Usmani Ghani Private High School

INTRODUCTION
TO
COMPUTERE

For School students

GRADE (9)

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WHAT IS A COMPUTER?

The word “computer” is derived from the Latin word “compute” which means to compute or calculate.With this meaning a computer is considered to be a calculating device that can perform arithmetic operations in less amount of timeComputer 80% were used for Mathematical Operations

Computer is an electronic device which takes data (data may be numbers, letters or both or even sounds) from input device (keyboard), processes it with a high electronic speed and gives the result as output

- But today’s computers perform a lot of jobs like
  - arithmetic operations,
  - text based work,
  - graphical work
  - Videos
  - Audio

A computer is an electronic device that can

- accept data (input),
- process the data according to specified rules or instructions,
- produce results (output), and
- Store the results (storage) for future use.

FIGURE 1 Common computer hardware components.

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COMPUTERS PARTS:

For beginning computer users.All types of computers consist of two basic parts:

- Hardware
- Software

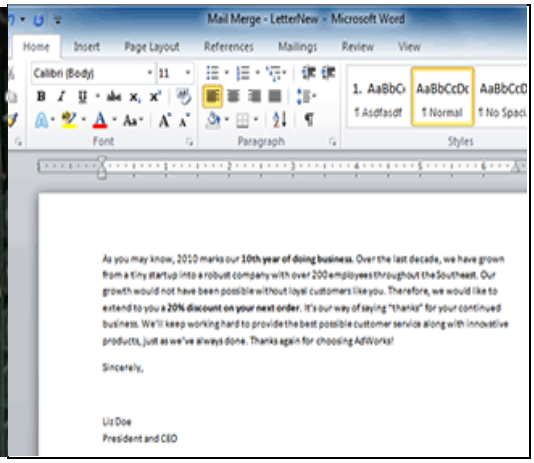
HARDWARE:

Hardware is any part of your computer that has a **physical structure**, such as the computer monitor or keyboard. All tangible component of computer are hardware. OR those things which can be seen and can be touched are computer hardware.

SOFTWARE:

Software is any **set of instructions**that tells the hardware what to do. It is what guides the hardware and tells it how to accomplish each task. Some examples of software are web browsers, games, and word processors such as Microsoft Word. OR those things which cannot be seen and touched are called computer software.

A motherboard (hardware)



Microsoft Word (software)

Anything you buy for your computer can be classified as either hardware or software. Application software is designed to perform useful general-purpose tasks.Software means a sequence of instruction given to computer to perform a specific task.Software consist of step by step instruction that direct the computer device to complete a function.

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Softwareis divided into two types:

SYSTEM SOFTWARE:

Systems software is often referred to as systemsprograms. System software are programs which hold instruction related with the controlling of hardware and software of computer System. System software acts as Controller/ Supervisor and responsible for controlling of input, processing and output of data. System software also known as Firmware or package's or programs. This software keep record of all peripherals equipment attached with the computer. These includeprograms, such as operating systems, assemblers andcompilers, and utilities. That software whichsupports the system is called system software.

APPLICATION SOFTWARE:

Application software tells the computer how to accomplish tasks the user requires, such as creating a document or editing a graphic image.Applications are that particular softwaredesigned to solve individual user problems. Theseprograms can be written by you, the user of a computersystem, developed by a central design agency, or theycan be purchased from softwaresecure. Numeroustypes of applications programs are written. They rangefrom games to word processing and electronic imaging

Common Examples of application software are:

a. Word Processing
b. Spreadsheet
c. Presentation Software
d. Desktop Publishing and Graphic Design
e. Web Design and Development
f. Word processing programs
g. Presentation programs
h. Networking software
i. Web design tools and browsers

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SYSTEM:

System can be defined is "when two or more component are combine to do a specific task or purpose is called system. Computer is a type of system which consist of hardware and software .Computer is a combination of components such is keyboard, mouse, monitor etc. therefore it is called system.

CLASSIFICATION OF COMPUTER:

- According to Size
- According to Technology or functions
- According to Purpose

According to size:

- **Supercomputers**
- **Mainframe Computers**
- **Minicomputers**
- **Workstations**
- **Microcomputers, or Personal Computers**
- **Server Computer**

➢ **SUPERCOMPUTERS:**are widely used in scientific applications such as processing of geological data.

- Super computer are large in size.
- Supercomputers are the most powerful computers. They are used for problems requiring complex calculations.
- Because of their size and expense, supercomputers are relatively unique.
- Supercomputers are used by universities, government agencies, and large businesses.
- All over the world used.

MAINFRAME COMPUTERS:

Are usually slower, less powerful and less expensive than supercomputers. Mainframes are used by banks and much business to update inventory etc.

• Mainframe computers can support hundreds or thousands of users, handling massive amounts of input, output, and storage.

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• Mainframe computers are used in large organizations where many users need access to shared data and programs.

• Mainframes are also used as e-commerce servers, handling transactions over the internet.

MINICOMPUTERS:

Are smaller than mainframe.it is also known as mid-sizecomputer. It is generally easier to use.

• Minicomputers usually have multiple terminals.

• Minicomputers may be used as network servers and Internet servers**.**

• Minicomputers are less expensive and smaller then mainframe.

•The size of the minicomputer prevents it from being portable but it can be moved more easily than a mainframe.The examples of mini computers are PRIME-9755, VAX-8650, and IBM System 36 etc.

- **Workstations or Client Computer:**

• Workstations are powerful single-user computers.

• Clientisthat computer which request from server.

• Workstations are often used as network and Internet.

• Workstations are also called client computer.

MICROCOMPUTERS OR PERSONAL COMPUTERS:

Microcomputer is the smallest, least expensive of all the computers. Micro computers have smallest memory and less power, are physically smaller and permit fewer peripherals to be attached.

• Microcomputers are more commonly known as personal computers. The term "PC" is applied to IBM-PCs or compatible computers.

• Desktop computers are the most common type of PC.

• Notebook (laptop) computers are used by people who need the power of a desktop system, but also portability.

• Handheld PCs (such as PDAs) lack the power of a desktop or notebook PC, but offer features for users who need limited functions and small size.

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PERSONAL COMPUTERS (PC)

DeskTop
Lap Top
Palm Top/Digital dairy/ Notebook
PDA

SERVERCOMPUTER:

A**server**is a computer that gives services to client computers on a network. A server may be a file server web server,state full server, stateless server .Many businesses have **file servers**that employees can use to store and share files. A server can look like a regular desktop computer, or it can be much larger. Those computer in which server operating system are installed are called server.

Servers also play an important role in making the internet work: they are where **web pages**are stored. When you use your browser to click a link, a **web server**delivers the page you requested.

ACCORDING TO FUNCTIONS OR TECHNOLOGY OR WORKING:

Computer types can be divided into 3 categories according to electronic nature. Types of computers are classified according to how a particular Computer functions. These computer types are

· Analogue Computers

· Digital Computers

· Hybrid Computers

ANALOGUE COMPUTERS:

Analogue types of Computer uses what is known as analogue signals? Analogue signals are continues in nature .Example: Automobile speedometer

With analogue types of computer no values are represented by physical measurable quantities. Analogue computer types program arithmetic and logical operations by measuring physical changes i.e. temperatures or pressure.

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DIGITAL COMPUTER:

With these types of computers operation are on electrical input that can attain two inputs, states of ON=1 and state of OFF = 0. With digital type of computers data is represented by digital of 0 and 1 or off state and on state. Digital computer type recognizes data by counting discrete signal of (0 0r 1), they are high speed programmable; they compute values and stores results..

HYBRID COMPUTER

Hybrid computer types are very unique, in the sense that they combined both analogue and digital features and operations. With Hybrid computers operate by using digital to analogue convertor and analogue to digital convertor. By linking the two types of computer above you come up with this new computer type called Hybrid.

ACCORDING TO PURPOSE

1. General purpose Computers
2. Special purpose Computers

GENERAL PURPOSE COMPUTERS

A ‘General Purpose Computer’ is a machine that is capable of carrying out some general data processing.
Refers to computers that follow instructions, thus virtually all computers from micro to mainframe are general purpose.

SPECIAL PURPOSE COMPUTERS

A special computer as the name implies is designed to perform a specific operation and usually satisfies the needs of a particular type of problem.Special purpose computers are also known as dedicated computers, because they are

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designed to perform a particular job.Such a computer would be useful in games, control traffic lights, weather prediction, satellite tracking or programming a video cassette recorder. While a special purpose computer may have many of the same features found in a general purpose computer.

OTHER TYPES OF COMPUTERS

Today, there lots of everyday devices that isbasically **specialized computers**, even though we don't always think of them as computers. Here are a few common examples:

The iPod, a type of tablet computer

- **TABLET COMPUTERS:** These use a **touch-sensitive screen** for typing and navigation. Since they don't require a keyboard or mouse, tablet computers are even more portable than laptops. The **iPod** is an example of a tablet computer.
- **MOBILE PHONES:** Many mobile phones can do a lot of things a computer can do, such as browsing the internet or playing games. These phones are often called **smartphones**.
- **GAME CONSOLES:** A **game console** is a specialized kind of computer that is used for playing **video games**. Although they are not as fully-featured as a desktop computer, many newer consoles, such as the **Nintendo Wii**, allow you to do non-gaming tasks like browsing the internet.

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CHAPTER NO 2

FUNCTIONAL UNITS OF COMPUTER SYSTEM

OR

FUNCTIONAL UNITS OF ACOMPUTER SYSTEM OR ORGANIZATION OF COMPUTER SYSTEM:

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INFORMATION TECHNOLOGY

Information technology (**IT**) is a branch of engineering dealing with the use of computers and telecommunications equipment to store, retrieve, transmit and manipulate data. The Information Technology Association of America has defined IT as "the study, design, development, application, implementation, support or management of computer-based information systems" The term is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones.

Digital computer systems consist of four distinctunits. These units are as follows:

- **Input unit**
- **Central Processing unit**
- **Output unit**
- **Memory unit**

INPUT UNIT:

A device which is connected to an I/O module of computer is called a **peripheral**.The internal structure of the computer system differs from one system model to another system model. The basic Organization remains the same for all computers .The data entry station or devices are termed as input units. Input is the process of entering and translating data into machine readable form so that it can be processed by a computer in order to produce the output The data entered into the computer known as inputInput device is a device through which data are entered and transformed into machine readable form

- ✓ Keyboard
- ✓ Mouse
- ✓ Trackball
- ✓ Joystick
- ✓ Touch Screen
- ✓ Track Point
- ✓ Touch Pad
- ✓ Light Pen

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(A) KEYBOARD:

The ***keyboard*** is a standard input device. It is a data entry platform of computer. The layout of the keyboard is like that of traditional **QWERTY** typewriter, although some extra command and function keys are provided for internet, multimedia, operating system and software operation. It has small processor attached to a visual display unit.

Keyboard

The processor checks for the accuracy of data at the time of entry. When key is pressed, electrical signal is generated which determine which key was pressed. This process is termed as encoding.

SOME TYPES OF STANDARD KEYBOARD:

(i) XT (Extended Technology):83 keys

(ii) AT (Advanced Technology):101 keys

(iii) ET(Enhanced Technology): 103 keys

In apple Macintosh, ABD keyboard is used. It is connected to Apple Desktop Bus (ADB).

(B) MOUSE:

Mouse is a point and click input device with two or three buttons. The first mouse was built in 1968 by Douglas Engelbart at Stanford Research Institute. This mouse is bulky and made from wood piece with two gear wheels.

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In beginning “bug” term is used for mouse, but it is replaced by term mouse very soon. The shape of modern mouse is designed by engineer and watchmaker Andre Guignard.Apple built the first single button mouse in 1982 for GUI (Graphic User Interface) of his products. The Doug Englebart is known as inventor of Mouse.

Mouse

There are many technology applied in designing of mouse. The optical mouse is based on laser technologies. Scroll wheel has facilities to scroll page upward.

TRACK BALL:

A variation on the mouse is the trackball. The trackball is like an upside-down mouseIt has a ball on the top and you can roll the ball directly with your handThe popularity of the trackball raised with the advent of the laptop computersTrackballs are often built-in on portable computers, but they can also be used

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JOYSTICK:

The ***joystick*** is originally from the field of aviation, where it refers to the control stick used by a pilot to control the flight of the plane. As such it is mainly used for interaction with computer games, in particular flight simulators. It consists of a lever, or stick, which is moved by the user and transmits these movements to the computer. It also normally has additional buttons or switches that are used in addition to the stick.

TOUCH SCREEN:

The touch screen registers input when a finger or other object comes in contact with the screen.two touch screen techniques involves infrared beams and ultrasonic acoustic waves. Touch screen have long been used in military applications. Today because they have been less expensive, touch screens are found in many applications.

TRACK POINT:

The mouse is not practical for people using a portable computer in a small spacesome notebook computers provide a mouse substitute called a TrackPoint.A button that fixed from the middle of the keyboardwith a track point you imitate mouse movements by pushing the button from side to side

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TOUCH PAD:

Many laptop computers use a touchpad in front of the keyboardyou move your finger on the pad to move the cursor on the screenwhen you want to click, you can tap the pad or use the buttons in front of the pad, which work like mouse buttons.

SCANNER:

scanner works very much like a photocopier, but a scanner digitizes the information into a computer, not onto the other piece of paperIn a process called imaging, a scanner converts a drawing, a picture, on any document into computer recognizable formScanners take an electronic picture of the printed page, break each image into thousands of light and dark dots that can be stored in the computerThen software in the computer tells it how to interpret the dot patterns Scanners consist of two components

- First a data capturing subsystem light-up the document so the image can be recorded
- Then an image-processing subsystem uses sophisticated software to convert the optical images into digital form and store the date in a file
- Scanners come in both handheld and desktop models

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BCR (BAR CODED READER):

Data coded in the form of light and dark lines or bars are known as bar codes Bar codes are used particularly by the retail trade for labeling goodsBCR is a device used for reading bar coded data.

BAR CODE READER

VOICE RECOGNITION DEVICE:

Voice Recognition has been possible for over 20 yearsVoice recognition is one of the newest, most complex input techniques used to interact with the computerIt requires a microphone and special voice recognition software. These devices can take place of keyboards for text entryIn addition some operating systems enable users to give vocal commands (Voice Recognition System)This device is used by the people whose jobs do not allow them to keep their hands free and by handicapped people who are not able to use traditional input devices.

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MACHINE VISION SYSTEM:

Computers need cameras for their eyesightA camera digitizes the images of the entire object then stores the images into computer, databaseWhen a new image is seen the system compares the digitized images with its databaseThe computer identifies the image by matching the structure.

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CHAPTER 3

FUNCTIONAL UNITS OF COMPUTER SYSTEM

OR

ORGANIZATION OF COMPUTER SYSTEM

“CENTRAL PROCESSING UNIT”

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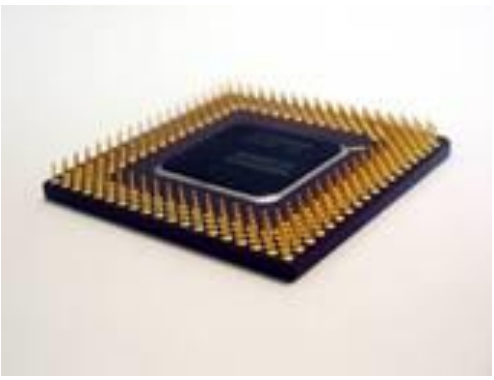
CENTRAL PROCESSING UNIT:

Central Processing UnitThe brain of a computer system is the centralprocessing unit (CPU). CPUCentral Processing Unit.

- ✓ Central: because it is the center for data processing
- ✓ Processor: because it process/execute data.

- ✓ Unit: it is a chip which contain several internal parts



CPU is main unit inside the computer which is responsible for events that occur inside the Computer system. The operation performed by the Processor is called Instruction-SetInstruction set determine the Machine language for CPU.The more complex Instruction set the more the CPU working slowly.CPU differ from one another by Instruction-setIf same program execute/run on the two different computers then these computers are called Compatible .IBM & Apple computers are not compatible.

1. Arithmetic Logic Unit (ALU)
2. Registers/ Memory
3. Clock Rate
4. Control Unit (CU)

ARITHMETIC-LOGIC SECTION:

The arithmetic and logic unit is the part where actual computations take place. It consists of circuits which perform arithmetic operations e.g.

- ❑ addition,
- ❑ substation,
- ❑ multiplication,
- ❑ division

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These operations are performed on the data received from the memory ALU is capable to compare numbers:

- less than,
- equal to,
- greater than

2) REGISTERS:

Registers are a group of data cells used for RAM/ Primary Memory data loading into itData is loaded from RAM into Registers and then moves to ALU for ProcessingRegisters are high speed memory that hold/save data for quick processingIt also hold the intermediate level result.

- **Register Types:**
  - **General Registers**
    - ✓ This portion keeps active program data.
  - **Special Purpose Registers**
    - ✓ This portion keeps the data for the further/next processing.

3) CLOCK UNIT:

All operation performed in a computer system are consist of thousands of separate Instruction/ Commands. These Instruction/ Commands should follow a specific time-intervals. These time-intervals are generated and controlled by clock unit. Every operation takes place with a clock pulse.

- The faster the clock the faster the computer processing.
- The clock rate (speed) is measured in Hertz.
  - KHz
  - MHz
  - GHz
- In older system the clock unit is external to the CPU.
- But in New computer Models it exist inside CPU.

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4) CONTROL UNIT:

Control Unit is responsible for managing and coordination the entire computer system. It does not perform any kind of processing on the data but it control and direct the input data. In other words: it is central controller for all of the activities that occurs inside CPU (internal) or outside (external) of Computer system.It interprets the instructions fetched into the computer,

- Control unit determines type of data
- What operation to apply on the data
- where to store the data after the operation
- send the control signals to the devices involved in the execution of the instructions
- To whom give the output (Monitor/ Printer)
- Also control & order the output devices for displaying the result

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CHAPTER NO 4

FUNCTIONAL UNITS OF COMPUTER SYSTEM

OR

“OUPTPUT UNIT “

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OUTPUT UNIT:

Output is the process of translating data from machine readable form into a form understandable to humans. Output Unit presents the results of machine operations in

- printed or
- visual form, or
- on disks

Output device allows a computer to communicate information to

- human by accepting data from the computer and
- transforming them into a usable form

This unit acts as a communicating link between a computer and the user.

- Function of Output Unit:
  - It accept the result produced by the computer which is in code form
  - It convert these code results to Human acceptable form
  - It displays the result to the user

- The output that is obtained from a computer system has two types
  - Soft Copy
  - Hard Copy

SOFT COPY:

The results (text/graphics) appear on displayed screen are known as soft copyIt is a transparent form of output and is lost when the computer is turned off if the data needed to create a soft copy have been saved on disk or tapes, the soft copy can be reproduced on the screen any time.

Soft Copy Devices:

- The main soft copy device is the monitor device
- A monitor is television like device used to display data or information.
- Monitors allow the users to view the results of processing
- There are two main types of monitors which are:

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1. CRT (Cathode Ray Tube)
2. LCD (Liquid Crystal Display)

1) CRT(Cathode Ray Tube):

On this type of screen, a data image is produced by an electron beam. The most common type of CRT has a display screen of 25 lines of 80 characters each (Other sizes are also available). The CRT's screen display is made of small picture elements, called pixels

a. The smaller the pixels, the better the image clarity.

LCD(LIQUID CRYSTAL DISPLAY):

The most common type of flat-panel display is the Liquid-Crystal Display (LCD) LCD uses a clear liquid chemical trapped in tiny pocket of liquid is covered both front and back by very thin wires

The advantages of the LCD monitors are:

b. low power consumption
c. low cost and
d. small size

HARD COPY

The results (text/Graphics) printed on paper is known as Hard Copy. It is considered to a permanent copy and can be retained even if the computer is turned off.

HARD COPY DEVICES:

Among a wide variety of hard copy output devices printers, and plotters are used the most.

1. **Printers**
2. **Plotters**

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PRINTERS:

A printer is an output device that can convert electrical signals into printers on papers and provides a permanent visual record of data The results we get through the printer is called printout or hard copy

There are two main types of printers.

a. **Impact printers**
b. **Non-impact printers**

IMPACT PRINTERS:

An impact printer makes contact with the paper.It usually forms the print image by pressing an inked ribbon against the paper using a hammer or pinsPrints one character at a time at speeds 10 to 500 characters per secondThus, form the slowest class of printers. Following are some impact printers:

a. **Dot Matrix Printer**
b. **Line Printer**

DOT MATRIX PRINTERS:

The dot-matrix uses print heads containing from 9 to 24 pins. These pins produce patterns of dots on the paper to form the individual character. The 24-pin dot-matrix printer produces more dots than a 9-pin dot-matrix printer, which results in much clearer characters.The user can produce a color output with a dot-matrix printer (the user will change the black ribbon with a ribbon that has color stripes).Dot-matrix printers are inexpensive and typically print at speeds of 100-600 characters per second.

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LINE PRINTER:

In business where large amount of material are printed, the character at a time printers are slow. Users need line at a time line printers. Line printers or line-at-a-time printers use special mechanism that can print a whole line at once

2. NON-IMPACT PRINTER:

- Non-impact printers do not use a striking device to produce characters on the paper.
- These printers do not hammer against the paper.
- Following are some non-impact printers:
    1. **Ink-jet Printer**
    2. **Laser Printer**

INK-JET PRINTER:

Ink-jet printers work in the same fashion as dot-matrix printers in that they form images or characters with little dots.However, the dots are formed by tiny drops of ink. Ink-jet printers form characters on paper by spraying ink from tinny nozzles at a speed of approximately 250 characters per secondSeveral manufacturers produce color ink-jet printers

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LASER PRINTER:

A laser printer works like a photocopy machine. Laser printer produce images on paper by directing a laser beam at the mirror which bounces the beam onto the drum. As the paper rolls by the drum, the toner is transferred to the paper printing a letter or other graphics on the paper.Laser printers use buffers that store an entire page at a time. When a whole page is loaded, it will be printed. The speed of laser printer ranges from 8 to 437 pages per minute if each page contains the 48 lines.

PLOTTER:

A plotter is an output device designed to produce high-quality graphics in a variety of colors. The plotter is used to give very neat best quality to the graphics. Plotter is useful for the engineers, artists, designers, architects to make graphics when the size output is more than one page. There are two basic types of plotters:

- those that use pens and
  - ✓ Drum and flatbed plotter both use the pens
- those that don't use pens
  - ✓ Electrostatic plotters don't use the pens

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IT Concepts

Chapter: 05

Organization of Computer System

“Storage Unit”

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MEMORY/ STORAGE DEVICES:

- The storage hardware provides the capability/ability to store data and program instructions.
- There are two types of storage devices.
    1. Primary Storage Devices
    2. Secondary Storage Devices

NOTE:

- the process of entering data into storage (primary storage or secondary storage) is called Writing
- the process of retrieving data from primary storage or secondary storage is called Reading

PRIMARY STORAGE DEVICE:

It is also known as magnetic core memory. It is a device which stores information in the form of binary coded data. It is a medium capable of recording and storing information quickly. This device holds input data before being processed, also results for output purposes (after processing) this memory is also known as internal memory. The primary storage refers to the internal storage of the computer, where program and their data are stored temporarily storage during program execution. Primary storage is located inside the computer and is linked directly to the other components of the CPU; access time to the data is very fast.

TYPES OF PRIMARY STORAGE:

i. RAM (Random Access Memory)
ii. ROM (Read Only Memory)
iii. PROM (Programmable Read Only Memory)
iv. EPROM (Erasable Programmable Read Only Memory)

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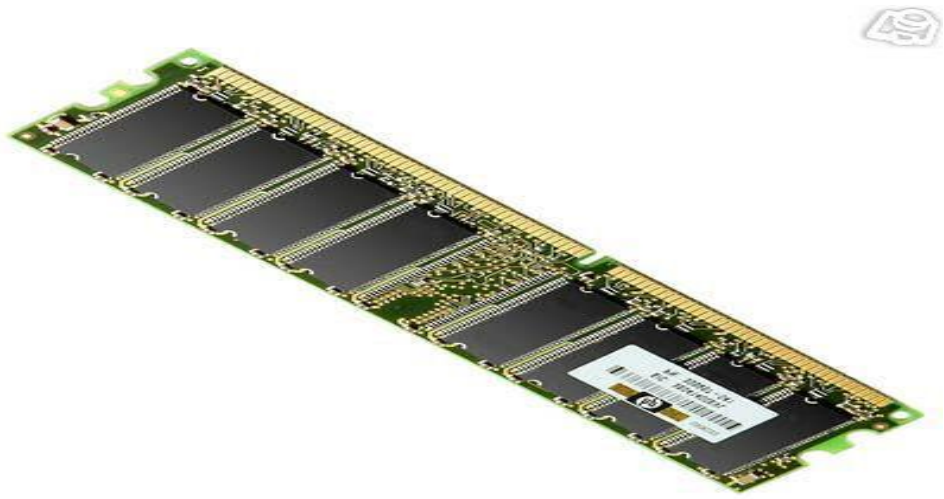
v. EEPROM(Electrically Erasable Programmable Read Only Memory)
vi. Buffer
vii. Cache Memory
viii. Flash Memory

RAM :

Random Access MemoryRAM is the part of primary storage where data and program instructions are held temporarily while being manipulating or executing The information stored in RAM can be accessed easily and randomly and hence called primary memoryThe data stored in this part of the memory can be read, changed or erased completely and thus refer to Read and write Memory.



- RAM is also known as temporary memory because, RAM depends on a steady supply of electricity to maintain data storage
- means that the information stored in it is lost when the computer is switched off or the light goes off
- RAM is also referred to as a Volatile Memory because stored data disappears whenever the computer is switched off.
- When the computer is powered on, RAM takes the data and the programs to be used.

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ROM:

Read Only MemoryAs the name implies the contents of the ROM, the data can be accessed or read any time but cannot be changed or removed or written to itROM is referred to as Nonvolatile storage medium. The information stored in ROM is permanent and is not lost due to light failure or switching off of the computer.ROM may contain information about how to start the computer and even instruction to the entire operating system

- Bootstrap (boot startup Program)
- IPL (initial Program Loader)

- The ROM contents are unchangeable and permanent.

ROM-BIOS: Basic Input Output System

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PROM:

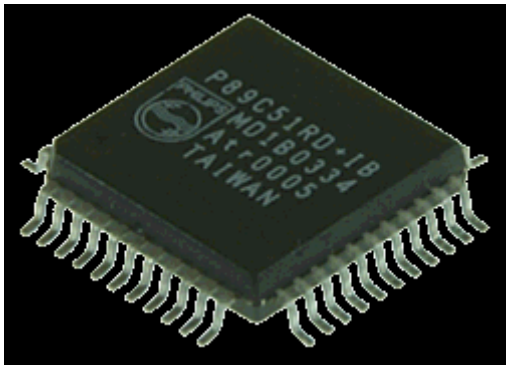
Programmable Read Only MemoryPROM in the beginning are empty chips.

ix. Nothing programmed or recorded inside PROM

The data is recorded on them with special programming device, which then becomes permanent like ROM

PROMs are normally programmed by the manufacturer who records dedicated programs such as graphics and games.

PROM



EPROM:

Erasable Programmable Read Only Memory. An EPROM chip has the feature of PROM.

x. (means EPROM are also empty chips like PROM)

The data is also recorded on them with special programming devices, but the difference is that the data can be erased and reprogrammed whenever it is requiredthe data is erased with ultraviolet light.

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EEPROM:

Electrically Erasable Programmable Read Only MemoryEEPROM has all the characteristics of EPROM except the difference of erasing technique i.e.

xi. It uses electrical pulses instead of ultraviolet light for erasing.

Erasing of data can be achieved by using keyboard commands without removingchips physically from the computer**.**

BUFFER:

It's a temporary holding/saving memory for DataIt may be built into devices used to input/ output datainput & output device are much slower than CPU Buffer act as intermediary between CPU & any other input/ output devices e.g.

xii. CPU to Printer/NIC/Scanner/Modem/Monitor

It's a volatile memory.

CACHE MEMORY:

Also known as High speed Buffer. It's very High speed memory used to speed of the Processor

xiii. By making available Programs & data to CPU

The speed of CPU is high than main memory or any other device. Cache memory is technique used to harmonize (match) the speed of devices

xiv. The speed of CPU with the speed of Main memory

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FLASH MEMORY:

It's a Nonvolatile memoryFlash memory permanently store the dataSecondary memory also store the data permanently but they much slower than Flash Memory used in Phones, iPhones, flight recorder devices, Notebook computers, handheld devices.

2. SECONDARY STORAGE DEVICE:

The term secondary storage is also known as auxiliary storage, external storage, backup storage or long-term storage. A secondary storage is a device into which information can be

- introduced (input),
- stored and
- the information obtained
- The information can be erased.

This storage device designed to retain data and instructions in a more permanent form means that computers have the ability to store

- their programs,
- the input data and
- the intermediate and

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- final results of its calculations permanently
- Secondary storage is non-volatile, meaning that the data and instructions remain stored even when the computer is turned off
- In this unit, data can be permanently stored usually in the form of magnetize spot on magnetic material
- It contains vast mass of data a computer can deal with
- Data is recorded in the form of binary digits either 1 or 0 known as bits

FUNCTIONS OF SECONDARY STORAGE DEVICES:

1. To provide long-term storage to data and programs, which are not being executed.
2. To give additional memory to the computer to save data and provide backup to primary memory.
3. To provide permanent storage so that electricity failure or switching off of the computer does not harm or lose the data.

TYPES OF SECONDARY STORAGE DEVICES:

There are several types of secondary storage devices in use they each have advantages and disadvantages

- Some are efficient but too expensive for many computer applications
- Some have extra-large capacity, others are fast.

I. Magnetic Tape:

Magnetic tape was introduced in 1957.The development of magnetic tape was stimulated(moved) by the search for a faster, more convenient(suitable), and more cost effective means than punched cards magnetic tape is ½ or ¼ inch wide produced in a variety of ranging from 200 to 3,600 feet.A modern tape storage can store the equivalent of more than 2.25 million punched card

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- Following are the types of Magnetic Tape.
  a. Reel-to-reel Tape
  b. Cassette Tape

Reel to Reel tape

Cassette Tape

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MAGNETIC DISK:

- The advantages of magnetic disk over magnetic tape are:
    1. The ability to access the data stored on it directly
    2. The ability to hold more data in a smaller space
    3. The ability to perform faster data transfer speeds.

TYPES OF MAGNETIC DISKS:

- two types of magnetic disks
    i. Floppy Disk
    ii. Hard Disk

I) FLOPPY DISKS:

- One of the most commonly used storage media is floppy disk
- A floppy diskette also called simply a diskette or disk
- It has been around since the early 1970s and was originally 8 inches diameter (width).
- They are often referred to “floppy” because they are made of flexible material

FLOPPY DISK

- The disk is enclosed in a protective jacket-either paper or plastic-lined with a soft material
- The diskette sizes are:
    1. 8-inch
    2. 5½-inch
    3. 3½-inch

- The initial diskette introduced by IBM was
    - 8 inches in diameter
    - It was the standard for many years

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- The use of 5½-inch diskette by IBM in their personal computer system in 1981

- Since the Apple introduced the 3½-inch diskette in 1984 and
- IBM switched to this size in 1987 in its PS/2 microcomputer system
- Although the 3½-inch diskettes
  - are smaller in size, they are capable of storing more data than 5½-inch diskettes and
  - they are also covered by a hard plastic jacket than a paper jacket.
- In initial stage, the diskettes were single-sided but nowadays diskette disks are double-sided disks

Floppy disks

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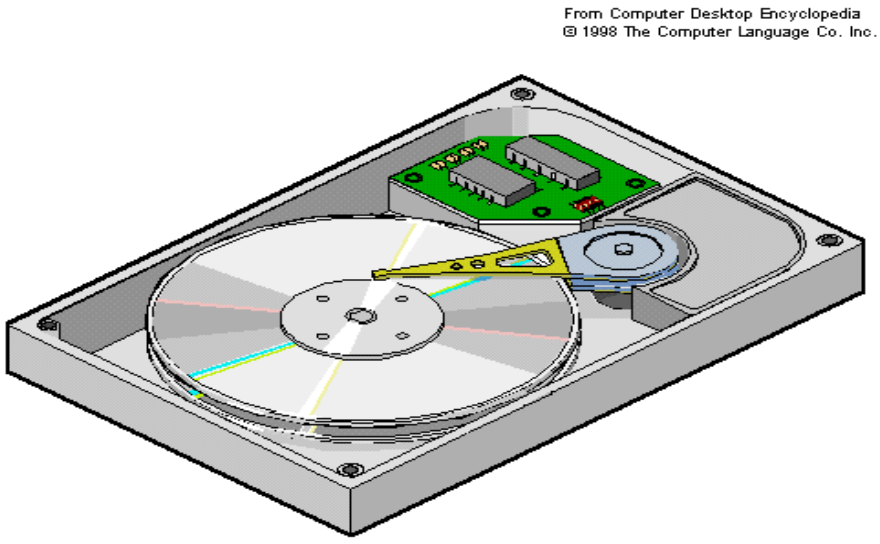
II. HARD DISK:

- when IBM first invented the hard disk in 1954
- the capacity of which was only 5MB
- 25 years later, Seagate Technology introduced the first hard disk drive for personal computers
  - which had the capacity of 40MB and
  - data transfer rate of 625 KBps

A later version of the company's ST506 interface increased both capacity and speedIt's hard to believe that as recently as the late 1980s 100MB of hard disk space was considered generous(kind).Today, this would be totally insufficient, hardly to install the operating system alone, let alone a huge application software such as Microsoft Office. Today's hard disks are by GBs even TB

Hard disk

Inside Hard disk



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OPTICAL TECHNOLOGY:

Optical technology involves the use of the laser beams. In this technology, a laser hit a layer of metallic material spread over the surface of a disk. Heats from the laser tiny (small) spots/pits on the disc surface that actually identify that the data is being exist. When these optical discs are placed on a disc playback devices/ Disk Drives,

- To read the data the laser scans the disc
- a beam of laser light is used to read the pit pattern and
- convert these pit pattern into the audio/visual signals needed to produce sounds and pictures
- The capacity of optical disc systems is large as compared to most magnetic disk storage devices
- This technology promises a storage capacity in access of 100 GB for a single 12-inch disc
- A 5¼-inch disc the same size as a diskette can store between 800 MB and 1 GB

TYPES OF OPTICAL DISCS:

1. CD-ROM
2. CD-R
3. WORM
4. EOD
5. CD-RW
6. DVD

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I. CD-ROM:

- Compact Disc-Read-Only Memory
- Most popular and least expensive type of optical disk
- Mostly the data on the CD-Rom is written
- Once the data written by the Manufacturer of disk
- The user is not able to:
  - Write the data
  - Change the data
  - Erase the data

CD-Rom

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CD-ROM & CD-ROM DRIVE

- Data in Written and Read via Laser beam/ Ultraviolet. Can store up to 650MB Size is 120 mm in diameter. These disks are different in speed.
- Original CD-Rom transfer data rate is 150000 bps (150Kbs)
    - Slow speed than Hard disk/ Floppy disk

II. CD-R:

- Compact Disc-Readable. Laser is used to write the data inside the CD-R
- These discs are writing once. Once the data written to CD-R then user is not able to write, change, and delete the data. Less expensive disc

III. WORM:

Write once, Read Many. Once the disc is written the data can be read many times but cannot be altered, delete .This technology introduced in 1980.Mainly used for saving of large amount of sensitive data of organizations. WORM discs are imprinted by Manufacturer.

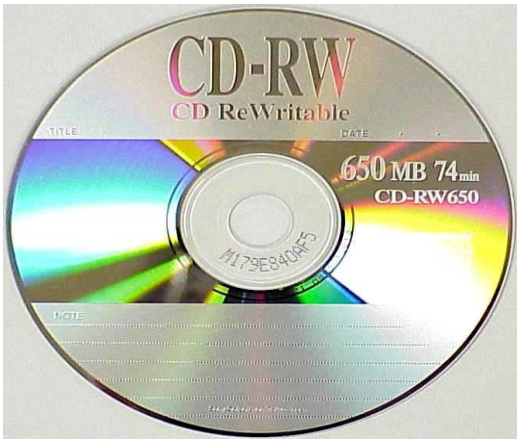
IV. ERASABLE OPTICAL DISC/EOD:

The discs are an alternative (option) to the large capacity hard disks. In contrast (diff) to CD-ROM and CD-R erasable discs can be changed and erased. Data is written or read by using laser beam .Used to backup fixed .

V. CD-RW:

Compact disc-Rewritable. These are Recordable CDs format that provides full Read/Write capabilities

- These are more expensive than other CDs.



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VI. DVD:

- Digital video disc. Digital versatile disc Capable of storing more data up to 17GB with data transfer rate more than 12Mbps (equal to Hard disk speed) DVDs are accessed by DVD Drives not by CD-Drives While DVD drives can play CD and DVD

END

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