

1. The Computer

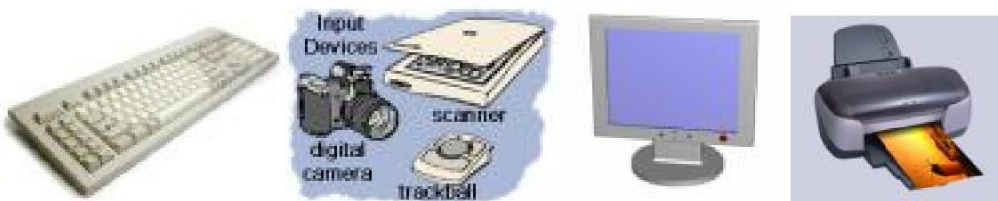
1.1 A BRIEF COMPUTER HISTORY

- The computer as we know it today had its beginning with a 19th century English mathematics professor name Charles Babbage.
- **First generation: 1937 – 1946**
 - a. In 1937 the first electronic digital computer was built by Dr. John V. Atanasoff and Clifford Berry.
 - b. In 1943 an electronic computer name the Colossus was built for the military.
 - c. In 1946 the first general– purpose digital computer, the Electronic Numerical Integrator and Computer (ENIAC) was built.
- **Second generation: 1947 – 1962**
 - a. In 1951 the first computer for commercial use was introduced to the public the Universal Automatic Computer (UNIVAC 1).
 - b. In 1953 the International Business Machine (IBM) 650 and 700 series computers.
- **Third generation: 1963 - present**
 - a. In 1980 Microsoft Disk Operating System (MS-Dos) was born
 - b. In 1981 IBM introduced the personal computer (PC) for home and office use. Three years later Apple gave us the Macintosh computer with its icon driven interface and the 90s gave us Windows operating system.

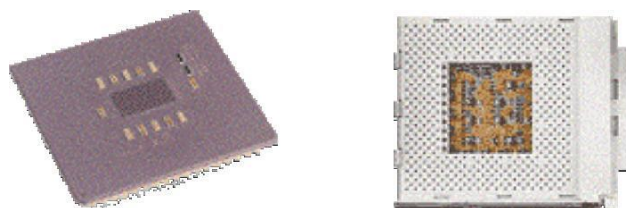
1.2 Computer Parts:

A computer is made up of many parts:

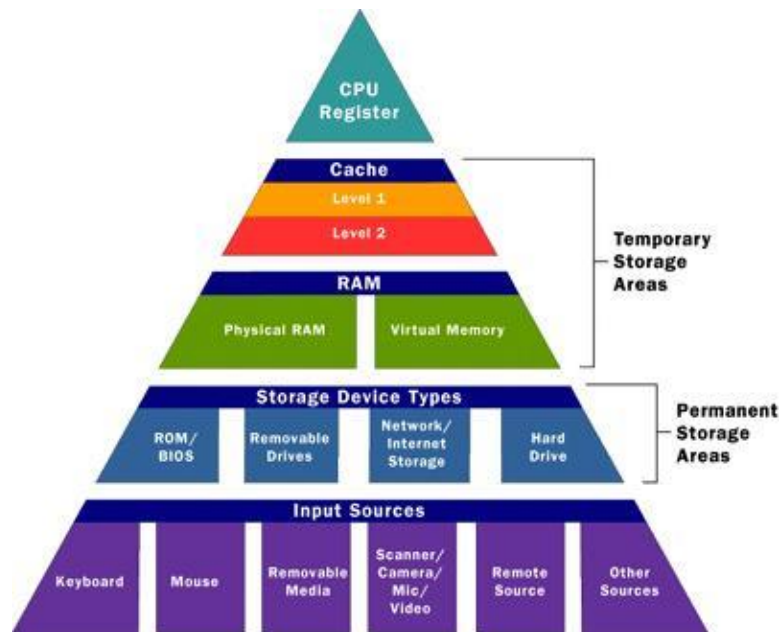
1. **Input/Output (I/O) devices** – These allow you to send information to the computer or get information from the computer.



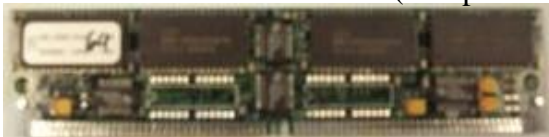
2. **Central Processing Unit** – CPU or Processor for short. The brain of a computer. Approximately 1.5 in X 1.5 in. Does all the computation/work for the computer.



3. **Memory** – Although memory is technically any form of electronic storage, it is used most often to identify fast, temporary forms of storage. Accessing the hard drive for information takes time. When the information is kept in memory, the CPU can access it much more quickly.



- a. **Random Access Memory** – RAM. Where information is stored temporarily when a program is run. Information is automatically pulled into memory, we cannot control this. RAM is cleared automatically when the computer is shutdown or rebooted. RAM is volatile (non-permanent).



- b. **Read Only Memory** – ROM. More permanent than RAM. Data stored in these chips is nonvolatile -- it is not lost when power is removed. Data stored in these chips is either unchangeable or requires a special operation to change. The BIOS is stored in the CMOS, read-only memory.



- c. **Hard Drive** – Where you store information permanently most frequently.

This is also nonvolatile.



4. **Motherboard** – A circuit board that allows the CPU to interact with other parts of the computer.



Ports – Means of connecting peripheral devices to your computer.

- a. **Serial Port** – Often used to connect a older mice, older external modems, older digital cameras, etc to the computer. The serial port has been replaced by USB in most cases. 9-pin connector. Small and short, often gray in color. Transmits data at 19 Kb/s.



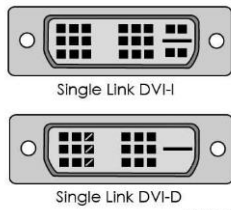
- b. **Monitor Ports** – Used to connect a monitor to the computer.

PCs usually use a VGA (Video Graphics Array) analog connector (also known as a D-Sub connector) that has 15 pins in three rows. Typically blue in color.



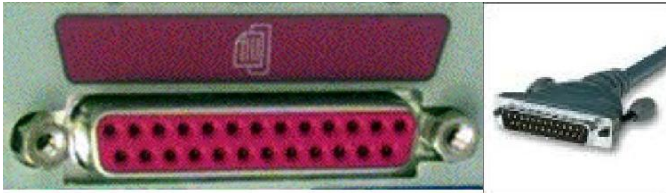
Because a VGA (analog) connector does not support the use of digital monitors, the

Digital Video Interface (DVI) standard was developed.



LCD monitors work in a digital mode and support the DVI format. At one time, a digital signal offered better image quality compared to analog technology. However, analog signal processing technology has improved over the years and the difference in quality is now minimal.

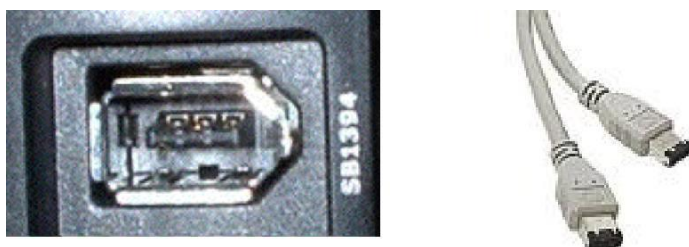
- c. **Parallel Port** – Most often used to connect a printer to the computer. 25-pin connector. Long and skinny, often pink in color. Transmits data at 50-100 Kb/s.



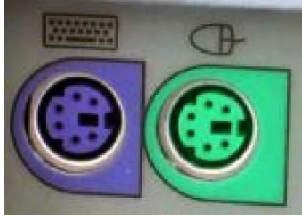
USB Port – Universal Serial Bus. Now used to connect almost all peripheral devices to the computer. USB 1.1 transmits data at 1.5 Mb/s at low speed, 12 Mb/s at full speed. USB 2.0 transmits data at 480 Mb/s.



- e. **Firewire/ IEEE 1394 Port** – Often found on Apple Computers. Often used with digital camcorders. Firewire transmits data at 400 Mb/s. Firewire 1394B (the new firewire) transmits data at 3.2 Gb/s.



- f. **PS/2 Port** - sometimes called a mouse port, was developed by IBM. It is used to connect a computer mouse or keyboard. Most computers come with two PS/2 ports.



- g. **Ethernet Port** – This port is used for networking and fast internet connections. Data moves through them at speeds of either 10 megabits or 100 megabits or 1 gigabit (1,000 megabits) depending on what speed the network card in the computer supports. Little monitor lights on these devices flicker when in use.



Power Supply – Gives your computer power by converting alternating current (AC) supplied by the wall connection to direct current (DC).



7. **Expansion Cards** – Used to add/improve functionality to the computer.

- a. **Sound Card** – Used to input and output sound under program control. Sound cards provide better sound quality than the built in sound control provided with most computers.



- b. **Graphics Card** – Used to convert the logical representation of an image to a signal that can be used as input for a monitor.



- c. **Network Card** – Used to provide a computer connection over a network. Transmit data at 10/100/1000 Mb/s.



CD ROM – A device used to read CD-ROMs. If capable of writing to the CD-ROM, then they are usually referred to as a ‘burner’ or CD-RW.



9. **DVD ROM** – A device that is used to read DVDs/CDs. If capable of writing to the DVD, then it is often referred to as a DVD-burner or a DVD-RW.



10. **Floppy Drive** – A device that is used to read/write to floppy diskettes.



11. **Fan** – Keeps your computer cool. If the inside of your computer becomes too hot, then the computer can overheat and damage parts.



12. **Heatsink** – Used to disperse the heat that is produced inside the computer by the CPU and other parts by increasing surface area.



- 13 **The little parts** – Capacitors – store energy, Resistors – allows a current through, Transistors – a valve which allows currents to be turned on or off.



14. **Case** – (Tower if standing upright.) What your motherboard, CPU, etc is contained in.



The three main components of a computer:

1. **CPU** – Central Processing Unit, coordinates all actions that occur in the system, executes program instructions.
2. **Memory** – Used to store information.
3. **I/O Devices** – Input/Output devices, which allow you to obtain or display data.

Mainframe computer



An [IBM System z9](#) mainframe

A [mainframe computer](#) is a much larger computer that typically fills a room and may cost many hundreds or thousands of times as much as a personal computer. They are designed to perform large numbers of calculations for governments and large enterprises.

Supercomputer

A [supercomputer](#) is superficially similar to a mainframe, but is instead intended for extremely demanding computational tasks. As of November 2013, the fastest supercomputer in the world is the [Tianhe-2](#), in [Guangzhou](#), China.

COMPUTER DATA

- computer data is coded, manipulated and stored by use of an exclusive two-state condition
 - in English such two-state forms of information can include yes/no, on/off, open/closed, hole/no hole

Binary notation

- in computer terminology, this two state condition is represented in binary notation by the use of 1s and 0s
- thus, two switches produce four codes - 00, 01, 10, 11
 - three switches produce eight codes - 000, 001, 010, 011, 100, 101, 110, 111
- in mathematical terms:
 - 1 binary digit provides $2^1 = 2$ alternatives
 - 2 binary digits provide $2^2 = 4$ alternatives
 - 3 binary digits provide $2^3 = 8$ alternatives
 - 8 binary digits provide $2^8 = 256$ alternatives

Bits and bytes

- each binary digit is called a bit
 - current PCs use 8, 16 and 32 bit paths
- a group of 8 bits is called a byte
 - bytes are the standard unit of measurement of computer data