable tools in Excel for efficient, flexible, and error-free data analysis. Pivot Tables offer many advantages, especially when working with large datasets. Below are the key benefits:

1. ***Speed:*** Complex calculations that may take an hour manually can be completed by a Pivot Table in just seconds.
2. ***Ease of Use:*** Fields can be dragged and dropped to create reports, no need to write formulas unless advanced customization is required.
3. ***Clear Summary:*** Thousands of rows of data can be converted into a clean and readable report that highlights only the most important information.
4. ***Multiple Views:*** Data can be analysed from different perspectives, such as by product, region, date, or payment method without modifying the source.
5. ***Flexibility:*** Pivot Tables can be adjusted anytime. New columns can be added, data can be removed or rearranged, and sorting options can be applied easily.
6. ***Pattern and Trend Identification:*** Trends or patterns like seasonal sales spikes or increased costs can be easily spotted using Pivot Table summaries.
7. ***Better Decision-Making:*** Quick insights from Pivot Tables support faster and smarter decisions in businesses, banks, schools, and other fields.

8. ***Scalability:*** Pivot Tables work efficiently even as data grows from a few rows to tens of thousands without slowing down.
9. ***No Extra Software Needed:*** Pivot Tables are built into Microsoft Excel, so no additional tools or costs are required.
10. ***Reduced Errors:*** Since calculations are automatic, the risk of manual errors is minimized, leading to more accurate reports.

Advanced Features of Pivot Tables

Advanced Pivot Table features in Excel enhance data analysis by allowing more customization and deeper insights beyond basic summarization. These tools help in organizing, calculating, and visualizing data more effectively. Below are some important features of Pivot Tables:

1. ***Filter****:* Filters allow only specific data to be displayed from a larger dataset. ***Example*****:** If your Pivot Table shows sales in all states, but you only want to see Maharashtra and Gujarat, you can apply a filter to show only those states.
2. ***Slicer****:* A slicer is a visual filter consisting of clickable buttons that simplify data filtering. Selecting a slicer option automatically updates the Pivot Table to show the filtered data.

   Example**:** If you have data on sales by category such as clothes, electronics, and groceries, you can add a slicer. Then click on "Electronics," and only electronics data will be shown.
3. ***Grouping****:* combines data into ranges for easier analysis. Dates can be grouped by months or years, while numbers can be grouped into ranges such as 1–10, 11–20, and so forth.

   Example**:** If your data has dates of transactions, grouping them by months will let you see monthly totals.

   Steps:

   - Right-click on the date column in Pivot Table.
   - Choose "Group".
   - Select how you want to group: by months, quarters, or years.
4. ***Calculated Fields****:* Sometimes, custom formulas need to be created within the Pivot Table. A calculated field makes this possible by allowing new calculations based on existing data.

   Example**:** If you have "Total Sales" and "Cost", and you want to find "Profit", you can create a calculated field: Profit = Total Sales – Cost.

   Steps:

   - Go to Pivot Table Analyse tab.
   - Click on "Fields, Items & Sets".

- Choose "Calculated Field".
- Enter the formula and click OK.

5. ***Nested Report:*** A Nested Report in a Pivot Table means showing more than one level of information inside rows or columns. It's like adding sub-categories under main categories. Nesting fields places one category inside another, providing a deeper understanding of the data.

   Example: Suppose you are a school principal, and you have a list of students along with their class, subject, and marks. You want to know:

   - What are the average marks of each class?
   - Inside each class, how are students performing in each subject?

   You can use a nested report in a Pivot Table to find this out. You can first add Class to the row area, and then add Subject below it. Now, the Pivot Table will show the class-wise report, and under each class, it will show subject-wise data. This is called *nesting fields* you are creating layers of data.

Create a Pivot Table

Let's take a small example:

Date	Category	Amount (INR)	Payment Mode
01-Jan-25	Groceries	1,200	UPI
01-Jan-25	Travel	3,500	Credit Card
02-Jan-25	Rent	8,000	Bank Transfer
03-Jan-25	Groceries	900	UPI

This is a list of expenses. Now to know how much was spent on each category.

To create a Pivot Table in Microsoft Excel (Fig. 4.3):

1. Select all the data along with the headers. That means selecting the columns for Date, Category, Amount, and Payment Mode.
2. Click on the "Insert" tab at the top menu.
3. Click on "PivotTable". A small box will appear.
4. Choose "New Worksheet" so that the Pivot Table appears in a new sheet.
5. Now the Pivot Table on the left and a list of column names on the right.
6. Drag the "Category" field to the Rows section.
7. Drag the "Amount" field to the Values section.

That's it. Excel will automatically show the total amount spent in each category. No need to use any formula.

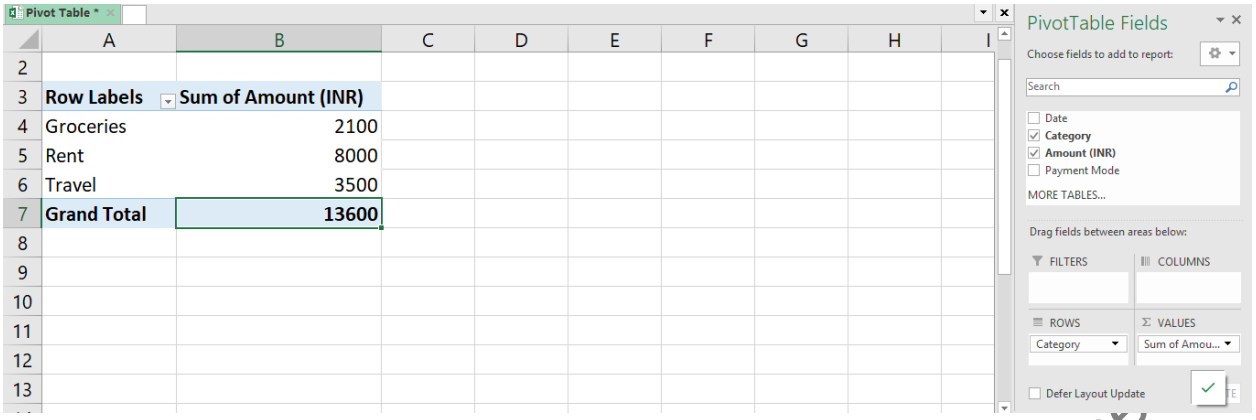


Fig. 4.3: Pivot Table

DASHBOARDS

Imagine you are the principal of a school. Every day, you want to know:

- How many students are absent today?
- How many students scored above 80% in the last test?
- How much money was collected as fees this month?

Now, you can look at 10 different reports to find this information. But what if all this information was shown together clearly, simply, and visually on one screen?

That's exactly what a dashboard does.

A dashboard is like a smart board that shows important information using charts, tables, and numbers all in one place. Long reports are not needed; a single glance at the dashboard provides a clear understanding of key data and trends.

Just like the dashboard in a car shows you your speed, fuel level, and warning lights, an Excel dashboard shows you your data like sales, attendance, performance, or profits clearly and quickly.

In simple words, a **Dashboard in Excel** is a visual summary that displays important data and performance indicators on a single screen. It is used to track, monitor, and analyse data efficiently. Dashboards combine charts, tables, and filters to present clear and actionable insights, making it easier to understand trends and make decisions.

Dashboards are used everywhere:

- In schools, to track student attendance and marks
- In hospitals, to track patient admissions, medicines, and recovery rate
- In banks, to see how many new accounts are opened, or how many loans are given

- In businesses, to track sales, expenses, and customer feedback
- In government offices, to monitor schemes, benefits, or surveys

Dashboards help managers, teachers, and even government officers make decisions faster because all important information is on one screen.

Key Elements of a Dashboard

A dashboard is used to track and display important data clearly and effectively. Below are key elements commonly included in a well-designed dashboard:

1. ***Charts and Graphs:*** These show data in a visual form like bar, line, or pie charts. They make it easy to compare values and see patterns or trends at a glance.
2. ***Summary Tables:*** Tables show key numbers such as totals, averages, or rankings. They are useful when exact figures are needed alongside visuals.
3. ***Key Performance Indicators (KPIs):*** These are the most important numbers to track performance. *Examples* include sales growth, total students, or number of late deliveries.
4. ***Slicers and Filters:*** These allow viewing specific parts of the data. *For example,* selecting only a certain month or department updates the whole dashboard accordingly.
5. ***Conditional Formatting:*** Highlights important data using colours or icons. *For example,* green for high performance and red for low, or arrows to show increase/decrease.
6. ***Titles and Labels:*** Every chart or table needs a clear title and label so the viewer understands what the data represents.

Dashboard Layout

Layout means how the dashboard is arranged on the screen or page. A good dashboard layout ensures clarity and quick understanding. It usually includes:

- Header Section: Title, date range, and filters
- Summary Section: Key KPIs in bold or coloured boxes
- Visual Section: Charts and graphs placed in an organized grid
- Details Section (Optional): Data tables or additional analysis

A well-designed dashboard should be easy to read, focused on the objective, and limited to the most important data points.

Planning a Dashboard Layout

Before opening Excel and creating a dashboard, it is important to plan the layout and content. A simple approach is as follows:

1. ***Know What You Want to Show:*** Think about the problem or question. ***Example:*** "I want to see the monthly attendance of each class."
2. ***Understand Your Audience:*** Who will use this dashboard?
   - If it is a teacher, show individual student performance.
   - If it is a principal, show class-wise summary.
3. ***Collect the Right Data:*** Only use data that is useful. Don't add everything.
   ***Example*:** For attendance dashboard, you don't need test marks.
4. ***Make a Rough Sketch:*** Use a notebook to sketch the placement of charts, KPIs, and tables. This helps save time during dashboard creation.
5. ***Start with Simple Charts:*** Make a bar chart or pie chart. Add one element at a time. Don't try to do everything at once.
6. ***Test Your Dashboard:*** Check if the data is correct. Does it change when using a slicer? Can others understand it easily?
7. ***Make It Interactive:*** Add slicers so users can choose what they want to see (e.g., Class 9, Class 10, Boys only, Girls only).

PRACTICAL EXERCISE

Activity 1: Create Pivot Tables with Calculated Fields and Grouping.

Materials Required:

- A computer/laptop with Microsoft Excel
- Sample dataset (e.g., Sales or Employee data) with columns like: Date, Product, Quantity Sold, Unit Price, Region
- Basic Excel knowledge

Procedure:

1. Prepare the Dataset.

   Create a table in Excel with the following columns:

Date	Product	Quantity Sold	Unit Price	Region
01-Jan-25	Product A	10	50	North
05-Jan-25	Product B	15	30	South
10-Jan-25	Product A	8	50	North
15-Jan-25	Product C	12	40	East

2. Insert a Pivot Table
   - Select the data range
   - Go to Insert > Pivot Table

- Choose New Worksheet → Click OK

3. Add Fields to the Pivot Table
   - Drag Product to the Rows area
   - Drag Quantity Sold to the Values area
   - Drag Unit Price to the Values area
4. Add a Calculated Field (e.g., Total Sales)
   - Click anywhere inside the Pivot Table
   - Go to PivotTable Analyse > Fields, Items, & Sets > Calculated Field
   - In the dialog box:

     Name: Total Sales

     Formula: =Quantity Sold * Unit Price
   - Click Add → OK

   This will add a new field "Total Sales" in the Pivot Table.
5. Group Data (e.g., by Date or Range)
   1. If grouping by Date:
      - Drag Date to the Rows area
      - Right-click any date value → Select Group
      - Choose to group by Months, Quarters, or Years
   2. If grouping numeric values:
      - Right-click on a numeric value in the Pivot Table
      - Click Group
      - Set starting and ending values with desired interval (e.g., 0–50, 51–100)
6. After completion save the file.
7. Explain the process to the teacher.

Activity 2: Building a Basic Dashboard in Excel to Visualize Monthly KPIs.

Materials Required:

- A computer/laptop with Microsoft Excel
- Sample dataset (e.g., sales or attendance) with columns such as: Month, Department/Product, Sales/Output, Target, Region

Procedure:

1. Prepare the Dataset

   Create a table with the following sample structure:

Month	Product	Sales (₹)	Target (₹)	Region
January	Product A	45,000	50,000	North
January	Product B	60,000	55,000	East
February	Product A	50,000	50,000	North
February	Product B	48,000	55,000	East

2. Insert Pivot Tables
   a) Select the dataset
   b) Go to Insert > Pivot Table → choose New Worksheet
   c) Create multiple Pivot Tables for KPIs like:
      - Total Sales per Month
      - Target vs. Actual Comparison
      - Region-wise Sales
3. Insert KPI Charts
   a) From each Pivot Table, insert charts:
      - Column chart for monthly sales
      - Bar chart for product-wise performance
      - Line chart for comparing target vs. actual
   b) Go to Insert > Chart, then choose the suitable type
   c) Customize with titles, axis labels, and data labels
4. Add Slicers for Interactivity
   - Click a Pivot Table
   - Go to Insert > Slicer
   - Add slicers for Month, Region, or Product
   - Align the slicers to control all charts simultaneously
5. Design the Dashboard Layout
   - Place all charts and slicers neatly in one worksheet
   - Add titles like “Monthly Sales Summary”, “Target Achievement”
   - Use consistent colour themes and fonts
   - Add shapes or boxes for better sectioning if needed
6. After completion save the file.
7. Explain the process to the teacher.

Activity 3: Add Slicers to the Dashboard for Interactive Data Exploration.

Materials Required:

- A computer or laptop with Microsoft Excel
- A prepared dashboard worksheet containing Pivot Tables and charts (based on a dataset like sales, attendance, etc.)

Procedure:

1. Open the Dashboard Sheet: Ensure the worksheet contains at least one Pivot Table created from the dataset, with charts if available.
2. Insert a Slicer
   - Click anywhere inside the Pivot Table.
   - Go to Insert tab → Click Slicer.
   - In the dialog box, select the fields you want to filter by (e.g., Month, Region, Product).
   - Click OK.
3. Use the Slicer
   - A slicer box will appear with filter buttons for the selected field.
   - Click any button (e.g., "January") to instantly update the Pivot Table and all linked charts.
   - Hold Ctrl to select multiple values at once.
4. Connect the Slicer to Multiple Pivot Tables (Optional)

   If the dashboard contains more than one Pivot Table:
   - Click on the slicer.
   - Go to Slicer Tools > Report Connections.
   - Tick all Pivot Tables you want the slicer to control.
   - Click OK.
5. Arrange and Format the Slicer
   - Resize and position the slicer on the dashboard.
   - Customize with colour and style from Slicer Tools > Options.
6. After completion save the file.
7. Explain the process to the teacher.

CHECK YOUR PROGRESS

A. Fill in the Blanks

1. A Pivot Table is used to _____ large amounts of data quickly.
2. The "_____" function in Pivot Table helps us to show only selected data.
3. A _____ is a button-based filter used with Pivot Tables.

4. In a Pivot Table, you can group dates into _____ or years.
5. A _____ field allows you to create a new column using formulas inside a Pivot Table.

B. Multiple Choice Questions

1. What is the main purpose of a Pivot Table in Excel?
   a) Drawing pictures
   b) Summarizing data
   c) Sending emails
   d) Formatting text
2. Which of the following is used as a visual filter in Pivot Tables?
   a) Calculator
   b) Graph
   c) Slicer
   d) Border
3. What happens when you drag a field to the "Rows" area in a Pivot Table?
   a) It creates a graph
   b) It deletes the data
   c) It lists the unique values
   d) It hides the data
4. Which feature helps in combining similar values like dates or numbers into blocks?
   a) Sorting
   b) Grouping
   c) Filtering
   d) Freezing
5. If you want to calculate profit as "Total Sales - Cost" inside a Pivot Table, which feature will you use?
   a) Calculated Field
   b) Insert Row
   c) Pivot Chart
   d) Merge Cells

C. State whether the following statements are True or False

1. Calculated Fields in Pivot Tables allow users to add new fields by performing calculations on existing data.
2. Grouping in Pivot Tables can only be done with numerical data.
3. A good dashboard should only include visual charts and avoid using any slicers or filters.

4. One of the key elements of a dashboard is to present data in a summarized and easy-to-understand format.
5. Planning a dashboard layout includes deciding what visuals to use, arranging them logically, and considering user needs.

D. Short Answer Questions

1. What is a Pivot Table in Excel?
2. How does a slicer help in data analysis?
3. Explain what grouping means in Pivot Tables.
4. Mention any two advantages of using Pivot Tables.
5. How is filtering different from sorting in Pivot Tables?
6. What is a nested report in Pivot Tables?

E. Long Answer Questions

1. Explain with an example how Pivot Tables can be useful for a small business owner.
2. Describe the key features of a Pivot Table and how each helps in data analysis.
3. How can a bank manager use Pivot Tables to make decisions? Explain with 2 examples.
4. Describe the steps to create a Pivot Table using sample data of monthly expenses.

F. Check Your Performance

1. A school administrator wants to analyse student performance data to prepare a monthly academic dashboard. The dataset contains student names, subjects, marks obtained, total marks, and the exam month.

   She wants to:

   - Calculate the percentage marks using a calculated field in a Pivot Table.
   - Group the results by exam month to compare overall performance month-wise.

   Build a dashboard that includes:

   - KPIs such as highest and average marks,
   - A chart for subject-wise performance,
   - A slicer to filter by class or subject.

   What steps should be followed to design this dashboard using advanced Pivot Table features and proper layout planning? Mention any two key elements that must be included in the dashboard and explain why they are important.

SESSION 4: MIS REPORTS AND BASIC DASHBOARDS

KPIs FOR MONTHLY REPORTS

In a Management Information System (MIS) report, Key Performance Indicators (KPIs) are important numbers that help show how well something is working. These could be about a process, a team, or a business. Usually, these numbers are checked every month to see how things are going.

KPIs in MIS reports help managers and decision-makers in the following ways:

- **Monitor performance trends:** Helps to track progress over time. E.g. Sales went up this month compared to last month.
- **Identify issues and gaps:** Shows where something is going wrong. E.g. Customer complaints are increasing – why?
- **Take informed decisions:** Helps to make better choices using real data. E.g. Should we hire more staff or promote a product?
- **Plan for the future:** Helps to prepare for next steps. E.g. Plan a sales campaign if performance is low.

KPIs are important in Monthly Reports:

- They summarize key data in a clear and simple way.
- They help managers and teams make decisions.
- They show what is working well and what needs improvement.
- They help in setting goals for the next month.

SOME EXAMPLES OF COMMON KPIS IN MONTHLY REPORTS

1. **Sales KPIs**
    - Monthly Revenue: Total money earned from sales in the month.
    - Number of New Customers: How many new people bought the product or service?
    - Sales Growth Rate: How much did sales increase or decrease compared to last month?
2. **Marketing KPIs**
    - Website Visitors: Number of people who visited the website.
    - Conversion Rate: Percentage of people who visited and actually made a purchase or filled out a form.
    - Social Media Engagement: Likes, shares and comments on social posts.
3. **Customer Service KPIs**
    - Customer Satisfaction Score (CSAT): Rating given by customers after receiving support.

- Average Response Time: How quickly customer support/care team replied to customer queries?
- Number of Support Tickets Closed: Total problems solved during the month.

4. Operational KPIs

- Productivity Rate: How much work was completed compared to the target.
- Order Fulfilment Time: Time taken to deliver an order after it was placed.
- Error Rate: Number of mistakes made during operations.

USING KPIS IN MONTHLY REPORTS

1. **Choose Relevant KPIs:** Select key performance indicators that align with the main goals of the business or department. *For example,* if the goal is to increase revenue, important KPIs could be total sales, number of new customers, or average order value. If the focus is customer service, KPIs might include customer satisfaction scores or response times.
2. **Collect Data for Each KPI:** Gather accurate data regularly for each chosen KPI. This data can come from sales records, customer feedback, delivery logs, or other sources related to the business process.
3. **Compare with Previous Months:** Review the KPI values month by month to identify trends. Are sales increasing, stable, or decreasing? Are customer complaints rising or falling? This comparison helps spot patterns and understand if performance is improving or declining.
4. **Visualize KPIs Using Charts or Tables:** Present KPI data clearly with charts like bar graphs, line charts, or tables. Visual tools make it easier to grasp trends and differences quickly rather than reading long lists of numbers.
5. **Write Simple Observations:** Include brief notes or comments on the report explaining key findings. For example: "Sales increased by 10% compared to last month due to a new marketing campaign," or "Customer complaints rose slightly and need further investigation." These observations highlight what improved and what requires attention.

KPIs in a monthly report tell the story of progress. They act like a health check up for a team or business showing what is going well and what needs improvement. For specific industries such as education, logistics, or marketing, tailored KPI examples can be provided to suit particular needs.

KPIS IN DASHBOARDS

A dashboard in Excel is like a smart control panel that display important information quickly using visual tools like charts and tables. KPIs are

important numbers that tell how well something is going such as sales, profits, customer complaints, etc. A dashboard shows these KPIs in a visual format so that anyone can easily understand and analyse the data.

A Dashboard in Excel is a visual tool that shows KPIs using:

- **Pivot Tables:** Used to summarize large data sets. E.g. Show total sales by region or month.
- **Charts (bar, line, pie, etc.):** Turn numbers into visual stories. E.g. A line chart showing profit trends over 6 months.
- **Interactive elements like slicers:** Let users filter data quickly (e.g., by region, month, or product). E.g. Click "North Region" and all charts update to show North's data only.

Dashboards make it easy to understand the KPIs at a glance, instead of reading through rows of data.

Let's say an MIS Report tracks the monthly performance of a retail store.

Raw Data:

Date	Region	Sales	Orders	Returns	Customer Rating
01/06/25	North	5000	25	2	4.5
02/06/25	South	6500	30	1	4.8
…	…	…	…	…	…

KPI Examples in the Report:

KPI	Description	Example Value (June)
Total Sales	Sum of all sales in June	₹ 1,20,000
Total Orders	Count of all customer orders	600
Return Rate	(Returns ÷ Orders) × 100	2%
Average Customer Rating	Average of daily ratings	4.6 out of 5

Visualizing KPIs in Dashboards (in Excel)

Using Pivot Tables and Charts, a basic dashboard can show:

- ***Line Chart:*** Monthly sales trend
- ***Bar Chart:*** Orders by region
- ***Gauge Chart:*** Target vs Actual Sales
- ***Slicers:*** Select month, region, or category to filter data

Example KPI Dashboard Output:

Dashboard Elements:

- ***Title:*** "Monthly Performance Dashboard – June 2025"

- ***KPI Box 1:*** Total Sales – ₹1,20,000
- ***KPI Box 2:*** Orders – 600
- ***KPI Box 3:*** Avg. Rating – 4.6
- ***Bar Chart:*** Orders by Region
- ***Slicer:*** Choose Month or Region

This allows management to quickly see:

- Which region performed best?
- Whether sales targets were achieved
- Where customer satisfaction needs improvement

Benefits of Using KPIs in MIS and Dashboards

- Easy to summarize complex data
- Helps in quick decisions
- Encourages data-driven performance management
- Makes reports more meaningful and visual

PIVOT TABLES AND CHARTS FOR MONTHLY ANALYSIS

Pivot Tables and Charts in Excel are powerful tools used to summarize and analyse large datasets, especially for monthly performance tracking. They help in organizing data in a meaningful way and provide clear visual representations.

1. **Pivot Tables**

   A Pivot Table rearranges data to display totals, averages, counts, etc., grouped by categories such as month, region, product, or employee. It helps quickly answer questions like:

   - What were the total sales each month?
   - How many orders came from each region?

   Example: If a dataset contains sales records by date, product, and region, a Pivot Table can show:

   - Monthly total sales per region
   - Monthly average customer ratings

2. **Pivot Charts**

   Pivot Charts are visual representations of data based on Pivot Tables. They help in quickly understanding the data by turning numbers into visuals such as column charts, line charts, bar charts, or pie charts. These charts automatically update when the Pivot Table is updated, making them highly dynamic and interactive. Pivot Charts make it easier to spot trends,

compare values, and highlight performance patterns that helps users make faster and more informed decisions.

Example:

- A Line Chart can show how sales changed over 6 months.
  A Bar Chart can compare monthly orders across regions.

Benefits for Monthly Analysis

- It saves time by automatically summarizing large amounts of data.
- It reduces manual errors by using built-in Excel functions.
- It provides clear visual insights through charts and tables.
- It supports informed decision-making by showing key performance trends.

CREATING BASIC DASHBOARDS USING EXCEL CHARTS AND TABLES, ADDING BASIC INTERACTIVE ELEMENTS (SLICERS)

Creating Basic Dashboards using Excel

A Dashboard is a collection of charts, tables, and graphs that display key business metrics. In Excel, dashboards help summarize large amounts of data in a way that is easy to understand. These dashboards can include:

- Tables to show detailed data.
- Charts to visualize trends and comparisons.
- KPIs to track important metrics like sales growth, revenue, or profit margin.

Dashboards are used to make data easily accessible and visually appealing so that anyone can understand the business's performance at a glance.

Below are the steps to create a basic dashboard in excel:

Step 1: Prepare the Dataset

- Organize data in a tabular format with headers (e.g., Date, Region, Product, Sales, Orders).
- Ensure there are no blank rows or columns.

Step 2: Insert Pivot Table

- Go to the **Insert** tab → **PivotTable**.
- Select the data range and choose where to place the Pivot Table (new sheet or existing).

Step 3: Summarize the Data

- Drag relevant fields (e.g., Month to Rows, Sales to Values) to create summaries.
- Create multiple Pivot Tables for different summaries if needed (e.g., sales by product, region, or month).

Step 4: Insert Pivot Charts

- Click on a Pivot Table → go to **Insert** tab → select a chart (Column, Line, Pie, etc.).
- Repeat for other Pivot Tables as needed.

Step 5: Insert Slicers (Optional for Interactivity)

- Select a Pivot Table → go to **Insert Slicer** → choose fields (e.g., Month, Region).
- Slicers allow users to filter the entire dashboard easily.

Step 6: Format the Dashboard

- Resize and align the Pivot Tables and Charts neatly.
- Add titles, labels, or text boxes to explain charts or KPIs.
- Use cell formatting and colours for a clean and readable layout.

Step 7: Review and Test

- Check if slicers filter the visuals correctly.
- Ensure the dashboard updates when data changes.

Step 8: Save the File

- Save the Excel workbook as a template or regular file for future use and updates.

Result: A dynamic dashboard that displays key performance indicators visually and interactively, helping in quick decision-making.

Adding Basic Interactive Elements (Slicers)

Below are the steps to Add Basic Interactive Elements in Excel Dashboards:

Step 1: Create Pivot Tables and Charts

- First, create Pivot Tables and corresponding charts from the data. These will form the main parts of the dashboard.

Step 2: Select a Pivot Table

- Click anywhere inside the Pivot Table to activate the PivotTable Tools on the Ribbon.

Step 3: Insert a Slicer

- Go to the PivotTable Analyse tab (or Analyse tab in some Excel versions).
  Click Insert Slicer.

Step 4: Choose Fields for the Slicer

- In the Insert Slicers dialog box, select the fields (columns) on which filtering will be needed, like Month, Region, Product, etc. Click OK.

Step 5: Use the Slicer

- The slicer appears as a clickable button box. Clicking any item in the slicer instantly filters the linked Pivot Table and charts to show only relevant data.

Step 6: Format the Slicer (Optional)

- Resize or move the slicer on the dashboard.
- Use the Slicer Tools tab to change colours, styles, and layout for better visuals.

Step 7: Connect Slicers to Multiple Pivot Tables (Optional)

If there are multiple Pivot Tables, link slicers to all relevant tables:

- Click on the slicer.
- Go to Slicer Tools > Report Connections (or PivotTable Connections).
- Check all Pivot Tables that the slicer should control.

Step 8: Test the Interactivity

- Click different slicer buttons to check how the dashboard updates instantly, making data exploration easier and faster.

This way, slicers add interactivity to dashboards, helping users quickly filter and analyse data without manually adjusting filters.

Let's understand with the help of example.

A national electronics retail chain i.e. Krush Tech, operates across four major regions: North, South, East, and West. The store sells products like Laptops, Mobiles, and Headphones. Each month, the management reviews performance data to understand:

- Sales trends across regions and products
- Number of customer orders
- Return rates and customer satisfaction ratings

To make this review more efficient, the store manager is asked to create a Monthly Performance Dashboard using Excel.

Date (June, 2025)	Month	Region	Product	Sales (₹)	Orders	Returns	Customer Rating
01	June	North	Laptop	50000	20	1	4.5
03	June	South	Mobile	30000	25	2	4.2
05	June	East	Headphones	15000	15	0	4.8

08	June	West	Laptop	40000	18	1	4.4
12	June	North	Mobile	35000	22	1	4.6
16	June	South	Headphones	10000	10	0	4.9
20	June	East	Laptop	55000	23	2	4.3
24	June	West	Mobile	25000	19	1	4.7

Step 1: Prepare the Dataset

- Open Excel and enter the sample dataset above.
- Ensure the data has headers and no blank rows or columns.

Step 2: Create a Pivot Table

- Select the entire dataset range (e.g., A1:H9).
- Go to Insert > Pivot Table.
- Choose to place the Pivot Table on a new worksheet.
- Click OK.

Step 3: Set Up the Pivot Table – In the Pivot Table Fields:

- Drag Month to the Rows area.
- Drag Sales (₹) or Orders to the Values area.
- Drag Region or Product to the Columns area (optional for comparison).

Step 4: Insert Pivot Charts

- Click inside the Pivot Table.
- Go to Insert > Recommended Charts or choose Column, Bar, or Line Chart
- A Pivot Chart will appear and automatically update with the Pivot Table.

Step 5: Add Slicers (Interactive Filters)

- Select the Pivot Table or Pivot Chart.
- Go to Insert > Slicer.
- Select one or more fields (e.g., Region, Product).
- Click OK – slicer buttons will appear.
- Click buttons to filter data instantly in the Pivot Table and Charts.

Step 6: Format the Dashboard

- Resize the chart and slicers neatly on the worksheet.
- Add chart titles (e.g., “Monthly Sales by Region”).

- Format data labels, legends, and slicer styles for clarity and appeal.
- Rename the sheet to “Dashboard”.

Result: Fig. 4.4

An Excel sheet with:

- A Pivot Table summarizing monthly sales or orders.
- A Pivot Chart showing trends.
- Slicers allowing selection of Region or Product.
- All visuals updating interactively with slicer selections.

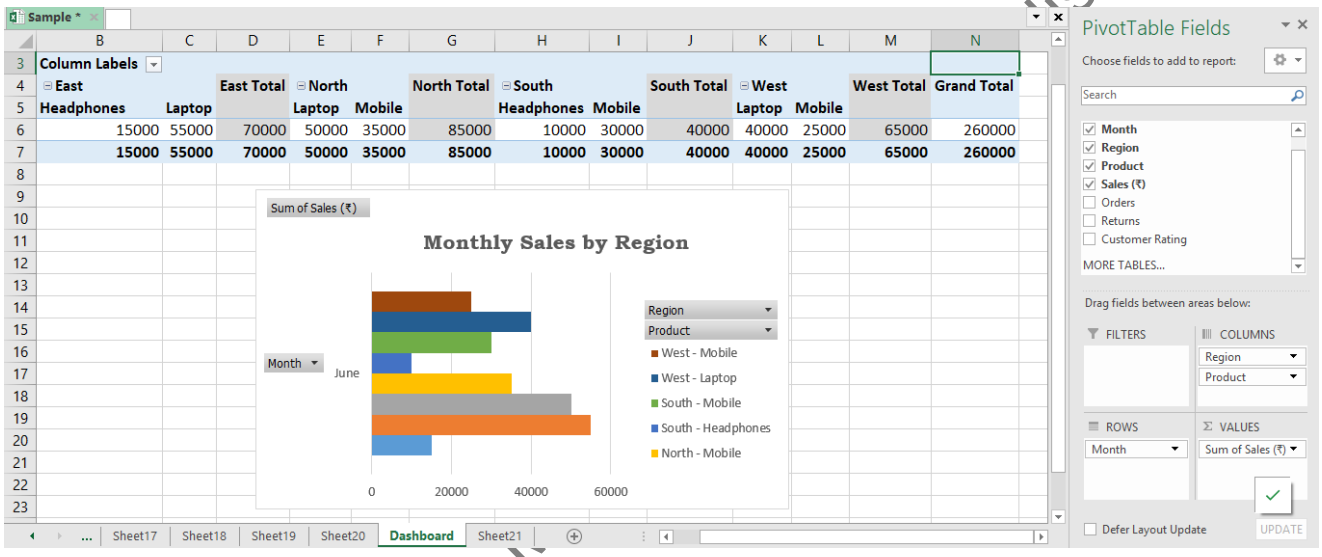


Fig. 4.4: Monthly Performance Dashboard using Excel

PRACTICAL EXERCISE

Activity 1: Create a Sample Monthly Performance Report Using Pivot Tables and Charts.

Material Required:

- Computer with Microsoft Excel installed
- Basic knowledge of Excel interface
- Sample dataset containing monthly performance data as below:

Month	Region	Sales (₹)	Orders	Returns	Customer Rating
January	North	50,000	200	5	4.5
January	South	45,000	180	3	4.6
January	East	40,000	160	6	4.3
February	North	52,000	210	4	4.7
February	South	48,000	190	5	4.5
February	East	42,000	170	2	4.6

March	North	55,000	220	3	4.8
March	South	50,000	200	6	4.7
March	East	45,000	180	4	4.4
April	North	58,000	230	2	4.9
April	South	53,000	210	5	4.6
April	East	48,000	190	3	4.5

Procedure:

1. Open Microsoft Excel and enter the sample monthly performance data exactly as shown. Make sure the data is clean, with no blank rows or columns inside the dataset.

2. Create a Pivot Table

- Select the entire data range (for example, cells A1:F13, including headers).
- Go to the Insert tab on the Excel ribbon.
- Click on Pivot Table.
- Choose to place the Pivot Table in a New Worksheet (recommended for clarity).
- Click OK.

3. Set Up the Pivot Table

a) In the Pivot Table Fields panel:

- Drag Month to the Rows area.
- Drag Sales (₹) to the Values area — this will automatically calculate total sales per month.

b) Optional:

- Drag Region to the Columns area if a month-wise region comparison is needed.
- Drag other KPIs (e.g., Orders, Returns) to the Values area for additional summaries.

4. Insert a Pivot Chart

- Click anywhere inside the Pivot Table to activate it.
- Go to the Insert tab.
- Choose a chart type such as Column Chart or Line Chart to visualize sales trends.
- The chart will automatically link to the Pivot Table data and display monthly sales visually.

5. Format the Chart
   - Add a Chart Title such as "Monthly Sales Performance."
   - Add Axis Titles (e.g., Months on the X-axis and Sales in ₹ on the Y-axis).
   - Include Data Labels if needed to show exact values on the chart bars or lines.
   - Adjust colours or styles for better visual appeal and clarity.
6. Analyse the Report
   a) Look at the chart and Pivot Table to identify:
      - Which month had the highest sales?
      - Are there any trends or seasonal changes?
      - How do different regions perform (if added)?
   b) Use these insights for decision-making, reporting to management, or planning future strategies.

Activity 2: Building a Basic Dashboard in Excel to Visualize Monthly KPIs.

Materials Required:

- Computer or Laptop with Microsoft Excel (2016 or later)
- Internet access (optional, for design ideas or templates)
- Pen and notebook (for noting observations or KPI definitions)
- Sample dataset (sales, region, month, orders, returns, customer rating, etc.)

Month	Region	Product	Sales (₹)	Orders	Returns	Customer Rating
June	North	Laptop	50,000	20	1	4.3
June	South	Mobile	65,000	30	0	4.8
June	East	Headphones	25,000	40	3	4.1
June	West	Laptop	55,000	22	2	4.4
…	…	…	…	…	…	…

Procedure:

1. Open Excel and enter or import the monthly performance data. Ensure the data is clean (no blanks, consistent column headers).
2. Create Pivot Table
   a) Select the full dataset.
   b) Go to the Insert tab → Click PivotTable.
   c) Choose "New Worksheet" → Click OK.

d) In PivotTable Fields:

- Drag Month to Rows
- Drag Sales or Orders to Values
- Drag Region or Product to Filters or Columns

3. Create Pivot Charts
   - Click inside the PivotTable.
   - Go to Insert → Choose Column Chart, Line Chart, or Pie Chart.
   - The chart will be linked to the PivotTable and show summary data.
4. Create KPI Boxes: Use Excel cells with formulas (like =SUM(...) or =AVERAGE(...)) to display KPIs:
   - Total Sales
   - Total Orders
   - Return Rate = Returns ÷ Orders × 100
   - Avg. Rating = AVERAGE of Ratings
5. Add Slicers (Interactive Filters)
   - Click on the PivotTable.
   - Go to Insert tab → Click Slicer
   - Select fields like Region or Product
   - Place slicers next to charts and tables.
   - Try clicking different slicer buttons (e.g., South Region) to filter the entire dashboard instantly.
6. Format and Finalize the Dashboard
   - Add headings like "Monthly Performance Dashboard – June 2025"
   - Format fonts, colours, and layout for better appearance.
   - Align all charts, slicers, and KPI boxes neatly.
   - Save the file as Monthly_KPI_Dashboard.xlsx

CHECK YOUR PROGRESS

A. Fill in the Blanks

1. A _____ is a one-screen summary of data using tables, charts, and KPIs.
2. In Excel, _____ allow users to filter data using buttons.
3. _____ is used to combine data into categories like months or years.
4. Dashboards help in _____ decision-making by showing key data clearly.
5. A _____ is used to highlight important numbers such as total students or average marks.

B. Multiple Choice Questions (MCQs)

1. What is the main purpose of a dashboard?
   a) To type long reports
   b) To show all data in text form
   c) To display important data visually
   d) To print Excel sheets
2. Which Excel tool helps you filter Pivot Tables using buttons?
   a) Grouping
   b) Slicer
   c) Formula
   d) Sorting
3. What can a KPI in a dashboard show?
   a) Colours
   b) A large table
   c) A detailed report
   d) A key value like pass percentage
4. What type of chart is best to compare student performance across subjects?
   a) Pie Chart
   b) Bar Chart
   c) Line Chart
   d) Scatter Chart
5. What does layout in a dashboard refer to?
   a) Font style
   b) Chart type
   c) Arrangement of charts and tables
   d) Excel version

C. State whether the following statements are True or False

1. Dashboards are only used in big companies.
2. You can use filters and slicers in Excel dashboards.
3. Dashboards cannot show data using colours or icons.
4. Bar charts are useful to compare class-wise attendance.
5. Dashboards make it harder to understand your data.

D. Short Answer Questions

1. What is a dashboard in Excel?
2. Name any two places where dashboards are commonly used.
3. What is a KPI? Give one example.
4. Why is layout important in dashboard design?
5. How does a slicer help in making a dashboard interactive?
6. What type of chart can be used to show changes in attendance over months?

E. Long Answer Questions

1. Explain what a dashboard is and why it is useful in schools.
2. Describe the steps to create a simple dashboard in Excel using attendance data.
3. Discuss five key elements that should be included in a well-designed dashboard.
4. Give a real-life example of how a dashboard can help a school principal make better decisions.

F. Check Your Performance

1. How should the sales manager create a monthly dashboard in Excel to display key performance indicators (KPIs) using Pivot Tables, Charts, and Slicers?
   List the steps involved and explain how these tools help in analysing monthly performance effectively.

MODULE 5: AUTOMATION AND PRESENTATION OF REPORTS

In today's business environment, organizations rely heavily on reports and presentations to make informed decisions. With increasing volumes of data, manual preparation of reports is time-consuming and prone to errors. This is where automation tools and effective presentation techniques play a key role. Automation, especially within Microsoft Excel, helps save time by performing repetitive tasks, updating reports, and ensuring consistency. Similarly, presenting reports clearly using tools like slide decks allows organizations to communicate data-driven insights effectively to stakeholders.

This module focuses on building essential skills for automating reports and presenting them in a professional format. It introduces students to the use of Macros and Visual Basic for Applications (VBA) in Excel for automating routine tasks. The module also covers techniques for automating report generation, integrating visuals into documents, and delivering effective presentations.

Further this module is divided in to 4 sessions. Session 1 deals with understanding Macros, recording them, and exploring the basics of VBA for task automation. Session 2 focuses on applying these skills to automate reports and dashboards, saving time on repetitive tasks. Session 3 emphasizes how to prepare structured, analytical reports using Excel outputs. Finally, Session 4 develops learners' ability to present data analysis effectively using professional slide presentations.

SESSION 1: MACROS AND VBA IN EXCEL

MACROS IN EXCEL

A macro in Microsoft Excel is a set of programmed instructions that automates repetitive tasks, allowing users to perform complex or routine operations quickly and efficiently. Macros are created using Visual Basic for Applications (VBA), Excel's built-in programming language.

Prerequisites for Using Excel Macros

Before learning how to create macros in Excel, it is necessary to turn on the developer mode in Excel. Follow below steps:

Step 1: ***Open MS Excel*** **–** Navigate to the MS Excel icon and give it a click to open it.

Step 2: ***Right-click on the Ribbon*** **–** Go to the menu and perform a right-click on the ribbon, select Customize the ribbon (Fig. 5.1).

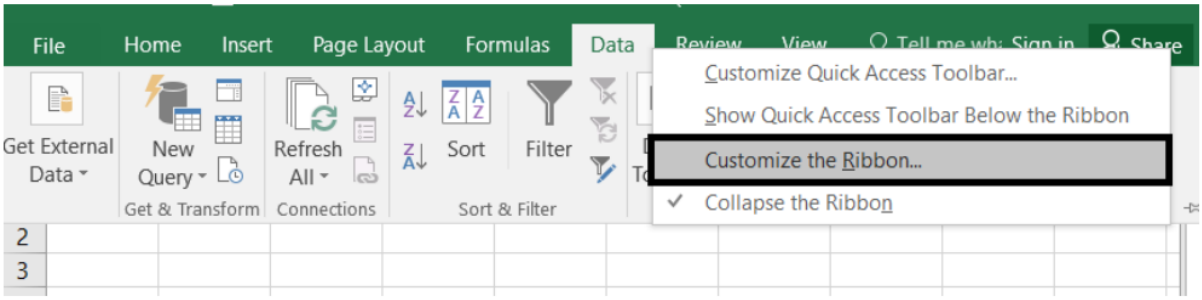


Fig. 5.1: Customize the Ribbon

Step 3: ***Check the Developer box and click on "OK"*** **–** Navigate to Customize the ribbon and place a check on the Developer Checkbox (Fig. 5.2).

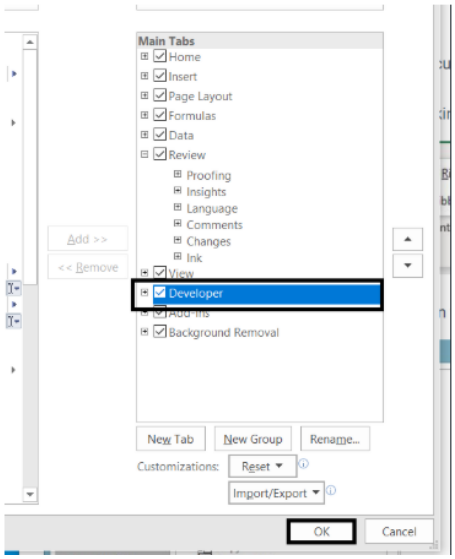


Fig. 5.2: Developer

Procedure to Enable Excel Macros

Follow the below steps to enable macros in Microsoft Excel:

1. ***Open the Excel File:*** Open the Excel workbook that contains the macros you want to enable.
2. ***Access the Trust Center:***
   - Click on the **File** tab in the top-left corner of the screen.
   - Select **Options** at the bottom of the left-hand menu.
   - In the Excel Options window, select **Trust Center** from the left-hand pane (Fig. 5.3).
   - Click on the **Trust Center Settings** button on the right side.

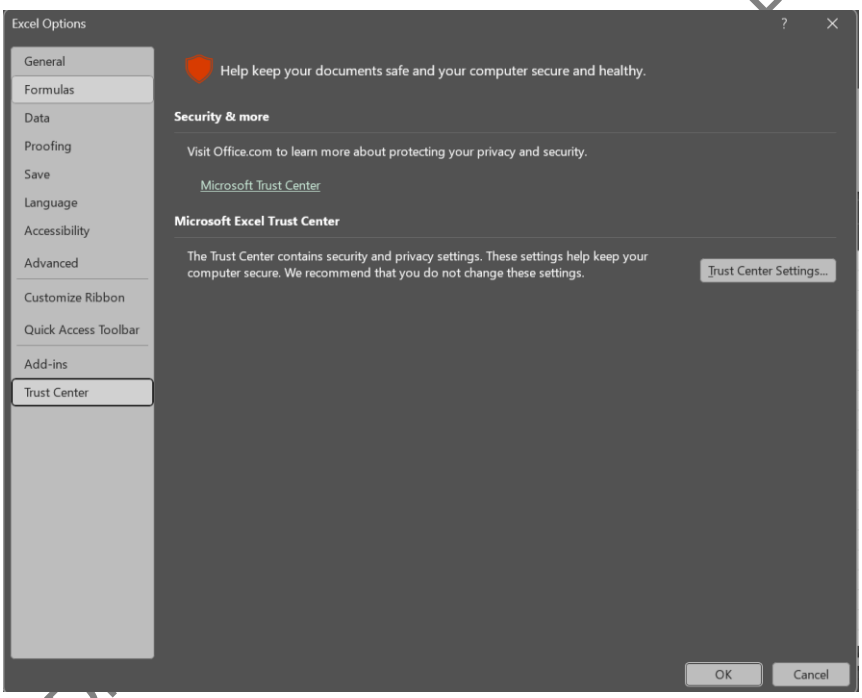


Fig. 5.3: Trust Center

3. ***Navigate to Macro Settings:*** In the Trust Centre window, click on **Macro Settings** on the left.
4. ***Choose the Appropriate Option:*** Select one of the following options based on security requirements:
   - *Disable all macros without notification:* Disables all macros silently.
   - *Disable all macros with notification:* Disables macros but shows a warning when a macro-enabled file is opened.
   - *Disable all macros except digitally signed macros:* Enables only macros signed by a trusted publisher.

- *Enable all macros (not recommended)*: Enables all macros without restrictions and may pose a security risk.

5. ***Save Your Settings:***
    - Click **OK** to close the Trust Center window.
    - Click **OK** again to close the Excel Options window.
6. ***Enable Macros for a Specific Workbook (If prompted):*** When a macro-enabled workbook is opened, a yellow Security Warning bar may appear below the ribbon. Click Enable Content to allow the macros to run.

RECORDING A MACRO

Recording a macro in Excel allows tasks to be automated by capturing a sequence of actions. Follow these steps to record a macro:

Step 1: ***Click on the Developer Tab*** **–** Go to the Developer tab located at the ribbon.

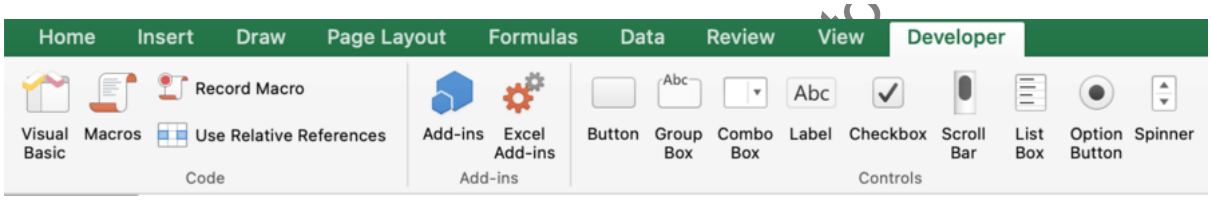


Fig. 5.4: Developer Tab

Step 2: ***Click on the Record Macro*** **–** In the Code Group, the tool **Record Macros** is located, to excel macros record you have to click on it.

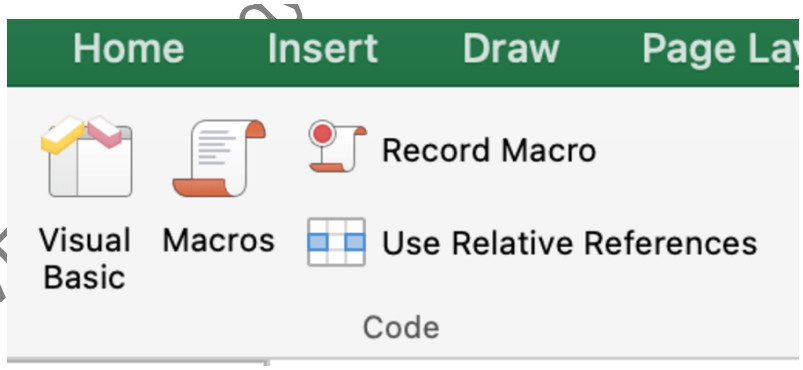


Fig. 5.5: Record Macro

Step 3: ***Fill the Record Macro Dialog Box*** **–** As macros are selected, a dialog box is opened which contains the following options to fill (Fig. 5.6).

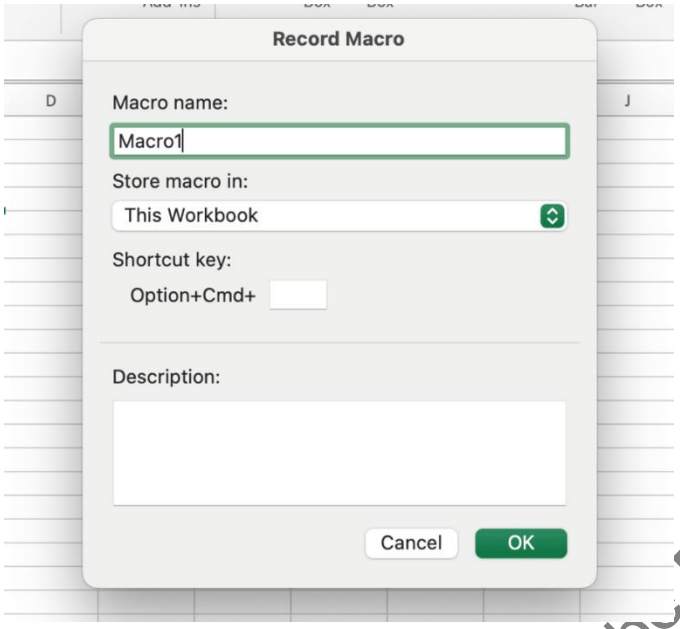


Fig. 5.6: Dialog Box

In the dialog box, enter the name of the Excel macro in the Macro name. However, space cannot be used in the Macro name to separate the words, underscore (_) can be used for this purpose. *Example:* Macro name.

There are some other options also in the dialog box, i.e., where to store the macro, the shortcut key which can be used to activate the macro, and the description for the macro created. They can be filled accordingly.

- After filling in the dialog box, **click on OK**.
- As soon as OK is clicked, **Excel Macro** records the set of operations the user is practicing.
- Once, the work is done, in the **Developer Tab**, an option **"Stop Recording"** can be seen. Clicking on which the recording gets stopped and the created macro is saved (Fig. 5.7)

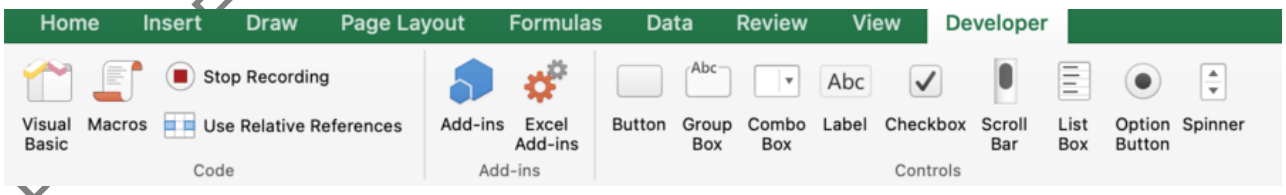


Fig. 5.7: Developer Tab

VBA EDITOR INTERFACE IN EXCEL

Visual Basic for Applications (VBA) in Excel is a language that allows users to automate repetitive tasks and enhance Excel's functionality far beyond its standard features.

The VBA interface is a User-friendly interface with various components that helps you to work with VBA code efficiently. Below are some elements:

Toolbar and Menu Bar: VBA Editor consists of a standard toolbar as well as a Menu bar same as other Windows applications. The toolbar provides quick access to common actions, such as running or stopping the code from being executed (Fig. 5.8).

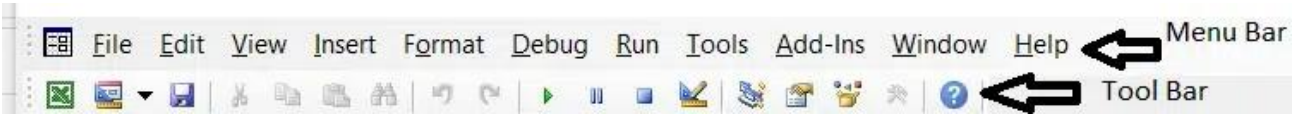


Fig. 5.8: Tool Bar and Menu

Project Explorer: It is located in the left pane of the VBA Editor. It shows a tree-like (hierarchical) view of all open workbooks, along with their components such as worksheets, modules, and user forms. This helps in navigating and managing different parts of the project during macro development (Fig. 5.9).

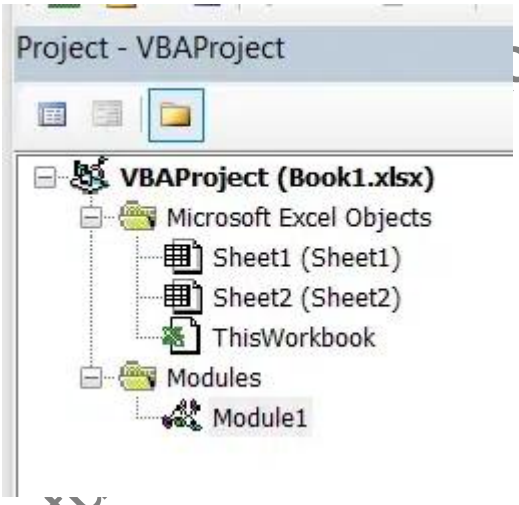


Fig. 5.9: Project Explore

Code Window: It is the main area of the VBA Editor where VBA code is written, viewed, and edited. It is linked to the selected object or module in the Project Explorer, and displays the code specific to that module or worksheet (Fig. 5.10).

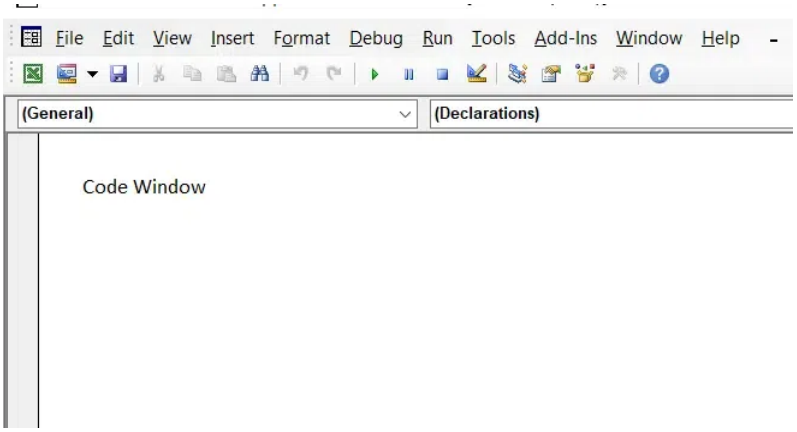


Fig. 5.10: Code Window

VISUAL BASIC FOR APPLICATIONS (VBA)

Visual Basic for Applications (VBA) is a simple programming language used within Microsoft Office applications like Excel to automate tasks and create custom solutions. Learning VBA helps users perform complex operations quickly and efficiently without repeating manual steps.

Variables in VBA

In VBA, **variables** are used to store information that can be used and changed throughout a program. Just like in mathematics where letters can represent numbers, in VBA, variables can hold numbers, text, dates, or other types of data.

Variables are named storage locations in memory that hold data values which can change during the execution of a program.

Declaring Variables

In VBA, variables must be declared before use, specifying their data type to allocate appropriate memory (Fig. 5.11).

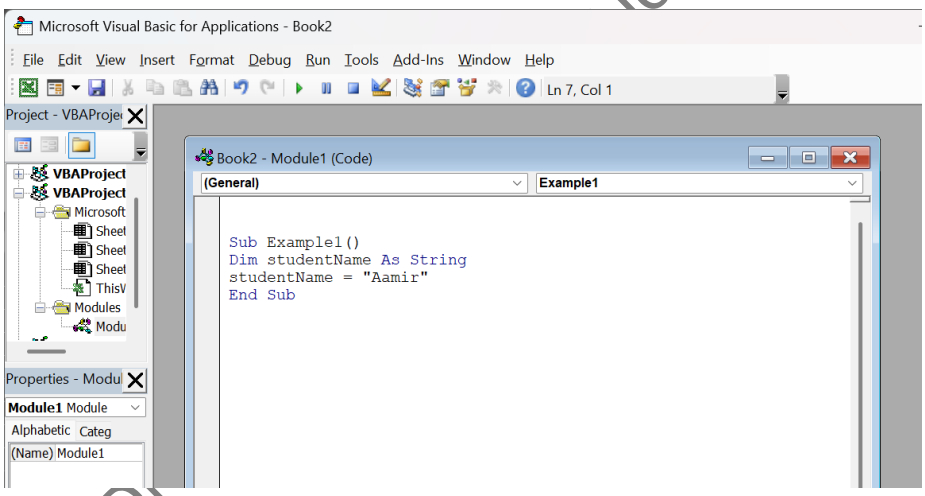


Fig. 5.11: Example of Declaring Variables

In this example:

- Dim is a keyword used to declare (introduce) a variable.
- Student Name is the name of the variable.
- As String tells VBA that the variable will store text.
- "Aamir" is the text assigned to the variable.

Common Data Types:

- Integer: Whole numbers (e.g., 10, -5)
- Double: Decimal numbers (e.g., 3.14, -0.001)
- String: Text (e.g., "Hello World")

- Boolean: True or False values

Example of Variable Declaration:

```
Dim age As Integer
Dim price As Double
Dim name As String
Dim is Available As Boolean
```

PRACTICAL EXERCISES

Activity 1: Record and run a simple Macro to format a table in Excel automatically.

Material Required:

- Computers with MS Excel installed
- Sample data table

Procedure:

1. Open Excel and load the sample data.
2. Go to the “View” tab and select “Record Macro”.
3. Name your Macro and assign a shortcut key (optional).
4. Perform basic formatting steps like changing font size, adding borders, and applying colour.
5. Stop recording.
6. Run the recorded Macro using the assigned shortcut or from the Macro list.
7. Observe how the steps are automatically repeated.
8. Show to the teacher.

Activity 2: Exploring the VBA Editor Interface**:** Open the VBA editor and locate the recorded Macro.

Material Required:

- Computers with MS Excel
- A pre-recorded Macro

Procedure:

1. Open Excel and press Alt + F11 to open the VBA editor.
2. Navigate the interface to find the recorded Macro under "Modules."

3. Double-click the module to view the code.
4. Briefly explore the toolbar and code window.
5. Close the editor after familiarization.

Activity 3: Making Minor Modifications to Recorded Macros.

Material Required:

- Computers with MS Excel
- Previously recorded Macro

Procedure:

1. Open Excel and go to the VBA editor (Alt + F11).
2. Locate the recorded Macro.
3. Find the line in the code where font colour is defined.
4. Change the colour code (e.g., from black to blue).
5. Save and close the editor.
6. Run the Macro to see the changes in action.

CHECK YOUR PROGRESS

A. Fill in the Blanks

1. A _____ is a set of instructions that can be recorded to automate tasks in Excel.
2. The shortcut key to open the VBA Editor in Excel is _____.
3. The place where recorded Macros and VBA codes are stored is called the _____.
4. In VBA, _____ are used to store data values that can change during program execution.
5. The process of saving a sequence of tasks in Excel for automatic repetition is called _____.

B. Multiple Choice Questions

1. What does VBA stand for?

   a) Visual Basic for Analysis

   b) Visual Basic for Applications

   c) Virtual Basic Assistant

   d) Visual Basic Automation

2. Which tab is commonly used to record a Macro in Excel?

a) Insert
b) View
c) Data
d) File

3. Which shortcut is used to open the VBA Editor?
   a) Ctrl + F12
   b) Alt + F11
   c) Ctrl + Alt + V
   d) Shift + F5
4. In VBA, what is a Variable?
   a) A permanent value
   b) A storage location for data
   c) A type of Excel worksheet
   d) A shortcut key
5. Which of the following is a correct basic VBA syntax?
   a) Add Row
   b) Range("A1"). Select
   c) Insert = Cell
   d) Go to Cell

C. Match the Columns

Column A: Concept		Column B: Description	
1.	Macros	**A.**	Shortcut to open VBA editor
2.	VBA	**B.**	Stores recorded Macros and code
3.	VBA Editor	**C.**	Visual Basic for Applications
4.	Variables	**D.**	A recorded sequence of actions
5.	Alt + F11	**E.**	Used to store changing data

D. Short Answer Questions

1. What is a Macro in Excel?
2. Why do we use Macros in Excel?

3. What is the purpose of the VBA Editor?
4. Define a variable in VBA.
5. Write an example of a basic VBA syntax.

E. Long Answer Questions

1. Explain the process of recording and running a basic Macro in Excel with an example.
2. Describe the VBA Editor interface and its main components.
3. Discuss the importance of using VBA for automating repetitive tasks.
4. Explain in detail what variables are in VBA, and why they are important in programming.
5. Write a simple VBA code that selects a cell, changes its font color to red, and explain each step.

F. Check Your Performance

1. Critically evaluate the benefits and limitations of using recorded Macros versus writing custom VBA code for automating repetitive tasks in Excel. Provide suitable business examples to support your answer.
2. Examine the role of variables and syntax accuracy in VBA programming. How do errors in variable declaration and syntax affect the execution and outcome of a Macro? Justify your answer with examples.
3. Design and develop a basic automated Excel report that includes formatting, chart updates, and data insertion using recorded Macros and minor VBA modifications. Explain the steps involved in your design.
4. Create a scenario where a business process can be fully automated using Macros and VBA. Develop a step-by-step plan, including how Macros would be recorded, edited, and executed to solve the identified problem.

SESSION 2: AUTOMATING REPORTS AND DASHBOARDS

ASSIGNING MACROS TO BUTTONS

Assigning macros to buttons and keyboard shortcuts allows users to run automated tasks quickly and easily, improving efficiency and reducing manual errors.

Following are the steps followed to assign a Macro to a Button in Excel:

Step 1: Enable the Developer Tab

- Go to **File → Options → Customize Ribbon.**
- Check the **Developer** checkbox and click **OK.**

Step 2: Insert a Button

- On the **Developer Tab,** click **Insert.**
- Under **Form Controls,** select the **Button (Form Control).**

Step 3: Draw the Button

- Click and drag on the worksheet to draw the button where you want it to appear.

Step 4: Assign the Macro

- After drawing the button, Excel automatically opens the **Assign Macro** window.
- Select the desired macro from the list.
- Click OK to confirm.

Step 5: Rename the Button (Optional)

- Right-click the button and select **Edit Text.**
- Type a meaningful name for the button *(Example: "Generate Report").*

Step 6: Test the Button

- Click the created button.
- The assigned Macro will run automatically.

ASSIGN KEYBOARD SHORTCUTS TO MACROS

A keyboard shortcut allows a macro to be run quickly using a specific key combination. Use the Macro Options window in Excel to assign or remove a shortcut key. Follow the steps below:

1. Go to the Developer tab and click the Macros button. *(If the Developer tab is not visible on the ribbon, it must be enabled from Excel Options.)* (Fig. 5.12).

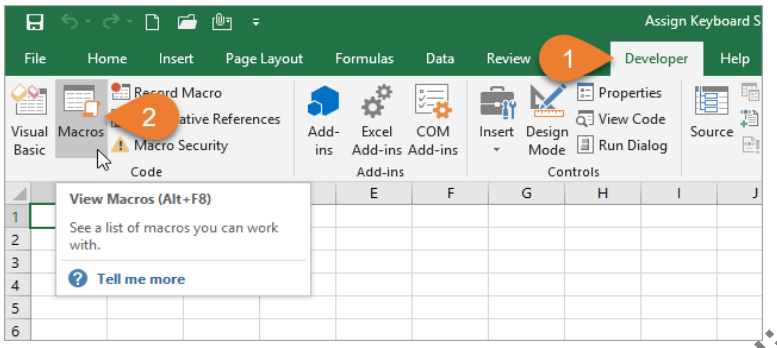


Fig. 5.12: Developer Tab and Macro Button

2. In the **Macro** dialog box, select the macro to which the shortcut key will be assigned, and click the **Options** button (Fig. 5.13).

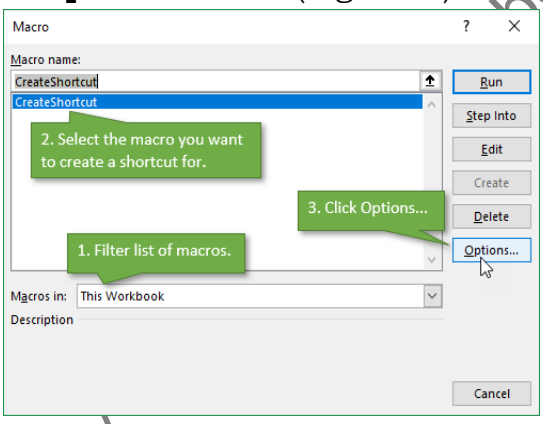


Fig. 5.13: Macro Dialog Box

3. In the **Macro Options** window, enter a letter, number, or symbol to create the shortcut key. To avoid conflicts with commonly used shortcuts (e.g., Ctrl+C for Copy), include **Shift** in the shortcut (e.g., Ctrl+Shift+C). (Fig. 5.14)

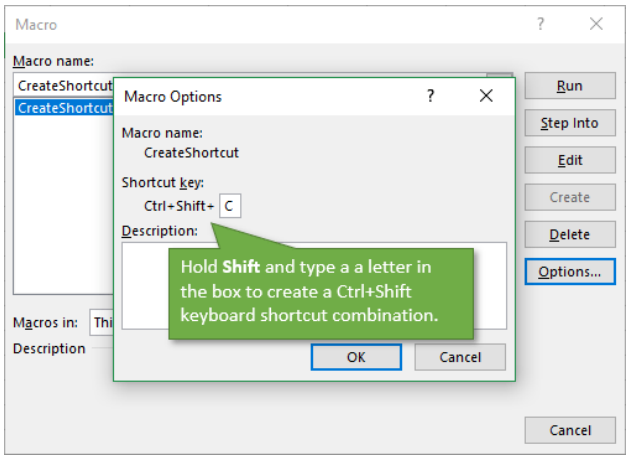


Fig. 5.14: Macro Options

4. To delete an existing shortcut key, open the **Macro Options** window again and remove the character from the shortcut field. Click **OK** to save changes (Fig. 5.15).

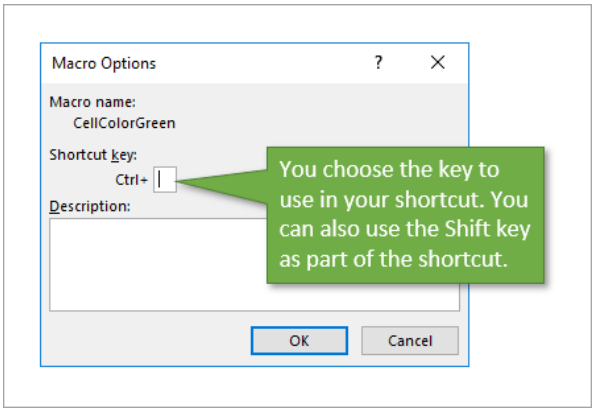


Fig. 5.15: Macro Options

AUTOMATE REPETITIVE TASKS IN EXCEL

The Macro Recorder allows recording and creation of repetitive macros for tasks that involve multiple steps to complete. In cases where operations are time-consuming due to the number of actions required, the use of automation through the Macro Recorder is recommended to improve efficiency.

Following are the steps to automate repetitive Tasks:

Step 1: Identify Repetitive Tasks

Start by pinpointing the tasks you frequently perform in Excel. Common examples include data entry, formatting, calculations, and report generation.

Step 2: Macro Recording

Each stage will be captured using the Macro Recorder.

Step 3: Macro Editing (Optional)

When necessary, the View > Macros > View Macros > Edit will be used to refine the macro. (Fig. 5.16)

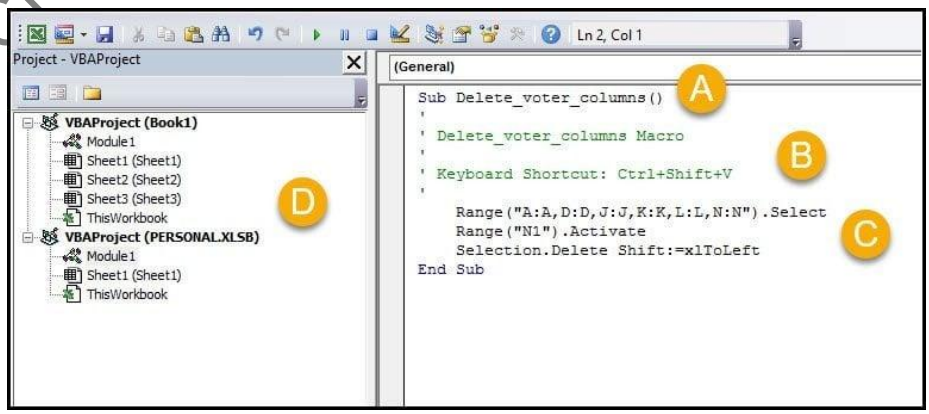


Fig. 5.16: Macro Editing

Fig. 5.16 displays several panels that appear based on the selected settings when the editor is opened. The panel on the right is introduced first, which displays the VBA code for the macro. Different panels are explained below:

- Each macro begins with a Sub reference followed by the assigned macro name. This represents a Subroutine or sub procedure.
- A series of green lines starting with an apostrophe (') are included. These are comments used to explain the macro.
- Additional comments can be added by starting a line with an apostrophe ('). Adding comments is useful when modifying a macro or for documentation purposes.
- The black-coloured lines represent the macro's actual code, including references to actions, properties, and objects. This section is effective for instructional purposes, as it shows how recorded steps are translated into code. In the earlier tutorial, specific columns such as A, D, J, K, L, and N were deleted using these code references.
- The Explorer panel, though potentially overwhelming, is essential. Macro code is typically displayed in items labelled as **Module**.

Steps to Automating Formatting Using Macros

1. Go to the **Developer Tab** and click **Record Macro.**
2. Give a **name** to your Macro *(Example: "Format Report").*
3. Select where to store the Macro (This Workbook is recommended).
4. Click **OK** to start recording.
5. Apply the formatting you need:
    - Change font size or style
    - Apply bold or italics
    - Set cell colours
    - Adjust borders
6. When finished, click **Stop Recording** on the Developer Tab.
7. Run the Macro anytime to apply the same formatting automatically.

Steps to Automating Printing Using Macros

1. Go to the **Developer Tab** and click **Record Macro.**
2. Name the Macro *(Example: "Quick Print").*
3. Click **OK** to start recording.
4. Go to **File** → **Print** and set the print settings (such as selected area, number of copies, page layout).

5. Print the document.
6. Click **Stop Recording.**
7. Run the Macro anytime to automatically print with the saved settings.

Steps to Automating Chart Updates Using Macros

1. Go to the **Developer Tab** and click **Record Macro.**
2. Name the Macro *(Example: "Update Chart").*
3. Click **OK** to start recording.
4. Select the chart and update:
   - The data range.
   - Chart type (if needed).
   - Chart title or labels.
5. Click **Stop Recording.**
6. Run the Macro anytime to automatically update the chart as per the recorded step

SCHEDULING BASIC MACRO EXECUTION

Microsoft Excel does not provide a built-in scheduling feature for Macros. However, Macro execution can be scheduled using **Windows Task Scheduler** by linking it to a workbook containing an **Auto-Run Macro**. Follow the steps below:

Step 1: Create an Auto-Run Macro

1. Open Excel workbook.
2. Press Alt + F11 to open the **VBA Editor.**
3. In the left panel, double-click **This Workbook.**
4. Type the following code to automatically run a Macro when the workbook opens:

```
Private Sub Workbook_Open ()
        Call YourMacroName
End Sub
```

5. Replace Your Macro Name with the name of your Macro.
6. Save the workbook as **Excel Macro-Enabled Workbook (*.xlsm).**

Step 2: Use Windows Task Scheduler

1. Open **Task Scheduler** on your computer.
2. Click **Create Basic Task.**
3. Give the task a **Name and Description.**

4. Choose when you want the Macro to run (Daily, Weekly, On Start-up, etc.).
5. In the **Action** step, select **Start a Program.**
6. Browse and select **Excel.exe** from your system (Ex: C:\Program Files\Microsoft Office\root\OfficeXX\EXCEL.EXE).
7. In the **Add Arguments (optional)** field, enter the full file path of your Macro workbook in double quotes, like this:

   "C:\Users\YourName\Documents\MacroWorkbook.xlsm"

8. Click **Finish** to schedule the Macro.

PRACTICAL EXERCISES

Activity 1: Assigning Macros to Buttons and Shortcuts.

Situation: You frequently apply the same formatting style to a set of reports. Instead of manually applying the formatting each time, you want to create a macro and assign it to a button and a keyboard shortcut to speed up the process.

Task: Create a macro that formats a report table (sets font size, bolds headers, applies borders), assign it to a button on the sheet, and link it to a custom keyboard shortcut.

Material Required:

- Excel with Developer tab enabled
- Basic knowledge of recording macros
- Understanding of button insertion and macro assignment

Procedure:

1. Open Excel and enable the Developer tab.
2. Create a sample report table.
3. Start recording a macro named "Format Report".
4. Apply the following formatting while recording:
   - Bold and centre-align headers
   - Set font size to 12
   - Apply borders to all cells
5. Stop recording the macro.
6. Insert a button from the Developer tab.
7. Assign the "Format Report" macro to the button.

8. Test the button functionality.
9. Go to Options > Customize Ribbon > Keyboard Shortcuts.
10. Assign a shortcut key (e.g., Ctrl + Shift + F) to the "Format Report" macro.
11. Test the keyboard shortcut.

Activity 2: Automating Repetitive Tasks (Formatting, Printing, Updating Charts).

Situation: Your team prepares weekly sales reports with the same formatting, printing, and chart updates. Manually completing these tasks is time-consuming.

Task: Create a macro that:

- Formats the sales report table
- Updates the sales chart
- Prints the report automatically

Material Required:

- Sample sales report data and chart
- Familiarity with recording macros
- Knowledge of printing setup in Excel

Procedure:

1. Prepare a sample sales data table and insert a corresponding chart.
2. Start recording a macro named "Weekly Report".
3. Apply desired formatting to the table (font style, colours, borders).
4. Refresh or update the chart to reflect any changes.
5. Set up the print area and printing preferences.
6. Print the sheet (this will be recorded in the macro).
7. Stop recording the macro.
8. Assign this macro to a custom button or shortcut key for easy execution.
9. Test the macro by running it on a new set of data.

Activity 3: Scheduling Basic Macro Execution.

Situation: You want to ensure a report is automatically updated and printed every Friday at 4 PM without manual intervention.

Task: Schedule a macro to automatically update and print the report on a specific day and time.

Material Required:

- Excel
- Windows Task Scheduler (if using personal systems)
- Basic VBA knowledge (if needed to write a refresh-print macro)

Procedure:

1. Record or write a macro named "Auto Weekly Report" that updates the report and prints it.
2. Save the Excel file as a Macro-Enabled Workbook (.xlsm).
3. Create a Windows Task Scheduler task:
   - Open Task Scheduler and create a new task.
   - Set the trigger to Weekly on Fridays at 4 PM.
   - Set the action to open the specific Excel file.
4. In the Excel file, set up a Workbook Open event in VBA:

```
Private Sub Workbook Open ()
        Call Auto Weekly Report
End Sub
```

5. Save and close the workbook.
6. Test the scheduled task by manually running it from the Task Scheduler.
7. Verify that the macro automatically updates and prints the report when the file opens.

CHECK YOUR PROGRES

A. Fill in the Blanks

1. The _____ tab in Excel allows you to access Macro recording and assignment options.
2. A macro can be assigned to a _____ to enable quick execution with a single click.
3. The _____ key combination is commonly used to assign shortcuts to macros.
4. Automating _____ tasks like formatting, printing, and chart updating saves time and reduces manual errors.
5. To schedule macro execution automatically on a specific day and time, _____ _____ is used in Windows.

B. Multiple Choice Questions

1. Which of the following is required to record a macro in Excel?
   a) Enabling the Developer tab
   b) Inserting a chart

c) Creating a pivot table

d) Using Conditional Formatting

2. What type of file must you save your workbook as to store macros?

a) .xlsx

b) .xlsm

c) .csv

d) .txt

3. Which tool allows you to automate the opening of Excel files and trigger macros at specific times?

a) Excel Scheduler

b) Windows Task Scheduler

c) Excel Timer

d) Macro Launcher

4. Which shortcut key is commonly used for assigning macro shortcuts?

a) Alt + F4

b) Ctrl + Shift + (Key)

c) Ctrl + P

d) F12

5. What happens when you assign a macro to a button in Excel?

a) The macro is permanently deleted

b) The macro is copied to another file

c) The macro runs when the button is clicked

d) The button automatically prints the sheet

C. Match the Columns

	Column A		Column B
1.	Developer Tab	**A.**	Schedule automatic macro execution
2.	Assign Macro to Button	**B.**	Enables macro recording
3.	Ctrl + Shift + Key	**C.**	Quick macro execution
4.	Windows Task Scheduler	**D.**	Run macro by clicking
5.	Automating Tasks	**E.**	Reduces manual effort

D. Short Answer Questions

1. What are the benefits of assigning macros to buttons in Excel?

2. Explain how keyboard shortcuts can improve the efficiency of macro execution.
3. List two repetitive tasks that can be automated using Excel macros.
4. What is the role of Windows Task Scheduler in macro automation?
5. What file format is required to store and run macros in Excel?

E. Long Answer Questions

1. Explain in detail the process of assigning a macro to a button and a keyboard shortcut in Excel. Provide step-by-step instructions.
2. Describe how you can automate repetitive tasks such as formatting, printing, and updating charts using macros. Support your answer with practical examples.
3. Discuss the steps involved in scheduling a macro to run automatically using Windows Task Scheduler. Why is this feature useful in an organization?
4. How can automating repetitive tasks in Excel improve productivity in large-scale reporting processes? Provide real-world scenarios to support your answer.
5. Compare and contrast the manual execution of tasks versus macro-based automation in Excel. Highlight the advantages and potential risks of using macros.

F. Check Your Performance

1. Evaluate a scenario where a company relies on manual report formatting and printing. Discuss how macro automation can improve the process and what risks need to be managed.
2. Create a detailed plan for developing, testing, and scheduling a macro that automates the following:
   - Formatting a weekly report
   - Updating sales charts
   - Printing the report
   - Automatically triggering the macro every Monday at 9 AM
3. Develop a solution to automate end-of-day reporting in Excel, including macro design, button placement, shortcut assignment, and scheduling using external tools.
4. Assess the effectiveness of using Windows Task Scheduler for automating Excel macros. What improvements can be made to ensure smooth and error-free execution?

SESSION 3: ANALYTICAL REPORTS

An analytical report is a written business document that companies of all sizes use to explore business opportunities, solve problems, and make more intelligent decisions. This report includes both quantitative and qualitative data to present a complete analysis of the problem.

When preparing analytical reports, the format chosen affects how well the information is communicated and understood. Below are the common types of analytical report formats: (Fig. 5.17)

Fig. 5.17: Analytical Report Format

1. Tabular Format

The tabular format is a method of presenting information using tables organized into rows and columns. This structured layout allows data to be arranged systematically, making it easy to locate, compare, and interpret specific pieces of information.

Data is divided into categories or fields (represented as column headers). Each row typically represents a record, entry, or unit of analysis. Tables can be sorted, filtered, and used for quick analysis of patterns and trends. Often used with large volumes of data because it minimizes clutter and maximizes clarity.

Advantages:

- Easy to read and understand for users familiar with numbers.
- Supports sorting, filtering, and basic calculations.
- Efficient for showing structured and standardized data.

Limitations:

- Lacks context and storytelling: It only presents raw data without explanation.
- Not visually engaging: Especially for senior management who may prefer charts or narratives.
- Can be overwhelming if the dataset is too large without summarization.

2. Narrative Formats

The narrative format is a style of presenting analytical reports where the focus is on explanation, interpretation, and storytelling using descriptive text. Instead of just presenting raw data, the narrative format walks the reader through the meaning behind the data, providing context, causes, and actionable recommendations.

Advantages of Narrative Format:

- **Provides Context:** The narrative format goes beyond numbers and explains the background, reasons, and impact of the data. It helps readers understand not just *what* happened but *why* it happened.
- **Supports Decision-Making:** Narrative reports usually include recommendations and strategic insights that guide managers and executives in making informed decisions.

STRUCTURE OF ANALYTICAL REPORTS

An analytical report follows a systematic structure to ensure that data, analysis, and conclusions are presented in a clear, logical, and actionable manner.

1. **Title Page:** Report title, author's name, date of submission, and sometimes the name of the organization. Clearly identifies the topic and scope of the report.
2. **Table of Contents:** It includes List of sections and page numbers. Provides quick navigation through the report.
3. **Executive Summary:** Brief summary of the purpose, key findings, conclusions, and recommendations. Gives busy decision-makers a quick overview without reading the entire report.
4. **Objectives / Purpose of the Report:** It Includes Clear statement of what the report aims to analyse or solve. Sets the focus and direction for the analysis.
5. **Methods / Methodology:** Description of how data was collected, analysed, and tools used (surveys, Excel analysis, financial models, etc.). Ensures the analysis is reliable and can be replicated if needed.
6. **Data Analysis / Findings:** Provides evidence and explains trends, comparisons, and patterns found in the data. It Includes Presentation of data through:
   - Tables
   - Charts
   - Graphs
   - Text-based analysis (if using narrative format)

7. **Discussion / Interpretation:** It Includes In-depth explanation of the results, reasons for the findings, and the potential impact. Adds meaning to the data and connects it to the business or research objectives.
8. **Conclusions:** Summarizes the key points and answers the report's original objectives and Provides closure and highlights what was learned from the analysis.
9. **Recommendations**: It Includes Actionable steps or strategies based on the findings. Guides the reader on what to do next.
10. **Appendices (If needed):** It Includes Supporting documents, raw data, detailed calculations, or additional charts. Keeps the main report clean while providing additional details if required.

Summary of the Sections of the Analytical Report

Section	Purpose
Title Page	Identifies the report
Table of Contents	Helps navigation
Executive Summary	Quick overview for decision-makers
Objectives	States the report's objectives/ purpose
Methods	Explains how data was gathered/analysed
Data Analysis	Presents evidence and findings
Discussion	Explains the significance of the results
Conclusions	Summarizes the key takeaways
Recommendations	Suggests actionable steps
Appendices	Provides detailed supporting information

STRUCTURE OF ANALYTICAL REPORTS IN THE CONTEXT OF FINANCIAL SERVICES

In the financial services sector, Management Information System (MIS) reports help monitor and evaluate different business functions such as sales, branch performance, and risks. These reports assist managers in making decisions based on data trends and operational performance.

A. Monthly Sales Report

The Monthly Sales Report is a critical business document that provides a snapshot of sales performance over a specific month. It helps decision-

makers track progress, identify trends, and make informed strategic choices.

A Monthly Sales Report provides a structured, data-driven summary of sales activities and outcomes over a specific month. It helps businesses track performance, analyse trends, and make informed decisions.

COMPONENTS OF MONTHLY SALES REPORT

Main Parts of a Monthly Sales Report:

1. **Title:** Clearly shows the reporting month.

   Example: "Monthly Sales Report – March 2025"

2. **Objective:** Tells why the report is made.

   Example: To check how much was sold and compare it with targets.

3. **Data Sources:** Where the sales data comes from.

   Example: Billing system, sales records, or Excel sheets.

4. **Methods:** Explains how the data is grouped or calculated.

   Example: Total sales, sales by product, or by region using Excel or PivotTables.

5. **Analysis:** Looks deeper into the data.

   Examples:

   - Actual vs Target → Did we meet our goals?
   - Growth → Is this month better than last month?
   - Top Performers → Which product or branch sold the most?

6. **Visuals:** Charts or tables that show data clearly.

   Examples: Bar charts, line graphs, and summary tables.

7. **Conclusion:** A short summary of the report's findings.

   Example: Sales improved by 6%, but one region missed its target.

8. **Recommendations:** Suggestions based on the report.

   Example: Promote the best-selling product or improve support in low-performing areas.

B. Branch Performance Report:

A Branch Performance Report is a comprehensive tool used by organizations, especially banks and retail businesses, to evaluate and monitor the performance of their individual branches. These reports help

identify best practices, areas needing improvement, and align branch activities with overall strategic goals.

Key Components of a Branch Performance Report

1. ***Performance Metrics and KPIs:*** Branch performance reports highlight important measures called Key Performance Indicators (KPIs). These include data like revenue, expenses, profits, and customer satisfaction. Comparing KPIs across different branches helps identify which branches are doing well and which need improvement. It supports better decision-making and targeted support.
2. ***Financial Analysis:*** The report shows detailed financial information for each branch, such as how much money is earned and spent. It may also include analysis by product line or customer type. Using methods like activity-based costing, the report ensures that costs are shared properly among branches, helping to understand how profitable each one truly is.
3. ***Customer and Market Insights:*** This section includes information about the type of customers each branch serves and which products are popular. It also looks at the local market, such as population, income levels, and job availability. These insights help branches understand their surroundings and how to better serve customers or expand business.
4. ***Operational and Staff Planning:*** Reports may also track how efficiently branches are working like how many transactions are completed, how productive staff are, and how many employees are needed. This helps in planning staff levels, improving operations, and using resources wisely to meet the branch's goals.
5. ***Reporting and Visualization Tools:*** To make the data easy to understand, the report often includes dashboards, charts, and tables. Users can filter information, save different views, and share reports easily. These visual tools make it simpler for managers to spot trends, compare branches, and take quick action when needed.

Benefits and Uses

- ***Strategic Alignment:*** Ensures branches align with corporate objectives such as revenue growth, customer retention, and cost control.
- ***Performance Monitoring:*** Enables branch managers and higher-level executives to track progress against targets and benchmarks regularly.
- ***Decision Support:*** Combines internal performance data with external market factors to inform branch expansion, marketing campaigns, and product development.

- ***Efficiency Improvements:*** Identifies operational inefficiencies and supports staff planning to optimize branch productivity.
- ***Enhanced Reporting:*** Automated and integrated reporting tools reduce manual effort and data redundancy, improving accuracy and timeliness of performance insights.

Example: Solutions and Tools

- ***Calxa:*** Offers branch KPI comparison reports and visual breakdowns of income and expenses by business unit.
- **Phrazor:** Provides automated branch performance reports that eliminate manual data consolidation and improve reporting efficiency.
- ***IBM Cognos Branch Performance Blueprint:*** A sophisticated solution combining internal data and external market analysis for detailed profitability planning, forecasting, and real-time monitoring.
- ***Branch Dashboard:*** Provides campaign performance reports with customizable filters and trend graphs to analyse marketing impact across branches.

C. Risk Analysis Report

A Risk Analysis Report is a structured document that identifies, assesses, and provides strategies to manage potential risks that an organization or project may face. It is essential for understanding uncertainties, minimizing losses, and supporting informed decision-making.

Key Elements of a Risk Analysis Report

1. ***Risk Identification:*** This involves listing potential risks that could impact the organization or project. These risks can be commercial, financial, operational, environmental, reputational, compliance-related, health and safety, strategic, or workforce-related.
2. ***Risk Assessment:*** This step evaluates the likelihood (probability) and impact (severity) of each identified risk. Tools such as risk matrices, decision trees, Failure Mode and Effects Analysis (FMEA), and bowtie models are commonly used to quantify and prioritize risks.
3. ***Risk Characterization and Analysis:*** The report characterizes risks by estimating their consequences and how serious they could be. It also may include root cause analysis to understand underlying issues and failure mode analysis to identify potential process failures.
4. ***Risk Management and Mitigation Plans:*** The report outlines risk management strategies and control measures to mitigate or eliminate risks. This includes a risk corrective action plan detailing how to respond if a risk materializes.

5. ***Risk Communication:*** Effective communication of risk findings to stakeholders is vital. The report should present risks clearly, often using dashboards, heat maps, and visual analytics to ensure understanding and facilitate decision-making.
6. ***Supporting Data and Documentation:*** A risk report often includes a risk register (listing risks, their owners, rankings, and responses), performance data reviews, project schedules, and status updates to provide context and track risk management progress.

Types of Risk Analysis Included

- ***Risk-Benefit and Cost-Benefit Analysis:*** Weigh advantages and disadvantages or costs against benefits to guide decisions.
- ***Needs Assessment:*** Identifies gaps in resources or capabilities critical to success.
- ***Business Impact Analysis:*** Evaluates the effect of disruptions and helps prioritize recovery efforts.
- ***Failure Mode and Effects Analysis (FMEA):*** Identifies potential failure points to improve reliability and reduce costs.
- ***Root Cause Analysis:*** Investigates fundamental causes of problems to prevent recurrence.

Benefits of a Risk Analysis Report

- Minimizes losses by anticipating adverse events and planning responses.
- Strengthens security and operational resilience.
- Improves resource allocation by focusing efforts where risks are highest.
- Enhances compliance with regulatory requirements.
- Supports strategic decision-making by balancing risks and benefits.

Tools and Software for Risk Analysis Reporting

Several software platforms facilitate risk analysis reporting by integrating data, automating workflows, and providing advanced analytics and visualization:

- ***Risk connect:*** Offers customizable dashboards, heat maps, predictive and prescriptive analytics, and easy report building for decision-ready insights.
- ***IBM OpenPages:*** A governance, risk, and compliance (GRC) platform with workflow automation and reporting capabilities.

- ***Service Now GRC:*** Cloud-based platform with incident management, risk assessment, mitigation planning, and continuous surveillance.
- ***Risk Optics:*** Provides operational risk management with customizable risk calculations and compliance management.

Perform Risk Analysis (Summary Steps)

1. Identify hazards and risks relevant to the organization or project.
2. Evaluate risks by assessing their likelihood and potential impact using appropriate tools.
3. Decide on and implement control measures to mitigate risks.
4. Document findings thoroughly to maintain records and support transparency.
5. Review and update the risk analysis regularly to reflect changes in conditions or new information.

EXCEL OUTPUT IN REPORTS

When using Excel output in reports, especially visuals like charts or pivot tables, it is important to consider how to export, clean, format, and embed these visuals effectively. Below is a detailed overview covering exporting visuals, cleaning and formatting them, and the pros and cons of using screenshots versus linked objects.

1. Exporting Excel Visuals for Reports

- **Exporting Data with Live Connection:** When Excel visuals are connected to dynamic data sources such as Power BI, export options allow maintaining a live connection. This enables the Excel workbook to refresh data directly from Power BI visuals, ensuring real-time accuracy in reporting.
- **Exporting Pivot Tables and Charts:** The "Copy as Picture" feature in Excel can be used to export pivot tables or charts as images while retaining their visual layout and formatting. This is especially useful for inserting visuals into documents or presentations.
- **Export to PDF:** Exporting Excel reports or charts as PDFs ensures consistent formatting and layout across devices and platforms. This reduces the risk of misinterpretation and preserves the visual integrity of the report.

2. Cleaning and Formatting Excel Visuals

- **Data Cleaning:** Prior to creating visuals, data should be cleaned by removing duplicates, correcting spelling errors, standardizing text case,

and eliminating blank rows or columns. Use Excel formulas to process the data, and replace formulas with values to stabilize the dataset.

- **Formatting Charts:** Select appropriate chart types that suit the data and intended message. Avoid unnecessary clutter, apply consistent colour schemes to emphasize key points, and customize labels and titles for clarity. Use legible fonts and minimize excess gridlines and labels to maintain chart readability.
- **Consistent Formatting:** Apply templates and uniform styling across all reports to ensure a professional appearance and enhance stakeholder engagement.

3. Screenshot vs. Linked Object

Aspect	Screenshot (Static Image)	Linked Object (Dynamic Link)
Data Update	Does not update if source data changes; static snapshot	Updates automatically when source Excel file changes
File Size	Typically, smaller, as it's just an image	Can increase file size due to embedded data
Interactivity	No interactivity; fixed image	Can be edited or interacted with by opening in Excel
Ease of Use	Simple to insert and position anywhere	Requires source file access and can be more complex to manage
Reliability	Always displays exactly as captured, no broken links	Risks broken links if source file is moved or renamed
Collaboration	Good for sharing finalized reports without source dependencies	Better for ongoing reports needing live data updates

ADDING TABLES AND VISUALS

1. Choosing the Right Chart

Selecting the appropriate chart type depends on the nature of the data and the message to be conveyed:

- Use Bar or Column Charts to compare quantities across categories.
- Use Line Charts to show trends over time.
- Use Pie Charts to show percentage distribution.

- Use Scatter Charts to show relationships or patterns between two numeric variables.

2. Table formatting

Effective tables should be easy to read and facilitate comparison:

i) Layout and Arrangement:

- Arrange numerical data in columns for easier vertical comparison.
- Place time-series categories across columns.
- Calculated values should be to the right of the source data columns.
- Indent subentries or use separate columns instead of cut-in rows for hierarchical data.

ii) Alignment:

- Left-align text (especially in stub columns) for readability.
- Right-align numbers and ensure consistent decimal places for easier comparison.

iii) Visual Design:

- Use thin, light lines sparingly—preferably only to separate headers and footers. Avoid heavy grids that clutter the table.
- Employ white space generously to improve readability; a row height roughly doubles the font size is recommended.
- Use subtle shading or zebra striping for alternate rows to guide the eye, especially in wide tables.
- Highlight important data with noticeable but not overwhelming colours.
- Remove duplicates and unnecessary

iv) Sorting and Grouping:

- Sort data by rank or time when applicable.
- Group related data logically (e.g., sales by country).

v) ***Text Orientation:*** Use horizontal text orientation for all table text to maintain readability.

vi) ***Font:*** Use a legible, consistent font throughout the table.

3. Enhancing Visuals in Reports

The following are to be followed to make visuals more effective and engaging:

- ***Purpose and Clarity:*** Ensure each visual has a clear purpose and is tailored to the audience. Avoid adding visuals that do not contribute to the main message.
- ***Simplicity:*** Keep visuals simple; remove unnecessary elements like excessive gridlines, labels, or colours that distract from the data.
- ***Use Colour Strategically:*** Use colour to highlight key data points or differentiate categories. Stick to a cohesive colour palette aligned with your brand or report theme.
- ***Labels and Annotations:*** Use clear labels and brief annotations to explain what the visual shows, making it easier to interpret.
- ***Interactive Elements:*** When possible, incorporate interactive visuals (e.g., dashboards) to allow users to explore data dynamically.
- ***Contextualization:*** Provide context around visuals to help readers understand the significance of trends or outliers.
- ***Accessibility:*** Use high-contrast colours and ensure visuals are accessible to all users, including those with colour vision deficiencies.

PRACTICAL EXERCISES

Activity 1: Developing a Sample Analytical Report using Excel (Sales Report for Q1).

Situation: A company wants to track and evaluate its sales performance for the first quarter (Q1) of the year. As a data analyst, you need to develop an analytical report using Excel.

Task: Prepare a Quarterly Sales Report for Q1 using Excel. The report should summarize sales by product, region, and month, and include visual elements like charts.

Material Required:

- Excel software
- Sales data (sample data provided or created by students)
- Basic Excel skills: charts, tables, formulas

Procedure:

1. Gather or create sample sales data for Q1 (January, February, March) for multiple products and regions.
2. Use Excel to:

- Calculate total sales per month.
- Summarize sales by product and region using PivotTables or summary tables.

3. Create visualizations:
   - Bar charts for product-wise sales.
   - Line charts for monthly trends.
4. Format tables and charts for clarity and presentation.
5. Prepare an Excel report file showing both raw data and summarized analysis.

Activity 2: Integrating Excel Elements into a Word Document with Descriptions.

Situation: Manager requires the Excel analysis to be presented in a professional Word document for client review.

Task: Create a Word document report by embedding Excel tables and charts. Provide clear descriptions and interpretations for each visual.

Material Required:

- Microsoft Word and Excel
- Completed Excel sales report from Activity 1
- Writing skills for report description

Procedure:

1. Open a new Word document and insert the title: *Quarterly Sales Report – Q1 2025*.
2. Write an introduction summarizing the report's objectives.
3. Embed formatted Excel tables (copy as linked objects or embedded content).
4. Insert Excel charts with appropriate headings.
5. For each table or chart:
   - Write a short description explaining what the data shows.
   - Provide brief interpretations (e.g., top-selling product, regional performance).
6. Summarize findings and add conclusions at the end of the report.
7. Save the document as *Draft Report – Q1 2025*.

Activity 3: Presenting Draft Reports in Small Groups.

Situation: You will present your draft report to your classmates in a small group to receive peer feedback and improve your final report.

Task: Present your draft analytical report and explain the key findings using your Word and Excel documents.

Material Required:

- Draft analytical report (Word file)
- Excel analysis file
- Presentation preparation (5-7 minutes)

Procedure:

1. Prepare a short oral presentation covering:
    - Purpose of the report.
    - Key sales trends and findings.
    - How the tables and visuals support your analysis.
2. Share your Word and Excel files with your group.
3. Present your draft report to your classmates in a small group.
4. Receive feedback on:
    - Clarity of visuals.
    - Quality of analysis.
    - Report structure and formatting.
5. Take notes on suggested improvements.
6. Use the feedback to revise your final report.

CHECK YOUR PROGRESS

A. Fill in the Blanks

1. In a _____ format, data is presented in structured tables for quick reference and numerical analysis.
2. The _____ section of a business report typically summarizes key findings and provides actionable insights.
3. A _____ object in Excel updates automatically when the source data changes, while a screenshot remains static.
4. A _____ chart is most appropriate for showing trends over time.
5. Cleaning and _____ visuals in Excel ensure that charts and tables are clear, readable, and professionally presented.

B. Multiple Choice Questions

1. Which of the following is an advantage of the narrative format in analytical reports?

   a) Easy to scan numerical data
   b) Supports decision-making with explanations
   c) Best for periodic summaries
   d) Requires minimal reading time

2. What is NOT a typical component of a business analytical report?

   a) Title
   b) Fictional Story
   c) Methods
   d) Conclusion

3. Which type of visual in Excel is best for comparing categories?

   a) Line Chart

   b) Pie Chart

   c) Bar Chart

   d) Scatter Plot

4. Which of the following is a disadvantage of using screenshots in reports?

   a) They update automatically
   b) They are easy to paste
   c) They remain static even if data changes
   d) They can be resized

5. Which report is commonly used to evaluate operational and financial outcomes of individual branches?

   a) Risk Analysis Report
   b) Branch Performance Report
   c) Monthly Sales Report
   d) Marketing Plan Report

C. Match the columns

Column A		Column B	
1.	Tabular Format	**A.**	Decision support with explanations
2.	Narrative Format	**B.**	Tracks monthly sales performance
3.	Monthly Sales Report	**C.**	Static image, not auto-updating
4.	Linked Object (Excel)	**D.**	Quick reference of numerical data
5.	Screenshot	**E.**	Updates automatically with source

D. Short Answer Questions

1. What is the key difference between a tabular format and a narrative format in analytical reports?
2. Why is it important to clean and format visuals before inserting them into a report?
3. List two advantages of using linked Excel objects instead of screenshots in business reports.
4. Name three key components of a business analytical report.
5. What is the purpose of a Risk Analysis Report in financial services?

E. Long Answer Questions

1. Explain the structure of a business analytical report. Describe the purpose of each section (Title, Objectives, Methods, Analysis, Conclusion).
2. Compare the advantages and disadvantages of using screenshots vs. linked objects when adding Excel outputs to reports. Provide examples.
3. Discuss the differences between tabular and narrative analytical report formats. When would each format be most appropriate? Provide examples from financial services.
4. Describe the steps and considerations involved in adding tables and visuals to a report. How can selecting the right chart type enhance understanding?
5. Write a detailed explanation of how a Monthly Sales Report is prepared, including data sources, analysis methods, visual representations, conclusions, and recommendations.

F. Check Your Performance

1. Analyse the advantages and potential limitations of using visuals like bar charts and line graphs in a Monthly Sales Report. When might visuals mislead decision-makers?
2. Design a Monthly Sales Report template that includes tabular data, narrative summaries, and appropriate Excel visuals. Explain your design choices and how they improve report clarity.
3. Develop a strategy to automate the process of exporting, cleaning, and integrating Excel visuals into analytical reports. Your strategy should ensure the reports remain accurate and easy to update.

SESSION 4: PROFESSIONAL PRESENTATIONS

DESIGN PRINCIPLES FOR SLIDE DECKS

The core design principles for creating engaging slide decks are centered around clarity, visual impact, and audience engagement. Based on expert recommendations and best practices, these principles include:

1. **Storytelling Structure**
   - Design the slide deck like a story with a clear beginning, middle, and end to guide the audience smoothly through your message.
   - Use intentional narrative gaps, questions, or hints to engage curiosity and keep the audience eager to follow along.
2. **Simplicity and Focus**
   - Stick to one main idea per slide to avoid overwhelming viewers.
   - Minimize text and bullet points; use concise, clear language.
   - Avoid clutter by removing unnecessary elements and focusing on key messages.
3. **Consistency**
   - Maintain a uniform look and feel throughout the deck using consistent fonts, colours, layouts, and styles.
   - This cohesion helps the audience focus on content rather than distracting design changes.
4. **Visual Hierarchy and Readability**
   - Use size, contrast, and positioning to guide the viewer's eye to the most important information first.
   - Make slide titles larger and bolder than supporting text.
   - Employ whitespace generously to avoid crowding and improve comprehension.
5. **Use of Strong Visuals**
   - Replace or complement text with relevant, original visuals such as images, charts, graphs, and icons to make data and concepts more memorable.
   - High-quality visuals should support the message without distracting from it.
6. **Audience-Centered Design**

- Tailor content and visuals to the audience's knowledge, interests, and needs.
- Design slides to help the audience succeed in understanding, not just to support the speaker's script.

7. Clear Typography and Colour Use

- Choose easy-to-read fonts and ensure text size is legible from a distance.
- Use a limited number of fonts and consistent color schemes with high contrast for accessibility.

8. Minimal and Effective Use of Multimedia: Incorporate multimedia elements like videos or animations sparingly to enhance engagement without overwhelming the audience

EXCEL CHART INTEGRATION IN SLIDE DECKS

Integrating Excel charts into slide decks, particularly PowerPoint presentations, can be done in several ways depending on whether static visuals or dynamic, updateable links are required. The following are the core methods and best practices for integrating the excel charts in slide Docks.

1. Copy and Paste Excel Charts into PowerPoint

i) ***Simple Copy-Paste:*** Select the chart in Excel, copy it (Ctrl+C), then paste it into PowerPoint (Ctrl+V). This creates a static image of the chart by default.

ii) ***Paste Options:*** After pasting, different paste options can be selected;

- *Use Destination Styles:* Formats the chart to match PowerPoint's style but is not linked to Excel data.
- *Keep Source Formatting:* Maintains Excel's look but remains static.
- *Embed:* Embeds the Excel chart as an object, allowing editing within PowerPoint but increases file size.
- *Picture:* Pastes as an image, no editing or updates possible.

2. Linking Excel Charts for Dynamic Updates

- ***Paste Special with Paste Link:*** Use PowerPoint's Paste Special feature and select Paste Link to create a live connection between the Excel chart and the PowerPoint slide.
- ***Benefits:***
  i. The chart in PowerPoint updates automatically when the Excel data changes.

ii. Ensures data consistency and saves time on manual updates.

- ***Requirements:***

i. Both Excel and PowerPoint files must be saved and accessible, preferably in the same folder to avoid broken links.

ii. Need to manually update links in PowerPoint or set automatic update options.

3. Embedding Excel Objects

- Entire Excel worksheets or selected ranges can be embedded into PowerPoint slides as objects.
- Embedded objects can be edited within PowerPoint by double-clicking, opening an Excel interface inside the slide.

Best Practices for Excel Chart Integration

- ***Simplify and Clean Charts in Excel:*** Remove unnecessary gridlines, labels, and colours before copying to improve clarity and visual consistency in the presentation.
- ***Match Design:*** Adjust chart colours and fonts to match the theme of the slide deck.
- ***Manage File Locations:*** Keep linked Excel and PowerPoint files together to prevent broken links.
- ***Test Updates:*** Before presenting, verify that linked charts update correctly and that embedded objects open without issues.
- ***Use Embedded Charts for Static Data:*** When data won't change, embedding or pasting as pictures reduces dependency on external files.
- ***Use Linked Charts for Dynamic Data:*** When data changes frequently, linking ensures that the presentation always reflects the latest figures.

PRESENTATION SKILLS

Good presentation skills enhance the effectiveness of a slide deck and help communicate ideas clearly and confidently. While slides provide structure and visual support, the speaker's delivery plays a key role in engaging the audience. The following skills are essential to complement any slide presentation:

1. **Clear and Confident Speaking:** Presenting with clarity and confidence ensures that the message is understood by the audience. Speaking at a moderate pace with proper pronunciation allows the listener to follow along easily. Confidence in tone helps build credibility, while pauses can be used

effectively to emphasize key points or allow time for the audience to absorb information.

2. **Body Language and Eye Contact:** Non-verbal cues such as posture, facial expressions, and gestures play a significant role in communication. Maintaining eye contact builds trust and keeps the audience engaged. Using natural body language and avoiding nervous habits can make the speaker appear more assured and connected with the audience, enhancing the delivery of the message.
3. **Voice Modulation:** Varying pitch, tone, and volume helps to maintain audience interest and avoids a monotonous delivery. Emphasizing important words or phrases through voice modulation can draw attention to critical information. A lively and expressive tone also adds energy to the presentation, making it more impactful and easier to follow.
4. **Effective Use of Slides:** Slides are visual aids meant to support the presentation, not replace the speaker. Instead of reading directly from the slides, the presenter should explain the content, add context, or share examples. Smooth transitions between slides and alignment of spoken content with visuals help maintain flow and reinforce the message.
5. **Time Management:** Good time management is essential to ensure that all important points are covered without rushing or exceeding the allotted time. Practicing the presentation beforehand helps with pacing and allows adjustments if necessary. Prioritizing key information ensures that the core message is delivered even if time becomes limited.
6. **Audience Engagement:** An engaging presentation encourages interaction and keeps the audience involved. Asking questions, using relatable examples, or including simple activities can make the session more interactive. Observing audience reactions and adjusting tone or pace accordingly also contributes to a more responsive and dynamic presentation.
7. **Handling Questions:** Responding to questions with patience and clarity demonstrates subject knowledge and openness. Listening carefully and answering directly builds trust with the audience. If a question cannot be answered immediately, offering to follow up later shows professionalism and a willingness to help.

Strong presentation skills turn a simple slide deck into an impactful communication tool. These skills not only enhance clarity but also build confidence, helping to deliver a memorable and professional presentation.

PRACTICAL EXERCISES

Activity 1: Creating a Slide Presentation from an Analytical Report.

Situation: You have completed an analytical report (e.g., Monthly Sales Report, Branch Performance Report, or Risk Analysis Report). Your manager

now requires you to present the key findings to the management team using a professional slide deck.

Task: Create a slide presentation that summarizes your analytical report, integrates Excel visuals, and highlights key insights. The presentation should effectively communicate the report's purpose, analysis, and recommendations.

Material Required:

- Completed analytical report (Excel and Word document)
- Presentation software (PowerPoint, Google Slides, etc.)
- Key Excel charts and tables to integrate
- Understanding of slide design principles
- Basic presentation skills

Procedure:

1. Planning the Slide Deck
   a) Review your completed analytical report and identify:
      - The report's objective
      - Key data points and conclusions
      - Important visuals (charts, tables)
   b) Outline your slide flow:
      - Title Slide
      - Report Objective Slide
      - Key Data Findings Slides
      - Visuals/Charts Slides
      - Summary and Recommendations Slide
2. Slide Creation
   a) Open your presentation software and start a new slide deck.
   b) Design each slide using proper formatting:
      - Use minimal text and bullet points.
      - Apply consistent fonts, colours, and styles.
      - Ensure charts are properly formatted and readable.
   c) Embed or link Excel charts and tables as needed.
   d) Add short descriptions and insights for each visual to guide the audience.
3. Finalizing the Slide Deck
   a) Review for:

- Clarity
- Consistency
- Proper sequencing of slides

b) Rehearse the presentation:

- Focus on explaining visuals and key findings.
- Prepare to answer questions from the audience.

4. Present your slide deck to classmates in small groups.
5. Receive feedback on slide design, content clarity, and presentation style.
6. Note down improvement / suggestions for your final submission.
7. Revise as per the suggestion.
8. Show to the teacher.

CHECK YOUR PROGRESS

A. Fill in the Blanks

1. A good slide design should follow the principle of _____ to maintain visual consistency throughout the presentation.
2. Excel charts should always be _____ before inserting them into slides to improve clarity and visual impact.
3. One key advantage of using _____ Excel objects in slides is that they automatically update when the Excel file changes.
4. A well-designed slide deck should avoid _____ visuals that distract from the key message.
5. Good presenters maintain _____ contact with their audience to build connection and trust.

B. Multiple Choice Questions

1. Which of the following is NOT a recommended slide design principle?
   a) Simplicity
   b) Consistency
   c) Cluttered layout
   d) Visual hierarchy
2. What is the benefit of embedding a linked Excel chart in a slide?
   a) It cannot be edited
   b) It updates automatically if the Excel data changes
   c) It improves slide background
   d) It increases file size unnecessarily
3. Which chart is most appropriate to show trends over time?
   a) Pie chart
   b) Bar chart
   c) Line chart
   d) Scatter chart
4. Which of the following is an essential presentation skill?
   a) Reading slides word-for-word

b) Speaking clearly and confidently
c) Avoiding eye contact
d) Ignoring audience questions

5. The best way to handle feedback during a presentation is to:
   a) Argue with the audience
   b) Politely accept and address questions
   c) Avoid responding
   d) Read directly from the slides

C. Match the Columns

Column A		Column B	
1.	Simplicity	**A.**	Use high-contrast colours
2.	Linked Excel Chart	**B.**	Keeps slides clean
3.	Contrast	**C.**	Updates with source data
4.	Visual Hierarchy	**D.**	Connects with audience
5.	Eye Contact	**E.**	Guides audience attention

D. Short Answer Questions

1. What is the importance of consistency in slide deck design?
2. Why should Excel charts be cleaned and formatted before inserting into a presentation?
3. What are the benefits of using visual hierarchy in a slide deck?
4. List two advantages of maintaining eye contact during a presentation.
5. What is the difference between embedding and linking an Excel chart in a slide?

E. Long Answer Questions.

1. Explain the key design principles that should be followed when creating a professional slide deck.
2. Describe the step-by-step process of integrating an Excel chart into a slide. Mention the pros and cons of using screenshots versus linked charts.
3. Discuss the importance of presentation skills in effectively delivering a report. Provide examples of good and poor presentation practices.
4. How can visuals such as charts and tables improve the impact of a presentation? Explain with examples.
5. Explain the best practices for engaging an audience during a presentation. How can a presenter ensure audience participation?

F. Check your Performance

1. Evaluate the pros and cons of using a linked Excel chart versus a static screenshot in a business presentation.

2. Justify the importance of visual hierarchy when designing slides for a sales presentation.
3. Assess how poor presentation skills can reduce the effectiveness of even well-designed slide decks.
4. Design a 5-slide deck to summarize an analytical report using proper slide design principles and Excel visuals. Explain your design choices.
5. Develop a presentation plan that integrates Excel charts and includes techniques to engage the audience throughout the session.

ANSWER KEY

MODULE 1: BANKING SECTOR AND ROLE OF MIS DATA ANALYST

SESSION 1: OVERVIEW OF THE BFSI SECTOR

A. Fill in the Blanks

1. Banking
2. Reserve Bank of India (RBI)
3. Commercial
4. Central
5. NBFCs (Non-Banking Financial Companies)

B. Multiple Choice Questions

1. b) Banking, Financial Services, and Insurance
2. c) RBI
3. c) Providing financial services without being a bank
4. c) Digital banking
5. c) Offer protection against risk

C. State whether the following statements are True or False

1. True
2. False
3. True
4. False
5. False

D. Match the Columns

1 – B

2 – E

3 – D

4 – A

5 – C

SESSION 2: MIS IN BFSI

A. Fill in the Blanks

1. Operational
2. Database
3. Businesses
4. Regulations
5. Management

B. Multiple Choice Questions

1) C) Decision-making and operations

2) B) Retail Banking
3) D) Processing Unit
4) B) Hierarchy
5) B) Credit Risk

C. State whether the following statements are True or False

1) False
2) True
3) False
4) True
5) True

D. Match the Columns

1) 1 - D
2) 2 - B
3) 3 - E
4) 4 – A
5) 5 - C

SESSION 3: MIS DATA ANALYST IN FINANCIAL SERVICES

A. Fill-in-the-Blanks

1. Data
2. KPIs
3. Excel
4. Marketing
5. Tables

B. Multiple Choice Questions

1. b) Management Information System
2. b) Excel
3. b) Analysing market trends
4. c) Net Interest Margin
5. b) Data and performance metrics

C. State whether the following statements are True or False

1. False
2. True
3. False
4. True
5. True

D. Match the Columns

1 – C

2 – D

3 – A

4 – B

5 – E

SESSION 4: ETHICS, DATA PRIVACY, AND REGULATORY ENVIRONMENT

A. Fill in the Blanks

1. Confidentiality
2. Consent
3. Transparency
4. Digital Personal Data Protection
5. Unethical

B. Multiple Choice Questions

1. c) To protect individuals
2. c) Selling user data without informing them
3. b) Know Your Customer
4. c) To follow legal rules and protect customers
5. d) Gaining informed consent from the customer

C. State whether the following statements are True or False

1. False
2. True
3. True
4. False
5. True

D. Match the Columns

1 – D

2 – C

3 – A

4 – B

5 – E

MODULE 2: EXCEL FOR FINANCIAL DATA MANAGEMENT

SESSION 01: EXCEL INTERFACE AND BASIC OPERATIONS

A. Fill in the Blanks

1. Letter, number

2. Page
3. Ribbon
4. Number, text, dates and logical values
5. 1048576, 16,384

B. Multiple Choice Questions

1. b) It allows access to Excel's features and commands
2. c) General
3. a) Formula Bar
4. b) Use the Center button in the Alignment group
5. b) It locates and selects specific data

C. State whether the following statements are True or False

1. False
2. True
3. False
4. True
5. True

SESSION 2: BASIC FORMULAS AND FUNCTIONS IN EXCEL

A. Fill in the Blanks

1. =
2. addition
3. AVERAGE
4. MAX
5. multiplication

B. Multiple Choice Questions

1. b) SUM
2. b) 100
3. d) /
4. a) MIN
5. b) COUNT

C. State whether the following statements are True or False

1. True
2. False
3. True
4. False
5. False

SESSION 3: DATA PRESENTATION AND BASIC CHARTS IN EXCEL

A. Fill in the Blanks

1. formatting

2. Column
3. portion
4. Conditional
5. Conditional Formatting

B. Multiple Choice Questions

1. b) Line Chart
2. c) Identify the highest or lowest values in a range
3. b) Data Bars
4. c) Column Chart
5. c) Pie Chart

C. State whether the following statements are True or False

1. False
2. True
3. False
4. False
5. True

SESSION 4: LOOKUP AND LOGICAL FUNCTIONS

A. Fill in the Blanks

1. formatting
2. Column
3. portion
4. Conditional
5. Conditional Formatting

B. Multiple Choice Questions

1. b) To search for a value vertically in a table and return a corresponding value
2. d) It checks if a condition is true or false and returns one value if true, another if false
3. b) AND ()
4. a) The row index number from which the corresponding value will be returned
5. d) HLOOKUP

C. State whether the following statements are True or False

1. False
2. False
3. False
4. True
5. True

MODULE 3: DATA ORGANIZATION AND MIS REPORT

SESSION 1: DATA ORGANIZATION AND VALIDATION

A. Fill in the Blanks

1. structured, analyse
2. Data Validation
3. Insert
4. Structure
5. Organization

B. Multiple Choice Questions

1. b) Clarity
2. b) Automatically expands when new data is added
3. d) Graphic
4. a) Automatically calculates sums and averages
5. c) Date

C. State whether the following statements are True or False

1. False
2. True
3. True
4. False
5. False

SESSION 2: AGGREGATE ANALYSIS

A. Fill in the Blanks

1. single
2. multiple
3. a specific
4. multiple
5. multiple

B. Multiple Choice Questions

1. c) Sums values based on a single condition
2. b) SUMIFS can handle multiple criteria, while SUMIF can only handle one
3. b) AVERAGEIF
4. c) It can count cells based on multiple conditions
5. b) An average_range and its criteria

C. State whether the following statements are True or False

1. True
2. False
3. False

4. True
5. False

SESSION 3: CREATING MIS REPORTS

A. Fill in the Blanks

1. informed
2. tables
3. daily
4. weekly
5. summary

B. Multiple Choice Questions

1. b) To summarize data and help in decision-making
2. d) Year-over-year change
3. b) Monthly report
4. c) Detailed company policies
5. c) To assess short-term progress and trends

C. State whether the following statements are True or False

1. True
2. False
3. False
4. True
5. False

SESSION 4: DATA VISUALISATION AND PIVOT TABLES

A. Fill in the Blanks

1. summarize
2. Pivot Table
3. Filters
4. Pivot
5. Values

B. Multiple Choice Questions

1. b) To summarize and analyse large datasets
2. d) Performing data entry tasks
3. b) By summarizing key metrics and trends for decision-making
4. b) Column chart
5. b) Selecting the data range

C. State whether the following statements are True or False

1. True
2. False
3. True

4. False
5. False

MODULE 4: ADVANCED EXCEL FOR ANALYSIS AND DASHBOARDS

SESSION 1: ADVANCED LOOKUP AND DYNAMIC FUNCTIONS

A. Fill in the Blanks

1. VLOOKUP
2. row_num
3. HLOOKUP
4. MATCH
5. range_lookup

B. Multiple Choice Questions

1. c) MATCH
2. b) Performs an approximate match
3. a) INDEX
4. b) HLOOKUP
5. b) They allow more flexibility than VLOOKUP or HLOOKUP

C. State whether the following statements are True or False

1. True
2. False
3. True
4. False
5. False

SESSION 2: MIS REPORTS USING EXCEL

A. Fill in the Blanks

1. Key Performance Indicators (KPIs)
2. PivotTable
3. =(Current Week Sales - Previous Week Sales)/Previous Week Sales
4. Column
5. Daily

B. Multiple Choice Questions

1. a) Total Sales
2. b) Line Chart
3. d) All of the above
4. b) Use bold font and shaded background
5. a) AVERAGE

C. State whether the following statements are True or False

1. True
2. False

3. False
4. True
5. True

SESSION 3: PIVOT TABLES AND DASHBOARDS

A. Fill in the Blanks

1. summarize
2. Filter
3. Slicer
4. months
5. calculated

B. Multiple Choice Questions

1. b) Summarizing data
2. c) Slicer
3. c) It lists the unique values
4. b) Grouping
5. a) Calculated Field

C. State whether the following statements are True or False

1. True
2. False
3. False
4. True
5. True

SESSION 4: MIS REPORTS AND BASIC DASHBOARDS

A. Fill in the Blanks

1. Dashboard
2. Slicers
3. Grouping
4. informed
5. KPI box

B. Multiple Choice Questions

1. c) To display important data visually
2. b) Slicer
3. d) A key value like pass percentage
4. b) Bar Chart
5. c) Arrangement of charts and tables

C. State whether the following statements are True or False

1. False
2. True

3. False
4. True
5. False

MODULE 5: AUTOMATION AND PRESENTATION OF REPORTS

SESSION 1: MACROS AND VBA IN EXCEL

A. Fill in the Blanks

1. Macro
2. Alt + F11
3. VBA Editor
4. Variables
5. Recording a Macro

B. Multiple Choice Questions

1. b) Visual Basic for Applications
2. b) View
3. b) Alt + F11
4. b) A storage location for data
5. b) Range("A1").Select

C. Match the Columns

1 → D
2 → C
3 → B
4 → E
5 → A

SESSION 2: AUTOMATING REPORTS AND DASHBOARDS

A. Fill in the blanks

1. Developer
2. button
3. Ctrl + Shift
4. repetitive
5. Windows Task Scheduler

B. Multiple Choice Questions

1. a) Enabling the Developer tab
2. b) .xlsm
3. b) Windows Task Scheduler
4. b) Ctrl + Shift + (Key)
5. c) The macro runs when the button is clicked

C. Match the Columns

1 – B
2 – D
3 – C
4 – A
5 – E

SESSION 3: ANALYTICAL REPORTS

A. Fill in the Blanks

1. Tabular
2. Conclusion
3. Linked
4. Line
5. Formatting

B. Multiple Choice Questions

1. b) Supports decision-making with explanations
2. b) Fictional Story
3. c) Bar Chart
4. c) They remain static even if data changes
5. b) Branch Performance Report

C. Match the Columns

1 – D
2 – A
3 – B
4 – E
5 – C

SESSION 4: PROFESSIONAL PRESENTATIONS

A. Fill in the blanks

1. Consistency
2. Cleaned and formatted
3. Linked
4. Decorative

5. Eye

B. Multiple Choice Questions (MCQs)

1. c) Cluttered layout
2. b) It updates automatically if the Excel data changes
3. c) Line chart
4. b) Speaking clearly and confidently
5. b) Politely accept and address questions

C. Match the Columns

1 – B
2 – C
3 – A
4 – E
5 – D