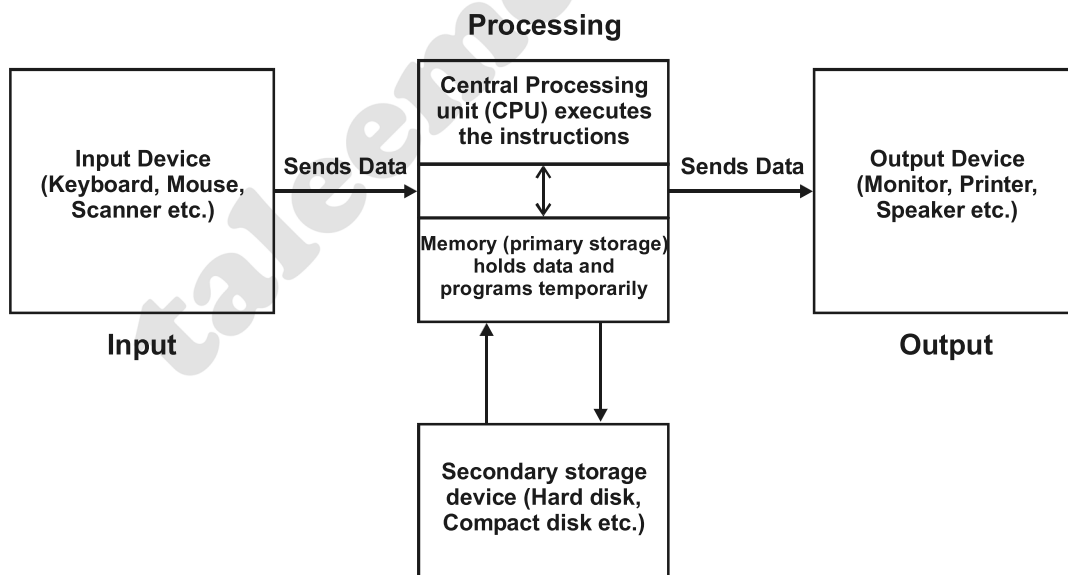


BASICS OF INFORMATION TECHNOLOGY

Q1. What is computer? What are its functions? Explain briefly.

COMPUTER:

- Computer is an electronic device or a programmable machine. It takes input. Process that given input and produces output in the form of information. Computer can process data on the basis of instructions given to it. It can also store data on secondary storage devices for future use.
- A computer become useful only when hardware and software are combined.



Functions of computer:

There are four functions in this definition:

- 1. Input**
- 2. Processing**
- 3. Output**
- 4. Storage**

Input:

- Everything we give to the computer is called input.
- The collection of raw facts and figures is called data. Data is entered in the computer through input devices e.g. keyboard, mouse etc.

Data Processing:

- The system that accepts data manipulates it in a useful and meaningful form is called data processing.
- The operations carried out on data to convert it into useful information are called data processing.
- CPU is a device which is used to process the data arithmetically or logically to convert into information.

Output:

- The organized and meaningful form of data after processing is called information.
- Output devices show the results or information in the form of output.
- Output devices are printers, monitors etc.

Storage:

- Data and information are stored on secondary storage devices for later use.
- Secondary storage devices are CD's, Hard Disk, and Floppy Disk etc.

Q2. What is Information Technology? Define Digital Convergence and Modern Scenario of Information Technology.

INFORMATION TECHNOLOGY:

- It is a technology that combines computing with high speed communication links that carry data in the form of text, sound, images, video etc. from one place to another in this global village (all over the world).
- The interconnection of computers enables people to send and receive information.
- Internet is also used as a source of information technology.

DIGITAL CONVERGENCE:

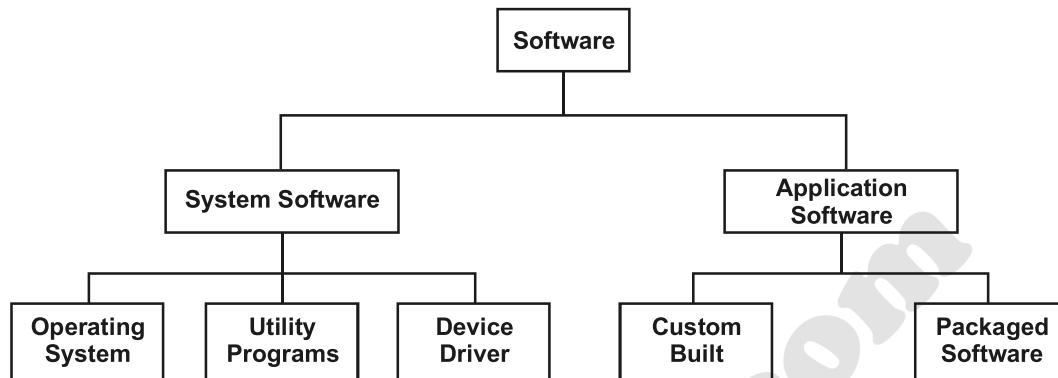
- In digital convergence different types of things are converted into a digital form.
- The digital convergence is the technological merger of the various industries through some electronic devices that exchange information between them.

MODERN SCENARIO OF INFORMATION TECHNOLOGY:

- Modern scenario means the modern situation of the information technology.
- The base of information technology is computing and high speed communication through satellite, fiber optic, mobile phones, fax-machine, ecommerce, M-Commerce etc.
- IT brought a revolution in our life and it is called computer revolution, Information Revolution, Multi-media revolution, communication revolution or Internet revolution.
- The major application of computers are:
 - **AI (Artificial Intelligence):** It is used to develop machines with human-like qualities such as learning, seeing and hearing etc.
 - **Web Based Applications:** It is a type of software application that is available on the Web. The user can use it by connecting to the Internet.
 - **E-Commerce:** It is a process of performing business over the Internet.
 - **M-Commerce:** It is a process of buying goods and services using mobile phone.
 - **Computer Animation:** It is a process to create moving images using computer.
 - **Multi-media and Hypermedia:** Multimedia is a collection of graphics, animation, audio and video presented by computer. Hypermedia is a process of creating links to files that contain photographs, audio, video and text etc.
 - **Distributed Applications:** It is a process of running single task on multiple computers.

Q3. What are Programs/Software and Hardware? Describe different types of Software and Hardware.

PROGRAM / SOFTWARE:



- A set of instructions given to the computer to solve any problem is called a program or software.
- These instructions tell the computer what to do. Software cannot be executed without hardware.

There are two types of software.

1. System software.
2. Application Software.

System Software:

- It is used to control the usage and allocation of different hardware components.
- It also enables the other application programs to execute.
- This software is developed to control the hardware components.
- Operating system (DOS, Windows etc.), utility programs (data backup programs etc.) and device driver software are the kinds of system software.

Operating System:

- An operating system is a set of programs that manages all computer components and operations. A computer cannot do anything without operating system. Operating system must be installed on every computer. Users interact with the computer through operating system. Linux and Windows are examples of operating system software.

Utility Programs:

- A utility program is a type of system software that is used for effective management of computer system. The user can use utility program to perform maintenance tasks related to different devices and programs. The utility program keep the computer system running smoothly. Most operating systems include

different built-in utility programs. The user can also buy stand alone utility programs.

Device Drivers:

- A device driver is a program that is used to operate and control a device attached to computer. Device drivers are provided by manufactures of devices. The devices cannot function properly without device drivers.

Application Software:

- Application software are developed to perform some specific task. These are specially designed to solve the problems of users.
- This software is also used to provide audio, video or multimedia entertainment to the users.
- Microsoft Word, Microsoft Excel and Adobe Photoshop are the examples of application software.

Custom-built software and packaged software are two types of application programs.

Custom-built software:

- These software are designed according to the requirement of a particular customer.
- The professional team of programmers depending on the requirements develops these programs.
- Cost of customized software is more than the packaged software.
- Patient information system, inventory system, college admission system and examination system are the examples

Packaged software:

- These are also known as off-the-shelf (ready made) programs. These are designed for sale to the general public.
- Software developers also acquire packaged software for their ease.
- These facilitate the users in all fields of life.
- Microsoft Office Package (MS-Word, MS-Excel, etc), ORACLE, Graphics software, Communication programs are the examples

Hardware:

- Physical parts of the computer are called hardware.
- **Input devices:** Keyboard, Pointing devices (Mouse, joystick, track-ball etc.), Source Data entry (Scanning) devices (camera, scanner, bar code reader etc.)
- **Output devices:** Monitor, Speakers, Printers, Projectors

- **Main Memory:** RAM, ROM
- **Secondary Storage devices:** Hard disk, Floppy disk, CD, Tape, DVD, USB
- **Inter Connectors:** Cables, Ports, Buses
- **Networking devices:** Modem, network cards, Bridge, Router, Gateway
- **I/O devices:** Terminals, Touch screen

The difference between software and hardware:

Software	Hardware
(1) Software is a set of instructions that tell a computer exactly what to do.	(1) Hardware is physical parts of computer that cause processing of data.
(2) Software cannot be executed without hardware.	(2) Hardware cannot perform any task without software.
(3) Software cannot be touched.	(3) Hardware can be seen and touched.
(4) Software is debugged in case of problem.	(4) Hardware is repaired in case of problem.
(5) Software is reinstalled if the problem is not solved.	(5) Hardware is replaced if the problem is not solved.

Q4. What are Input Devices? Describe different types of Input Devices.

INPUT DEVICES:

- Input is anything given the computer e.g. data, instruction. The devices, which are used to enter data into the computer, are called input devices.
- These are the devices through which user can communicate with the computer.
- Keyboard, Pointing devices and Source data entry devices are the types of input devices

Key Board:

- It looks like a typewriter with some special keys.
- Data is entered through keyboard by typing keys.
- The layout of the standard keyboard is QWERTY which describes the beginning keys in the top row of keyboard.
- There are about 101 to 124 keys available on the keyboard.
- There are different types of key available on the keyboard.
- Alphabetic
- Numeric
- Functions
- Special characters

- Special function keys
- Editing keys
- Cursor movement keys

Pointing devices/Point and Draw devices:

- Pointing devices control the position of the cursor or pointer on the screen.
- Mouse, Trackball, Pointing stick, Joystick, Touchpad, Touch screen, Light pen, Digitizing/graphic tablet and Pen-based systems are the examples.

Source data entry devices:

- These devices are used for direct data entry to the computer systems. Examples are:
- Bar-code reader
- Mark-and character recognition devices.
 - MICR (magnetic ink character recognition)
 - OMR (Optical mark recognition)
 - OCR (Optical character recognition)
- Magnetic strip cards
- Smart cards
- Fax machine
- Imaging system
- Audio input device
- Video input device
- Digital camera

Q5. What is a Keyboard? Describe different Keys available on the keyboard.**KEYBOARD:**

- The keyboard is usually a rectangular frame having keys on it. It is used to input character data.
- In a computer, a keyboard is a device that enters letters, numbers and other characters and processor converts electrical signals into machine-readable form.
- Keyboards are of different layouts and sizes. The most common layout is QWERTY (named for the first six keys from left side of top row). The standard keyboard has 101 keys.
- Notebooks have embedded keys accessible by special keys or by pressing key combinations. Each key on a standard keyboard has one or more functions.
- Press the key to get the lower character and hold Shift to get the upper.
- There are different types of keys available on the keyboard.

- Alphabets (Upper and lower case letters A, B,C -----, a, b, c -----)
- Numeric (0 to 9)
- Function Keys (F1 to F12)
- Special characters (!, \$, #, ^ etc.)
- Editing keys (Ctrl, Alt, Del, Enter, Back Space, etc.)
- Cursor movement keys (Arrows, pg-up, pg-down, home, end)
- Command Keys: (Ctrl, Alt, Del, Shift)
- **Command Keys** - Have a special use. The three most common are the CTRL, Alt and the Shift keys. Command keys normally do nothing on their own but work in combination with other keys. Software uses the command keys to perform different standardize functions.
- The **Control key** or Ctrl is often used to access commands.
- The **Alternative key** or Alt is often used to access menus.
- The **Shift** key is used to type CAPITAL LETTERS.
- As well the command keys are all used to move through documents and edit text faster and easier. As well many computers have Special keys design specifically for the particular computer.
- **ENTER or RETURN** - Moves the cursor on the start of next line. Enter also process commands such as choosing an option in a dialog (message) boxes and submitting a form.
- **DEL or DELETE** - Deletes one character from right side of the cursor. It will also delete the selected text on the right side.
- **BKSP or BACKSPACE** - Deletes the character to the left of cursor and all highlighted text.
- **SPACE BAR** - Moves the cursor one space at a time to the right.
- **SHIFT KEY** - is pressed in combination with other keys. Use the shift keys to type capital letters and to type the upper character on keys with two characters on them.
- **CAPS LOCK** - Locks the keyboard so it types capital letters (a light goes on when caps lock is on).
- **TAB** - Moves the cursor five spaces to the right (number of spaces are usually adjustable). Tab moves to the next field in a form or table (Shift-Tab for previous field).
- **ESC or ESCAPE** - Cancels a menu or dialog box or it allows to “escape” to the previous screen of the program.
- **ARROW KEYS** - Moves the cursor around document without changing text
- **END** Key moves the cursor to the end of current line.

- **HOME Key** – It moves the cursor to the beginning of the current line in a document.
- **PgDn Key** – It advances one full screen while the cursor stays at the same position.
- **PgUp Key** – It backs up to the previous screen while the cursor stays at the same position.
- **Insert Key** – It will overwrite the existing text.
- **Print Screen Key** – causes the screen display to be taken a copy of information.
- **Scroll Lock Key** – It stops cursor movement. It allows scrolling without changing the position of the cursor. Microsoft Excel also supports scroll lock. If scroll lock is enabled on the keyboard when you press any of the arrow keys the screen will move in that direction but the selected cell will not change.
- **Pause Key** – Causes the screen to pause when information is appearing on the screen too fast to read.
- **Function Keys (F1 to F12)** – It is an easy way to give commands to the computer. They have different functions in different programs.

Numeric Keys:

This part of keyboard consists of numeric keys and arithmetic operator keys. These keys are usually located on the right of the keyboard. These keys are similar to calculator keys. This part of keyboard also has an extra Enter key and Num Lock key. The Num Lock key is used to activate or de-activate the numeric keypad.

The numeric keys can be used for two purposes:

- (1) When the computer is in Num Lock mode, these keys are used to enter numeric data and mathematical operators (such as /, *, -, +).
- (2) When the computer is not in the Num Lock mode, then the numeric keys area can be used to move the cursor on the screen (or into document) and to perform other functions such as.

1 End	In most application programs, this key is used to move the cursor to the end of current line of document or to the bottom-left corner of the screen.
2 ↓	This key is used to move the cursor downward (one line at a time).
3 PgDn	This key is used to move one full screen downward while cursor stays at same place.
4 ←	This key is used to move the cursor to the left (one character at a time).
6	This key is used to move the cursor to the right (one character at a time).

→	time).
7 Home	In most programs, this key is used to move the cursor or the beginning of the current line of document or to move the cursor to the to-left corner of the screen.
8 ↑	This key is used to move the cursor upward (one line at a time).
9 PgUp	This key works opposite to 3 PgDn key. It is used to move one full screen upward.
0 Ins	This key is used to change insert mode to overwrite mode and vice versa. it is a toggle key.
. Del	This key is used to delete a character or space to the right of the cursor position. If texts are selected, these are deleted when Del key is pressed.



Q6. What are Pointing Devices? Describe different types of Pointing Devices.

POINTING DEVICES:

Pointing devices control the position of the cursor or pointer on the screen. Examples are:

- Mouse
- Trackball
- Pointing stick
- Joystick
- Touchpad

- Touch screen
- Light pen
- Digitizing/graphic tablet
- Pen-based systems

Mouse:

- Mouse is a small handy device. It has a ball at its bottom. Some mouse don't have ball but they use laser for motion detection.
- There are two buttons and a wheel at its top.
- When we move a mouse, cursor on the screen also moves accordingly.
- Left button is used to select an object. It can also be used to open an application by double clicking.
- Right button is used to display context menu.
- Scroll wheel is used to scroll through the documents.

**Trackball:**

- It is a variation of mouse.
- In trackball, ball is located at the top of the device.
- When we rotate this ball, cursor on the screen also moves.
- Ball on the top of a stationary device can be rotated with the fingertip or palm of a hand.
- Instead of moving the whole mouse around, the user rolls the trackball only.

Advantage:

- Does not need as much desk space as a mouse.
- It is less tiring because less motion is needed.

**Pointing stick:**

- It is a pointing device looks like a pencil eraser.
- It is located between G, H and B keys of the keyboard.
- We move the pointing stick with our forefinger while using the thumb to press buttons located in front of the spacebar of the keyboard.

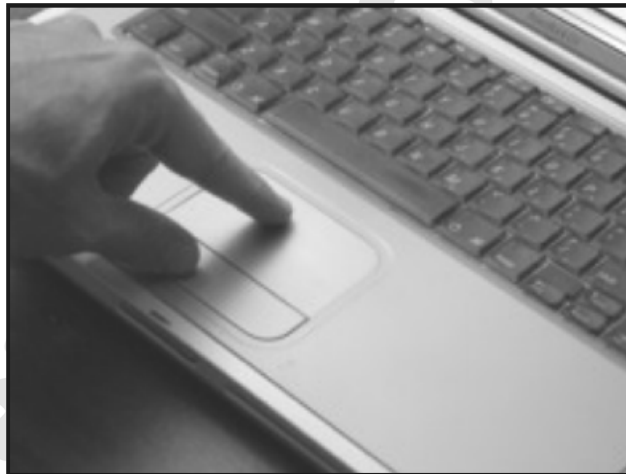
**Joystick:**

- Cursor motion is controlled by vertical stick (joystick) or arrow buttons (game pad)
- A joystick gives a more natural-feeling.
- It is used to move objects in games.
- It has more buttons for special functions than a mouse and can combine buttons for even more actions.
- It can also be used in CAD (Computer aided design) applications.



Touchpad:

- It is a small flat surface over which we slide our finger to move the cursor on the screen.
- It is common on the portable computers.
- Click operation is performed by tapping the finger on pad's surface or by pressing button that is close to the pad.



Touch screen:

- It is a special video display screen in which data is entered by touching the screen using fingertip i.e. make selection by just touching the screen.
- It is covered with plastic layer and has infrared beam of light behind it.
- It uses sensors to detect the touch of finger on provided buttons and menus and display information on the screen accordingly.

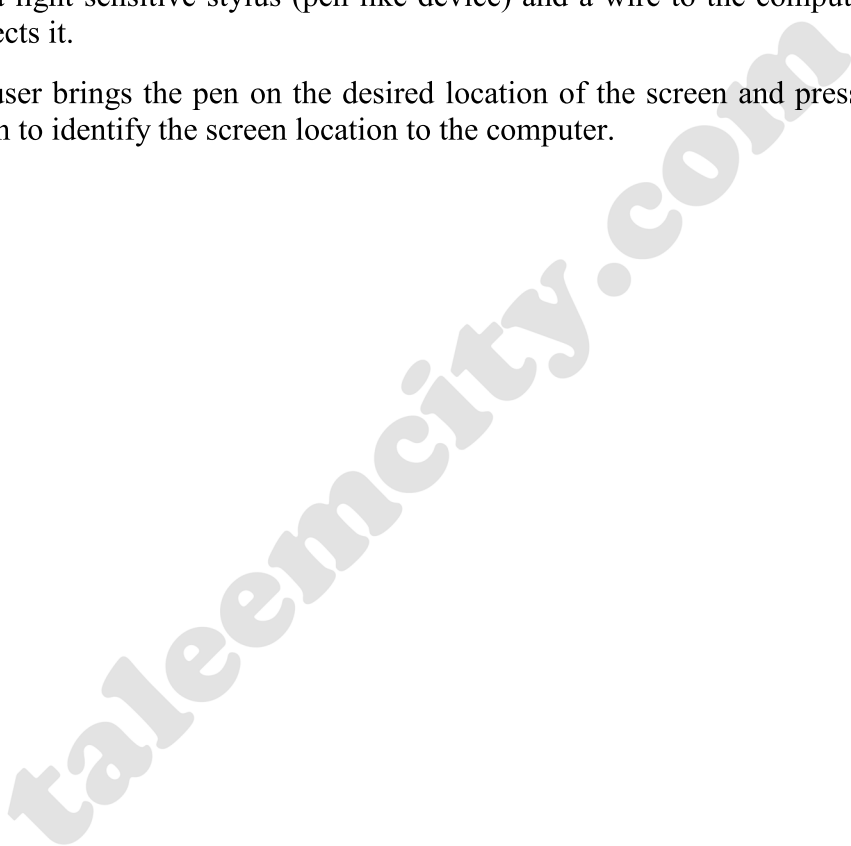
Advantage:

- It's natural to touch something.

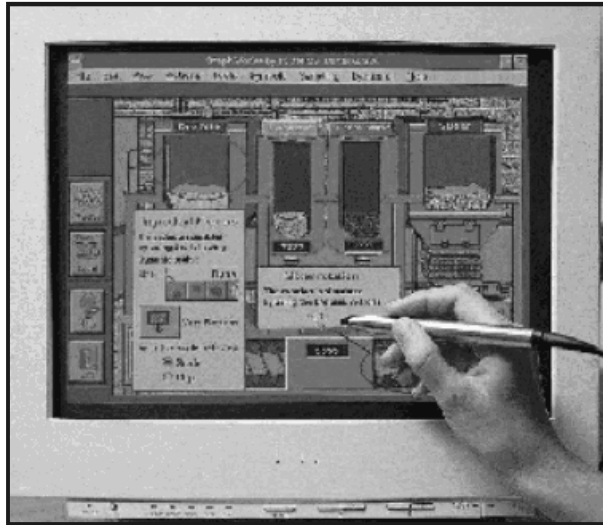
Disadvantage:

- It's tiring if many choices are to be made.
- It takes a lot of screen space for each choice since fingers are bigger than cursors.

Light pen:

- It is a light sensitive stylus (pen like device) and a wire to the computer terminal connects it.
 - The user brings the pen on the desired location of the screen and presses the pen button to identify the screen location to the computer.
- 

- Engineers, graphic designers and illustrators use light pens.

**Digitizing/Graphic Tablet:**

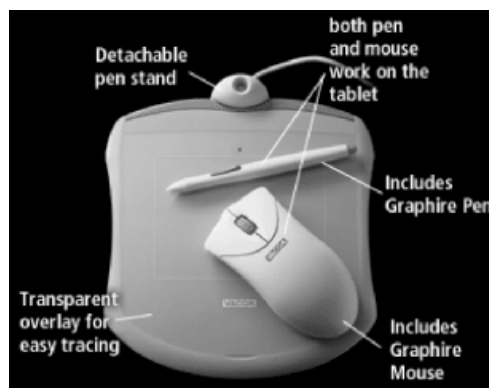
- A digitizing tablet consists of a tablet connected by a wire to a stylus or a puck.
- A stylus is a pen like device with which user sketches an image.
- A puck is a copying device with which the user copies an image.
- It converts drawings, photos, etc. to digital form.
- The tablets have special commands.

Advantage:

- Don't have to redraw graphics already created
- It is used in design and engineering.

Disadvantage:

- Expensive



Pen-based systems:

- It is used especially in Personal Digital Assistants (PDA).
- Pen Input is used for:

Data Input: By writing, PDA recognizes your handwriting.

Pointing Device: Functions like a mouse in moving a cursor around the screen and clicking by tapping the screen.

Command Gestures: You can issue commands by moving pen in patterns. So a certain kind of swirl would mean to save the file and a different kind of swirl could mean to open a new file.

Advantage:

- Can use handwriting instead of typing
- Can use gestures instead of typing commands
- Small in size

Q7. What are Source Data Entry Devices? Describe its different types.**SOURCE DATA ENTRY DEVICES:**

- It is used for direct data entry to the computer system e.g. Bar-code reader, MICR, OMR, OCR, Magnetic strip cards, Smart cards, Fax machine, Imaging system, Audio input device, Video input device, Digital camera

Bar Code Reader

- Bar-codes are vertical zebra stripped lines.
- It is usually located on the price tag of a product.
- It is also called UPC (Universal Product Code) and bar-code reader read the bar codes on products.
- Bar-code reader converts these codes in to digital form which is fed into the computer for further processing.
- Retail shops now use printed bar codes on products to keep the record of their sale.

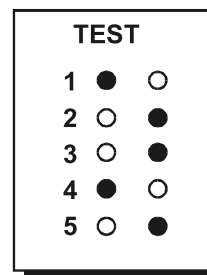


MARK AND CHARACTER RECOGNITION DEVICES:**(i) Magnetic Ink Character Recognition (MICR):**

- It is a method of reading characters written with magnetized ink.
- MICR equipment is used to convert them into digital form. It is then given to the computer for processing.
- Bank account # is printed with special ink of magnetic qualities which can be read by this machine.

**(ii) OMR (Optical Mark Recognition):**

- OMR uses light beam to scan input data to convert it into digital form which are then sent to the computer for processing e.g. test scoring

**(iii) Optical Character Recognition (OCR):**

- It reads printed characters in particular font and converts them into digital code. Most OCR devices use a small optical scanner to read characters.
- The OCR software takes a scanned image of characters and then converts that image into computer characters.

- The document can be edited with a word processor. This is a very tricky process. Documents must be carefully checked for wrong conversions.
- The common example is utility bills and price tags in departmental stores.



(iv) Magnetic strip cards:

- Magnetic strip card has a strip of magnetically encoded data on its back.
- The back of a credit card has a metallic strip that contains magnetically encoded numbers.
- A credit card reader can read the numbers and transmit them to a computer to verify that the card is good.
- These are used for personal identification during driving, in the stores, at public places etc.

(v) Smart Cards:

- It is a chip containing microprocessor and memory. It is used to keep the record of changes, like deducting purchases from the amount entered originally on the card.
- It has a new sensor technology that can read your finger print on the card. The digital image of the fingerprint is then transmitted to a database. In database it is compared with the record.
- Mobile SIM and ATM cards are the examples of smart cards.

(vi) Fax Machine:

- It is also known as "Facsimile Transmission Machine".
- It scans an image and sends it as signals over telephone lines to a receiving fax machine which recreates the image on paper.
- Fax modems are also used to send and receive fax.
- Machines designed only for sending and receiving fax are called dedicated fax machines.
- Fax modems are circuit boards inside the computers and it has the ability to send signals directly to other fax machines or computers.

Imaging System/Image Scanners:

- Scanners allow you to transfer pictures and photographs to your computer.
- The scanner works like a copy machine. It creates a digital image of what it scanned. Scanned text cannot be edited at this point.
- The image scanner scans color or black and white image with light. It then breaks the image into light and dark dots or color dots. Finally, it converts them to digital form. It is also called raster graphics. **Raster graphics** is a technique in which an image is represented as a matrix of dots.
- Flat bed scanners open wide enough to allow you to lay a document or book flat on the glass surface. A document scanner can only scan individual sheets of paper, not books or objects.

**Sound Input/Audio input device:**

- Recording sounds for your computer requires special equipment (Conversion of analog into digital signals).
- Sound cards allow computers to produce sound like music and voice. It is a circuit board that converts analog signals into digital form.
- The older sound cards were 8 bit, then 16 bit cards were being used. Now 32 bit cards are very common.
- Microphones can capture sounds from the air.
- To get best results musical instrument must be directly connected to the computer.

**Video Input Device:**

- Video-capture card is used to convert films and videos into digital form.
- Video cards allow computers to display video, animation and television signals.
- It is also used to capture frames from video.
- Frame-Grabber Video Card and Full-Motion Video Card are the two types of video capture card

Frame-Grabber Video Card:

- It can capture and digitize a single frame at a time.

Full-Motion Video Card:

- It is also known as adapter. It converts analog data into digital signals at the rate of up to 30 frames per second giving the effect of continuously flowing motion picture.

DIGITAL CAMERA:

- Digital cameras allow you to take digital photographs. The images are stored on a memory chip or disk that can be transferred to your computer. Some cameras can also capture sound and video.



VCR/Video Camera:

- A **video camera or recorder** (VCR) can record data that can be uploaded to the computer with the right hardware. Though it is not digital data, you can still get good results with the right software. Both of these take huge amounts of storage. Photos make for very large files.

Web cam:

- A **web cam** is a tiny video camera designed especially to sit on your computer.
- It feeds pictures directly to the computer - no tape or film to develop.
- Web cam is used for video conferencing over the Internet.
- They show the world what's going on outside their window (weather, traffic etc.).

Q8. What are Output Devices? Briefly describe different types of output devices.**OUTPUT DEVICES:**

- Output devices are the devices through which computer can communicate with the user.
- We can view the processed information in the form of output on output devices.
- There are two types of output:

Soft copy:

- It refers to data as shown on screen or in audio or voice form.
- It is not tangible.
- It cannot be touched.
- Virtual reality and robots can be considered softcopy devices.

Hard copy:

- It refers to the printed output on paper.

Output Devices are:

DISPLAY SCREENS:

- The device, which displays computer output to us.

Size:

- Desktop screens are usually 14 – 21 inch. by diagonal measurement. (This is how TV screens are measured.).
- Larger sizes are available, at a significantly higher cost.

Resolution

- The number of dots or pixels per inch determines resolution.
- It determines how clear and detailed the image is.
- Pictures on a screen are made up of tiny dots and 1 dot on screen is 1 **pixel** (form "picture element").
- The more pixels per inch, the clearer and more detailed the picture.

PRINTERS:

- The printer takes the information on your screen and transfers it to paper or a hard copy.
- There are many different types of printers with various levels of quality.
- Resolution of printer is measured in dpi (dots per inch).
- Quality of a printer depends on its resolution and speed.
- The speed of a printer is measured in:
 - cps** = characters per second
 - lpm** = lines per minute
 - ppm** = pages per minute
- The cost depends on the speed of the printing.
- There are two types of printers.
- Impact printers form characters and images by striking mechanism such as print hammer, or wheel against the ink ribbon. Dot matrix, daisy wheel and line printers are the examples of impact printers.
- Non Impact printers do not involve actually striking the paper. Instead, it uses ink spray or toner powder. Laser, Inkjet and Thermal are the examples of Non-Impact Printers.

PLOTTER:

- A plotter is a special output device used to produce high-quality graphics in many colors.
- It is used for specialized application such as for printing, architectural drawing, maps, graphs and charts.
- Flatbed Plotters and Drum Plotters are two kinds of plotters.

Flatbed Plotter:

- Flatbed plotter plots on a paper that lies on a flat bed like surface.
- The bed size varies according to the requirement.
- One to four pens move across the paper and images are printed accordingly.

Drum Plotter:

- It is similar to flatbed plotter.
- Paper is mounted over a drum for continuous output.
- Its usage is to track earthquake reading.

SOUND OUTPUT - Speakers:

- It is used to get audio output from the computer.
- Sound is in the form of analog signals but the data in computer is in digital form; sound card converts digital signals into analog signals.
- A variety of speakers are available in the market for audio output.

Q9. What are Display Screens and explain different types of display screen.

DISPLAY SCREENS:

- The device which displays soft copy computer output to us.



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Screen Features**Size:**

- Desktop screens are usually 14 - 21 inch by diagonal measurement. (This is how TV screens are measured.).
- Larger sizes are available, at a significantly higher cost.

Resolution:

- The number of dots or pixels per inch determines resolution.
- It determines how clear and detailed the image is.
- Pictures on a screen are made up of tiny dots and 1 dot on screen is 1 **pixel** (form "picture element").
- The more pixels per inch, the clearer and more detailed the picture.

Video Display Adapter:

- A display screen must have a video display adapter card attached with the computer.
- It is known as video graphics card and it is a circuit board that determines the resolution colors, and speed with which images appear on the screen.
- There are three types of the graphics card. VGA, SVGA and XGA

VGA:

- It stands for video graphics array.
- It supports 16-256 colors depending on the resolution.
- At 320 x 200 pixels, it supports 16 colors.
- At 640 x 480 pixels, it supports 256 colors.
- It is called 4 bit color.

CGA	Color Graphics Adapter	320 x 200
VGA	Video Graphics Adapter	640 x 480

SVGA -Super video graphics array:

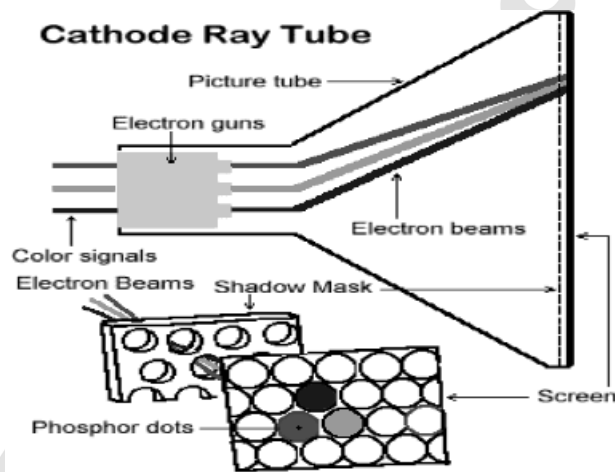
- It determines what resolutions are available and how many colors can be displayed.
- It supports 256 colors at higher resolution.
- It has two graphics modes: 800 x 600 and 1024 x 768.
- It is called 8 bit color.

XGA -Extended graphics array:

- It supports 16.7 million colors.
- It has resolution of 1024 x 768.
- XGA will support 256, 65536 or 16777216 colors depending on video adapter memory chip.
- It is called 24 bit color or true color.

TYPE OF SCREENS:**CRT screen (Cathode Ray Tube):**

- A standard monitor screen is a **CRT (cathode ray tube)**.
- The screen is a vacuum tube. Its inner side is coated with phosphorous (phosphorous dots).
- When a beam of electrons hits a dot, the dot will glow.
- On a color monitor these phosphor dots are in groups of three: **Red, Green, and Blue**.
- This **RGB** system can create all the other colors by combining these three basic colours. There are 3 signals that control the 3 electron beams in the monitor, one for each RGB color. Each beam only touches the dots that the signal tells it to light. All the glowing dots together make the picture.

**Flat Panel Display:**

- The flat panel displays are much thinner, weightless and consume less power than CRT.
- It is used in laptops.
- Flat panel displays are made up of two glass plates with a substance in between them, which is activate in different ways.
- There are three types of flat panel display screens: LCD, Gas Plasma and EL.

LCD (Liquid Crystal Display):

- This screen uses a different technique.

- LCD displays are made of two layers of a polarizing material with a liquid crystal solution in between.
- The modules of this substance lineup in such a way that the light behind the screen blocked or allowed to create an image.

**Gas plasma Screens:**

- It is used for very large screens and some laptops. These are flat, good color, but much more expensive.
- It is like a neon bulb in which the display uses a gas that emits light in the presence of an electric current.

EL:

- It stands for Electro Luminescent display and it contains a substance that glows when it is charged by electric current.

Q10. What are Printers? Explain its different types.**PRINTERS:**

- The printer takes the information on your screen and transfers it to paper or a hard copy i.e. it is used to print characters, symbols or graphics on the paper.

There are many different types of printers with various levels of quality.

The speed of a printer is measured in:

cps = characters per second

lpm = lines per minute

ppm = pages per minute

- The cost depends on the speed of the printing.

TYPES OF PRINTERS:

- Impact Printers
- Non-Impact Printers

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IMPACT PRINTERS:

- These printers form characters and images by striking mechanism such as print hammer, or wheel against the ink ribbon.
- Dot matrix, daisy wheel and line printers are the examples of impact printers.

Dot Matrix Printer:

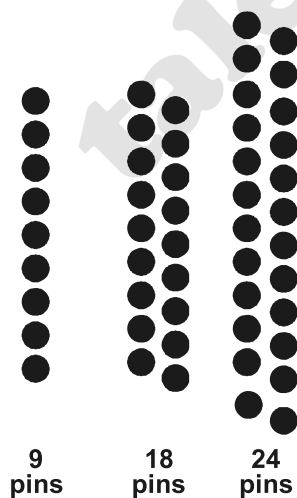
- Dot matrix printers work like a typewriter transferring ink from a ribbon to paper with a series or 'matrix' of tiny pins.
- Dot matrix printer forms characters using row(s) of pins, 9, 18, or 24 which impact the ribbon on top of the paper.
- Dot matrix printers are also called pin printers.
- More pins will print more clear characters.

Most dot matrix printers have the characteristics below:

- **Bi-directional** - prints left to right and also right to left
- **Tractor feed** - uses sprockets to pull continuous-feed paper
- **Friction feed** -uses pressure to pull single sheets

Advantages: Inexpensive, Can do multi-copy printing

Disadvantages: Can be slow, Loud, Graphics of low quality.



Daisy Wheel Printer:

- This printer uses a series of petals arranged on a wheel having a character at the end of each petal.
- A petal comes into a print position by the rotation of wheel. Image is formed when hammer strike on the desired character.
- It is slower than dot-matrix printer but better in quality.

**Line Printer:**

- It is normally used with mainframe or mini computers.
- It prints one line at a time.
- It prints 3000 lines per minute.

There are two types of line printers.

Chain and Band Printers:

- It uses characters on a band or chain that is moved into place before striking the characters onto the paper.
- Advantages: Very fast up to 3000 lpm (lines per minute)
- Disadvantages: Very expensive, loud

**NON-IMPACT PRINTERS:**

- This type of printer does not involve actually striking the paper. Instead, it uses ink spray or toner powder.

- Laser, Inkjet and Thermal are the examples of Non-Impact Printers

Advantages:

- Quiet and can handle graphics and often a wider variety of fonts than impact printers.

Disadvantages:

- These are more expensive than impact printers.

Laser printers:

- It uses the same technology as a photocopier using heat to transfer toner onto paper.
- The images are created on drum and magnetically charged toner transfers the drum image on paper.
- Laser printers are page printers.
- The Laser printer uses 300 dpi to 1200 dpi.

Advantages:

- Quiet and faster than other non-impact printers; its printing speed is ranging from 4-32 ppm (pages per minute) and up to 200 ppm for mainframes; High quality print and graphics; some can do color.

Disadvantages:

- More expensive than impact printers
- Cannot use multiple-copy paper

**Ink-Jet Printer:**

- Ink jet printers work like dot matrix printers but fire a stream of ink from a cartridge directly onto the paper to form characters.
- Its resolution is 300 dpi to 720 dpi.
- It normally prints 1 to 6 pages per minute.
- Bubble jet printer uses print head, heat element and 128 tiny nozzles for printing.

Advantages:

- Quiet, High quality text and graphics, some can do color, Cheaper than laser printer.

Disadvantages:

- Cannot use multiple-copy paper; Ink can smear

**Thermal Printer:**

- It uses heat on chemically treated waxy paper to form characters. Fax machines that use rolls of paper are also of this type.
- The image is created on paper by burning dots on it.

Advantages:

- o Quiet and High quality print.

Disadvantages:

- o Relatively slow, Expensive, Requiring special paper, Output is affected by sunlight and cannot use multiple-copy paper

Q11. What are Plotters and speakers?**PLOTTER:**

- A plotter is a special hard copy output device used to produce high-quality graphics in many colors.
- It is used for specialized application such as for printing architectural drawings, maps, graphs and charts.
- Flatbed Plotters and Drum Plotters are the kinds of plotters.

Flatbed Plotter:

- Flatbed plotter plots on a paper that lies on a flat bed like surface.
- The bed size varies according to the requirement.
- One to four pens move across the paper and images are printed accordingly.

**Drum Plotter:**

- It is similar to flatbed plotter.
- Paper is mounted over a drum for continuous output.
- Its usage is to track earthquake reading.

**SOUND OUTPUT:****Speakers:**

- It is used to get audio output from the computer.
- Sound is in the form of analog signals but the data in computer is in digital form; sound card converts digital signals into analog signals.
- A variety of speakers are available in the market.



Q12. What are units of data storage? Explain Bit, Byte and word.**BASIC UNITS OF DATA STORAGE:**

- The memory is composed of an electronic circuitry which is a combination of “ON” or “OFF” switches. In computer terminology, this two state condition is represented in binary notation by the use of 1s and 0s

Units of Data Storage:

Bit, Byte, Word

Bit:

- It stands for Binary Digit. The binary numbers 0 or 1 are called bits.
- It is the basic and smallest unit of data storage in computer memory.
- The circuit being on or off at a time.
- A bit on the memory is always storing some kind of data.
- The complexity of computer circuitry is described in terms of the number of bits that can be transmitted simultaneously
- This is determined by the number of wires that run parallel to one another on the circuit-boards.
- Current PCs use 8, 16, 32 and 64 bit paths.

BYTE:

- It is a combination of 8-bits. It can store a single character of data.
- The storage capacity or memory capacity is expressed in terms of number of bytes it can hold or store.

Unit	Abbreviation	No. of Bytes
Kilo Bytes	K or KB	2^{10}
Mega Bytes	M or MB	2^{20}
Giga Bytes	G or GB	2^{30}
Terabytes	T or TB	2^{40}

1024B	=	1KB
1024 KB	=	1MB
1024MB	=	1GB
1024GB	=	1TB

WORD:

- It is the number of bytes in common unit of data as defined by the computer system.
- The word is the size of register of a microprocessor. The length of word varies from computer to computer.
- The power of computer depends on the size of word.

No of Bytes	No of Bits	ERA of computer
1 Byte	8	Early PC
2 Bytes	16	Micro Computers
4 Bytes Single Word	32	Mainframe, Mini, Micro Computers

8 Bytes Double Word

64

Super Computers or Micro computer

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Convert 240 MB Memory in bytes and kilo-bytes

No. of Bytes in 1 MB	=	2^{20}	
No. of Bytes in 240 MB	=	240×2^{20}	= 251658240B
No. of kilo-Bytes in 1MB	=	2^{10}	
No. of kilo-Bytes in 240MB	=	240×2^{10}	= 24560 KB

Convert 60GB memory in words

No. of Bytes in 1 GB	=	2^{30}	
No. of Bytes in 60 GB	=	60×2^{30}	
No. of Words in 4 B	=	1W	
No. of Words in 60GB	=	$60/4 \times 2^{30}$	
	=	$15 \times 2^{30} = 161016127360W$	

Q13. What are System and its components?**SYSTEM:**

- A system is a combination of some related components that interact with each other to perform some specific tasks.
- System is created to solve problems.
- A problem must exist before the development of a system.
- First, the problem is defined then a system is developed to solve it.

There are five system components.

Hardware - The physical parts required to develop a system.

Software - The instructions run the system smoothly.

People/User - User uses the system and gets benefits from the system

Data/Information - Data is input provided to the system and information is output obtained from the system.

Communication Setup - The transmission of information from one location to another at right time and at right place is called communication setup.

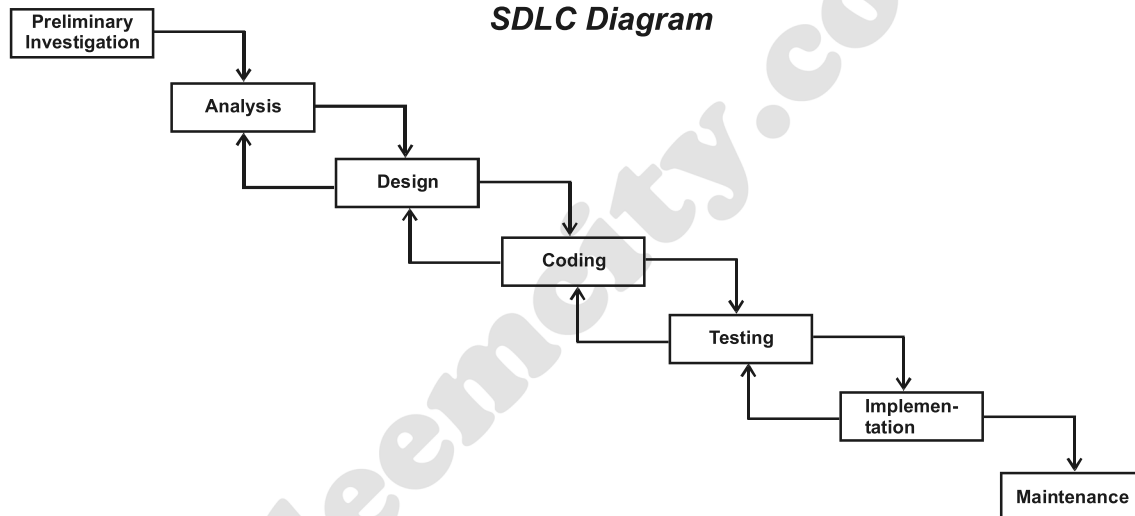
Q14. What is SDLC and discuss all the phases of SDLC?**SDLC:**

- It stands for system development life cycle.
- It is an organized way to develop a successful system.
- Every organization requires some system in order to run smoothly; therefore the process of putting systems into a place and continuing to maintain or enhance them is referred as system development.
- The concept of life cycle fits anything that originates, matures over time and eventually dies.

- SDLC involves a series of steps that closely follow the steps of system approach.

It consists of seven phases.

1. Preliminary investigation
2. Analysis
3. Design
4. Coding
5. Testing
6. Implementation
7. Maintenance



PRELIMINARY INVESTIGATION:

- It is the first step in developing and managing system.
- In preliminary investigation we identify the requirement for a new system.
- The objective of preliminary investigation is to conduct an initial analysis, propose alternative solutions, describe cost and benefits and submit a preliminary plan with recommendation as discussed below.

System Identification:

- At this stage, system must be identified because everything done in future will be based on this identification.

System Scope:

- The scope of the system is established at this stage.
- It is necessary to describe all the limitations of the system:
- How much resources are required?
- How much cost is required for the system?
- What is Time limit of the system?
- How many personnel are required for the system?

Alternative Solutions:

- There may be alternative solutions to develop a successful system.
- Identify all those solutions and select the best one.
- Observe what the competitors are doing for the same system.

Feasibility Study:

- In this step we see the financial, political, technical, economical, operational feasibility for the proposed system.
- It means the proposed project:
- Helps the organization to achieve overall objectives.
- Helps the organization to specify the performance criteria for the system (what is required).
- It helps to change the organization's way of doing business.

Preliminary plan:

- In this step, a feasibility report is submitted to the managers for approval.
- The feasibility report consists of all these findings in the shape of a written document.
- The managers will decide the future actions to be taken based on this report.
- It is possible that managers might make few amendments in the report based on the preliminary investigation.

SYSTEM ANALYSIS:

- If management has decided to continue, then the project team moves towards the analysis of the system.
- **System analysis** is the study of the requirements of the end-user and the organization that is required before the design of the new system.
- **System analyst** is a person who is responsible for the analysis of the system. The analysts conduct three types of activities in system analysis phase.
 1. Need analysis/Requirement analysis
 2. Data gathering
 3. Data analysis and analysis Report

Need analysis/Requirement analysis:

- Analyst sum up the requirements of the system from the users and the managers.

Data gathering:

- The system analyst collects the data about the new system. He uses different tools and techniques to collect data depending on the situation. These are:
 1. Written documents
 2. Interviews
 3. Questionnaires
 4. Observations
 5. Sampling

Written Documents:

- The written documents are the reports, forms, memos, business plans, policy statements, organizational charts.
- The analyst collects all these manual documents to develop the new system or upgrade the existing computerized system.

Interviews:

- The project team or analysts interviews the managers, users, clients, suppliers and competitors.
- The questions in the interviews should be precise and relevant.
- These interviews will help the analysts to gain more knowledge about the system.

Questionnaires:

- Interviewing method is a time consuming method to get data; hence the analyst designs a questionnaires (a form) to collect information from different people.
- This method is inexpensive but the response of gathering data is insufficient and confusing.

Observations:

- The analyst and his team may collect information through observation of the working of the existing system.

Sampling:

- If there are large number of people and events involved in a system, then it is a better to work on a portion of all of them to save time.

Data Analysis:

- The collected data of the system is analyzed.
- The analyst ensures that the data is accurate, complete and readily available in the new system design.
- For this purpose the analyst and his team uses many tools which are:
 1. DFD (data flow diagrams)
 2. Flow Charts

3. Connectivity diagrams
4. Grid charts
5. Decision tables etc.

Analysis Report:

This report is presented to management for the approval of the project and report consists of three parts:

1. The working of the current system.
2. Problems in the existing system.
3. Requirements for the new system and recommendations for the future.

DESIGN:

- It is a logical representation of the system.
- It is divided into three steps.
 1. Logical design
 2. Physical design
 3. Report

Logical design:

- It describes the functional capabilities of the proposed system.
- The logical design describes the system components and their interaction.
- For logical design following tools are used.
- CASE (Computer Aided Software Engineering) tools
- Project management software (MS-Project, Gantt Chart, PERT diagrams etc.)

Physical design:

- The physical design describes how a proposed system will deliver the general capabilities described in the logical design.
- The following points are discussed in physical design:
 1. Input requirements
 2. Output requirements
 3. Storage requirements
 4. Processing requirements
 5. System control requirements
 6. Backup and recovery.

Report:

- A detailed report about the physical and logical design is submitted to the management.
- It explains the complete proposed system.

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CODING:

- It is the core area of SDLC in which actual codes of the system are written.
- It needs a lot of time, effort, and budget to produce the system.
- The analysis and designs are given to the programmers and software engineers to produce the system.
- The programmers use packaged software to write the programs and save time.

TESTING:

- In testing phase, system developers detect and remove the errors in the software.
- There are two types of testing:
 1. Unit testing
 2. System-testing

Unit testing:

- It is also called modular testing.
- Each module of the software is tested individually using sample data.

System-testing:

- All the modules of the program are linked and tested as a single unit.
- Both sample data and actual data may be used to test the whole system.
- If the system fails then programmers removes those errors.
- If the system passes all the tests then the developers implement the system for the organization.

IMPLEMENTATION:

- It means installation of hardware and software systems and data files for use to solve our problems.
- Users of the system are also trained in this phase.
- There are five methods to implement a system:
 1. Direct Implementation
 2. Parallel Implementation
 3. Phased Implementation
 4. Pilot Implementation
 5. Users Training

Direct Implementation:

- Users stop working on the old system.

- Users start working directly with the new system.

Parallel Implementation:

- The new and old systems are used side by side until it is felt that new system is better than the old system.

Phased Implementation:

- Parts of the systems are implemented from time to time until the whole system is implemented.

Pilot Implementation:

- This type of implementation allows to implement the complete system but to a selected group of users and departments.

Users Training:

- In this step of SDLC, developers provide training of users to run the new system.
- The training may conducted “In-House” or it may be “Contracted out”.
- Different techniques are used to train the people. These are:
 1. Instruction Manuals
 2. Video tapes
 3. CD's
 4. Lectures

MAINTENANCE:

- It is never ending phase.
- The system must be monitored to ensure that it is successful.
- Maintenance includes:
 1. Keeping the machinery running.
 2. Update and upgrade the system according to the new requirements.
 3. Feedback and Evaluation.

4. Help is also provided to the users against their queries or problems.

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