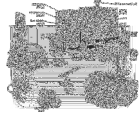# Introduction to Computers

By

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**MESRA – 835 215, RANCHI**
2011

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What Is A Computer?

A computer is an electronic device, operating under the control of instructions (software) stored in its own memory unit, that can accept data (input), manipulate data (process), and produce information (output) from the processing. Generally, the term is used to describe a collection of devices that function together as a system.

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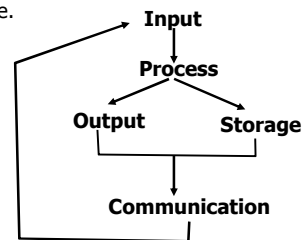

Devices that comprise a computer system
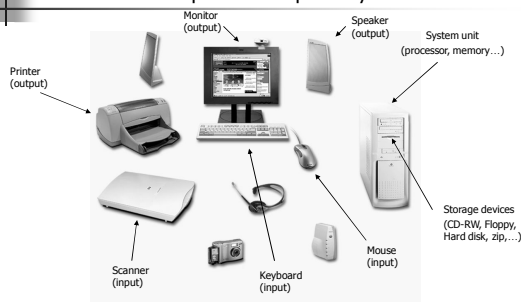
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What Does A Computer Do?

Computers can perform four general operations, which comprise the information processing cycle.

- Input
- Process
- Output
- Storage

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Data and Information

- All computer processing requires **data**, which is a collection of raw facts, figures and symbols, such as numbers, words, images, video and sound, given to the computer during the input phase.
- Computers manipulate data to create information. **Information** is data that is organized, meaningful, and useful.
- During the output Phase, the information that has been created is put into some form, such as a printed report.
- The information can also be put in computer storage for future use.

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Why Is A Computer So Powerful?

- The ability to perform the information processing cycle with amazing speed.
- Reliability (low failure rate).
- Accuracy.
- Ability to store huge amounts of data and information.
- Ability to communicate with other computers.

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How Does a Computer Know what to do?

- It must be given a detailed list of instructions, called a **compute program** or **software**, that tells it exactly what to do.
- Before processing a specific job, the computer program corresponding to that job must be stored in memory.
- Once the program is stored in memory the compute can start the operation by executing the program instructions one after the other.

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What Are The Primary Components Of A Computer ?

- Input devices.
- Central Processing Unit (containing the control unit and the arithmetic/logic unit).
- Memory.
- Output devices.
- Storage devices.
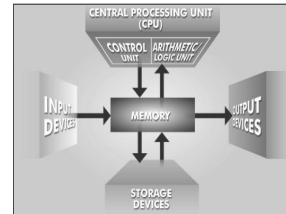
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Input Devices

- Keyboard.
- Mouse.

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The Keyboard

The most commonly used input device is the keyboard on which data is entered by manually keying in or typing certain keys. A keyboard typically has 101 or 105 keys.

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The Mouse

Is a pointing device which is used to control the movement of a mouse pointer on the screen to make selections from the screen. A mouse has one to five buttons. The bottom of the mouse is flat and contains a mechanism that detects movement of the mouse.

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The Central processing Unit

The central processing unit (CPU) contains electronic circuits that cause processing to occur. The CPU interprets instructions to the computer, performs the logical and arithmetic processing operations, and causes the input and output operations to occur. It is considered the "brain" of the computer.
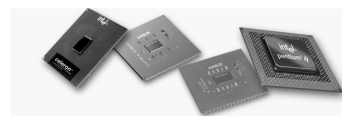
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Memory

Memory also called Random Access Memory or **RAM** (temporary memory) is the main memory of the computer. It consists of electronic components that store data including numbers, letters of the alphabet, graphics and sound. Any information stored in RAM is lost when the computer is turned off.

Read Only Memory or **ROM** is memory that is etched on a chip that has start-up directions for your computer. It is permanent memory.

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Amount Of RAM In Computers

The amount of memory in computers is typically measured in kilobytes or megabytes. One kilobyte (K or KB) equals approximately 1,000 memory locations and one megabyte (M or MB) equals approximately one million locations A memory location, or byte, usually stores one character.

Therefore, a computer with 8 MB of memory can store approximately 8 million characters. One megabyte can hold approximately 500 pages of text information.

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Output Devices

Output devices make the information resulting from the processing available for use. The two output devices more commonly used are the **printer** and the computer **screen**.

The printer produces a hard copy of your output, and the computer screen produces a soft copy of your output.

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Storage Devices

Auxiliary storage devices are used to store data when they are not being used in memory. The most common types of auxiliary storage used on personal computers are floppy disks, hard disks and CD-ROM drives.

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Floppy Disks

A floppy disk is a portable, inexpensive storage medium that consists of a thin, circular, flexible plastic disk with a magnetic coating enclosed in a square-shaped plastic shell.
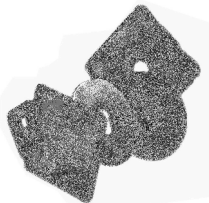
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Structure Of Floppy Disks

- Initially Floppy disks were 8-inches wide, they then shrank to 5.25 inches, and today the most widely used folly disks are 3.5 inches wide and can typically store 1.44 megabytes of data.
- A folly disk is a magnetic disk, which means that it used magnetic patterns to store data.
- Data in floppy disks can be read from and written to.
- **Formatting** is the process of preparing a disk for reading and writing.
- A track is a narrow recording band that forms a full circle on the surface of the disk.
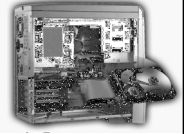
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- The disk's storage locations are divided into pie-shaped sections called **sectors**.
- A sectors is capable of holding 512 bytes of data.
- A typical floppy stores data on both sides and has 80 tracks on each side with 18 sectors per track.
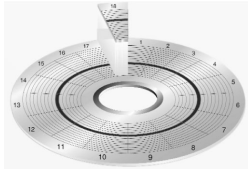
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Hard Disks

- Another form of auxiliary storage is a hard disk. A hard disk consists of one or more rigid metal plates coated with a metal oxide material that allows data to be magnetically recorded on the surface of the platters.
- The hard disk platters spin at a high rate of speed, typically 5400 to 7200 revolutions per minute (RPM).
- Storage capacites of hard disks for personal computers range from 10 GB to 120 GB (one billion bytes are called a gigabyte).

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Compact Discs

- A compact disk (CD), also called an optical disc, is a flat round, portable storage medium that is usually 4.75 inch in diameter.
- A CD-ROM (read only memory), is a compact disc that used the same laser technology as audio CDs for recording music. In addition it can contain other types of data such as text, graphics, and video.
- The capacity of a CD-ROM is 650 MB of data.

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DVD

- Digital Versatile/Video Disc
- Replacing CD-ROM
- Holds much larger amount of information (such as movie)
- Size 4.7 GB

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Flash Drive/ Pen Drive

- Most recent widely used storage system
- Very portable, often worn like jewelry
- 2-8 GB most common size

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Computer Software

Computer software is the key to productive use of computers. Software can be categorized into four types:

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- Operating System Software
- Application Software
- Open source Software
- Proprietary Software

Operating System Software

Operating system software tells the computer how to perform the functions of loading, storing and executing an application and how to transfer data.

Example:
Operating Systems, Compiler, Loader, Linker, Interpreter.

- **Operating System:** Operating System is a software, which acts as an interface between the application programs and the machine hardware.
- **Compiler:** A compiler is a program that reads a program in one language – the source language and translates into an equivalent program in another language – the target language.
- **Loader:** A loader is the part of an operating system that is responsible for loading programs into memory, preparing them for execution and then executing them.
- **Linker:** A **linker** or **link editor** is a program that takes one or more objects generated by compilers and assembles them into a single executable program.
- **Interpreter:** An **interpreter** is a computer program that translates and executes instructions written in a computer programming language line-by-line, unit by unit etc.,
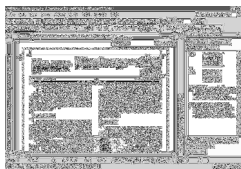
Application Software

Application Software consists of programs that tell a computer how to produce information. Some of the more commonly used packages are:

- **Word processing**
- **Electronic spreadsheet**
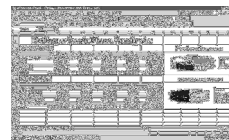- **Database**
- **Presentation graphics**

Word Processing

- Word Processing software is used to create and print documents. A key advantage of word processing software is that users easily can make changes in documents.
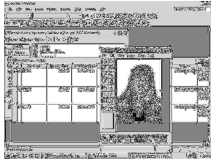
Electronic Spreadsheets

- Electronic spreadsheet software allows the user to add, subtract, and perform user-defined calculations on rows and columns of numbers. These numbers can be changed and the spreadsheet quickly recalculates the new results.
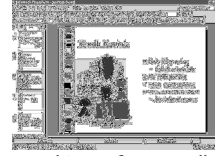
Database Software

- Allows the user to enter, retrieve, and update data in an organized and efficient manner, with flexible inquiry and reporting capabilities.

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Presentation Graphics

- Presentation graphic software allows the user to create documents called slides to be used in making the presentations. Using special projection devices, the slides display as they appear on the computer screen.

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Open Source Software

- **Open source software (OSS)** is computer software whose source code is available under a license that permits users to use, change, and improve the software, and to redistribute it in modified or unmodified form.

- It is often developed in a public, collaborative manner.
  Well-known OSS products are Linux, Netscape, Apache, etc.,

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Proprietary Software

- **Proprietary software** (also called **non-free software**) is software with restrictions on using, copying and modifying as enforced by the proprietor. Restrictions on use, modification and copying is achieved by either legal or technical means and sometimes both.

- Proponents of proprietary software are Microsoft.

- Ex: CAD, MATLAB etc.,

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