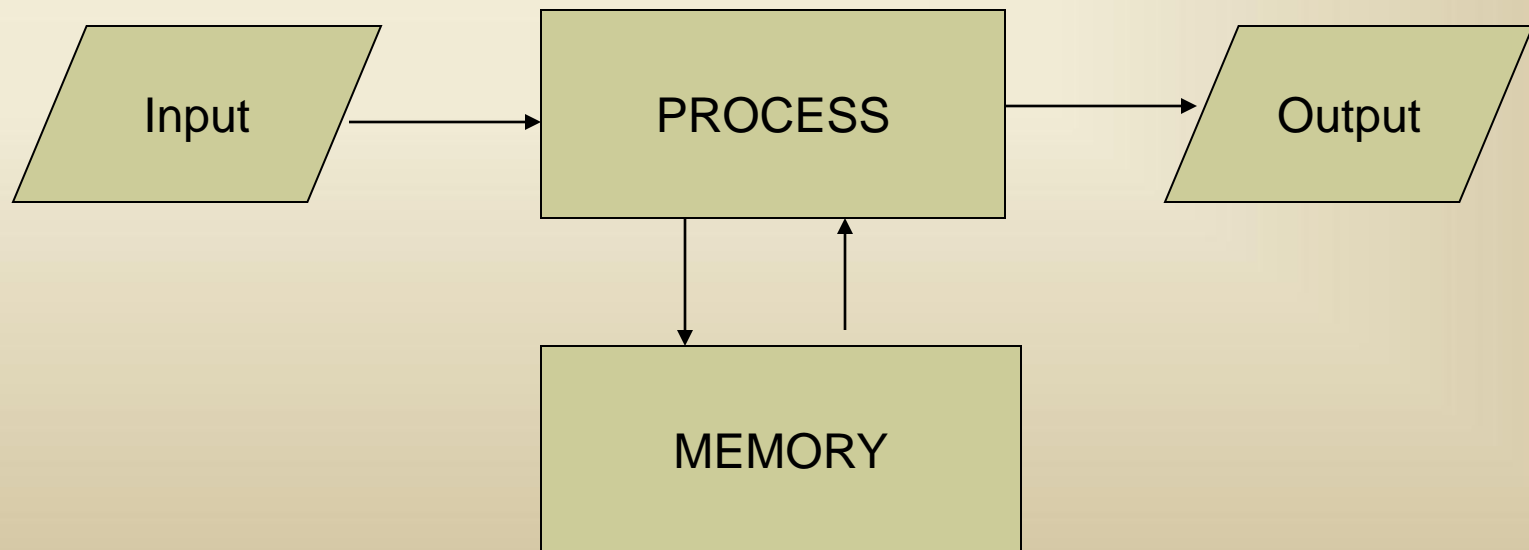


Computer Fundamentals

What is Computer ?

A Computer is an electronic device that processes data, converting it into information that is useful to people.

A simple model of a computer



A computer system consists of four parts:



■ 1. Hardware

- ✓ The physical devices that make up the computer are called hardware.
- ✓ Hardware is any part of the computer we can touch.
- ✓ Interconnected electronic devices to control computer operation, input & output

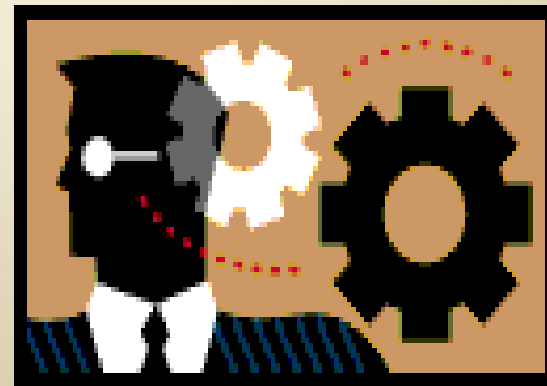


2. Software

Software is a **set of programs** that tells the computer what to do and program is set of Instruction written in a computer language

Some programs exists for the computer's use

Other types of programs exist for the user such as creating documents.



Contd....



- **Users**

People are the computer operators

People design, build, program & repair computer systems.

- **Data**

- **Individual facts & figures**
- **Bits of information**
- **Computer reads & stores data**
- **Stores all kinds of data.....words, numbers, images, sounds...**
- **Computer manipulates, calculates, compares data or information**

Files & Documents...

- Data is organized into files.
- File is set of data given a name.
- File is often called a document
- Programs are also organized into files



Internal Parts of a Computer



- *Processor*

- The processor (CPU) is like the brain of the computer

- It processes (transforms) raw data into useful information.

- It is slivers of silicon with tiny electronic circuits.

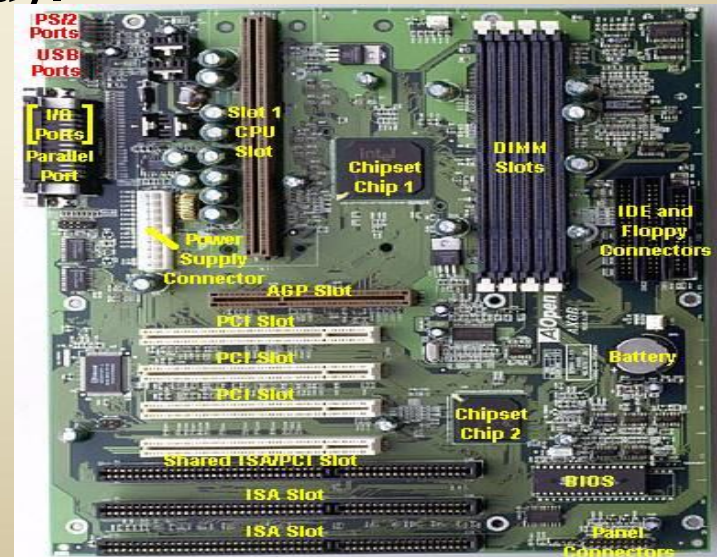
- Organizes & carries out instructions

- Processor has microprocessor



Contd....

- Microprocessor is plugged into motherboard.
- Devices like video cards, sound cards, disk controllers are also on this board.
- Some computers have devices directly mounted on motherboard (master board).



Memory

- *Memory*
- Electronic scratch pad
- Program & Data are loaded into & run from memory.
- RAM is read & write memory
- It is volatile
- Memory measuring unit is BYTE.



Memory contd....

- 1024 bytes ----- 1 Kilo byte
- 1024 Kilo bytes ----- 1 Mega Byte
- 1024 Mega bytes ----- 1 Giga Byte
- 1024 Giga byte ----- 1 Tera Byte



Memory contd....

- One kilobyte equals 2 to the 10th power, or 1,024 bytes.
- One megabyte equals 2 to the 20th power, or 1,048,576 bytes.
- One gigabyte equals 2 to the 30th power, or 1,073,741,824 bytes.
- One terabyte equals 2 to the 40th power, or 1,099511,627,776 bytes.
- One petabyte equals 2 to the 50th power, or 1,125,899,906,842,624 bytes.
- One exabyte equals 2 to the 60th power, or 1,152,921,504,606,846,976 bytes.
- One zettabyte equals 2 to the 70th power, or 1,180,591,620,717,411,303,424
- One yottabyte equals 2 to the 80th power, or 1,208,925,819,614,629,174,706,176

Memory contd....

- ROM Stores permanent instructions which computer needs to work on.
- Flash memory (like in digital cameras, used to capture images)
- Cache Memory helps CPU to retrieve data quickly.



Computer Devices



- Input Devices
- Output Devices
- Storage
- Communication Devices



- *Input and Output Devices*

Input devices accept data and instructions from the user or from another computer system.

Output devices return processed data to the user or to another computer system.



Input Devices

A device that can be used to insert data into a computer or other computational device

Standard Input Devices

- *Keyboard*



It is the primary input device for entering text and numbers.

A standard keyboard includes about 100 keys, each key sends a different signal to CPU.



The Mouse



A mouse is a pointing device that rolls around on a flat surface and controls the pointer.

Most mice are mechanical.

Another type of mouse is the **optical mouse**.



Alternative Input Devices

■ Pens

This device is called stylus.

We can use pen on a special pad or directly on the screen.

It can also be used as a pointing device.



■ Touch Screen

It accept input to place directly fingerprint on the screen



■ Game Controller



It fall into two broad categories **joysticks** and **game pads**.

Optical Input Devices

These devices allow computer to use light as a source of input

■ Bar Code Reader

These devices read bar codes and converts the individual bar pattern into numeric digits.



- **Image Scanners and Optical Character Recognition (OCR)**

Image scanners convert any printed image into electronic form.

OCR is used to scan a text document.



Audio Visual Input Devices

- Microphone
It records speech.
- Speech Recognition



Translating voice to text is known as speech recognition.



Video Input

- PC Video Camera
- Digital Cameras



Output Devices

■ Monitors

- ✓ Monitor is the most commonly used output device.
- ✓ Monitors can be categorized by the way they display colors
- ✓ **Monochrome**: display only one color
- ✓ **Grayscale** : display varying intensities of gray against a white or off white background.
- ✓ **Color Monitor**: display from 16 to 16 million colors.



- **Digital Light Projector**

A digital light projector projects the video output on to an external surface.



- **Sound Systems**

Speakers and their associated technology are key output systems.



■ Printers

Printers are used to print documents.

Printers fall into two categories

- ✓ **Impact** : creates an image by using pins or hammers to press an inked ribbon against the paper.
- ✓ **Non impact**: they use tiny nozzles to spray droplets of ink onto page.

Dot Matrix Printer: A dot matrix printer creates an image by using print heads.

Ink Jet Printer: It creates an image directly on the paper by spraying ink through tiny nozzle.

Laser Printer: It creates an image by using laser.



Communication Devices

Modem

A **modem** (**mod**ulate and **dem**odulate) is a device that modulates an analog carrier signal to encode digital information, and also demodulates such a carrier signal to decode the transmitted information.



Storage devices

- To hold data permanently.
- 1. More room than in RAM.
- 2. Contents are put in permanent storage when not in use.
- 3. Storage is slow than memory.
- Examples – tape drives, optical drives & removable hard drives.





Storage Devices



Storage Devices is used to hold data even when the computer is turned off.

- **Floppy Disk:** It contains a single thin disk made of plastic.
- **Hard Disk:** It includes one or more platters mounted on a central spindle.

Floppy and Hard disk both stores data in tracks divided into sectors



- **Tape Drives:** It read and write data to the surface of a tape the same way an audiocassette recorder does.

Memory Types

■ *Random Access Memory (RAM)*

- ✓ RAM in a computer is considered *main memory* (or primary storage)
- ✓ It is the working area used for displaying and manipulating data.
- ✓ This type of RAM is usually in the form of integrated circuit (IC).
- ✓ It allow the stored data to be accessed in any order — that is, **at random**, not just in sequence.
- ✓ RAM is typically erased when a computer is shut down, means it is **volatile memory**.

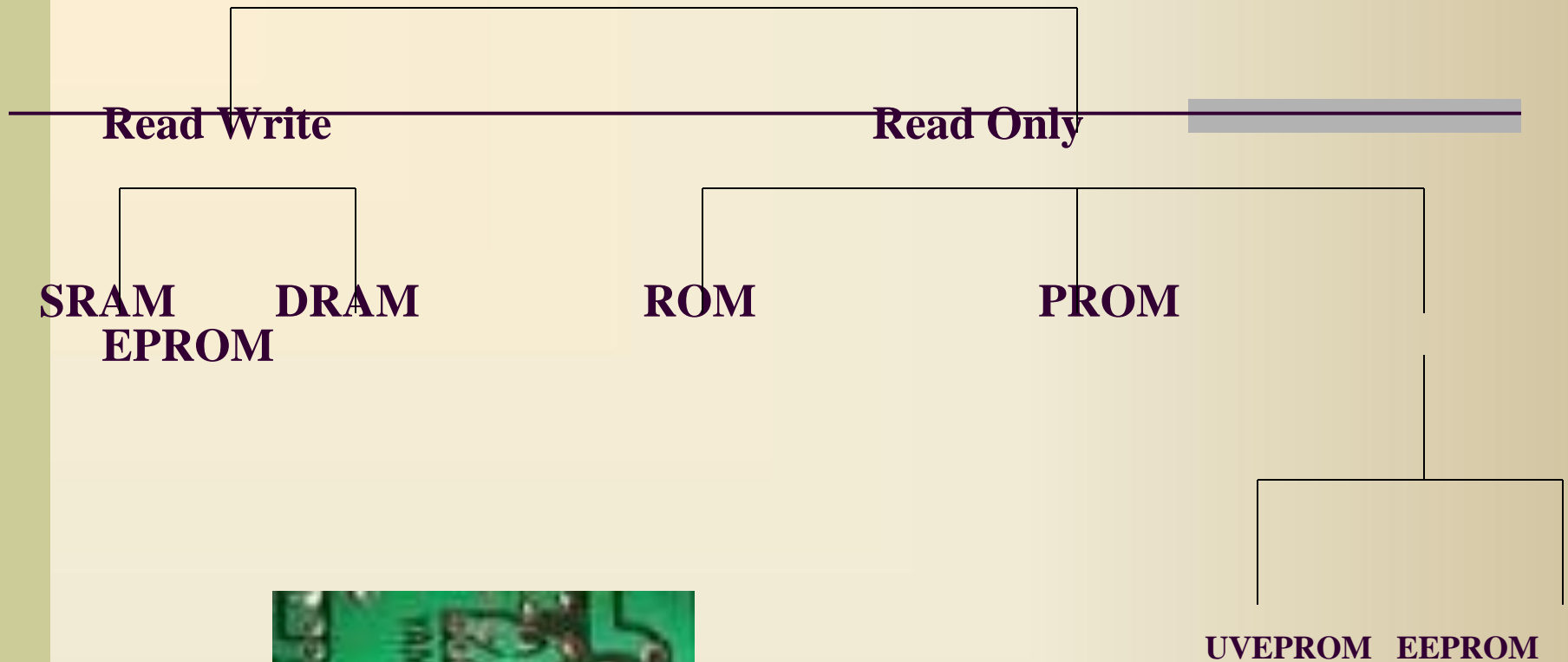


■ *Read Only Memory (ROM)*

- ✓ It is also primary memory in which words are permanently written during fabrication.
- ✓ The contents of the word cannot be altered.
- ✓ It is **non volatile memory**.



Random Access Memory



- ✓ **SRAM (Static Random Access Memory):** retains its contents as long as power remains applied, unlike dynamic RAM (DRAM) that needs to be periodically refreshed
- ✓ **PROM (Programmable Read Only Memory):** is a ROM in which user can write its own function or program
- ✓ The information in it can not be altered.
- ✓ The information can be erased and reprogrammed in *EPROM* (Erasable Programmable Read Only Memory).
- ✓ It can be done in two ways by **ultra violet rays or electrically.**





Cache Memory



- Cache memory is very fast memory that the processor can access much more quickly than main memory or RAM.

- Cache memory, is much like other memory, except it can operate much faster, and much more expensive.

- Cache memory attempts to bridge the gap between fast, expensive memory that can be made in limited quantities, and the large amounts of RAM needed for modern applications.

- By giving the processor a small amount of fast memory to use, and then having that memory read in and write to main memory in "spare" time, the processor can operate at full speed much of the time.

VIRTUAL MEMORY

- **Virtual memory** or **virtual memory addressing** is a memory management technique, used by multitasking computer operating systems wherein non-contiguous memory is presented to a software as contiguous memory.
- This contiguous memory is referred to as the virtual address space.



Software Types



- *System Software*

Any computer software that is an essential part of the computer system.

System software is a set of programs that handle the running of your computer's hardware

It is used by the system to manage its own resources.

- The two main categories are:

- **operating systems**

Utility programs

Compiler

A **compiler** is a computer program (or set of programs) that translates text written in a computer language (the *source language*) into another computer language (the *target language*).

The original sequence is usually called the source code and the output called object code.

- *Application Software*

*** For a particular purpose

Word Processors ex: Ms Word

Spreadsheets ex: Ms Excel, Lotus 1.2.3

Presentation Software ex: PowerPoint

Desktop Publishing ex: Coral Draw

***Categories of Application software

1. Ready to use

-----Purchase & directly use

2. Customized software

-----Modify to suit requirements &
use



■ Data & Information

Data: symbols

Data... data is raw. It simply exists and has no significance beyond its existence (in and of itself). It can exist in any form, usable or not. It does not have meaning of itself. In computer parlance, a spreadsheet generally starts out by holding data.

Information: data that are processed to be useful; provides answers to "who", "what", "where", and "when" questions

Information... information is data that has been given meaning by way of relational connection. This "meaning" can be useful, but does not have to be. In computer parlance, a relational database makes information from the data stored within it.

Information Systems

- **Information System (IS)** refers to a system of people, data records and activities that process the data and information in an organization, and it includes the organization's manual and automated processes.
- *information system* (or **computer-based information system**) refers to the specific application software that is used to store data records in a computer system and automates some of the information-processing activities of the organization.

Types of IS

Transaction processing systems(TPS) automate the handling of data about business activities or transactions, which can be thought of as simple, discrete events in the life of an organization. Data about each transaction are captured, transactions are verified and accepted or rejected and validated transactions are stored for later aggregation. Reports may be produced immediately to provide standard summarizations of transactions and transactions may be moved from process to process in order to handle all aspects of the business activity.

Contd...

■ A **management information system (MIS)** is a subset of the overall internal controls of a business covering the application of people, documents, technologies, and procedures by management accountants to solve business problems such as costing a product, service or a business-wide strategy. Management information systems are distinct from regular information systems in that they are used to analyze other information systems applied in operational activities in the organization.

Contd..

- **Decision support systems** constitute a class of computer-based information systems including knowledge-based systems that support decision-making activities.
- **Expert system** is software that attempts to reproduce the performance of one or more human experts, most commonly in a specific problem domain, and is a traditional application and/or subfield of artificial intelligence.

Contd..

- **Office automation** refers to the varied computer machinery and software used to digitally create, collect, store, manipulate, and relay office information needed for accomplishing basic tasks and goals. Raw data storage, electronic transfer, and the management of electronic business information comprise the basic activities of an office automation system. Office automation helps in optimizing or automating existing office procedures.

Contd..

- **Business intelligence (BI)** refers to skills, technologies, applications and practices used to help a business acquire a better understanding of its commercial context. Business intelligence may also refer to the collected information itself.
- **Electronic Data Processing (EDP)** can refer to the use of automated methods to process commercial data. Typically, this uses relatively simple, repetitive activities to process large volumes of similar information.