JMBA51 –MANAGEMENT INFORMATION SYSTEM

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SYLLABUS

JMBA51 – MANAGEMENT INFORMATION SYSTEM

UNIT	Details
I	Computers & Information processing- generation of computers- Input devices-Output devices- internal and external Storage devices- Batch & Online Processing- Hardware- Software,Types of software.
II	Concept of Information System- Characteristics of information system , objectives of MIS– System Classification- Categories of Information Systems- Structure of MIS- MIS support for planning, organising & controlling.
III	Information for decision making- Functional Information System- Personal, production, material, marketing, strategic information system & competitive advantage, process of SIS planning.
IV	Decision Support System- Characteristics- Purpose- Components of DSS- Types of DSS- pros and cons.
V	Business Process Outsourcing- Meaning- Types of BPO- Benefits of BPO- Drawbacks- Customer Relationship Management- Meaning- Types of CRM Software.

	References Books
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2	Management Information System by Concise study by Kelkhar S A
3	CSV Murthy -"Management Information Systems" Himalaya publishing House.
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Unit – I

Structure:

1.1 Introduction to Computer

1.2 History of Computer

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1.4 Definitions

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1.8 Internal and External Storage Devices

1.9 Batch and Online Processing

1.10 Hardware, Software, Types of Software

1.1 Introduction to Computer:

A computer is an electronic device that takes data as input, processes it according to a set of instructions, and produces an output of information. It operates using a combination of hardware and software, including a central processing unit (CPU), memory, and input/output devices, to perform a wide range of tasks quickly and accurately.

1.2 History of Computer

i) Early Tools and Mechanical Devices (Before 1800s)

Before electronic computers, humans used tools to help with calculation.

- ✓ **Abacus (c. 2500 BCE)** – Invented in ancient Mesopotamia and later improved by the Chinese; used for basic arithmetic.
- ✓ **Napier's Bones (1617)** – Created by John Napier for multiplication and division.

- ✓ **Pascaline (1642)** – Blaise Pascal built this mechanical calculator that could add and subtract.
- ✓ **Leibniz's Calculator (1673)** – Gottfried Wilhelm Leibniz designed a machine that could multiply and divide.
- ✓ **Jacquard Loom (1801)** – Used punched cards to control weaving patterns — an early example of programmable control.

ii) The Mechanical Computer Era (1800s)

Inventors began to design machines that could perform more complex calculations automatically.

- ✓ **Charles Babbage (1791–1871)**
  - ➢ Designed the **Difference Engine** (1822) for mathematical tables.
  - ➢ Conceived the **Analytical Engine** (1837), the first design for a general-purpose computer.
- ✓ **Ada Lovelace** – Wrote the first algorithm for Babbage's Analytical Engine, becoming the **world's first computer programmer**.

iii) The Electromechanical Era (1900–1940s)

Electricity began to replace purely mechanical systems.

- ✓ **Hollerith Tabulating Machine (1890)** – Used punched cards to process U.S. Census data; led to IBM's founding.
- ✓ **Zuse Z3 (1941)** – Built by Konrad Zuse in Germany; often considered the first programmable digital computer.
- ✓ **Harvard Mark I (1944)** – An electromechanical computer used by the U.S. Navy during WWII.

iv) The Electronic Computer Era (1940s–1950s)

Vacuum tubes replaced mechanical parts, enabling faster and more reliable machines.

- ✓ **ENIAC (1946)** – First general-purpose electronic computer; built in the U.S. using vacuum tubes.
- ✓ **EDVAC (1949)** – Introduced the idea of **stored programs** (instructions kept in memory).
- ✓ **UNIVAC I (1951)** – First commercial computer sold in the U.S.

v) The Transistor and Integrated Circuit Era (1950s–1970s)

Computers became smaller, faster, and cheaper.

- ✓ **Transistor (1947)** – Replaced vacuum tubes, revolutionizing electronics.
- ✓ **Integrated Circuits (1958)** – Allowed multiple transistors on one chip.
- ✓ **Mainframes** like IBM 360 became standard for business computing.
- ✓ **Minicomputers** appeared in the 1960s (e.g., DEC PDP series).

vi) The Personal Computer Revolution (1970s–1990s)

Computers entered homes and offices.

- ✓ **Microprocessor (1971)** – Intel 4004 made it possible to build small computers.
- ✓ **Apple I (1976)**, **Apple II (1977)**, **Commodore PET**, and **IBM PC (1981)** popularized personal computing.
- ✓ **Microsoft Windows (1985)** and **Mac OS** made computers user-friendly.
- ✓ Networking and the **Internet** began to grow rapidly.

vii) The Internet and Mobile Era (1990s–2010s)

Computing became global and mobile.

- ✓ **World Wide Web (1991)** – Created by Tim Berners-Lee.

- ✓ **Laptops**, **smartphones**, and **tablets** made computing portable.
- ✓ **Cloud computing**, **social media**, and **search engines** transformed how people use information.

viii) The AI and Quantum Era (2010s–Present)

Modern computers are powerful, intelligent, and interconnected.

- ✓ **Artificial Intelligence (AI)** and **Machine Learning** dominate computing advances.
- ✓ **Quantum computers** are being developed to solve complex problems faster than classical computers.
- ✓ **5G**, **IoT**, and **edge computing** connect billions of devices worldwide.

1.3 Meaning of Computer

A computer is an electronic device designed to accept data as input, process it according to a set of instructions, and produce meaningful output. It can perform a wide variety of tasks such as calculations, data processing, communication, and automation with high speed and accuracy. Modern computers are capable of storing vast amounts of data, retrieving it when needed, and executing complex operations that would take humans much longer to complete.

Computers consist of both **hardware** (the physical components like the CPU, memory, keyboard, and monitor) and **software** (the programs and instructions that tell the hardware what to do). They are used in almost every field today—including education, healthcare, business, research, and entertainment—making them an essential part of modern life.

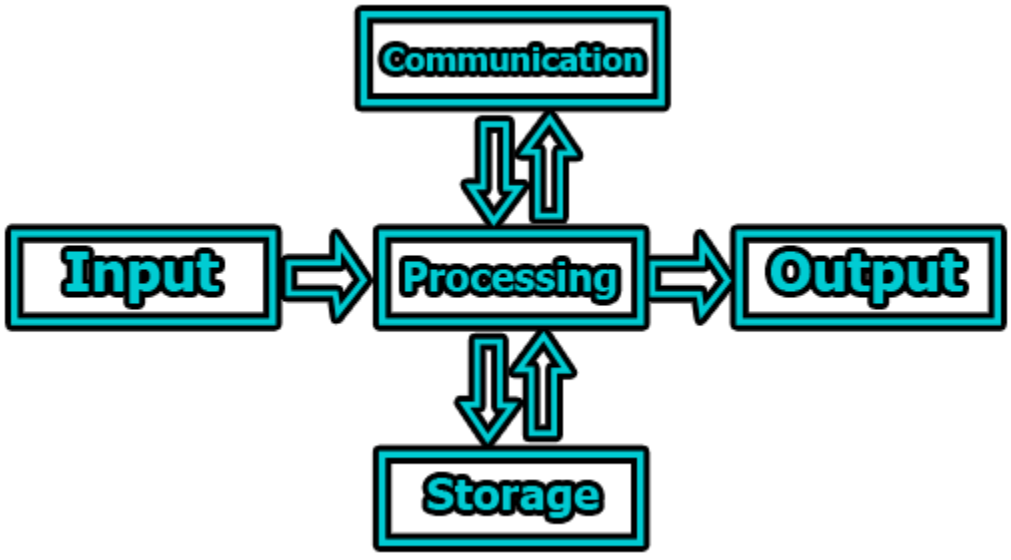
1.4 Definitions

A computer is defined in various ways by different authors. According to **Morris Mano**, “A computer is an electronic device that operates under the control of instructions stored in its

memory, accepts data, processes it, and provides output." **Tanenbaum** describes it as "a general-purpose device that can be programmed to carry out a set of arithmetic or logical operations automatically." Similarly, **Dennis P. Curtin** defines a computer as "a device that can accept information (input), store information, process it according to a program, and produce output." The **International Organization for Standardization (ISO)** states that "a computer is an electronic system capable of receiving, storing, and processing data to produce meaningful information." Furthermore, **V. Rajaraman** defines it as "a versatile, high-speed electronic device that accepts input, processes and stores data, and provides output in a desired format."

1.5 Computers & Information Processing

Computer and information processing refers to the process of an electronic computer taking in raw data (input), manipulating it to create meaningful information (processing), presenting the results (output), and saving it for later use (storage). This cycle, fundamental to how computers work, is driven by hardware components like the CPU and is directed by software to perform calculations, comparisons, and other operations.



The four main functions of the information processing cycle:

i) Input:

Entering raw data into the computer using devices like a keyboard or mouse.

ii) Processing:

The CPU performs operations on the data, such as calculations and comparisons, to convert it into meaningful information.

iii) Output:

Presenting the processed information to the user through devices like a monitor or printer.

iv) Storage:

Saving the data, programs, or information for future use in the computer's memory.

1.6 Generation of Computers

The modern computer took its shape with the arrival of your time. It was around the 16th century when the evolution of the computer started. The initial computer faced many changes, obviously for the better. It continuously improved itself in terms of speed, accuracy, size, and price to urge the form of the fashionable day computer.

Phases of Computer Generations

The evolution of computers is divided into five generations:

Generations of Computers	Time-Period	Evolving Hardware
First Generation	1940s - 1950s	Vacuum Tube Based
Second Generation	1950s - 1960s	Transistor Based
Third Generation	1960s - 1970s	Integrated Circuit Based
Fourth Generation	1970s - Present	Microprocessor Based
Fifth Generation	Present - Future	Artificial Intelligence Based

Before computers, we used calculators, spreadsheets, and computer algebra systems, mathematicians and inventors searched for solutions to ease the burden of calculation.

Below are the 8 **Mechanical Calculators** before modern computers were invented.

1. Abacus (ca. 2700 BC)
2. Pascal's Calculator (1652)
3. Stepped Reckoner (1694)
4. Arithmometer (1820)
5. Comptometer (1887) and Comptograph (1889)
6. The Difference Engine (1822)
7. Analytical Engine (1834)
8. The Millionaire (1893)

i) First Generation Computers

The technology behind the primary generation of computers was a fragile glass device, which was called a vacuum tube. These computers were very heavy and really large. These weren't very reliable, and programming on them was a tedious task as they used a low-level programming language and had no OS. First-generation computers were used for calculation, storage, and control purposes. They were too bulky and large; they needed a full room and consumed a lot of electricity. Punch cards were used to improve the information for external storage. Magnetic card used. Machine and assembly language is developed.

Used vacuum tubes; big and slow.

Examples of some main first-generation computers are mentioned below.

- ✓ **ENIAC:** Electronic Numerical Integrator and Computer, built by J. Presper Eckert and John V. Mauchly was a general-purpose computer. It had been cumbersome, and large, and contained 18,000 vacuum tubes.
- ✓ **EDVAC:** Electronic Discrete Variable Automatic Computer was designed by von Neumann. It could store data also as instruction and thus the speed was enhanced.
- ✓ **UNIVAC:** Universal Automatic Computer was developed in 1952 by Eckert and Mauchly.

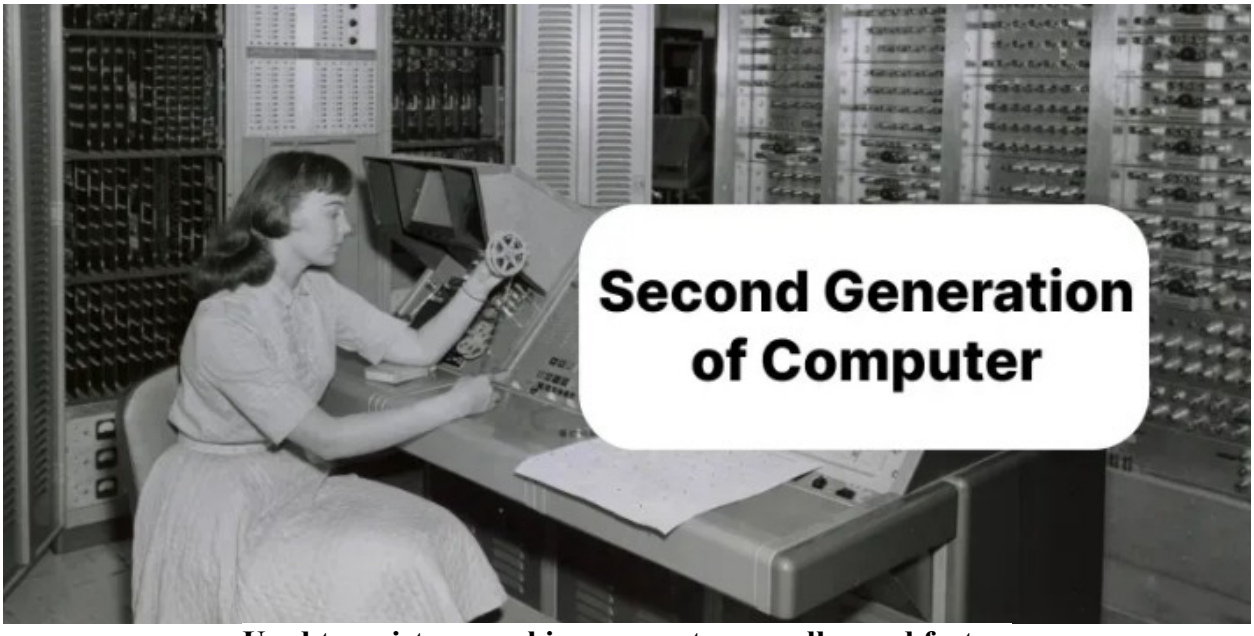
Vacuum Tube

Characteristics of First-Generation Computers

Characteristics	**Components**
Main electronic component	Vacuum tube.
Programming language	Machine language.
Main memory	Magnetic tapes and magnetic drums.
Input/output devices	Paper tape and punched cards.
Speed and size	Very slow and very large (often taking up an entire room).
Examples of first generation	IBM 650, IBM 701, ENIAC, UNIVAC 1, etc.

ii) Second Generation Computers

Second-generation computers used the technology of transistors rather than bulky vacuum tubes. Another feature was the core storage. A transistor may be a device composed of semiconductor material that amplifies a sign or opens or closes a circuit.



Used transistors, making computers smaller and faster.

Transistors were invented in Bell Labs. The use of transistors made it possible to perform powerfully and with due speed. It reduced the dimensions and price and thankfully the

warmth too, which was generated by vacuum tubes. Central Processing Unit (CPU), memory, programming language, and input, and output units also came into the force within the second generation.

The programming language was shifted from high level to programming language and made programming comparatively a simple task for programmers. Languages used for programming during this era were FORTRAN (1956), ALGOL (1958), and COBOL (1959).

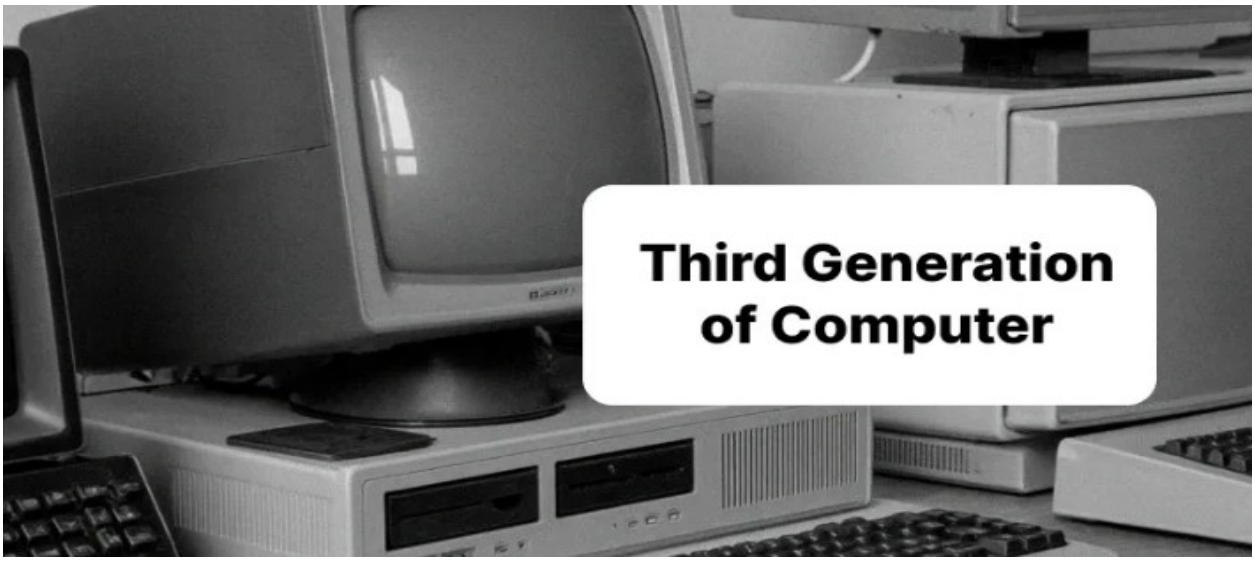
Characteristics of Second-Generation Computers

Characteristics	**Components**
Main electronic component	Transistor.
Programming language	Machine language and assembly language.
Memory	Magnetic core and magnetic tape/disk.
Input/output devices	Magnetic tape and punched cards.
Power and size	Smaller in size, they had low power consumption and generated less heat (in comparison with the first-generation computers).
Examples of the second generation	PDP-8, IBM1400 series, IBM 7090 and 7094,

	UNIVAC 1107, CDC 3600, etc.

iii) Third Generation Computers

During the third generation, technology envisaged a shift from huge transistors to integrated circuits, also referred to as ICs. Here, a variety of transistors were placed on silicon chips, called semiconductors. The most important feature of this era's computers was speed and reliability. IC was made from silicon, also called silicon chips.



Used integrated circuits for better performance.

The computer programs was designed to make the machine work. Operating system was a program designed to handle a machine completely. Because of the operating system machine could execute multiple jobs simultaneously. Integrated circuits were used to replace many transistors used in the second generation.

A single IC has many transistors, registers, and capacitors built on one thin slice of silicon. The value size was reduced, and memory space and dealing efficiency were increased during this generation. Programming was now wiped out Higher level languages like BASIC (Beginners All-purpose Symbolic Instruction Code). Minicomputers found their shape during this era.

Integrated Circuit

Characteristics of Third-Generation Computers

Characteristics	**Components**
Main electronic component	Integrated circuits (ICs).
Programming language	High-level language.
Memory	Large magnetic core, magnetic tape/disk.
Input/output devices	Magnetic tape, monitor, keyboard, printer, etc.
Examples of third-generation	IBM 360, IBM 370, PDP-11, NCR 395, B6500, UNIVAC 1108, etc.
Main electronic component	Integrated circuits (ICs).

iv) Fourth Generation Computers

In 1971 First microprocessors were used, the large-scale of integration LSI circuits built on one chip called microprocessors. The advantage of this technology is that one microprocessor can contain all the circuits required to perform arithmetic, logic, and control functions on one chip. LSI placed thousands of transistors onto a single chip.

Used microprocessors, making computers very powerful

The computers using microchips were called microcomputers. This generation provided even smaller-sized computers with larger capacities. That's not enough, then Very Large Scale Integrated (VLSI) circuits replaced LSI circuits. The Intel 4004 chip, developed in 1971, located all the components of the pc from the central processing unit and memory to input/ output controls on one chip and allowed the dimensions to reduce drastically. VLSI placed several hundred thousand transistors on a single silicon chip. This silicon chip is known as the microprocessor.

Technologies like multiprocessing, multiprogramming, time-sharing, operating speed, and virtual memory made it a more user-friendly and customary device. The concept of private computers and computer networks came into being within the fourth generation.

Characteristics of Fourth-Generation Computers

Characteristics	**Components**
Main electronic component	Large-scale integration (VLSI) and the microprocessor (VLSI has thousands of transistors on a single microchip).
Memory	semiconductor memory (such as RAM, ROM, etc.).
Input/output devices	pointing devices, optical scanning, keyboard, monitor, printer, etc.
Examples of the fourth generation	IBM PC, STAR 1000, APPLE II, Apple Macintosh, Alter 8800, etc.

v) Fifth Generation Computers

The technology behind the fifth generation of computers is AI. It allows computers to behave like humans. It is often seen in programs like voice recognition, the area of medicine, and entertainment. Within the field of game playing also it has also shown remarkable performance where computers are capable of beating human competitors.

Focuses on artificial intelligence and advanced computing.

The speed is the highest, the size is the smallest and the area of use has remarkably increased within the fifth generation computers. Though not a hundred per cent AI has been achieved to date, keeping in sight the present developments, it is often said that this dream also will become a reality very soon.

To summarize the features of varied generations of computers, it is often said that a big improvement has been seen so far because of the speed and accuracy of functioning care, but if we mention the dimensions, it's been small over the years. The value is additionally diminishing and reliability is increasing.

AI-Based Computers

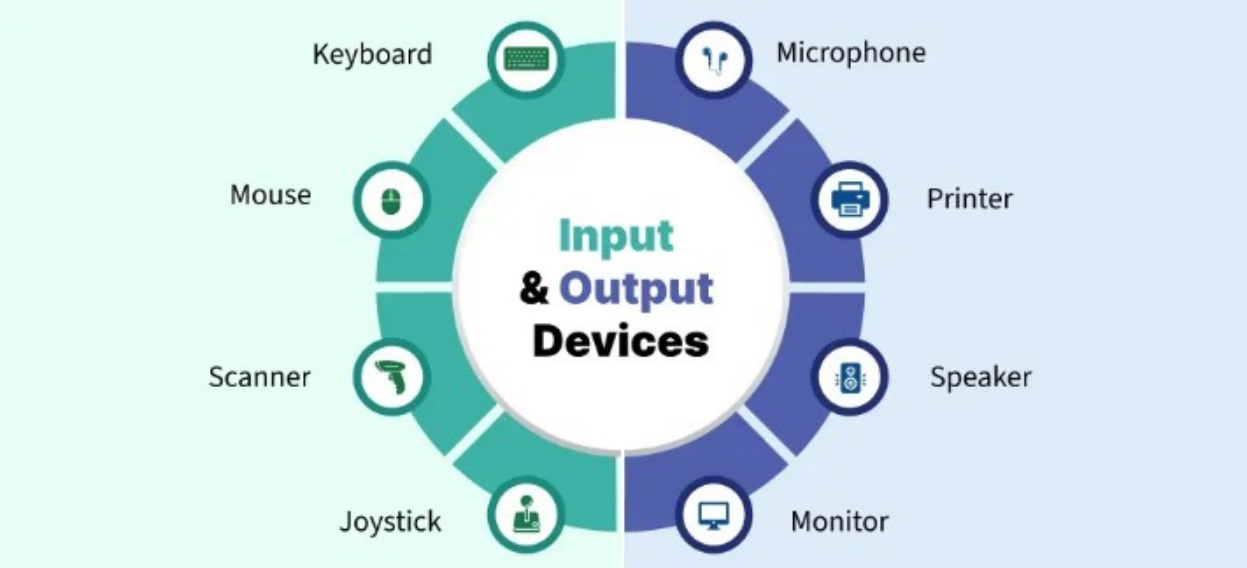
Characteristics of Fifth-Generation Computers

Characteristics	**Components**
Main electronic component	Based on artificial intelligence, uses the Ultra Large-Scale Integration (ULSI) technology and parallel processing method (ULSI has millions of transistors on a single microchip and the Parallel processing method use two or more microprocessors to run tasks simultaneously).
Language	Understand natural language (human language).
Size	Portable and small in size.
Input/output device	Trackpad (or touchpad), touchscreen, pen, speech input (recognize voice/speech), light scanner, printer, keyboard, monitor, mouse, etc.
An example of the fifth generation	Desktops, laptops, tablets, smartphones, etc.

1.7 Input devices-Output devices

An **input/output (I/O) device** is any hardware that enables a human user or another system to communicate with a computer. As the name suggests, these devices can both **receive data (input)** from the user or another source and **deliver data (output)** from the computer.

Essentially, an I/O device bridges the computer and external entities, facilitating seamless data exchange.



Input and Output Devices

i) Input Devices

Input devices are the devices that are used to send signals to the computer for performing tasks. The receiver at the end is the CPU (Central Processing Unit), which works to send signals to the output devices. Some of the classifications of Input devices are:

- ✓ Keyboard Devices
- ✓ Pointing Devices
- ✓ Composite Devices
- ✓ Game Controller
- ✓ Visual Devices
- ✓ Audio Input Devices

Some of the input devices are described below.

Keyboard

The keyboard is the most frequent and widely used input device for entering data into a computer. Although there are some additional keys for performing other operations, the keyboard layout is similar to that of a typical typewriter. Generally, keyboards come in two sizes: 84 keys or 101/102 keys but currently keyboards with 104 keys or 108 keys are also available for Windows and the Internet.

Keyboard

Types of Keys

- ✓ **Numeric Keys:** It is used to enter numeric data or move the cursor. It usually consists of a set of 17 keys.
- ✓ **Typing Keys:** The letter keys (A-Z) and number keys (09) are among these keys.
- ✓ **Control Keys:** These keys control the pointer and the screen. There are four directional arrow keys on it. Home, End, Insert, Alternate(Alt), Delete, Control(Ctrl), etc., and Escape are all control keys (Esc).
- ✓ **Special Keys:** Enter, Shift, Caps Lock, NumLk, Tab, etc., and Print Screen are among the special function keys on the keyboard.

- ✓ **Function Keys:** The 12 keys from F1 to F12 are on the topmost row of the keyboard.

Mouse

The most common pointing device is the mouse. The mouse is used to move a little cursor across the screen while clicking and dragging. The cursor will stop if you let go of the mouse. The computer is dependent on you to move the mouse; it won't move by itself. As a result, it's an input device.

A mouse is an input device that lets you move the mouse on a flat surface to control the coordinates and movement of the on-screen cursor/pointer. The left mouse button can be used to select or move items, while the right mouse button when clicked displays extra menus.

Mouse

Joystick

A joystick is a pointing device that is used to move the cursor on a computer screen. A spherical ball is attached to both the bottom and top ends of the stick. In a socket, the lower spherical ball slides. You can move the joystick in all four directions.

Joystick

The joystick's function is comparable to that of a mouse. It is primarily used in CAD (Computer-Aided Design) and playing video games on the computer.

Track Ball

Track Ball is an accessory for notebooks and laptops, which works on behalf of a mouse. It has a similar structure to a mouse. Its structure is like a half-inserted ball and we use fingers for cursor movement. Different shapes are used for this like balls, buttons, or squares.

Light Pen

A light pen is a type of pointing device that looks like a pen. It can be used to select a menu item or to draw on the monitor screen. A photocell and an optical system are enclosed in a tiny tube. When the tip of a light pen is moved across a monitor screen while the pen button is pushed, the photocell sensor element identifies the screen location and provides a signal to the CPU.

Light Pen

Scanner

A scanner is an input device that functions similarly to a photocopier. It's employed when there's information on paper that needs to be transferred to the computer's hard disc for subsequent manipulation. The scanner collects images from the source and converts them to a digital format that may be saved on a disc. Before they are printed, these images can be modified.

Scanner

Optical Mark Reader (OMR)

An Optical Mark Reader is a device that is generally used in educational institutions to check the answers to objective exams. It recognizes the marks present by pencil and pen.

Optical Character Reader (OCR)

OCR stands for optical character recognition, and it is a device that reads printed text. OCR optically scans the text, character by character turns it into a machine-readable code, and saves it to the system memory.

Magnetic Ink Card Reader (MICR)

It is a device that is generally used in banks to deal with the cheques given to the bank by the customer. It helps in reading the magnetic ink present in the code number and cheque number. This process is very fast compared to any other process.

Bar Code Reader

A bar code reader is a device that reads data that is bar-coded (data that is represented by light and dark lines). Bar-coded data is commonly used to mark things, number books, and so on. It could be a handheld scanner or part of a stationary scanner. A bar code reader scans a bar code image, converts it to an alphanumeric value, and then sends it to the computer to which it is connected.

Barcode Reader

Web Camera

Because a web camera records a video image of the scene in front of it, a webcam is an input device. It is either built inside the computer (for example, a laptop) or attached through a USB connection. A webcam is a computer-connected tiny digital video camera. It's also known as a web camera because it can take images and record video. These cameras come with software that must be installed on the computer to every broadcast video in real-time over the Internet. It can shoot images and HD videos, however, the video quality isn't as good as other cameras (In Mobiles or other devices or normal cameras).

Digitizer

Digitizer is a device that is used to convert analog signals to digital signals. It converts signals into numeric values. An example of a Digitizer is a Graphic Tablet, which is used to convert graphics to binary data.

Microphone

The microphone works as an input device that receives input voice signals and also has the responsibility of converting it also to digital form. It is a very common device that is present in every device which is related to music.

ii) Output Devices

Output Devices are the devices that show us the result after giving the input to a computer system. Output can be of many different forms like image, graphic audio, video, etc. Some of the output devices are described below.

Monitor

Monitors, also known as Visual Display Units (VDUs), are a computer's primary output device. It creates images by arranging small dots, known as pixels, in a rectangular pattern. The amount of pixels determines the image's sharpness.

The two kinds of viewing screens used for monitors are described below.

Cathode-Ray Tube (CRT) Monitor: Pixels are minuscule visual elements that make up a CRT display. The higher the image quality or resolution, the smaller the pixels.

Flat-Panel Display Monitor: In comparison to the CRT, a flat-panel display is a type of video display with less volume, weight, and power consumption. They can be hung on the wall or worn on the wrist.

Flat-panel displays are currently used in calculators, video games, monitors, laptop computers, and graphical displays.

Television

Television is one of the common output devices which is present in every **can** house. It portrays video and audio files on the screen as the user handles the television. Nowadays, we are using plasma displays as compared to CRT screens which we used earlier.

Printer

Printers are output devices that allow you to print information on paper. There are certain types of printers which are described below.

- ✓ Impact Printers
- ✓ Character Printers
- ✓ Line Printers
- ✓ Non-Impact Printers
- ✓ Laser Printers
- ✓ Inkjet Printers

Impact Printer

Characters are printed on the ribbon, which is subsequently crushed against the paper, in impact printers. The following are the characteristics of impact printers:

- ✓ Exceptionally low consumable cost.
- ✓ Quite noisy
- ✓ Because of its low cost, it is ideal for large-scale printing.
- ✓ To create an image, there is physical contact with the paper.

Character Printers

Character Printer can **to produce** print only one character at a time. It is of two types.

- ✓ Dot Matrix Printer

- ✓ Daisy Wheel

Line Printers

Line Printers are printers that have the capability to print one line at a time. It is of two types.

- ✓ Drum Printer
- ✓ Chain Printer

Non-Impact Printers

Characters are printed without the need for a ribbon in non-impact printers. Because these printers print a full page at a time, they're also known as Page Printers. The following are the characteristics of non-impact printers:

- ✓ Faster
- ✓ They don't make a lot of noise.
- ✓ Excellent quality
- ✓ Supports a variety of typefaces and character sizes

Laser Printers

Laser Printers use laser lights to produce**.** dots which will produce characters on the page.

Inkjet Printers

Inkjet printers are printers that use spray technology for printing papers. High-quality papers are produced in an Inkjet printer. They also do color printing.

Speakers

Speakers are devices that produce sound after getting a command from a computer. Nowadays, speakers come with wireless technology also like Bluetooth speakers.

Projector

Projectors are optical devices that have the work to show visuals on both types of screens, stationary and moving both. It helps in displaying images on a big screen. Projectors are generally used in theatres, auditoriums, etc.

Plotter

Plotter is a device that helps in making graphics or other images to give a real view. A graphic card is mandatorily required to use these devices. These are the pen-like devices that help in generating exact designs on the computer.

Braille Reader

Braille Reader is a very important device that is used by blind users. It helps people with low vision or no vision to recognize the data by running their fingers over the device to understand easily. It is a very important device for blind persons as it gives them the comfort to understand the letters, alphabets, etc which helps them in study.

Video Card

A video Card is a device that is fitted into the motherboard of the computer. It helps in improvising digital content in output devices. It is an important tool that helps people in using multiple devices.

Global Positioning System (GPS)

Global Positioning System helps the user in terms of directions, as it uses satellite technology to track the geometrical locations of the users. With continuous latitudinal and longitudinal calculations, GPS gives accurate results. Nowadays, all smart devices have inbuilt GPS.

Headphones

Headphones are just like a speaker, which is generally used by a single person or it is a single-person usable device and is not commonly used in large areas. These are also called headsets having a lower sound frequency.

iii) Input-Output Devices (Hybrid Devices)

Some devices can act as both input and output tools, making them very versatile. These devices let you send data to a computer and receive processed results from it. Unlike regular input or output devices, hybrid devices improve functionality, efficiency, and user interaction by combining both capabilities

They are commonly used in modern computing for:

- ✓ Data storage
- ✓ Communication
- ✓ Seamless interaction

Here are some key examples of input-output devices:

Touch screen

A touch screen is a device that acts as both an input and an output tool. As an output device, it shows information like a regular monitor. But it also works as an input device because you can interact with it directly by touching the screen.

Touch screens are commonly used in:

- ✓ Smartphones
- ✓ Tablets
- ✓ ATMs
- ✓ Kiosks

They let you navigate, select, and control functions without needing a mouse or keyboard. Advanced touchscreens, like capacitive and resistive types, can detect multiple touches at once.

External Hard Drive

An external hard drive is a storage device that can both store and retrieve data. You can save files onto it (output) and access or modify them later (input). These drives connect to your computer using USB, Thunderbolt, or other interfaces.

External hard drives are commonly used for:

- ✓ Backing up important data.
- ✓ Transferring large files between computers.
- ✓ Adding extra storage space.

Unlike the storage inside your computer, external hard drives are portable. This means you can easily move large files between different computers.

USB Flash Drive

A USB flash drive is a small, portable storage device that can both send and receive data. When you copy files onto the flash drive, it acts as an output device, storing the information. When you access or transfer those files to another computer, it acts as an input device, providing the data to the system.

USB flash drives are popular for several reasons:

- ✓ They are compact and easy to carry around.
- ✓ They can store a lot of data.
- ✓ They are simple to use.

People commonly use USB flash drives to:

- ✓ Transfer files between computers.
- ✓ Create bootable operating systems.
- ✓ Serve as emergency backup storage.

These versatile devices have made computing more efficient and convenient. Their ability to act as both input and output devices enhances productivity across various tasks.

1.8 Internal and External Storage Devices

Storage Devices

A **storage device** is a hardware component used to **store data, instructions, and information** either temporarily or permanently. Stored data can be accessed whenever needed.

Storage is measured in:

- ✓ Kilobyte (KB)
- ✓ Megabyte (MB)
- ✓ Gigabyte (GB)
- ✓ Terabyte (TB)

Types of Storage Devices

Storage devices are broadly classified into:

i) Internal Storage Devices

ii) External Storage Devices

i) Internal Storage Devices

Internal storage devices are located **inside the computer system**. They are mainly used to store data and instructions required for the **working of the computer**.

a) RAM (Random Access Memory)

- ✓ RAM is **temporary or volatile memory**
- ✓ Stores data and programs currently being used by the CPU
- ✓ Contents are lost when the computer is switched off
- ✓ Very fast compared to other storage devices
- ✓ Helps in smooth multitasking

Advantages:

- ✓ Fast data access
- ✓ Improves system performance

Disadvantages:

- ✓ Data is lost when power is off
- ✓ Limited storage capacity

b) ROM (Read Only Memory)

- ✓ ROM is **permanent or non-volatile memory**
- ✓ Stores essential instructions needed to start the computer
- ✓ Data cannot be easily modified
- ✓ Retains data even when power is turned off

Types of ROM:

- ✓ PROM (Programmable ROM)
- ✓ EPROM (Erasable Programmable ROM)
- ✓ EEPROM (Electrically Erasable Programmable ROM)

Use: Booting process (BIOS)

c) Hard Disk Drive (HDD)

- ✓ A permanent internal storage device
- ✓ Stores operating system, software, and user files
- ✓ Large storage capacity (GBs to TBs)
- ✓ Uses magnetic disks to store data
- ✓ Slower than SSD but cheaper

Advantages:

- ✓ Large storage
- ✓ Cost-effective

Disadvantages:

- ✓ Slower speed
- ✓ Can be damaged by shock

d) Solid State Drive (SSD)

- ✓ Permanent internal storage device
- ✓ Uses flash memory technology
- ✓ Much faster than HDD
- ✓ No moving parts
- ✓ Consumes less power

Advantages:

- ✓ High speed
- ✓ Durable
- ✓ Silent operation

Disadvantages:

- ✓ Expensive
- ✓ Limited rewrite cycles

ii) External Storage Devices

External storage devices are **outside the computer system** and are mainly used for **backup, portability, and data transfer**.

a) USB Flash Drive (Pen Drive)

- ✓ Small, portable device
- ✓ Uses flash memory
- ✓ Can be plugged into USB port
- ✓ Storage ranges from few GBs to hundreds of GBs

Advantages:

- ✓ Easy to carry
- ✓ Reusable
- ✓ Quick data transfer

Disadvantages:

- ✓ Easy to lose
- ✓ Limited lifespan

b) External Hard Disk

- ✓ Large portable storage device
- ✓ Connects via USB cable
- ✓ Used for data backup
- ✓ Available in HDD and SSD forms

Advantages:

- ✓ High storage capacity
- ✓ Suitable for backups

Disadvantages:

- ✓ Bulky compared to pen drives
- ✓ Can be damaged if dropped

c) Memory Cards

- ✓ Small storage devices
- ✓ Used in smartphones, cameras, tablets
- ✓ Types include:
    - SD card
    - microSD card
    - CompactFlash

Advantages:

- ✓ Small size
- ✓ Easy to use

Disadvantages:

- ✓ Easy to misplace
- ✓ Limited speed

d) Optical Storage Devices

Use **laser technology** to read and write data.

Types:

- ✓ CD (Compact Disc) – 700 MB
- ✓ DVD (Digital Versatile Disc) – 4.7 GB
- ✓ Blu-ray Disc – 25 GB or more

Advantages:

- ✓ Cheap
- ✓ Good for media storage

Disadvantages:

- ✓ Easily scratched
- ✓ Becoming outdated

Cloud and Virtual Storage

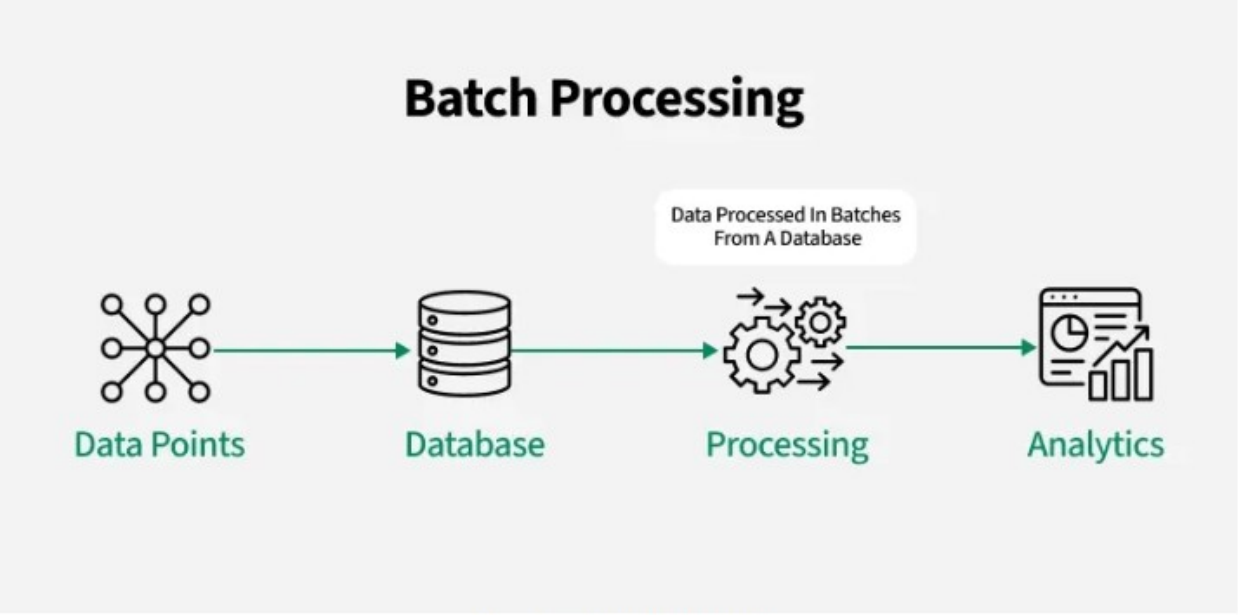
Nowadays, secondary memory has been upgraded to virtual or cloud storage devices. We can store our files and other stuff in the cloud and the data is stored for as long as we pay for the cloud storage. There are many companies that provide cloud services largely Google, Amazon, Microsoft, etc. We can pay the rent for the amount of space we need and we get multiple benefits out of it. Though it is actually being stored in a physical device located in the data centers of the service provider, the user doesn't interact with the physical device and its maintenance. For example, Amazon Web Services offers AWS S3 as a type of storage where users can store data virtually instead of being stored in physical hard drive devices. These sorts of innovations represent the frontier of where storage media goes.

1.9 Batch and Online Processing

Batch Processing System

A Batch processing system handles large amounts of data which processed on a routine schedule. Processing occurs after the economic event occurs and is recorded. It requires fewer programming, hardware, and training resources. In this system, programs are scheduled through jobs.

- ✓ It allows sharing of programs and files.
- ✓ It is processed, especially where a group of transactions is collected over a period of time. In this process, at first, data is collected, entered and processed. Afterward, it produces batch results. For input, process, and output, batch processing requires separate programs.
- ✓ Examples includes Inventory query, website shopping transaction, e-Banking account withdrawal etc.



Batch Processing Flow diagram

Advantages of Batch Processing System

- ✓ **Efficient for large volumes**: Ideal for processing large amounts of data or transactions at once.
- ✓ **Improves performance**: Enhances system efficiency by avoiding the overhead of handling each task individually.
- ✓ **Time flexibility**: Can be scheduled during off-peak hours or designated times to optimize resource usage.
- ✓ Disadvantages of Batch Processing System
- ✓ **Time delay**: There's often a significant lag between data collection and receiving the processed results.
- ✓ **Outdated master file**: Since updates are processed in batches, the master file is not always current or in real time.
- ✓ **Slow for one time tasks**: Processing a single or small set of tasks using batch processing can be inefficient and time consuming.

Online Processing System

An online processing system handles transactions in real time and provides the output instantly. When any economic event takes place then the processing occurs. It requires more number of dedicated hardware resources, processing elements are required.

- ✓ In this system programs are initiated through transactions.
- ✓ It does not allow sharing of programs and files.
- ✓ We can feed data into analytics tools by building data streams, as soon as it is generated.

- ✓ Examples includes are month end tax calculation, data transformation, data analysis, data transformation etc.

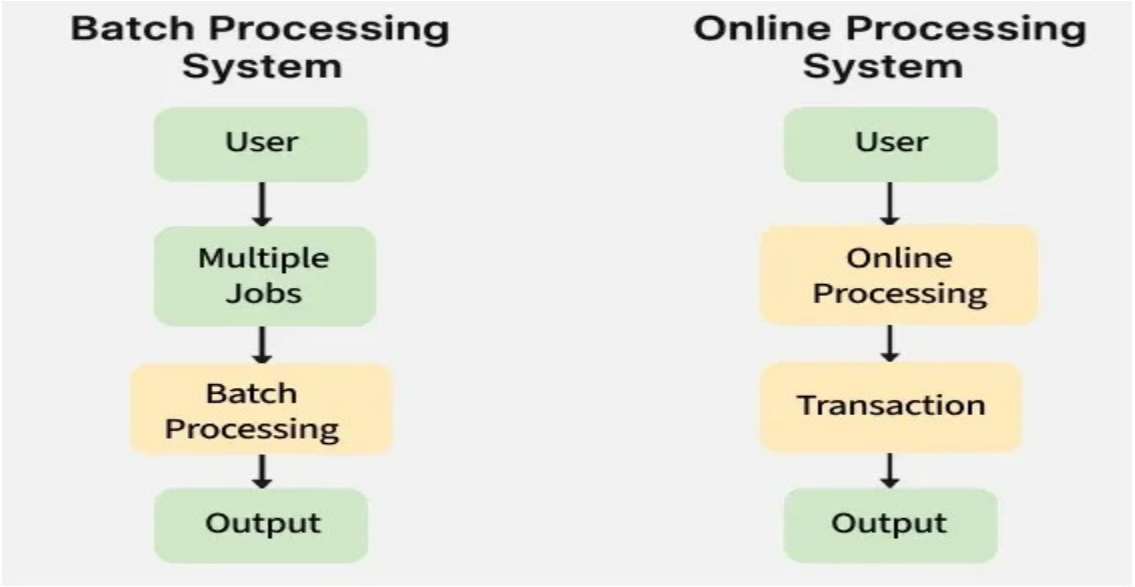
Advantages of Online Processing System

- ✓ **Global Communication** : Online systems enable fast and seamless communication across the globe.
- ✓ They support real-time messaging, video conferencing, and data sharing, breaking geographical barriers.
- ✓ **Cost-Effective** : Accessible to a wide range of users through the Internet, requiring only basic devices.
- ✓ **Good Response Time** : Many online systems such as booking portals and e-commerce platforms offer quick response times, enhancing user satisfaction.

Disadvantages of Online Processing System

- ✓ **Not Suitable for High-Priority or Critical Tasks** :Due to the above limitations, online systems are not ideal for time-sensitive applications.
- ✓ They may experience latency or delays, making them unsuitable for tasks where instantaneous response is critical.
- ✓ **Data Overload Handling Issues** : When a large volume of data is sent or received simultaneously, online systems may struggle or fail to process it efficiently.

Procedure of Batch Processing Vs Online Processing System



Procedure Of Batch Vs Online Processing System

Difference between Batch Processing System and Online Processing System

Feature	Batch Processing System	Online Processing System
Processing Approach	Handles large amounts of data processed on a scheduled basis.	Handles transactions in real-time and provides immediate output.
Event Handling	Processing occurs after the economic event is recorded.	Processing occurs at the time the economic event takes place.
Resource Requirement	Requires fewer programming, hardware, and training resources.	Requires more dedicated hardware resources and processing elements.
Delay Management	Some records are processed after the event to avoid delays.	All records related to the event are processed immediately.
Data Preparation	Input data is prepared before execution.	Data is prepared at the time of execution as needed.
Processing Sequence	Processing sequence is predictable.	Processing sequence is unpredictable.
Program/File Sharing	Programs and files cannot be shared.	Programs and files can be shared.
Program Triggering	Programs are scheduled through jobs.	Programs are initiated through transactions.
Error Recovery	Recovery and restart is simple and straightforward.	Recovery and restart requires additional effort and

		mechanisms.
Storage Medium	Typically uses tape storage.	Typically uses disk storage.
Examples	Tax calculation, data transformation, month-end payroll.	Online banking, inventory queries, e-commerce transactions.

1.10 Hardware, Software, Types of Software

A computer system consists of two main parts: **Hardware and Software. Hardware** refers to the physical components, like the CPU and RAM, while Software includes the programs and applications that control these components. Both are essential for the computer to function properly, and they work together to ensure smooth performance.

i) Hardware

Definition: The tangible, electronic and mechanical parts of a computer system.

Examples: CPU, RAM, hard drives, keyboard, mouse, printer, monitor.

Function: Executes instructions provided by software.

ii) Software

Definition: A set of instructions, data, or programs used to operate computers and execute specific tasks.

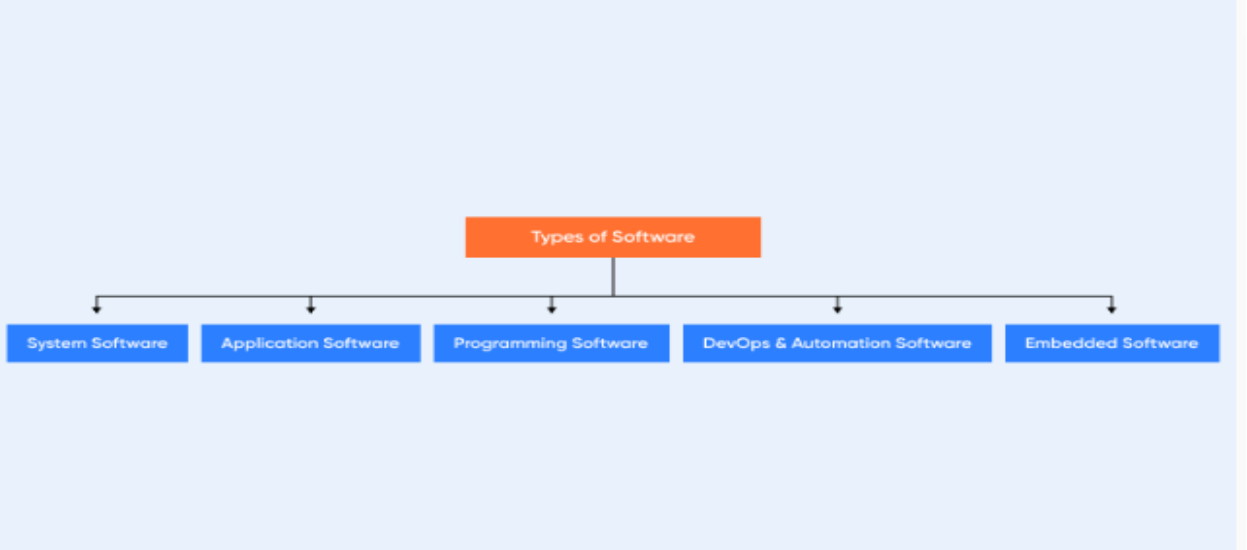
Key Relationship: Software tells hardware what to do; hardware provides the platform for software to run.

Types of Software

Software powers every computer or smartphone you use. It acts as the brain of your device getting its instructions. Many types of software exist, each serving a unique purpose. Some help you write documents. Others let you play games. Some run your entire computer system. Understanding these types of software matters because our daily activities from studying

to shopping rely on them. This guide will teach you about software and its various forms in the digital world.

The software consists of instructions that direct a computer's operations. Unlike tangible components such as keyboards or mice, it's invisible yet powerful. The software enables computers to perform specific tasks like problem-solving or video playback. It manages hardware and makes it functional. A computer without software is just a box. Every app game, or website you use is a type of software. It serves as a guide that controls how your device behaves and responds to your actions.



i) System Software

System software oversees the core components of a computer system. It allows hardware and other software to work in harmony. This software handles file management, program execution, and system resource allocation. Let's find out the types of system software we come across every day:

a) Operating Systems (OS): Your computer's most crucial software is the operating system. It manages all hardware components such as CPU, RAM hard drive, and screen. It also enables other software to run without issues. Windows macOS, Linux, and Android serve as examples.

b) Device Drivers: Device drivers are compact programs that help hardware interact with the operating system. To illustrate, a printer requires a printer driver. A keyboard needs a keyboard driver. Each device relies on its own driver to communicate with the computer.

Utility Software: Utility software keeps your computer in good shape. It has an impact on tasks like virus scanning, junk file removal, and backup management. Some examples include antivirus programs, disk cleanup tools, and file compressors such as WinZip.

ii) Application Software

Application software is designed to perform specific jobs like writing, painting, studying, or gaming. End users are its main focus. Let’s explore the types of applications software use every day:

a) Productivity Software: These are tools made to speed up work. Word processors, spreadsheets, and presentation tools – these help you make and handle content. Think Microsoft Office, Google Workspace, or Notion.

b) Multimedia Software: Multimedia tools deal with audio, video, graphics, and animations. Apps like Adobe Photoshop or VLC Media Player fit this group. DevOps teams use multimedia software to record processes and create training modules.

c) Web Browsers: Web browsers are digital doors. They allow users to reach websites and online platforms. Examples include Chrome, Firefox, and Safari. They run web-based DevOps dashboards like Jenkins UI and Grafana panels.

d) Communication Software: These apps keep teams connected. Tools like Zoom, Slack, and Microsoft Teams help with instant messaging, video calling, and teamwork. In agile and DevOps workflows, these tools are crucial for smooth communication during sprints.

iii) Programming Software

Programming software allows coders to write and test programs. It's used to create other software.

a) Code Editors: Code editors are basic text environments used to write source code. Examples include Notepad++, Sublime Text, and Visual Studio Code. In DevOps, VS Code extensions support Docker, YAML, GitOps, and Terraform scripting.

b) Compilers and Interpreters: These tools change human-written code into a language machines can understand. Compilers process entire programs at once, while interpreters run one line at a time. Languages like Python and Java need these to run.

c) Debuggers: Debuggers help find and fix bugs in code. They follow errors, look at logs, and test how code runs. DevOps teams often use debugging tools during Continuous Testing in their pipelines.

iv) DevOps and Automation Software

DevOps software brings development and operations teams together. It makes processes automatic, connects tools, and cuts down on deployment mess.

a) Configuration Management Tools: These tools have an influence on infrastructure management and control. Ansible, Puppet, and Chef are some examples. They maintain server synchronization, make OS updates automatic, and guarantee consistency across different environments.

b) CI/CD Tools: CI/CD tools such as Jenkins, GitLab CI, and CircleCI make build, test, and deployment cycles automatic. They help teams send code to production more without causing issues.

c) Containerization and Orchestration Tools: Docker and Kubernetes operate applications in containers and coordinate how they grow. Kubernetes makes load balancing, pod scaling, and rollout strategies automatic in a cluster setting.

d) Monitoring and Alerting Tools: Software like Prometheus, Datadog, and New Relic keeps an eye on system health and performance. It alerts users right away if something breaks or doesn't work well.

v) Embedded Software

Embedded software runs in machines we don't think of as computers. You'll find it in IoT gadgets medical gear, and factory robots. It comes pre-loaded, works with tiny controllers, and does things in real-time.

a) Firmware: Firmware is a special kind of embedded code stored in hardware chips. It helps the device start-up and talk to other software layers. Think about your router, washing machine, or smart thermostat.

b) Real-Time Operating Systems (RTOS): RTOS manages time-critical tasks in systems like pacemakers or car braking systems. It handles commands giving minimal delay and top accuracy.

vi) Open Source vs Proprietary Software

This group looks at who owns and can access software.

a) Open Source Software: Open Source tools are free for anyone to use, change, and help improve. Linux, Apache, and Git are some examples. DevOps works well with open-source platforms because they're flexible, clear about how they work, and have lots of add-ons.

b) Proprietary Software: Companies own proprietary tools. You need to buy a license to use them. Windows OS and Adobe Creative Suite are examples. They often come with special support and extra features.

Check Your Progress

Choose the Correct Answer:

1. Which generation of computers used vacuum tubes**?**

A. First generation

B. Second generation

C. Third generation

D. Fourth generation

Answer: A

2. Which of the following is an input device**?**

A. Monitor

B. Printer

C. Keyboard

D. Speaker

Answer: C

3. Which device is used to display output in visual form?

A. Mouse

B. Scanner

C. Monitor

D. Keyboard

Answer: C

4. Which of the following is an internal storage device**?**

A. Pen drive

B. Hard disk

C. CD-ROM

D. DVD

Answer: B

5. Which of the following is an external storage device**?**

A. RAM

B. ROM

C. Cache

D. Pen drive

Answer: D

6. Batch processing **means:**

A. Data is processed immediately

B. Data is processed in groups at a fixed time

C. Data is processed manually

D. Data is processed one by one

Answer: B

7. Online processing **is also known as:**

A. Delayed processing

B. Batch processing

C. Real-time processing

D. Offline processing

Answer: C

8. Which of the following is considered hardware**?**

A. Windows

B. MS Word

C. Printer

D. Antivirus

Answer: C

9. Software that controls the working of the computer is called:

A. Application software

B. Utility software

C. System software

D. User software

Answer: C

10. MS Paint is an example of:

A. System software

B. Application software

C. Utility software

D. Programming software

Answer: B

Small Questions – LOCF Mapping Table

S.No	Small Question	CO	Bloom's Level	PO
1	What are the different generations of computers?	CO1	Remember	PO1
2	Name the common input devices used in computers.	CO2	Remember	PO2
3	List the types of output devices.	CO2	Remember	PO2
4	What is the difference between internal and external storage devices?	CO3	Understand	PO3
5	Define batch processing and online processing.	CO3	Understand	PO3

Big Questions – LOCF Mapping Table

S.No	Big Question	CO	Bloom's Level	PO
1	Explain the different generations of computers and their characteristics.	CO1	Understand	PO1
2	Describe the various input devices and their uses in computing.	CO2	Understand	PO2
3	Explain the types of output devices and their applications.	CO2	Understand	PO2
4	Discuss internal and external storage devices with examples.	CO3	Analyze	PO3
5	Compare batch processing and online processing, highlighting their advantages and disadvantages.	CO3	Analyze	PO3

UNIT – II

Structure:

2.1 Concept of Information System

2.2 Definitions of MIS

2.3 Characteristics of Information System

2.4 Objectives of MIS

2.5 System Classification

2.6 Categories of Information System

2.7 Structure of MIS

2.8 MIS Support for Planning, Organising & Controlling

2.1 Concept of Information System

An information system is a way to work with information using computers and other technology. It combines different parts like computer programs, physical devices, and networks. Businesses use information systems to collect important data. They use this data to run their operations smoothly. Information systems also help businesses talk to their customers. Using information systems makes businesses work better than their competitors.

Some companies like eBay, Amazon, Alibaba, and Google are built completely on using information systems and technology to work. These companies cannot operate without using information systems.

What Are The Components of Information Systems?

- ✓ **Hardware:** Hardware is the physical parts you can touch like computers, disks, keyboards, and iPads. Hardware costs are lower now but using it can hurt the

environment. Storage is now available in the "cloud" which you access through networks.

- ✓ **Software:** Software consists of programs that run on hardware. System software like Windows helps hardware work. Application software like Excel does specific tasks. Big companies buy special software for their needs. Some software is free to use.
- ✓ **Data consists of:** Data is just facts and numbers. When put together properly, data becomes useful information for businesses to make decisions.
- ✓ **Telecommunications:** Telecommunications connects computers and devices to share information. This can use wires or wireless signals like radio waves. Wires include fiber optics and cables. Wireless uses radio and microwave signals.

Examples of Information System

- ✓ Information systems are very important for businesses today. In the future, they will become even more important as more work is done by computers and AI.
- ✓ General information systems provide common services that many businesses need. For example, a database system helps organize all kinds of data. A company can use data in the database to understand trends, like what products customers buy at different times.
- ✓ Specialized information systems are designed for a specific purpose in a business. For example, an "expert system" can solve very complex problems in a specific area like medicine. The expert system can work faster and better than a person trying to solve the same problem alone.

Types of Information Systems

i) Operations Support Systems

These systems support specific business operations. For example, all banks use transaction processing systems to handle customer bank accounts and transactions. Operations support systems allow a company to manage a core business process.

ii) Management Information Systems

These systems integrate hardware and software to help an organization's main functions. They collect data from different systems. The data is then analyzed to help managers make decisions for the business.

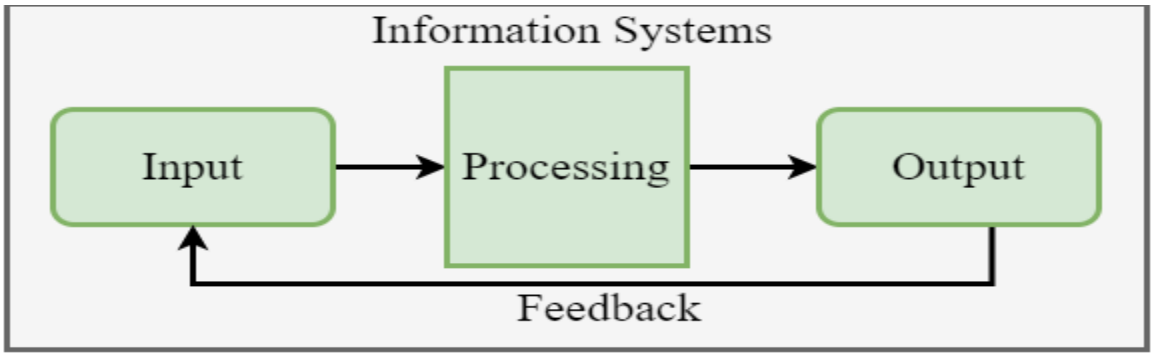
iii) Decision Support Systems

These systems help organizations make informed decisions. They analyze rapidly changing information that cannot be planned in advance. Decision support systems can work automatically or with human operators. Using both humans and computers together works best.

iv) Executive Information Systems

These are management support systems specifically for senior executives. Executive information systems help top managers make high-level decisions for the entire organization.

How Does Information System Work?



Working of information System

- ✓ **Input:** First the system collects data as input. This data can come from the typing, voice commands, touch screens, and sensors. The input data can be structured (organized) and unstructured (disorganized).
- ✓ **Processing:** Since the input data is raw the computers processor (CPU) has to organize it into the structured format. It does this through steps like the sorting, grouping, searching, analyzing, and making the reports.
- ✓ **Storage:** Next the organized data is stored temporarily or permanently. It gets stored in databases, hard drives, or solid-state drives.
- ✓ **Output:** The stored data is then analyzed and presented in a useful way like reports, dashboards, or data visualizations.
- ✓ **Feedback:** Finally the system gets feedback from users on their experience. This helps measure how well the system is working.

2.2 Definitions of MIS

Gordon B. Davis

"**Management Information System** is an integrated, user–machine system for providing information to support operations, management, and decision-making functions in an organization."

James A. O'Brien

"A **Management Information System** is a system that provides information to support effective decision-making by managers."

Kenneth C. Laudon & Jane P. Laudon

"A **Management Information System** is a system that provides managers with reports and access to the organization's current and historical performance data."

"A **Management Information System** is a formal system for collecting, processing, and providing information for management decision-making."

2.3 Characteristics of Information System

An **information system (IS)** is a set of components that collect, process, store, and distribute information to support decision-making and control in an organization. Its main **characteristics** include:

i) Integration

Combines people, hardware, software, data, and procedures into one coordinated system.

ii) Data Processing Capability

Collects raw data and processes it into meaningful information (e.g., sorting, calculating, summarizing).

iii) Accuracy and Reliability

Produces correct, consistent, and dependable information.

iv) Timeliness

Provides information at the right time so users can make effective decisions.

v) Relevance

Supplies information that is useful and appropriate to the user's needs.

vi) Accessibility

Information is easily available to authorized users when needed.

vii) Flexibility

Can adapt to changes in user requirements, technology, or organizational needs.

viii) Security

Protects data and information from unauthorized access, misuse, or loss.

ix) Cost-Effectiveness

Delivers value by improving efficiency and decision-making relative to its cost.

x) Support for Decision-Making

Helps managers and users plan, control, and make informed decisions.

2.4 Objectives of MIS

The main objectives of a Management Information System (MIS) are to **improve decision-making, boost efficiency, and support strategic planning** by providing timely, accurate data for managers, helping them control operations, manage resources better, and gain a competitive edge through automation, data analysis, and streamlined information flow across the organization.

Key Objectives of MIS:

- ✓ **Improve Decision-Making:** Provides managers with relevant reports, trends, and forecasts for informed choices, reducing uncertainty.
- ✓ **Streamline Operations & Efficiency:** Automates routine tasks, integrates departments, and reduces manual effort for better productivity.
- ✓ **Support Strategic Planning:** Helps in forecasting, budgeting, resource allocation, and aligning IT with business goals.
- ✓ **Data Management & Accuracy:** Collects, stores, processes, and retrieves data efficiently, ensuring consistency and reliability.
- ✓ **Enhance Control & Performance:** Monitors actual performance against standards, identifies variances, and highlights strengths/weaknesses.

- ✓ **Resource Optimization:** Tracks inventory, finances, and workforce to ensure optimal use and reduce waste.
- ✓ **Gain Competitive Advantage:** Analyzes market trends and customer behavior to help businesses stay ahead.
- ✓ **Facilitate Communication:** Ensures smooth data flow and transparency across organizational levels.

2.5 System Classification

System classification in Management Information Systems (MIS) groups information systems by function (like TPS, MIS, DSS, ESS, OAS), user level (operational, tactical, strategic), or technology (batch, real-time, AI), helping organizations understand how systems support different business needs, from daily transactions to long-term planning and decision-making. Common categories include Transaction Processing Systems (TPS) for daily operations, Management Information Systems (MIS) for routine reports, Decision Support Systems (DSS) for semi-structured problems, and Executive Support Systems (ESS) for strategic insights.

i) Classification by User/Level

- ✓ **Transaction Processing Systems (TPS):** Automate routine, daily tasks like sales, payroll, and order entry (e.g., POS systems).
- ✓ **Management Information Systems (MIS):** Generate summarized reports from TPS data for middle managers to monitor and control operations (e.g., inventory reports).
- ✓ **Decision Support Systems (DSS):** Help managers with non-routine decisions using interactive tools and data analysis (e.g., what-if analysis).
- ✓ **Executive Support Systems (ESS) / Executive Information Systems (EIS):** Provide high-level, strategic information (dashboards, market trends) for senior executives.

- ✓ **Office Automation Systems (OAS):** Improve communication and productivity (e.g., email, word processing).
- ✓ **Knowledge Management Systems (KMS):** Capture and share organizational knowledge.

ii) Classification by Function/Application

- ✓ **Enterprise Resource Planning (ERP):** Integrate core business processes (finance, HR, supply chain).
- ✓ **Customer Relationship Management (CRM):** Manage customer interactions.
- ✓ **Supply Chain Management (SCM):** Manage flow of goods and services.
- ✓ **Business Intelligence (BI) / Analytics Systems:** Analyze data for insights.

iii) Classification by Technology/Interaction

- ✓ **Batch Processing:** Processes data in groups (e.g., end-of-month billing).
- ✓ **Real-Time/Online Systems:** Process data instantly as it occurs.
- ✓ **Expert Systems/AI Systems:** Use artificial intelligence for complex problem-solving.

2.6 Categories of Information System

Information systems (IS) are categorized by the business function and user level they support, with major types including **Transaction Processing Systems (TPS)** for daily operations, **Management Information Systems (MIS)** for middle management reports, **Decision Support Systems (DSS)** for semi-structured decisions, **Executive Support Systems (ESS)** for high-level strategy, **Knowledge Management Systems (KMS)** for sharing expertise, and **Enterprise Resource Planning (ERP)** for integrating core business processes, plus **Customer Relationship Management (CRM)** and **Supply Chain Management (SCM)** for specific functions.

Here's a breakdown of common types:

- ✓ **Transaction Processing Systems (TPS):** Handle routine, day-to-day business operations like sales, orders, and payroll, supporting operational levels.
- ✓ **Management Information Systems (MIS):** Provide summarized reports and data to middle managers for monitoring and controlling performance.
- ✓ **Decision Support Systems (DSS):** Help managers with semi-structured, non-routine decisions by analyzing data and modeling scenarios.
- ✓ **Executive Support Systems (ESS/EIS):** Offer high-level summaries and dashboards for senior executives to make strategic, long-term decisions.
- ✓ **Knowledge Management Systems (KMS):** Facilitate the creation, sharing, and use of knowledge and expertise within an organization.
- ✓ **Enterprise Resource Planning (ERP):** Integrate key business processes (finance, HR, manufacturing) into a single system.
- ✓ **Customer Relationship Management (CRM):** Manage all interactions with current and potential customers.
- ✓ **Supply Chain Management (SCM):** Streamline the flow of goods, information, and finances from suppliers to customers.
- ✓ **Office Automation Systems (OAS):** Support administrative tasks, like word processing, email, and scheduling.

2.7 Structure of MIS

Structure of MIS may be understood by looking at the physical components of the information system in an organization. The physical components of an organizational

information system may be hardware, software, database, manual procedures and operating persons. A brief description of these components has been outlined in the following paragraphs:

i) Hardware: Hardware refers to the physical data processing equipment and peripheral devices, For example, CPU, monitor, keyboard, printer, drives, tapes, communication devices, etc.

ii) Software: Software is a broad term given to the instructions or programs that direct the operating of the hardware. Software could be of two types, i.e. system software and application software.

iii) Database: The database consists of all data utilized by application software. Data is stored in files.

iv) Procedures: Formal operating procedures, which are required to operate a system, such as manuals, are also regarded as physical elements.

v) Operating Personnel: Personnel like Computer Operators, Computer Programmers, System Analysts, System Managers, etc., are the operating people of the information systems.

vi) Input and Output: Various physical inputs and outputs from the information system, existing in forms like printout, reports etc.

2.8 MIS Support for Planning, Organizing & Controlling

Management Information Systems (MIS) provide crucial support for planning, organizing, and controlling by collecting, processing, and presenting data into actionable insights, enabling managers to set goals (planning), coordinate resources (organizing), monitor performance against targets, and take corrective action (controlling). MIS transforms raw data into summarized reports, dashboards, and analysis, helping different management levels make informed decisions, from strategic goals to daily operations.

i) Support for Planning

- ✓ **Strategic Planning (Top Management):** MIS provides long-term forecasts, market trends, and financial analyses to help set organizational goals and business plans.
- ✓ **Short-Term/Operational Planning (Middle/Junior Management):** Offers data for resource allocation, scheduling, and setting targets for specific functions like sales or production.

ii) Support for Organizing

- ✓ **Resource Allocation:** Helps assign the right people, tasks, and materials by providing visibility into current workloads and requirements.
- ✓ **Integration & Coordination:** Keeps different departments informed about each other's needs and progress, fostering collaboration.
- ✓ **Structure:** Supports the design of efficient business processes and structures by providing data on workflow and bottlenecks.

iii) Support for Controlling

- ✓ **Performance Monitoring:** Generates reports (KPIs, variance analysis) to compare actual performance against planned targets.

- ✓ **Exception Reporting:** Highlights deviations or "out-of-control" situations, allowing for timely intervention.
- ✓ **Feedback & Correction:** Provides data for follow-up, allowing managers to evaluate changes, make adjustments, and ensure processes remain effective.

Check Your Progress

Choose the Correct Answer:

1. An Information System mainly converts:

A. Data into knowledge

B. Data into information

C. Information into data

D. Knowledge into data

Answer: B

2. Which of the following is a key characteristic of an Information System?

A. Random data

B. Timeliness

C. Personal opinion

D. Informal reports

Answer: B

3. The main objective of MIS is to:

A. Increase computer usage

B. Support management decision-making

C. Store large volumes of data

D. Reduce employee workload

Answer: B

4. MIS mainly supports which level of management?

A. Operational level

B. Technical level

C. Middle and top level

D. Clerical level

Answer: **C**

5. Which of the following is a classification of systems?

A. Manual system

B. Open system

C. Computer system

D. Office system

Answer: B

6. Transaction Processing System (TPS) is used at which level?

A. Strategic level

B. Tactical level

C. Operational level

D. Top management level

Answer: C

7. Which of the following is NOT a category of Information System?

A. TPS

B. MIS

C. DSS

D. Internet System

Answer: D

8. The structure of MIS includes:

A. Only hardware

B. Only software

C. People, data, procedures, hardware, and software

D. Only management

Answer: C

9. MIS helps in planning by:

A. Providing past and present data

B. Hiring employees

C. Increasing production

D. Eliminating managers

Answer: A

10. MIS supports controlling by:

A. Setting goals

B. Comparing actual performance with standards

C. Recruiting staff

D. Designing products

Answer: B

Small Questions – LOCF Mapping Table

S.No	Small Question	CO	Bloom's Level	PO
1	What is an Information System?	CO1	Remember	PO1
2	List the key characteristics of an information system.	CO1	Remember	PO1
3	What are the main objectives of MIS?	CO2	Understand	PO2
4	Name the categories of information systems.	CO2	Remember	PO2
5	How does MIS support planning, organizing, and controlling?	CO3	Understand	PO3

Big Questions – LOCF Mapping Table

S.No	Big Question	CO	Bloom's Level	PO
1	Explain the concept and importance of an Information System.	CO1	Understand	PO1
2	Discuss the key characteristics of an effective Information System.	CO1	Analyze	PO1
3	Explain the objectives of MIS and how it benefits organizations.	CO2	Understand	PO2
4	Describe the system classification and categories of Information Systems.	CO2	Analyze	PO2
5	Explain how MIS supports planning, organizing, and controlling functions in an organization.	CO3	Evaluate	PO3

UNIT – III

Structure:

3.1 Information for Decision Making

3.2 Functional Information System

3.3 Strategic Information System

3.1 Information for Decision Making

Information for decision-making involves a structured process of **defining the problem**, **gathering relevant, accurate, timely, and reliable data** from internal/external sources, **identifying and analyzing alternatives**, weighing evidence (risks/rewards), making a choice, taking action, and reviewing the outcome, using tools like decision trees to navigate complexities and achieve optimal results.

Key Steps in the Process

- ✓ **Identify the Decision:** Clearly define the problem or goal.
- ✓ **Gather Information:** Collect pertinent data from internal sources (self-assessment, history) and external sources (experts, research, market data).
- ✓ **Identify Alternatives:** Brainstorm all possible courses of action.
- ✓ **Weigh the Evidence:** Analyze pros, cons, impacts (short/long term) of each alternative using tools like decision trees.
- ✓ **Choose an Alternative:** Select the best option based on analysis.
- ✓ **Take Action:** Implement the chosen decision.
- ✓ **Review & Evaluate:** Assess the results and learn for future decisions.

Characteristics of Good Information

- ✓ **Accuracy:** Correct and error-free.

- ✓ **Relevance:** Directly related to the decision.
- ✓ **Timeliness:** Up-to-date and available when needed.
- ✓ **Completeness:** Sufficient for understanding.
- ✓ **Reliability:** Based on sound collection methods.

3.2 Functional Information System

Functional Information Systems (FIS) in Management Information Systems (MIS) are specialized IT systems supporting an organization's core business areas like **Finance, Marketing, Production, and Human Resources**, providing tailored data and reports for decision-making at operational, tactical, and strategic levels, integrating internal data to streamline processes and support managers. Key examples include **Financial Information Systems (FIS)**, **Marketing Information Systems**, **Production/Manufacturing Information Systems**, and **Human Resource Information Systems (HRIS)**, each handling unique data (transactions, research, staffing, etc.) for specific management needs.

The following four functional areas in an organisation are:

i) Human Resources (Personal)

ii) Manufacturing (Production)

iii) Material and

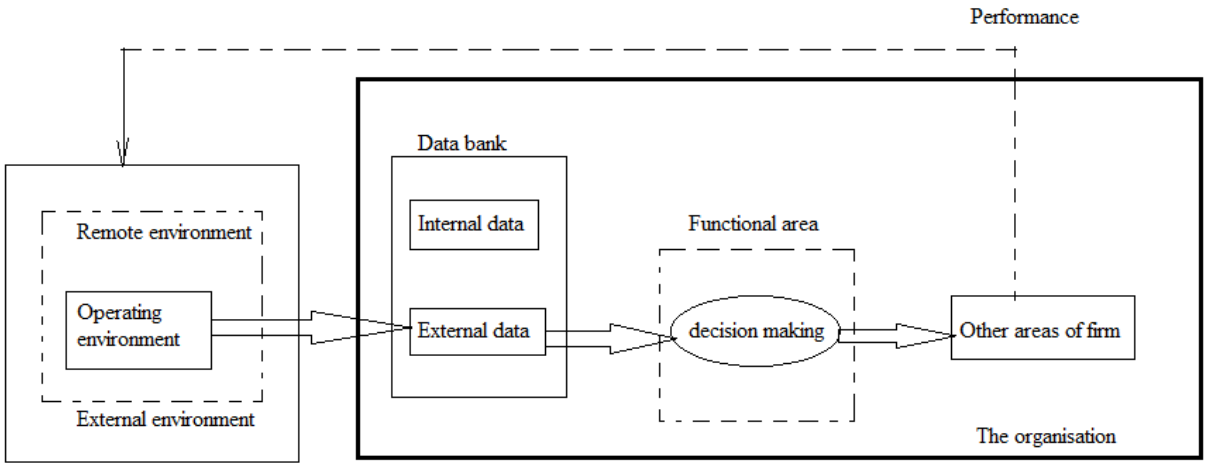
iv) Marketing

In each of the functional area, a data flow model portrays the local decision making environment. Figure shows the data flow diagram, which consists of the following components:

- ✓ **External environment :-**The external environment contains two components the operating environments, which consists of consumer, suppliers, competitors, distributors, and the labour supply; and the remote environment, which consists of economics, social,

political, technological, an industry concerns. These environmental sources generate key external information that flows into the firm, at times informally.

- ✓ **Data bank:-**It is used generally to describe the general storage of data. A data bank can include data existing in files and in computer databases. An organisation's data bank consists of internal data, such as those generated from the firm's transaction processing system or from monitoring forecasts and external data which are collected from monitoring the external environment. Both types of data have information potential.



Data Flow Digram in Basic Function Areas

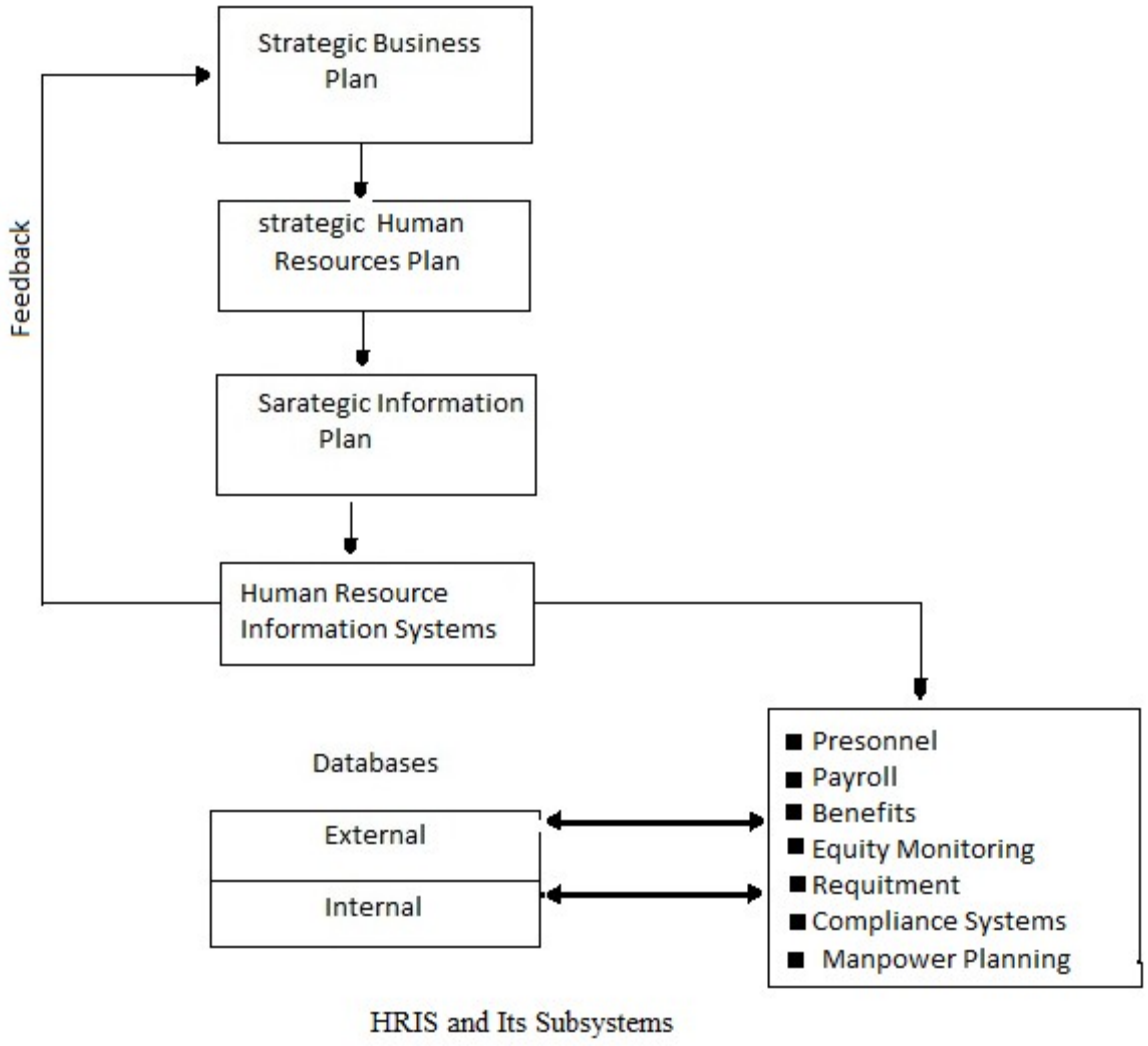
- ✓ **Decision making:-** Decision making is the key of each functional data flow model .this process consists of selecting those data needed to make a decision and then making the decision.
- ✓ **Other areas of the firm:-**Information produced by decision making in one functional area is often used in another. For example, sales forecast prepared by the marketing department is used as data by the finance department to produce the overall financial plan for the firm.

- ✓ **Feedback mechanism**:- The dotted feedback arrow indicates that decision made by the firm ultimately affect its performance in the market place. The firm's performance, in term, generates other data that are used by elements in the environment. The firm's performance is often important on the competitor's, consumers, and suppliers. Only a radical change coming from within a big organization such as a state (or provincial) government, or a corporate giant, like Tata industries; would cause noticeable change in the remote environment.

i) Human Resources Information Systems

- ✓ Human resource information system (HRIS) is a system that supports the planning, control, coordination, administration, and management of an organisation's human resources.
- ✓ HRIS also include a large number of subsystems that address the information needs if various human resources functions. They provide managers with information, policies, and procedures concerning recruiting, layoffs, employee evaluation, promotion, termination, transfer, salary equity monitoring, job descriptions and responsibilities, training, affirmative action plan (AAP), and equal employment opportunities (EEO) .
- ✓ HIRS also facilitate vital information on matters such as payroll, central and state taxes, health benefits, child care, grievance procedures, and other personal information that affects employees personal and professional lives, it is imperative that these systems be highly responsive to employee needs.
- ✓ Human resource systems were slow to be computerised in 1960s. However, in 1990s, many organisations begin to realise the importance of HIRS. It is estimated that by the year 2000. HIRS will be a necessity for most of the big giants if they are to keep up with

increasing government regulations and respond to personal information queries about employees.

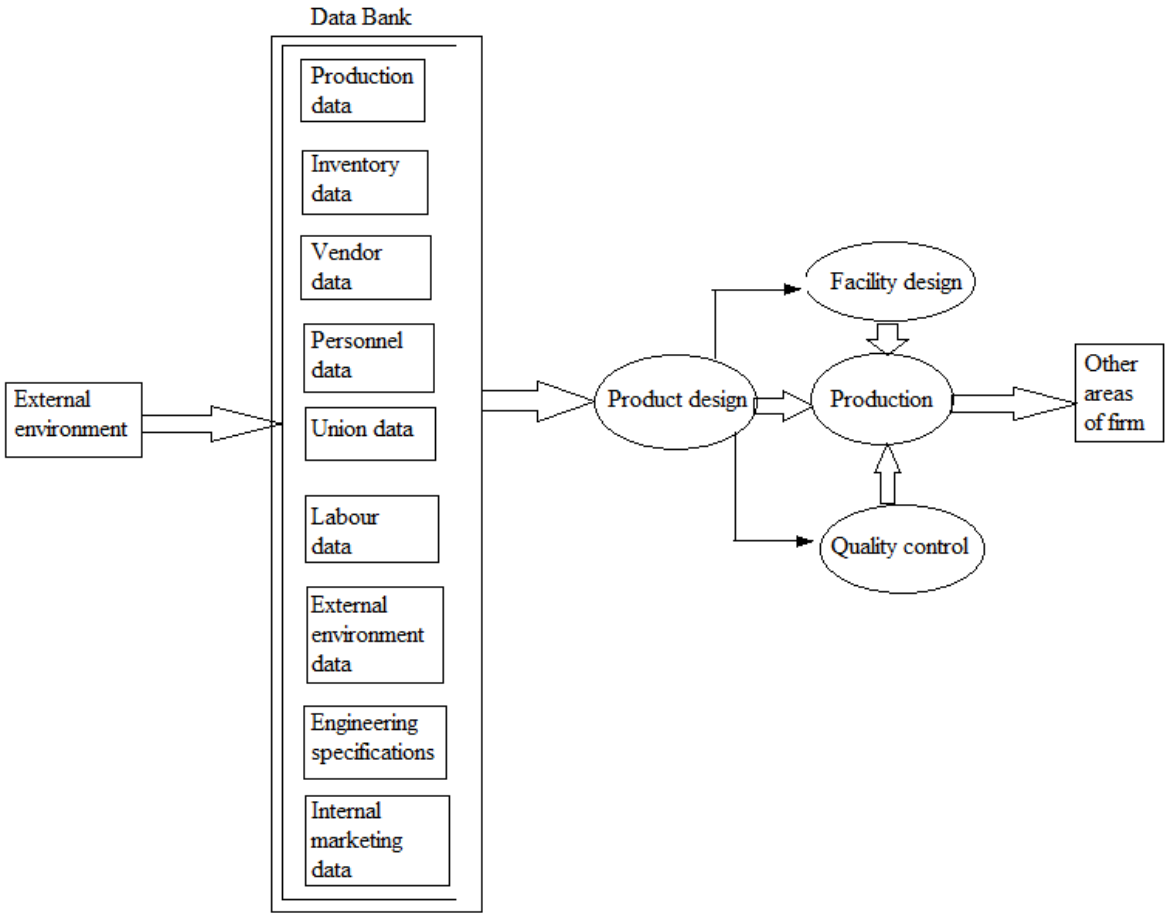


HRIS and Its Subsystems

ii) Manufacturing Information Systems

Manufacturing information system is a system the support the manufacturing functions of purchasing, receiving, quality control, inventory management, material requirements planning, capacity planning, production scheduling, and plant design. It performance applies to both

Manufacturing and service environments. Hence, the term manufacturing should be considered in terms of delivering both goods and services.



Data Flow Representation of manufacturing Information System

Generally, the primary decisions made in the manufacturing include product design, production, facility design, and quality control.

a) Product design is the starting point of the manufacturing process. It is the step in which the design and technical specifications for the product are finalized. Increasingly, product design and engineering are becoming more computerized through approaches such as computer aided design (CAD), computer aided engineering (CAE), and robotics. After a product is designed, the

facilities to manufacture must be planned. This design may be as simple as changing a few manufacturing stations on the production floor or as complex as designing an entirely new plant. The computer can also model plant layout. Monte Carlo simulation on computers has been used since 1950s to address certain facility layout problems –sometimes with substantial success.

b) Production is the process of making new products from raw materials. Generally, he production methods: job shop and process. Most production process as an integrated system. Some firms are trying to integrate CAD, CAM and other manufacturing activities, a concept known as computer integrated manufacturing (CIM). All manufacturing processes concerned with information processing, storage, collection, and distribution are related in a way that optimizes performance of the entire enterprise. Integration allows organizations to efficiently manage (and control) manufacturing and engineering information by eliminating barriers across departments and functions-possibly even across organizations.

c) Agile manufacturing refers to manufacturing environments that are dynamic and flexible enough to instantaneously produce customized goods and services in varying quantities and to effortlessly switch the manufacturing process from one product to another. Agile manufacturing has four main characteristics:

- ✓ The ability to thrive on constant change
- ✓ Recognition by the organization that people are its main asset
- ✓ Incorporation of the virtual company idea through the use of telecommunications
- ✓ A focus on creating products and services with real added value.

Sources of Manufacturing Information

- ✓ **Product data.** By using terminals around the production floor, data on production processes can be quickly gathered and processed. These data are used for billing and in almost every aspect of production control.
- ✓ **Inventory data.** it includes inventories of raw materials goods –in-process, and finished goods. Accurate raw material data are especially imp in a manufacturing situation because running out of certain items at critical times can shut down production lines, leaving workers idle.
- ✓ **Vendor data.** It shows sources and prices for raw materials. Often, it are maintained by the purchasing department, although, sometimes the manufacturing area will personally buy certain items. In any case, manufacturing personnel must be constantly aware of the origination of their raw materials, what new types of products are offered by vendors, and current prices.
- ✓ **Personnel data**. It shows various statistics on current manufacturing personnel.
- ✓ **Union data.** Many types of labour today are unionized production shops usually have strict regulations regarding such items as pay scales, hiring and firing, promotion, and working conditions.
- ✓ **Engineering specifications.** It is the data indicate whether something can be built and how. It contain such facts a size of screws; whether a certain drill bit is suitable for wood.
- ✓ **Internal marketing data.** It ends where manufacturing begins, so marketing output is manufacturing input. Marketing specifies the number of units of goods that must be product in each time period in order to meet consumer demand.

Advantages of Manufacturing Information System

- ✓ Manufacturing goods & services is the main function of a business. The information generated from the shop- floor drives the rest of the organization. Hence, the firms that have wall –integrated manufacturing information systems are bound to reap significant benefits.
- ✓ In late 1990, an India-based multinational firm started replacing its PC- based manufacturing system with a new manufacturing information system called integrated information system architecture. The main objective was reducing manufacturing cost and cutting down cycle times. The new system, which used data base, networks, GUIs, and of the shelf software, allows 1800 employees distributed throughout the firm to easily access enterprise-wide manufacturing data by integrating a num of code business system. Embedded with decision support capabilities, the system allows managers to be decision making instead of data collectors.

iii) Material Information Systems

A Material Information System (MMIS) within Management Information Systems (MIS) is a specialized software system that manages the entire lifecycle of an organization's physical materials, from procurement to usage, by integrating data for planning, controlling inventory, automating purchases, tracking costs, and streamlining supply chain functions like ordering, receiving, and distribution, ultimately helping managers make informed decisions for efficiency and cost savings.

Core Functions & Features:

- ✓ **Inventory Management:** Tracks stock levels, alerts for reordering, and manages movement.

- ✓ **Purchasing Automation:** Streamlines vendor selection, ordering, and payment processing.
- ✓ **Financial Integration:** Links with accounting systems for accurate cost tracking and patient billing (in healthcare).
- ✓ **Data & Reporting:** Compiles data to provide insights on usage, costs, and vendor performance.
- ✓ **Supply Chain Control:** Manages the flow of materials from suppliers to final use.

Key Benefits:

- ✓ Reduced material waste and costs.
- ✓ Improved efficiency in procurement and distribution.
- ✓ Better coordination across departments.
- ✓ Enhanced strategic decision-making through data.

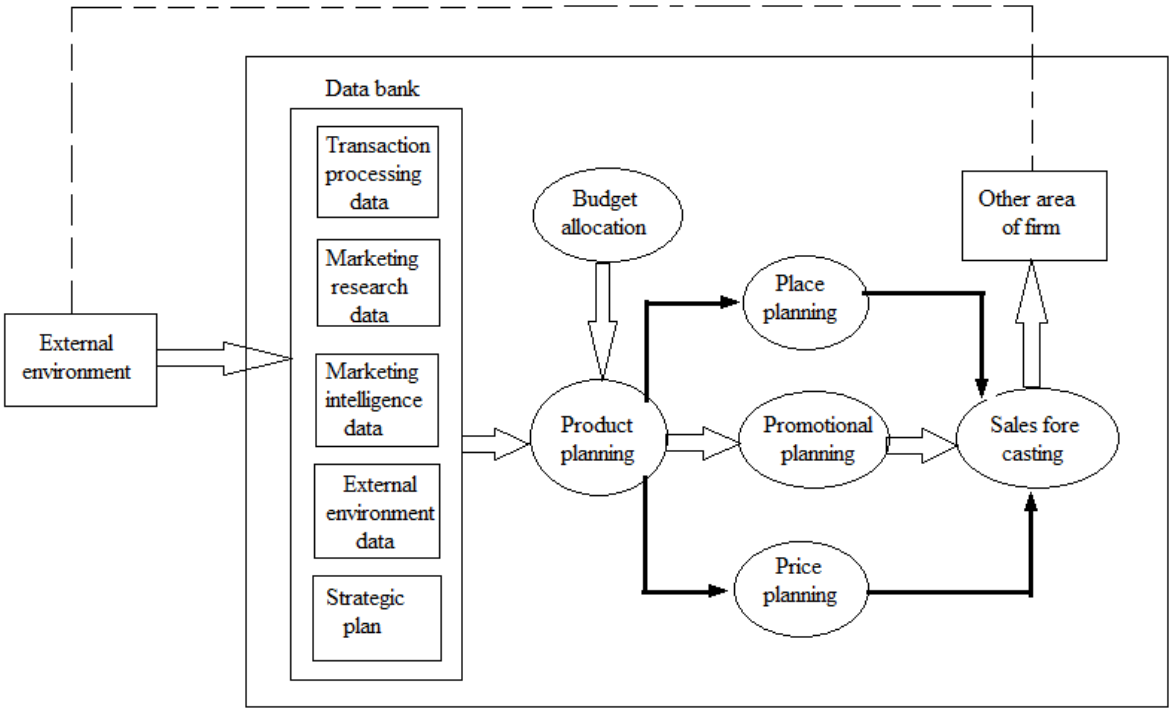
iv) Marketing Information System

Marketing strategies consist of a mixture of ingredients that has been named the marketing mix product, promotion, place & price. Collectively they are known as the four Ps. Product is what the customer buys to satisfy a perceived want or need. Promotion is concerned what all the means of the encouraging the sale of the product, including advertising & personal selling. Place deals with the means of physically distributing the product to the customer through a channel of distribution. Price consists of all the elements relating to what the customer pays for the product.

Input of Marketing Information Systems

Information used for marketing, decisions arrived at from different data sources, the most important of which are:-

- ✓ **Transaction processing data:** This data show the sales that result from specific mixes of the four Ps. Thus they provide feedback on the effectiveness of past marketing strategies.
- ✓ **Marketing research data**. Marketing is the it is responsible for gathering consumer-related data that can be used to support making decisions; example, personal interviews, phone interviews, 7 mails survives. Often tests determined if the research findings are statistically significant or if they should be attributed, instead, to chance.
- ✓ **Marketing intelligence data:** marketing intelligence refers to information about the strategies of competitors. The term "intelligence" is a carryover from the military, which uses the term to describe data gathered about enemy activities. Most making intelligence information is collected in an unstructured or semi structure manner: through word of mouth interaction or through observing statistics available in the media & commercial data –base services.
- ✓ **External environment data: in market**, success is largely attributable to what will happen in the function external environment. For example: - when a new car is introduced, the firm never knows exactly how consumers will react to it. 198 out of 235 people are tested the prototype loved it & said they would buy it.
- ✓ **Strategic plan:-**the strategic plan is really the starting point of all marketing decisions. It contains the type of product that the firm plans to supply to the consumer marketplace. These broad guidelines define the direction of the marketing effort. The tactical marketing plan addresses what, how, when & where questions that is appropriate to the implementation of the strategic plan.



Data flow representation of the marketing information system

Outputs of marketing information systems

- ✓ **Product planning:-**It is often complicated, unstructured decision. A number of factors contribute to a products success or failure. Complicating these product planning decisions are the facts that the choice of consumers constantly change & that competitors always develop new products. Most products follow a product a life cycle.
- ✓ **Place planning:**-It refers to the channels of distribution that a firm uses to get its products to the consumer. The resources flowing through a channel includes a supplier, manufacturer, wholesaler, retailer, &consumer. The material flow originates with the supplier & ends with the consumer. Information that flow in the direction opposite to the material flow is called feedback information, & the flow of information toward the consumer is called feed forward information.

- ✓ **Promotion: -** It is composed of two principal areas: personal selling & advertising. Technology is vital to the selling effort in several ways: (a) typing in customers 7 suppliers; (b) increasing selling time; (c) increasing effectiveness of the client site; (d) identifying selling opportunities; & (e) making salespeople more efficient.
- ✓ **Price:**-Depending on the firm's pricing policies, the price area can run close to promotion
- ✓ in terms of decision support difficulty. Some firms engage in cost-based pricing by determining their costs & then adding a desired mark-up. A less cautions pricing policy is demand-based pricing, which establishes a price compatible with the value that the consumer places on the product.
- ✓ **Budget allocation:-**Two other imp decision making areas, in addition to four Ps, are the allocation of the marketing budget & sales forecasting. Marketing does not have an unlimited source of funds. Thus, a budget must limit the overall size of expenditures.
- ✓ **Sales forecast:-**The sales forecast reflects estimates by the marketing personal on future product sales. Since it is the main source of firm's revenue, sales forecast is an important part of the financial plan. Many technology tools are also used in sales forecasting.

Advantages of Marketing Information Systems

A good marketing system provides employees with information that helps firms capture niche markets in highly competitive industries. Marketing system has a deep & directed influence on the quality of customer's service. Hence, it is seen that competitive intelligence is of interest to the firm as a whole. Although the name of the functional information implies that is only for managers in that area, the information output can be of value to other management & executives as well. Hence, marketing information system play a vital & critical role in helping an organization achieve its goals.

3.3 Strategic Information System

Strategic information systems (SIS) are information systems that are developed in response to corporate business initiative. They are intended to give competitive advantage to the organization. They may deliver a product or service that is at a lower cost, that is differentiated, that focuses on a particular market segment, or is innovative.

Strategic information management (SIM) is a salient feature in the world of information technology (IT). In a nutshell, SIM helps businesses and organizations categorize, store, process and transfer the information they create and receive. It also offers tools for helping companies apply metrics and analytical tools to their information repositories, allowing them to recognize opportunities for growth and pinpoint ways to improve operational efficiency.

Definition

A SIS is a computer system that implements business strategies; They are those systems where information services resources are applied to strategic business opportunities in such a way that the computer systems affect the organization's products and business operations. Strategic information systems are always systems that are developed in response to corporate business initiative. The ideas in several well-known cases came from information Services people, but they were directed at specific corporate business thrusts. In other cases, the ideas came from business operational people, and Information Services supplied the technological capabilities to realize profitable results.

Most information systems are looked on as support activities to the business. They mechanize operations for better efficiency, control, and effectiveness, but they do not, in themselves, increase corporate profitability. They are simply used to provide management with sufficient dependable information to keep the business running smoothly, and they are used for

analysis to plan new directions. Strategic information systems, on the other hand, become an integral and necessary part of the business, and they affect the profitability and growth of a company.

They open up new markets and new businesses. They directly affect the competitive stance of the organization, giving it an advantage against the competitors.

Characteristics of Strategic Management Information System (SMIS)

The key characteristics of strategic management information system (SMIS) are as follows –

i) An organized occurrence

The strategy includes a set of action plans that are not contrary to each other because they are covered by a common theme. It's not just a great idea; it lets the idea happen as well. The strategy is a unified, systematic, and integrated action plan.

ii) Goal-oriented approach

SMIS is a goal-oriented process. The process is carried out with the aim and objective of evaluating the different elements through SWOT analysis and other methods and designs a plan or strategy that enables the organization to manoeuvre it around every hurdle and make use of its strength.

iii) Involvement of top executives

Strategic management applies to many aspects of the activities of an organization. So, it needs the participation of top management. In general, the broad consequences of its decisions and the power to approve the required resource allocations are only understood by top management.

iv) Multidisciplinary approach

The strategy includes marketing, financing, human resources, and strategy development & execution tasks. A strategy is an integrated view of its activities. It is multidisciplinary and an approach that affects all the functional fields, i.e., marketing, financial, human resources, and operations.

v) Prosperity in the long term

If an organization has committed to a specific strategy, then the strategy is related to its objectives and in a competitive way; its prosperity depends for a long time on such a strategy.

vi) Multidimensional technique

A strategy is not only about vision and ambitions, but also about how to accomplish them. It, therefore, means that, with transparent accountability and performance-related rewards, the company should possess the resources and competencies necessary for the execution of the plan as well as a strong performance.

vii) Future-orientated

Strategic management requires projections, which are expected by the executives. The focus in such decisions is on the creation of forecasts that will enable the company to choose the most promising strategic options. An organization can only thrive in a volatile world if it takes a constructive approach to change.

viii) Multi-functional or multi-business ramifications

For other aspects of the firm, strategic management has complex ramifications. In particular, they affect different strategic business units in areas related to customer mix, competitive emphasis, organizational structure, etc. Allocations or reallocations of roles and resources arising from these decisions can impact all of these areas.

ix) Hierarchical methodology

Corporate strategies come on top; these are the strategies for the business unit, and finally practical methods. The top management plans business-level strategies, individual strategic business units determine organizational strategies, and the functional strategies are determined by the functional heads.

x) Dynamic in nature

SMIS is to build a balance between the atmosphere and the activities of the organization. As the world itself is subject to rapid change, the approach must also be dynamic to shift in step with the environment.

xi) Decisions those are non-self-generative

Although strategic management can entail making decisions, at any point in time, the company must be prepared to make strategic choices.

Benefits of Strategic Information System

- ✓ Establishing entry barriers.
- ✓ To gain competitive advantage.
- ✓ To improve productivity and performance.
- ✓ To enable new ways of managing and organizing.
- ✓ To develop new businesses.
- ✓ Affecting the cost of switching operations.
- ✓ Differentiating products/services.
- ✓ Limiting access to distribution channels.
- ✓ Ensuring competitive pricing.
- ✓ Decreasing supply costs.

- ✓ Increasing cost efficiency.
- ✓ Using information as a product.
- ✓ Building closer relationships with suppliers and customers.
- ✓ Linking the organisation to customers or suppliers,
- ✓ Creating effective integration of the use of information in a value-adding process, eg data mining, data warehousing, ERP.
- ✓ Enabling the organisation to develop, produce, market and distribute new products or services, eg CAD, CRM.
- ✓ Giving senior management information to help to develop and implement strategy, eg knowledge management.

The Strategic Information Systems Planning Process

SISP planners have to consider the preparatory steps that ensure that business, organizational and information strategies are aligned in a complementary fashion. The overall role of technology and information systems within the organization must be determined, and the internal and external assessments need to be addressed. The most important point to remember is that the SISP process must be part of the overall organization plan.

SISP has been described in terms of phases and the specific tasks within them. The phases and tasks represent the components of the planning process, with each having its own objectives, participants, preconditions, products, and techniques. The phases and tasks can be used to describe an organization's attempts to be comprehensive in its strategic planning process. SISP unfolds in five phases. The overall five phase breakdown is as follows:

Strategic Business Planning: Prerequisite to systems planning:

- ✓ It outlines an organization's overall direction, philosophy, and purpose.

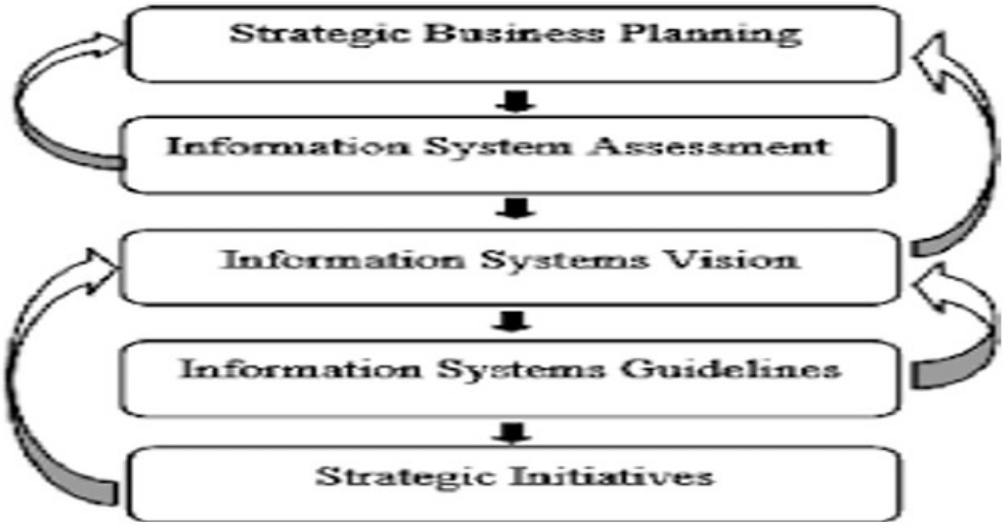
- ✓ It examines its current status in terms of its strengths, weakness, opportunities, and threats.
- ✓ It sets long-term objectives.
- ✓ It formulates short-term tactics to reach them.

Information Systems Assessment: Evaluation of the system to assess its status (current information systems resources) in terms of original or current expectations and how they are serving the organization.

Information Systems Vision: Ideal role that should be pursued for use of information systems resources.

Information Systems Guidelines: Set of statements that clarify use of organization's technical and information systems resources.

Strategic Initiatives: Three to five-year long-term proposals that specify new initiatives for information systems organization.



The Strategic Information Systems Planning Process

Check Your Progress

Choose the Correct Answer:

1. Information used for routine and short-term decisions is known as:

A. Strategic information

B. Tactical information

C. Operational information

D. Analytical information

Answer: C

2. A Personal Information System **is mainly used to:**

A. Manage company strategy

B. Support individual employee tasks

C. Control production processes

D. Analyze market trends

Answer: B

3. Which Information System helps in planning, scheduling, and controlling manufacturing activities?

A. Marketing Information System

B. Material Information System

C. Production Information System

D. Strategic Information System

Answer: C

4. Material Information System is concerned with:

A. Sales forecasting

B. Customer relationship management

C. Inventory control and purchasing

D. Employee performance appraisal

Answer: C

5. Which system provides information for sales analysis, advertising, and market research?

A. Production Information System

B. Personal Information System

C. Marketing Information System

D. Material Information System

Answer: C

6. Strategic Information System (SIS) primarily supports:

A. Daily transactions

B. Middle-level management control

C. Long-term planning and competitive strategy

D. Clerical operations

Answer: C

7. Competitive advantage means:

A. Selling products at higher prices

B. Advantage gained over competitors through better strategy

C. Government protection

D. Use of advanced machines

Answer: B

8. Which of the following is a way SIS helps in achieving competitive advantage?

A. Increasing manual work

B. Reducing information flow

C. Cost leadership and differentiation

D. Delaying decisions

Answer: C

9. The first step in the process of SIS planning **is:**

A. System design

B. Implementation

C. Analysis of business environment

D. Software installation

Answer: C

10. The main objective of SIS planning is to:

A. Reduce employee workload

B. Align information systems with business strategy

C. Increase hardware usage

D. Improve office communication

Answer: B

Small Questions – LOCF Mapping Table

S.No	Small Question	CO	Bloom's Level	PO
1	What is the role of information in decision making?	CO1	Remember	PO1
2	Define Functional Information System and give examples.	CO2	Understand	PO2
3	What is a Personal Information System?	CO2	Remember	PO2
4	Explain Strategic Information System (SIS) and its role in competitive advantage.	CO3	Understand	PO3
5	What are the key steps in the process of SIS planning?	CO3	Understand	PO3

Big Questions – LOCF Mapping Table

S.No	Big Question	CO	Bloom's Level	PO
1	Explain the role of information in decision making with suitable examples.	CO1	Understand	PO1
2	Discuss Functional Information Systems and their applications in different departments.	CO2	Analyze	PO2
3	Explain the concept of Personal Information Systems and their importance.	CO2	Understand	PO2
4	Describe Strategic Information Systems (SIS) and how they provide competitive advantage.	CO3	Analyze	PO3
5	Explain the process of SIS planning and the key steps involved.	CO3	Evaluate	PO3

UNIT – IV

Structure:

4.1 Introduction to Decision Support System

Decision Support Systems (DSS) help executives make better decisions by using historical and current data from internal Information Systems and external sources. By combining massive amounts of data with sophisticated analytical models and tools, and by making the system easy to use, they provide a much better source of information to use in the decision-making process.

Decision Support Systems (DSS) are a class of computerized information systems that support decision-making activities. DSS are interactive computer-based systems and subsystems intended to help decision makers use communications technologies, data, documents, knowledge and/or models to successfully complete decision process tasks.

While many people think of decision support systems as a specialized part of a business, most companies have actually integrated this system into their day to day operating activities.

For instance, many companies constantly download and analyze sales data, budget sheets and forecasts and they update their strategy once they analyze and evaluate the current results. Decision support systems have a definite structure in businesses, but in reality, the data and decisions that are based on it are fluid and constantly changing.

4.2 Definitions

Gorry and Scott Morton (1971)

"Decision Support Systems are interactive computer-based systems that help decision makers utilize data and models to solve unstructured problems."

Keen and Scott Morton (1978)

"Decision Support Systems couple the intellectual resources of individuals with the capabilities of the computer to improve the quality of decisions."

Alter (1980)

"A Decision Support System is a computer-based system that helps managers make decisions in semi-structured and unstructured situations."

Turban and Aronson (2001)

"A Decision Support System is an interactive, flexible, and adaptable computer-based information system designed to support decision making."

Sprague and Carlson (1982)

"A Decision Support System is a class of information systems that draws on transaction processing systems and interacts with the user to support decision making."

Power (2002)

"Decision Support Systems are computer-based systems that support organizational decision-making activities."

4.3 Evolution of DSS

- ✓ The notion of decision support as a formal concept was coined by G. Anthony Gorry and Michael S. Scott Morton. They felt a need for a frame work to channel computer application towards management decision making and developed a grid, known as the Gorry and Scott Morton grid.
- ✓ The grid each based on Simon's concept of programmed and non-programmed decision and Robert N. Anthony's management levels.
- ✓ The decision types are described in terms of problems structure, ranging from structured to semi-structured to unstructured.
- ✓ A fully structured problem is one in which the first three of Simon's phases – intelligence, design and choice-are structured. The decisions are routine and straightforward. By following a setup pre-established step, a solution to the problem can be found. Such a problem does not require intuition or judgement. Therefore, the system returns the same solution every time.
- ✓ An unstructured problem is one in which none of the three phases is structured. The decisions are unique and non--repetitive. Because they require intuition, experience judgement, there may be no one 'best' solution and solutions may differ from one decision maker to the other.
- ✓ A semi-structured problem is one in which one or two of the phases are structured. The decision in this category fall somewhere between structured decisions, which are routine and repetitive, and unstructured decision, which are unique and non-repetitive.
- ✓ Gorry and Scott Morton entered types of business problem into their grid. For example, accounts receivable is solved by managers on the operational-control level making

structured decision. R&D planning is accomplished by strategic planning managers making unstructured decisions.

- ✓ The horizontal dotted line through the middle of the grid is significant. Its separate the problem that had been successfully solved with computer assistance from those problems that had not been subjected to computer processing.
- ✓ The upper area was named structured *decision system* and the lower area was named decision support systems.
- ✓ DSS are especially useful for semi-structured problems where problem-solving is improved by interaction between the managers and the computer system.
- ✓ The emphasis is on small, simple models which can easily be understood and used by the decision maker.
- ✓ Examples of semi-structured decision are : planning a mix of investments for a portfolio, looking at the financial implication of various way of financing a short-term cash flow deficit, consideration of alternative production and pricing policies, assessing the impact of potential future changes in exogenous variables such as interest rates, analysis of the of the credit-worthiness of corporate clients, and assessing the likely impacts of departmental reorganization.

4.4 Objectives of Decision Support System (DSS)

- ✓ Support decision making in semi-structured and unstructured problems.
- ✓ Improve the quality of decisions by providing accurate, timely, and relevant information.
- ✓ Assist managers at different levels (top, middle, and operational) in decision making.
- ✓ Provide analytical tools and models to evaluate different alternatives.

- ✓ Enhance managerial effectiveness, not replace human judgment.
- ✓ Enable faster decision making by reducing the time required to analyze data.
- ✓ Improve communication and coordination among decision makers.
- ✓ Support “what-if” analysis to examine the impact of different decision scenarios.
- ✓ Increase organizational control and planning by better forecasting and analysis.
- ✓ Provide flexibility and user-friendly interaction for easy use by managers.

4.5 Characteristics of DSS

Following are the characteristics of the Decision Support System –

- ✓ Support for decision-makers in semi-structured and unstructured problems.
- ✓ Support for managers at various managerial levels, ranging from top executive to line managers.
- ✓ Support for individuals and groups. Less structured problems often requires the involvement of several individuals from different departments and organization level.
- ✓ Support for interdependent or sequential decisions.
- ✓ Support for intelligence, design, choice, and implementation.
- ✓ Support for variety of decision processes and styles.
- ✓ DSSs are adaptive over time.

4.6 Purpose of DSS

The purpose of a Decision Support System (DSS) in a Management Information System (MIS) is to help managers make complex, non-routine decisions by providing interactive tools to analyze data, build models, and explore different scenarios (like "what-if" analyses) for

semi-structured or unstructured problems, transforming raw data into actionable insights for better strategic planning and problem-solving, complementing MIS's focus on routine reporting.

Key Functions & Goals:

- ✓ **Support Complex Decisions:** DSS tackles problems that aren't easily solved by standard procedures, unlike routine MIS reports.
- ✓ **Data Analysis & Modeling:** It uses analytical models and data from various systems (like MIS) to find trends, patterns, and exceptions, enabling forecasting and simulations.
- ✓ **Explore Alternatives:** Allows managers to test different strategies (e.g., "what-if" scenarios) in a risk-free environment to understand potential outcomes.
- ✓ **Enhance Speed & Quality:** Improves the efficiency, accuracy, and overall quality of decisions by reducing guesswork and providing data-driven insights.
- ✓ **User-Friendly Interface:** Offers interactive tools (like the Dialogue Management System) for easy interaction, allowing users to query and manipulate data.

4.7 Components of Decision Support System

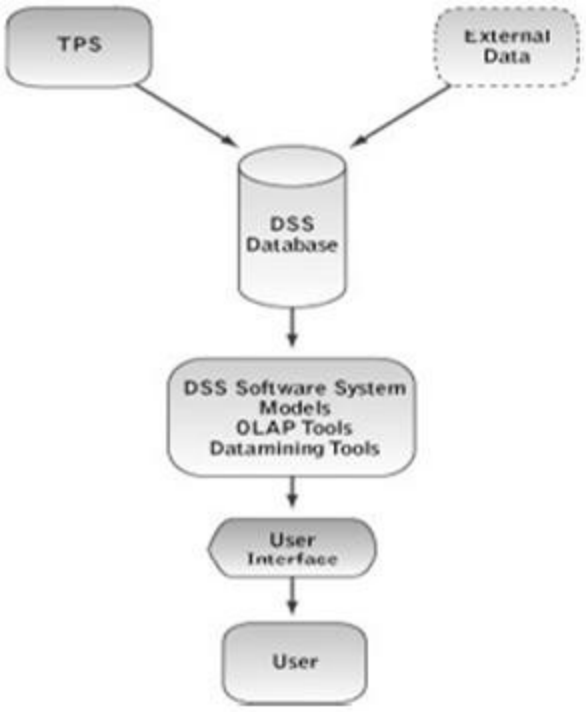
A Decision Support System (DSS) typically has four core components: a **Database** (for data storage), a **Model Management System** (for analysis), a **User Interface** (for interaction), and often a **Knowledge Base** (for rules and expertise). These components work together to collect, analyze, and present data and models, allowing users to make better, informed decisions by transforming raw data into actionable insights.

i) Database/Data Management System: Stores vast amounts of data from internal (e.g., sales, inventory) and external (e.g., market trends, news) sources, serving as the foundation for analysis.

ii) Model Management System: Contains analytical models (statistical, financial, optimization) that process data to simulate scenarios, forecast outcomes, and present decision options.

iii) User Interface: The interactive part that allows users to input data, select models, and view results in an understandable format (like graphs, reports) without needing deep technical skills.

iv) Knowledge Base: An optional but common component holding rules, heuristics, and expertise that guide the system and users in the decision-making process.



4.8 Types of Decision Support System

Decision Support Systems (DSS) are categorized mainly by their focus: **Data-Driven** (analyzing large datasets), **Model-Driven** (using mathematical models), **Knowledge-**

Driven (expert systems with rules), **Document-Driven** (managing information/text), and **Communication-Driven** (facilitating group collaboration). Modern systems often combine these, creating **Hybrid DSS**, to provide comprehensive support for various decision-making needs, from operational analysis to strategic planning.

i) Data-Driven DSS: Focuses on querying databases, data warehouses, and data mining to find trends, often for business intelligence.

ii) Model-Driven DSS: Uses quantitative models (like financial forecasts, optimization) to analyze scenarios and predict outcomes for complex problems.

iii) Knowledge-Driven DSS: Incorporates expert knowledge, rules, and AI to provide advice, recommendations, and solve complex domain-specific problems (e.g., medical diagnosis).

iv) Document-Driven DSS: Helps users find and manage unstructured information, like reports, web pages, or research documents, through keyword searches.

v) Communication-Driven DSS: Facilitates collaboration and communication among users through tools like chat, video conferencing, and shared workspaces (also known as Group DSS).

vi) Hybrid DSS: Integrates features from two or more of the above types for more flexible and comprehensive decision support.

4.9 Advantages and Disadvantages of Decision Support Systems (DSS)

Decision Support Systems (DSS) offer advantages like faster, more effective decisions, improved communication, cost reduction, and increased control by analyzing data, but suffer from disadvantages such as high implementation costs, potential over-reliance/blaming the computer, complexity, data quality issues, risk of information overload, and inability to replace human intuition/subjectivity, requiring a balance with human judgment.

Advantages of DSS

- ✓ **Improved Decision Quality:** Helps in analyzing complex data, leading to better, more informed decisions and increased effectiveness.
- ✓ **Time Savings & Productivity:** Automates processes, provides timely information, and reduces decision cycle time.
- ✓ **Enhanced Communication & Control:** Improves collaboration and provides data for monitoring performance, increasing organizational control.
- ✓ **Cost Reduction:** Can lower labor costs and overall operational expenses over time.
- ✓ **Learning & Adaptability:** Promotes learning and allows for exploring various scenarios (what-if analysis).
- ✓ **Competitive Advantage:** Can provide insights that give businesses an edge.

Disadvantages of DSS

- ✓ **High Costs:** Significant investment for development, implementation, and maintenance.
- ✓ **Over-reliance & Loss of Intuition:** Users may become too dependent on the system, ignoring human judgment or subjectivity.
- ✓ **Information Overload:** Can present too much data, creating dilemmas for users.
- ✓ **Data Quality Issues:** Effectiveness hinges on clean, reliable data; "garbage in, garbage out".
- ✓ **Complexity & User Resistance:** Can be difficult to design, implement, and use, leading to resistance from staff.

- ✓ **Security Risks:** Handling sensitive data introduces privacy and security concerns.
- ✓ **System Limitations:** May struggle with purely creative, intuitive, or highly subjective decisions.

Check Your Progress

Choose the Correct Answer:

Basic Concept of DSS

1. What does DSS stand for?

A. Data Storage System

B. Decision Support System

C. Digital Software System

D. Data Security System

Answer: B

2. A Decision Support System mainly helps in:

A. Routine data processing

B. Taking structured decisions only

C. Supporting decision-making activities

D. Storing large amounts of data

Answer: C

3. DSS is mainly designed to support:

A. Only clerical staff

B. Only top management

C. Decision-makers at different levels

D. Customers

Answer: C

4. Which of the following is a characteristic of DSS?

A. It replaces managers

B. It supports semi-structured decisions

C. It works without data

D. It is used only for accounting

Answer: B

5. The main purpose of DSS is to:

A. Automate office work

B. Eliminate decision-making

C. Improve the quality of decisions

D. Store employee records

Answer: C

6. DSS helps users by providing:

A. Raw data only

B. Reports and analysis tools

C. Only hardware

D. Network security

Answer: B

7. Which of the following is NOT a component of DSS?

A. Database

B. Model base

C. User interface

D. Operating system

Answer: **D**

8. The component that stores data in DSS is called:

A. Model base

B. Knowledge base

C. Database

D. Interface

Answer: C

9. The user interacts with DSS through:

A. Database

B. Model base

C. User Interface

D. Server

Answer: C

10. Which DSS focuses mainly on data analysis?

A. Model-driven DSS

B. Data-driven DSS

C. Knowledge-driven DSS

D. Document-driven DSS

Answer: B

Small Questions – LOCF Mapping Table

S.No	Small Question	CO	Bloom's Level	PO
1	What is a Decision Support System (DSS)?	CO1	Remember	PO1
2	List the key characteristics of a DSS.	CO1	Remember	PO1
3	What is the main purpose of a DSS?	CO2	Understand	PO2
4	Name the main components of a DSS.	CO2	Remember	PO2
5	What are the types of DSS and their pros and cons?	CO3	Understand	PO3

Big Questions – LOCF Mapping Table

S.No	Big Question	CO	Bloom's Level	PO
1	Explain the concept of Decision Support System (DSS) and its importance in decision making.	CO1	Understand	PO1
2	Discuss the key characteristics of a DSS with examples.	CO1	Analyze	PO1
3	Explain the main purpose of DSS in organizations.	CO2	Understand	PO2
4	Describe the components of DSS and their roles in decision making.	CO2	Analyze	PO2
5	Discuss the types of DSS along with their advantages and disadvantages.	CO3	Evaluate	PO3

UNIT – V

Structure:

5.1 Introduction to Business Process Outsourcing

Business Process Outsourcing (BPO) is hiring a third-party provider to handle specific company operations, like customer service, HR, or accounting, freeing the main company to focus on core activities, reduce costs, and gain expertise. It involves both **front-office** (customer-facing like call centers) and **back-office** (internal functions like payroll) tasks, leveraging specialized skills and technology for efficiency, with modern BPO increasingly incorporating AI and digital tools for better outcomes.

How it Works

Companies (clients) hire third-party providers (BPOs) to handle specific functions, from customer service (front office) to data entry and HR (back office), providing strategic advantages for growth and stability.

5.2 Meaning of BPO

BPO stands for **Business Process Outsourcing**. It refers to the practice where a company hires another organization to handle specific business activities instead of managing them internally. These activities often include customer service, technical support, payroll, data entry, accounting, and human resource services. Companies use BPO to reduce costs, improve efficiency, and focus more on their core business operations. BPO services can be provided within the same country or outsourced to other countries depending on cost, expertise, and business needs.

5.3 Definitions

According to **Thomas L. Friedman Business Process Outsourcing (BPO)** is defined as "the delegation of one or more IT-intensive business processes to an external provider who owns, administers, and manages the selected processes.*"*

According to **Gary P. Schneider BPO** is "the practice of handing over non-core business activities to external service providers to achieve cost savings and efficiency.*"*

According to **Michael F. Greaver II**, "Business Process Outsourcing is the act of transferring selected business activities and related responsibilities to a third-party service provider.*"*

According to **S. Minoli BPO** is described as "a strategic use of outside resources to perform activities traditionally handled by internal staff."

5.4 Types of BPO

Business Process Outsourcing (BPO) types vary by function (Back-office, Front-office), location (Onshore, Nearshore, Offshore), and expertise (KPO/LPO), involving tasks like customer service, accounting, IT, and data entry, often using third-party providers to cut costs and improve efficiency, with key categories being location-based (same country, nearby, or far away) and service-based (core tasks vs. knowledge-intensive work).

i) By Location (Geographic)

- ✓ **Onshore:** Outsourcing to a provider in the same country.
- ✓ **Nearshore:** Outsourcing to a neighboring country, often with similar time zones.
- ✓ **Offshore:** Outsourcing to a distant country (e.g., India or the Philippines for US companies).

ii) By Function (Service Type)

- ✓ **Back-Office BPO:** Internal business functions like payroll, accounting, HR, data entry, and order fulfillment.
- ✓ **Front-Office BPO:** Customer-facing tasks, including call centers (inbound/outbound), technical support, and telemarketing.
- ✓ **Knowledge Process Outsourcing (KPO):** High-level, knowledge-based work requiring advanced skills, like research, data analysis, legal, and financial analysis.
- ✓ **IT Outsourcing:** Managing IT infrastructure, software development, and helpdesk services.
- ✓ **Legal Process Outsourcing (LPO):** Outsourcing legal tasks like contract review, patent research, and compliance.

iii) By Provider Model

- ✓ **Third-Party BPO:** An external company handles processes for multiple clients (e.g., XYZ BPO managing calls for different companies).
- ✓ **Captive Outsourcing:** Setting up a wholly-owned subsidiary (a "captive center") in another location to serve internal needs.
- ✓ **Co-sourcing:** A partnership where a third-party provider handles specific, selected tasks within a department.

Common Outsourced Tasks

- ✓ Customer Service & Support
- ✓ Accounting & Finance
- ✓ Human Resources (HR)
- ✓ IT Support & Software Development
- ✓ Data Entry & Processing
- ✓ Supply Chain & Procurement

5.5 Benefits of BPO

Business Process Outsourcing (BPO) offers benefits like significant cost savings, allowing companies to access global talent and reduce overheads, while improving efficiency, quality, and focus on core business by leveraging experts and advanced tech, leading to better scalability, risk management, and 24/7 operations for enhanced customer satisfaction.

i) Cost Reduction:

Lower labor costs (labor arbitrage), reduced infrastructure/tech investment, and overhead savings.

ii) Focus on Core Business:

Frees internal teams from non-core tasks (like payroll, IT, customer service) to concentrate on innovation and growth.

iii) Improved Quality & Expertise:

Access to specialized skills, established processes, and industry best practices from expert providers.

iv) Scalability & Flexibility:

Easily adjust resources up or down to meet fluctuating demand without major hiring commitments.

v) Enhanced Efficiency:

BPO firms use automation (AI, RPA) and optimized workflows to boost productivity.

vi) 24/7 Operations:

Offshore BPO partners enable round-the-clock service, crucial for global customer support.

vii) Risk Management & Compliance:

BPOs manage adherence to complex regulations, reducing legal risks.

viii) Access to Technology:

Leverage advanced tools (AI, machine learning) without large upfront investments.

ix) Better Customer Experience:

Specialized support leads to faster responses, higher satisfaction, and loyalty.

5.6 Drawbacks of BPO

Disadvantages of BPO (Business Process Outsourcing) include loss of control, security risks (data breaches), communication gaps (language/time zone issues), potential for lower

quality, hidden costs, negative impact on employee morale, and challenges in alignment with company culture, leading to dependency on external providers and potential loss of internal innovation.

i) Loss of Control & Quality

Reduced oversight can lead to subpar service, errors, and difficulty managing the outsourced tasks, impacting brand reputation.

ii) Security & Privacy Risks

Sharing sensitive data with third parties increases vulnerability to breaches, which can harm the business.

iii) Communication Challenges

Time zone differences and language barriers can cause delays, misinterpretations, and hinder real-time collaboration.

iv) Hidden Costs

Initial low quotes can hide unexpected expenses for legal, transition, or scope creep, inflating the total cost.

v) Employee Morale & Culture

Outsourcing can create job insecurity and anxiety among existing staff, while the BPO's culture might clash with the company's values.

vi) Dependency & Instability

Over-reliance on a single provider makes a company vulnerable to their instability, policy changes, or even business failure, requiring complex transitions.

vii) Reduced Innovation

Relying on external teams can stifle internal innovation and long-term competitive growth.

5.7 Introduction to Customer Relationship Management

Customer Relationship Management (CRM) is a business strategy and technology framework designed to manage and optimize interactions with customers throughout their lifecycle. It helps organizations collect, organize, and analyze customer data to improve satisfaction, loyalty, and business growth. By centralizing communication across sales, marketing, and service channels, CRM ensures that every customer interaction is personalized, timely, and impactful.

- ✓ **Customer Centric Approach:** Focuses on understanding customer needs and building long-term relationships.
- ✓ **Data Integration:** Consolidates information from emails, calls, social media, and websites into a single platform.
- ✓ **Automation & Efficiency:** Streamlines sales, marketing, and support processes for faster response times.
- ✓ **Personalized Engagement:** Enables targeted campaigns and tailored experiences that enhance customer retention.

CRM involves email marketing and integration, documents, sales calls, relationship management, etc.

5.8 Role of CRM

Customer Relationship Management (CRM) plays a crucial role in shaping how organizations engage, retain, and grow their customer base. It provides structure and strategy to build meaningful, long-term relationships that drive business success.

Key Roles of CRM:

- ✓ **Defines a Clear Vision:** Establishes a bold and strategic roadmap for building and nurturing customer relationships.
- ✓ **Executes Relationship Strategies:** Aligns customer engagement initiatives with organizational goals to enhance loyalty and satisfaction.
- ✓ **Enables Team Collaboration:** Brings sales, marketing, and support teams together under a unified relationship strategy.
- ✓ **Drives Leadership in Client Management:** Encourages proactive communication, accountability, and continuous relationship growth.

5.9 Functions of CRM

- ✓ **Information Acquisition & Storage:** Collects and organizes customer data from multiple touchpoints.
- ✓ **Sales Growth Enablement:** Helps identify opportunities, automate follow ups, and improve conversion rates.
- ✓ **Quality Improvement:** Enhances service delivery through data driven insights and feedback loops.
- ✓ **Customer Lifecycle Management:** Tracks every stage of the customer journey to ensure consistent satisfaction.

- ✓ **Streamlined Communication:** Maintains seamless interaction across departments and channels.

5.10 Advantages of CRM

- ✓ Customers are motivated to return again and again as they receive good customer service and continue to do business.
- ✓ It enables an organization to create detailed profiles such as customer likes/dislikes.
- ✓ It decreases the cost.
- ✓ It highlights the poor operational processes.
- ✓ It increased accessed to a source of market and competitor information.

5.11 Disadvantages of CRM

Despite its benefits, CRM implementation requires careful planning and oversight to avoid potential drawbacks.

- ✓ **Security & Privacy Risks:** Cloud based CRM systems may expose sensitive customer data if not properly managed.
- ✓ **Limited Flexibility:** Predefined structures can restrict customization for unique business needs.
- ✓ **Increased Vulnerability:** Dependence on digital infrastructure can lead to downtime or technical disruptions.
- ✓ **Maintenance Overhead:** Requires dedicated management and regular updates to remain effective.
- ✓ **Duplication of Effort:** Poor data synchronization or user errors can lead to redundant tasks and inefficiencies.

5.12 Types of CRM Software

CRM software types generally fall into Operational, focusing on daily tasks (sales, service); Analytical, analyzing data for insights; and Collaborative, improving team communication, with Strategic often added to guide long-term goals; many modern platforms combine these for comprehensive customer management. Other categories include AI-powered, Social, B2B/B2C, and specialized solutions like Sales CRM or Contact Center CRM.

Core Types of CRM Systems

i) Operational CRM:

Automates and streamlines front-office processes like sales, marketing (lead generation, campaigns), and customer service (support tickets, tracking) for efficiency.

ii) Analytical CRM:

Uses data mining and reporting to understand customer behavior, preferences, and trends, helping businesses make data-driven decisions and personalize experiences.

iii) Collaborative CRM:

Focuses on information sharing across departments (sales, marketing, support) to ensure a unified customer view and consistent experience.

iv) Strategic CRM:

Aims to build long-term customer loyalty and relationships, often leveraging insights from other CRM types.

Other Important Categories

i) AI-Powered CRM:

Integrates artificial intelligence for smarter automation, predictive analytics, and hyper-personalization.

ii) Social CRM:

Connects with social media platforms to engage customers and gather insights from social interactions.

iii) B2B vs. B2C CRM:

Tailored for business-to-business (longer sales cycles, complex relationships) or business-to-consumer (individual customer focus).

iv) Vertical CRM:

Industry-specific solutions (e.g., real estate, healthcare) with built-in features for particular business needs.

Check Your Progress

Choose the Correct Answer:

1. **What does BPO stand for?**

   a) Business Process Output

   b) Business Process Outsourcing

   c) Business Performance Office

   d) Business Planning Organization

   Answer: b)

2. **Which of the following is a back-office BPO service?**

   a) Technical support

   b) Customer care

   c) Payroll processing

   d) Telemarketing

   Answer: c)

3. **Outsourcing services to another country is called:**

   a) Onshore BPO

   b) Nearshore BPO

   c) Offshore BPO

   d) Domestic BPO

   Answer: c)

4. **Which is a major benefit of BPO?**

   a) Increased workload

   b) Higher costs

c) Cost reduction

d) Data loss

Answer: c)

5. **A major drawback of BPO is:**

a) Increased control

b) Data security risks

c) Higher productivity

d) Skill development

Answer: b)

6. **CRM stands for:**

a) Customer Relation Market

b) Customer Resource Management

c) Customer Relationship Management

d) Customer Retail Management

Answer: c)

7. **Which CRM focuses on data analysis?**

a) Operational CRM

b) Strategic CRM

c) Analytical CRM

d) Collaborative CRM

Answer: c)

8. **Which CRM improves communication between departments?**

a) Analytical CRM

b) Operational CRM

c) Collaborative CRM

d) Technical CRM

Answer: c)

9. **Customer support centers are examples of:**

a) Back-office BPO

b) Front-office BPO

c) Offshore BPO

d) Nearshore BPO

Answer: b)

10. **CRM software mainly helps in:**

a) Manufacturing goods

b) Managing employees

c) Managing customer relationships

d) Reducing taxes

Answer: c)

Small Questions – LOCF Mapping Table

S.No	Small Question	CO	Bloom's Level	PO
1	What is the meaning of Business Process Outsourcing (BPO)?	CO1	Remember	PO1
2	Name the main types of BPO.	CO2	Remember	PO2
3	List the benefits of BPO for organizations.	CO2	Understand	PO2
4	What are the drawbacks of BPO?	CO3	Understand	PO3
5	Give examples of common BPO services.	CO3	Remember	PO3

Big Questions – LOCF Mapping Table

S.No	Big Question	CO	Bloom's Level	PO
1	Explain the meaning and concept of Business Process Outsourcing (BPO).	CO1	Understand	PO1
2	Discuss the different types of BPO with examples.	CO2	Analyze	PO2
3	Explain the benefits of BPO for organizations and employees.	CO2	Evaluate	PO2
4	Discuss the drawbacks and challenges associated with BPO.	CO3	Analyze	PO3
5	Explain how BPO contributes to business efficiency and competitive advantage.	CO3	Evaluate	PO3