Mustansiriyah University
Physics Science
First Stage

Computer Skills

Outline

- ✓ Computer System
- ✓ Computer Types
- ✓ Personal Computer and its Components
- ✓ Input/ Output Devices
- ✓ Basic Concepts of Computer Hardware
- ✓ Memory Types/Main and Secondary memory

Computer System

A computer system consists of two components **Hardware** and **Software** components

Hardware components are the electronic and mechanical parts.

Software components are the programs and applications.

Computers Types

Computers can be generally classified by size and power as follows:

Personal computer: A small, single-user computer, based on a moderately powerful microprocessor.

Workstation: A workstation is like a personal computer, but it has a more powerful microprocessor.

Minicomputer: A multi-user computer capable of supporting up to hundreds of users at the same time.

Mainframe: A powerful multi-user computer capable of supporting many hundreds or thousands of users at the same time.

Supercomputer: very fast computer that can perform hundreds of millions of instructions per second.

Computers Types

Personal computer

Workstation

Minicomputer

Supercomputer

Mainframe

Personal Computer

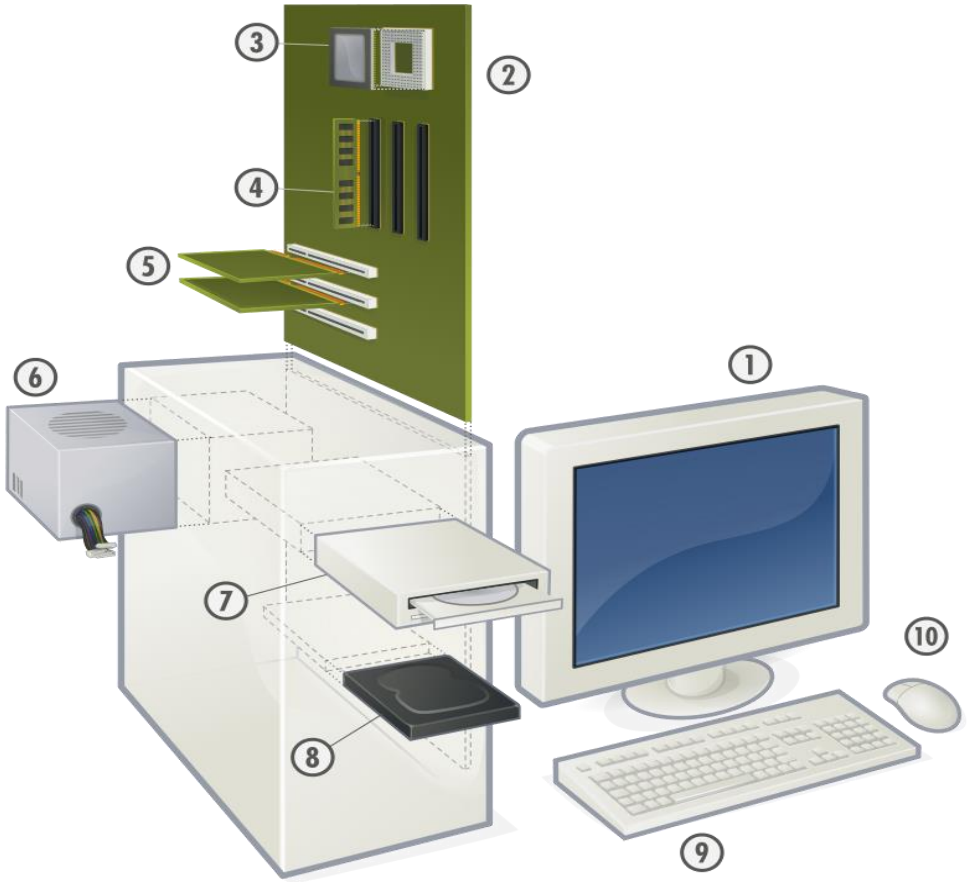
Also known as the PC, is one of the most common types of computer.

The Most Common type

- Desktop Microcomputer
- Laptop Computer

Desktop Computer

1. Monitor
2. Motherboard
3. CPU
4. RAM
5. Expansion cards
6. Power supply
7. Optical disc drive
8. Hard disk drive
9. Keyboard
10. Mouse



Case

The computer case is a plastic or metal enclosure that houses most of the components.

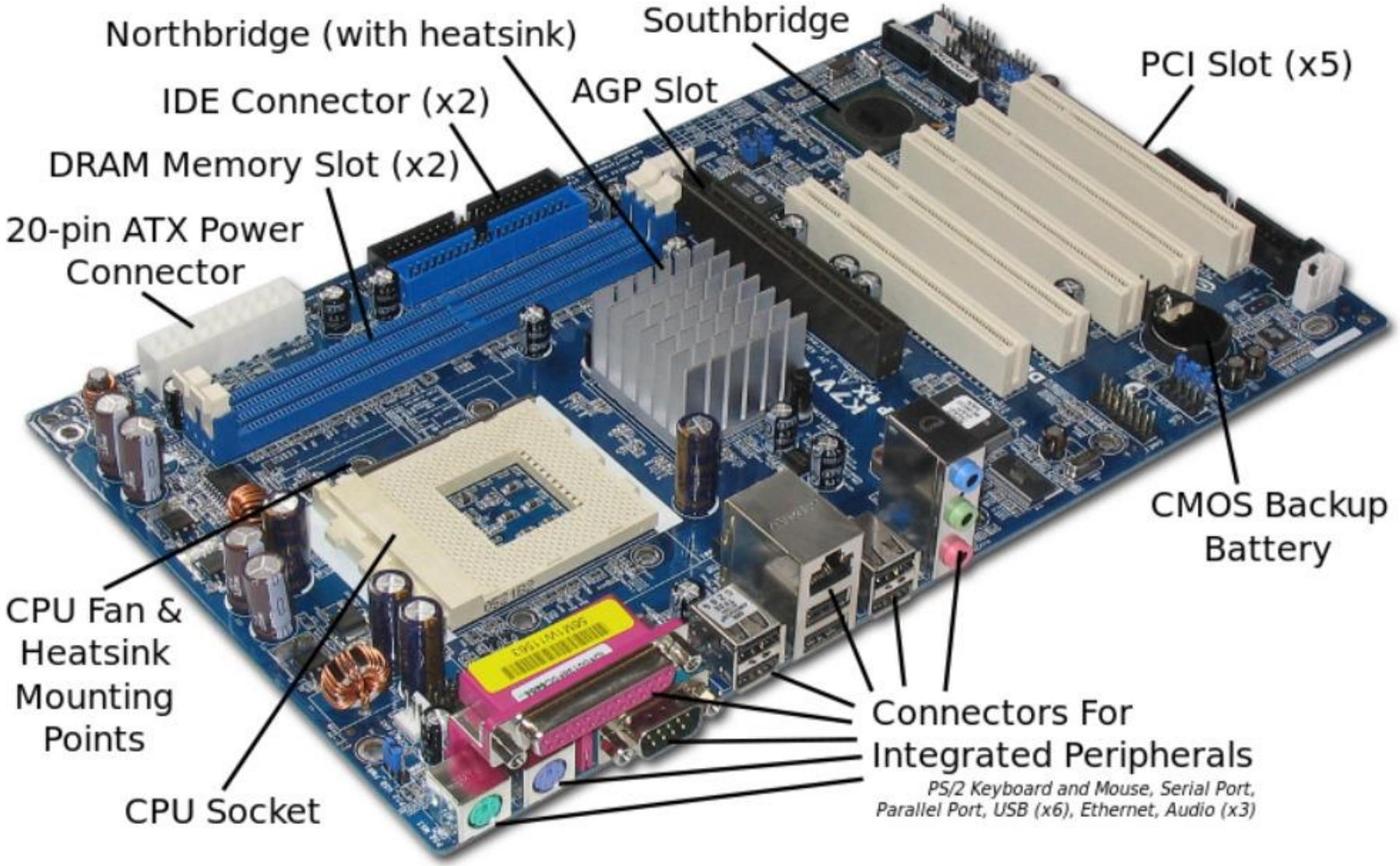
Power Supply

A power supply unit (PSU) converts alternating current (AC) electric power to low-voltage DC power for the internal components of the computer.

Motherboard

The **motherboard** is the main component of a computer. It is a large rectangular board with integrated circuitry that connects the other parts of the computer including the CPU, RAM, disk drives(CD,DVD, hard disk) as well as any peripherals connected via the ports or the expansion slots.

Motherboard



Motherboard

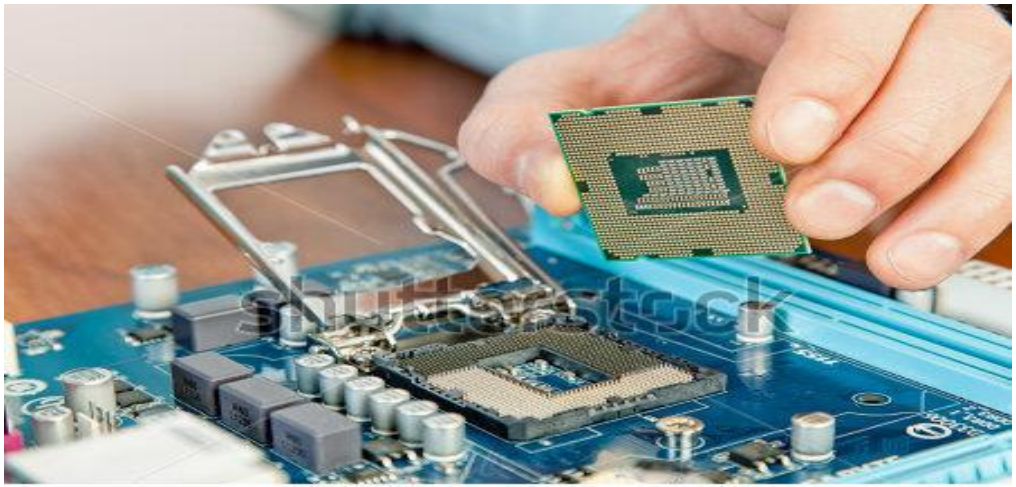
The components that directly attached to or part of the motherboard include:

- **CPU** (Central Processing Unit)
- **Chipset**
- **Random-Access Memory** (RAM)
- **Read-Only Memory** (ROM)
- **Buses**
- **Battery**
- **Expansion Cards**
- **Storage Devices/Fixed Media and Removable**

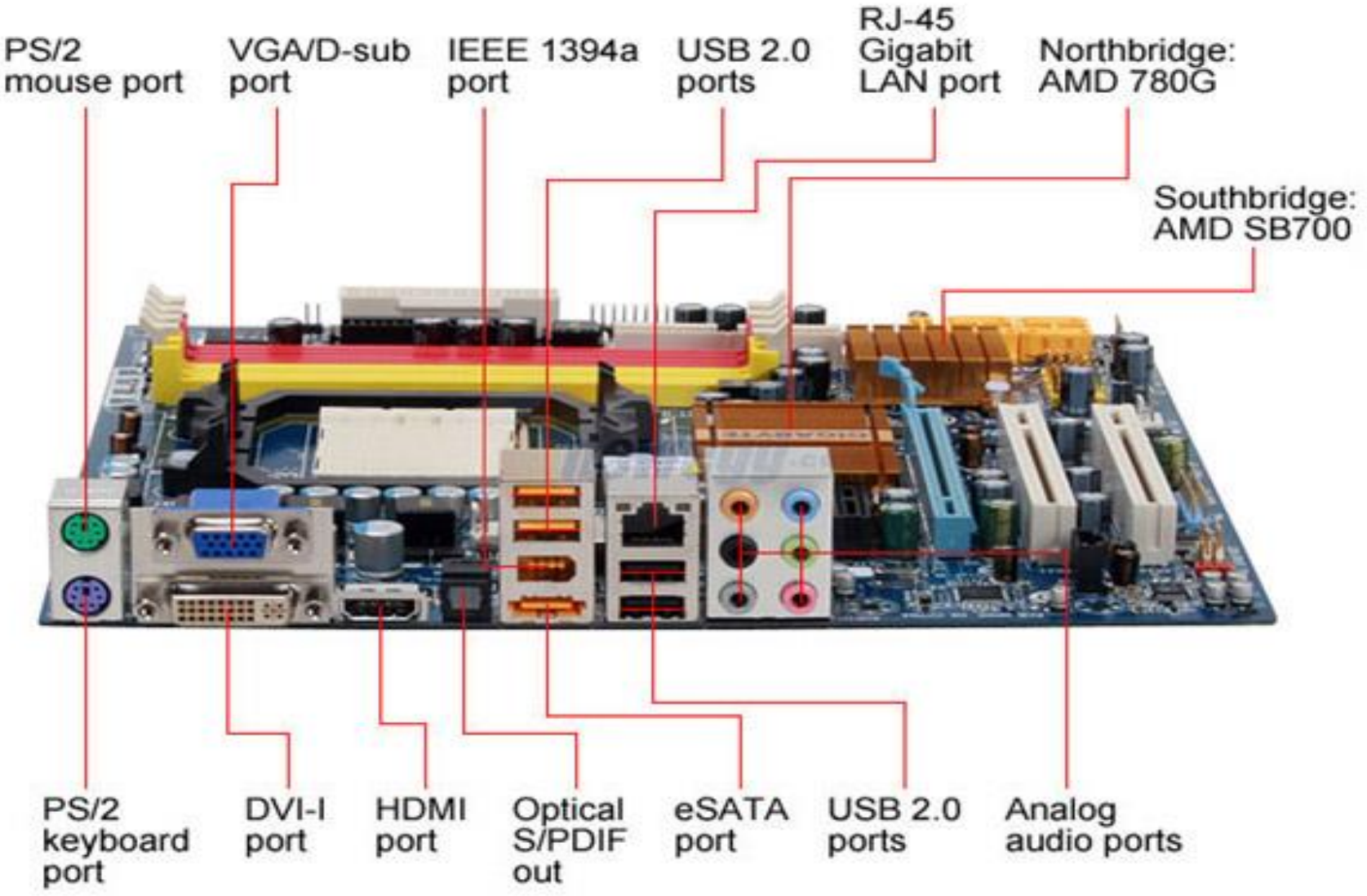
CPU (Central Processing Unit)

The processor is sometimes called the **Central Processing Unit** or **CPU**.

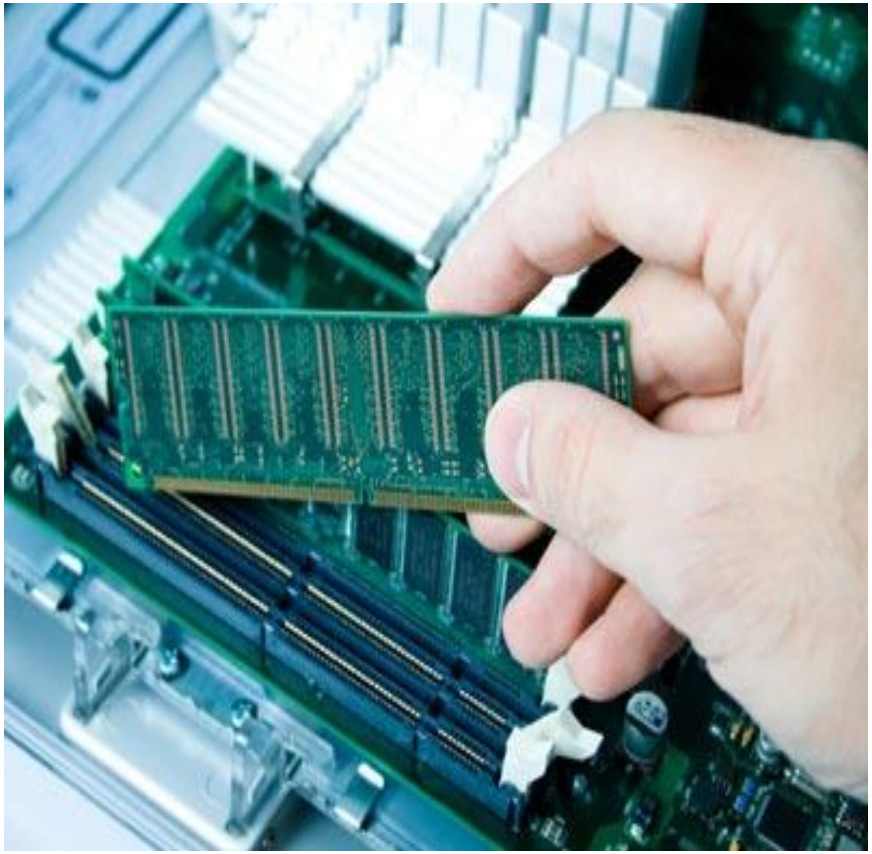
The **processor** is an electronic device about a 2.54 centimeters square, covered in plastic. Inside the square is an even smaller square of silicon containing millions of tiny electrical parts.

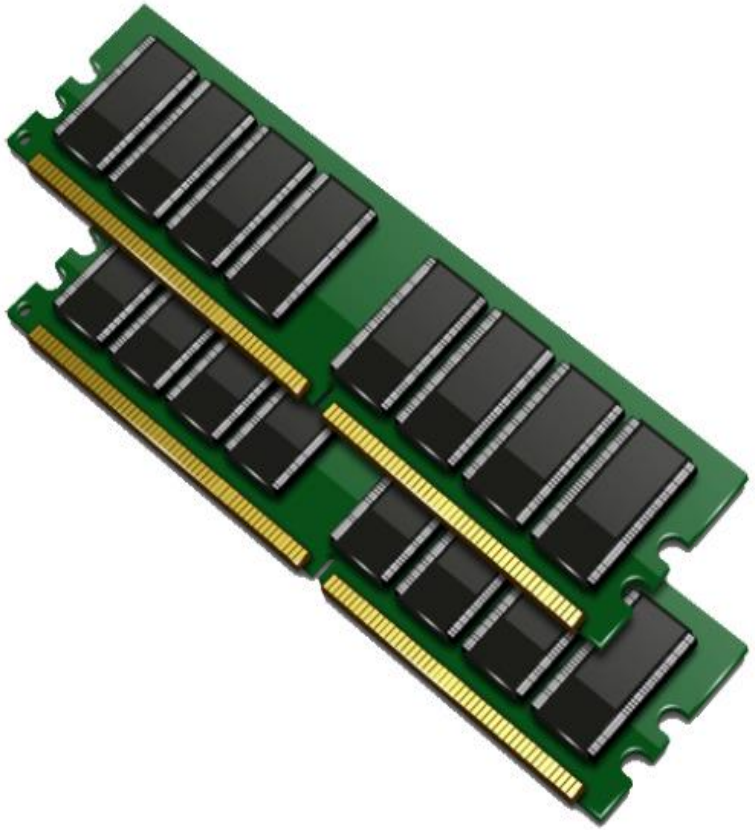


Chipset


PS/2 mouse port
VGA/D-sub port
IEEE 1394a port
USB 2.0 ports
RJ-45 Gigabit LAN port
Northbridge: AMD 780G
Southbridge: AMD SB700
PS/2 keyboard port
DVI-I port
HDMI port
Optical S/PDIF out
eSATA port
USB 2.0 ports
Analog audio ports

RAM





ROM

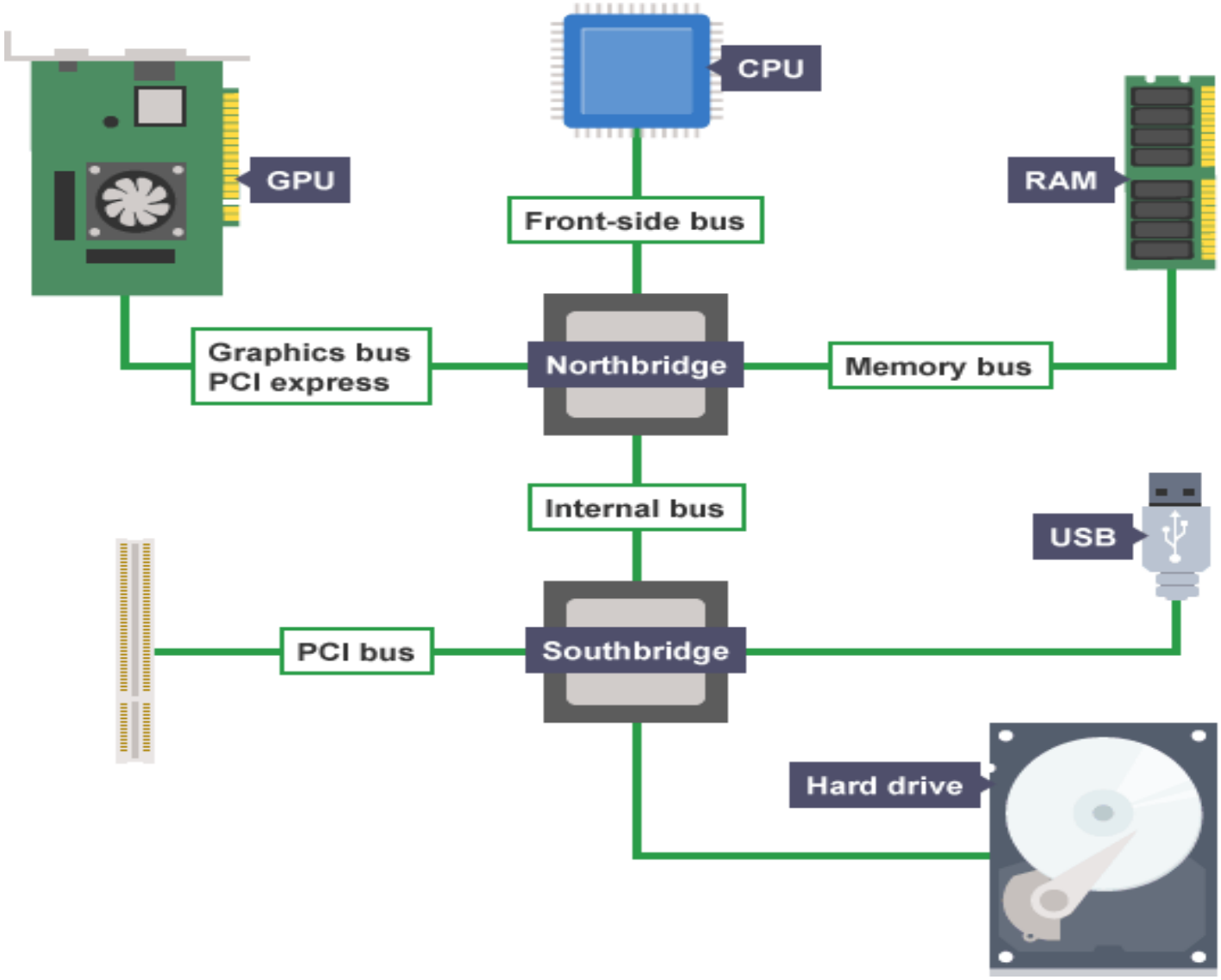
ROM is Read Only Memory, it is "built-in" computer memory containing data that normally can only be read, not written to. ROM contains the programming that allows your computer to be "booted up"

Bus

A **bus** is a group of wires on the main circuit board of the computer. It is a pathway for data flowing between components.

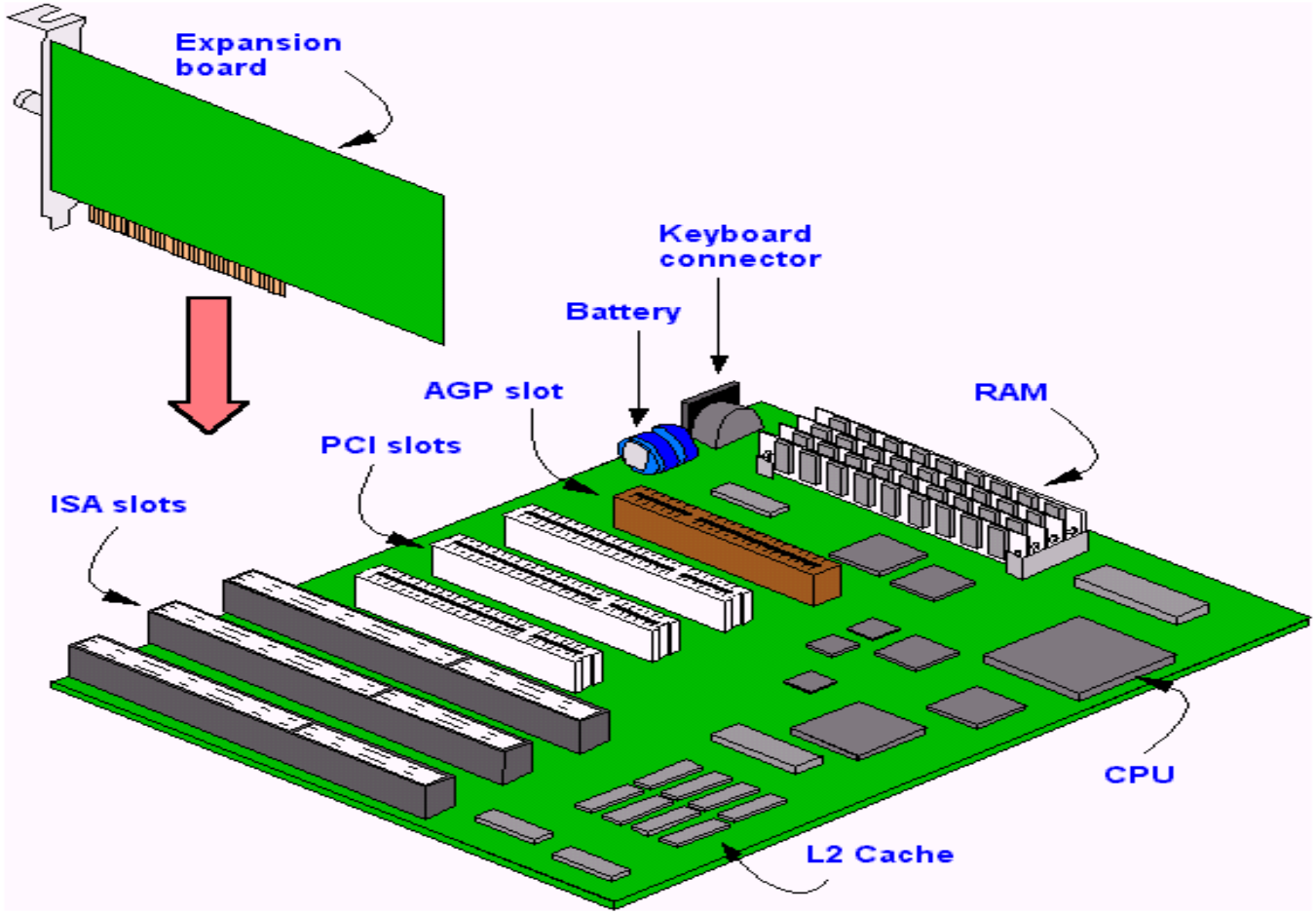
Most devices are connected to the bus through a **controller** which coordinates the activities of the device with the bus.

Buses


CPU
GPU
RAM
Front-side bus
Graphics bus
PCI express
Northbridge
Memory bus
Internal bus
USB
PCI bus
Southbridge
Hard drive

Expansion Cards

It is a printed circuit board that can be inserted into an expansion slot of a computer motherboard to add functionality to a computer system.



Storage Devices/Fixed Media

Hard disk drives (HDD)

solid-state drives (SSD)

Storage Devices/Removable Media

USB Flash

Optical Disc

Input devices

Input devices allow the user to enter information into the system

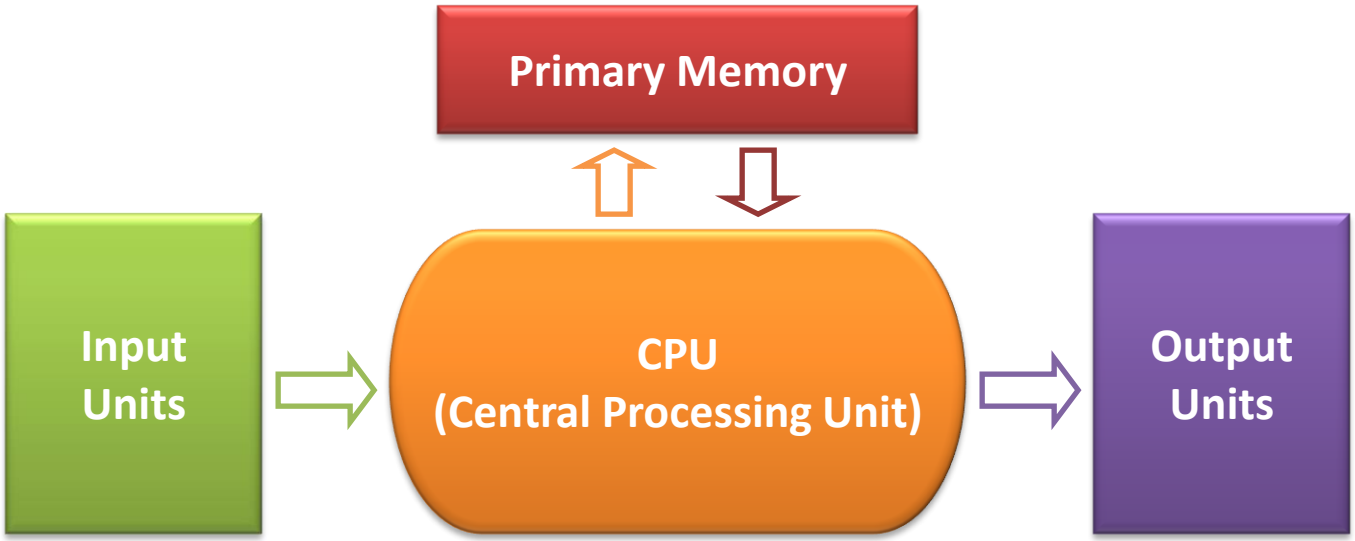
- **Keyboard**
- **Mouse**
- **Webcams**
- **Microphones**
- **Joysticks**
- **Image Scanners**

Output devices

Output devices display information in a human readable form.

- **Printer**
- **Speakers**
- **Monitor**

Basic Concepts of Computer Hardware



This model of the typical digital computer is often called the **von Neumann** computer.

Memory

There are two fundamental types of memory: main memory and secondary memory.

A **Processor chip** has little memory. It has only enough memory to hold a few instructions of a program and the data they process. Complete programs and data sets are held in main or secondary memory.

Main memory

- It is sometimes called **main storage**, sometimes called **volatile** because it looses its information when power is removed.
- closely connected to the processor.
- stored data are quickly and easily changed.
- holds the programs and data that the processor is actively working with.
- interacts with the processor millions of times per second.
- needs constant electric power to keep its information

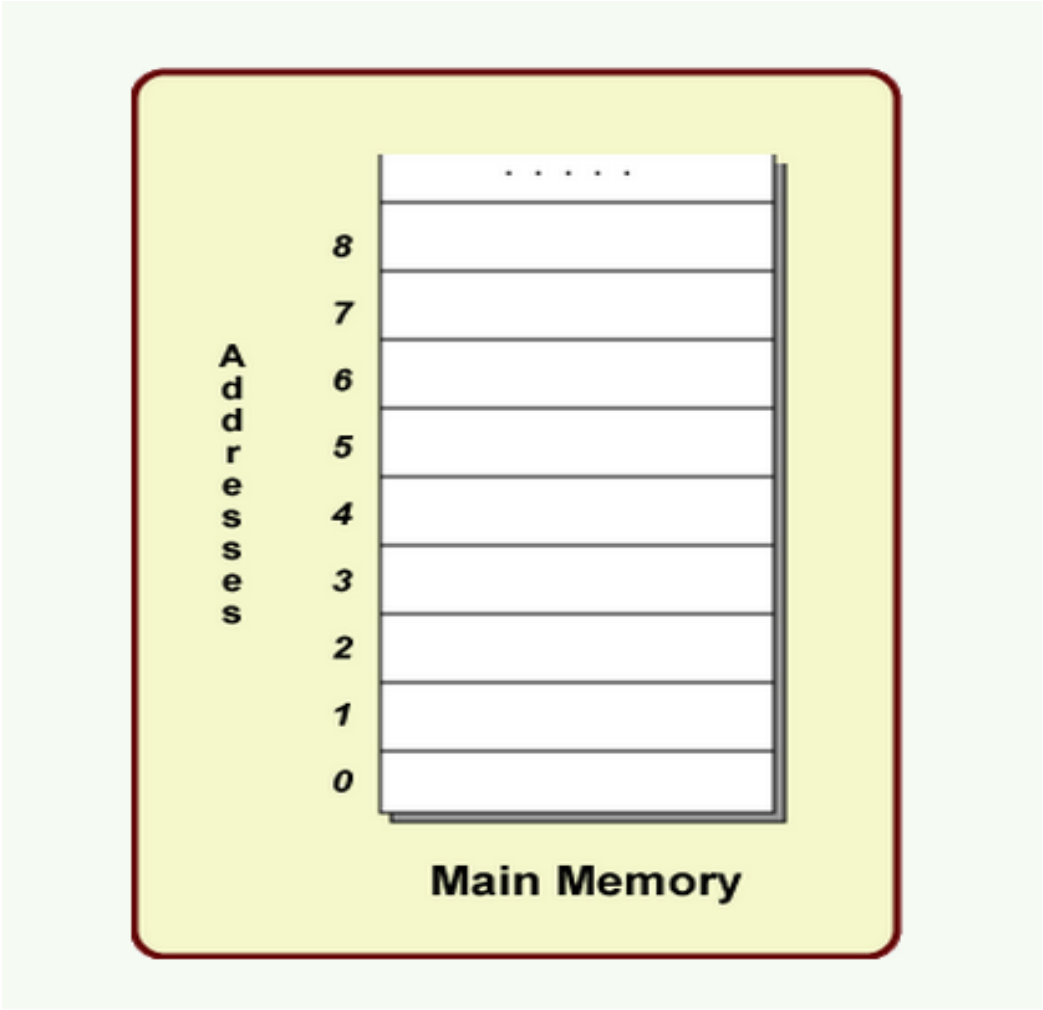
Main Memory

Main memory is sometimes called **RAM. ” Random Access Memory”,** "Random" means that the memory cells can be accessed in any order, in other word means the type of silicon chip used to implement main memory.

If computer has "512 megabytes of RAM“, one megabyte of memory is enough to hold approximately one million (10^6) characters of a word processing document.

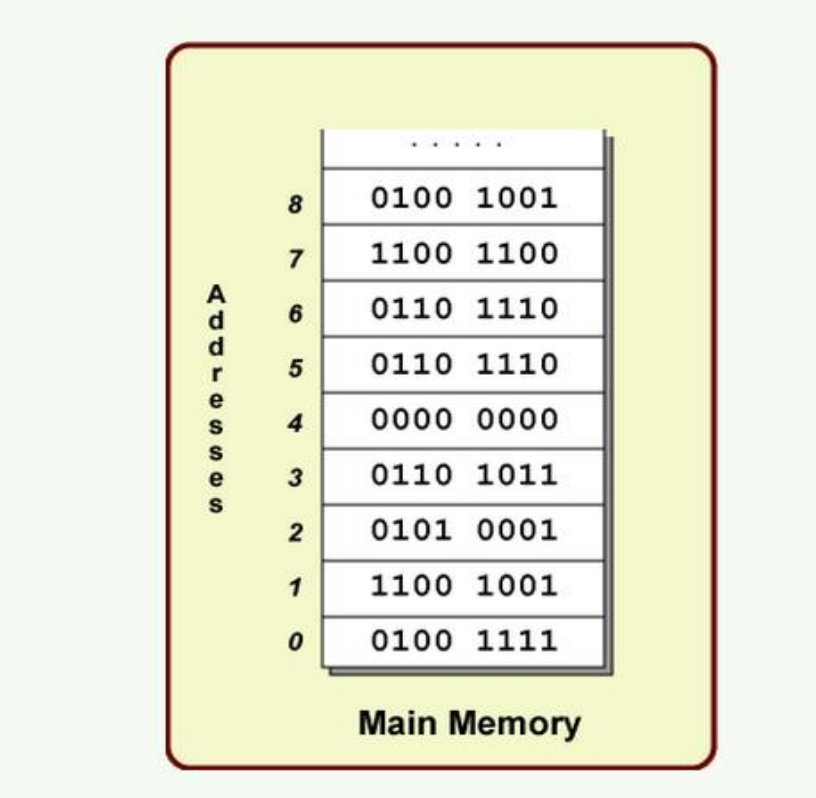
Nothing permanent is kept in main memory. Sometimes data are placed in main memory for just a few seconds, only as long as they are needed.

Each byte of main memory has a unique address.
If main memory is 4 megabytes large,
there will be $4 * 2^{20}$ addresses.



Contents of Main Memory

The only thing that can be stored at one memory location is eight bits, each with a value of "0" or "1". The bits at a memory location are called the contents of that location.



Reading and Writing Memory

The processor can do two fundamental process with in main memory:

Write

Read

Secondary memory

- Secondary memory is usually **nonvolatile** because it retains its information when power is removed.
- It is connected to main memory through the bus and a controller. It's sometimes called **secondary storage** or **mass storage**.
- stored data are easily changed, but changes are slow compared to main memory.
- before data and programs can be used, they must be copied from secondary memory into main memory.

Hard Disks

The hard disk (HDD) of a computer system records bytes on a magnetic surface much like the surface of audio tape. The recording (writing) and reading of the data is done with a *read/write head* similar to that used with audio tape.