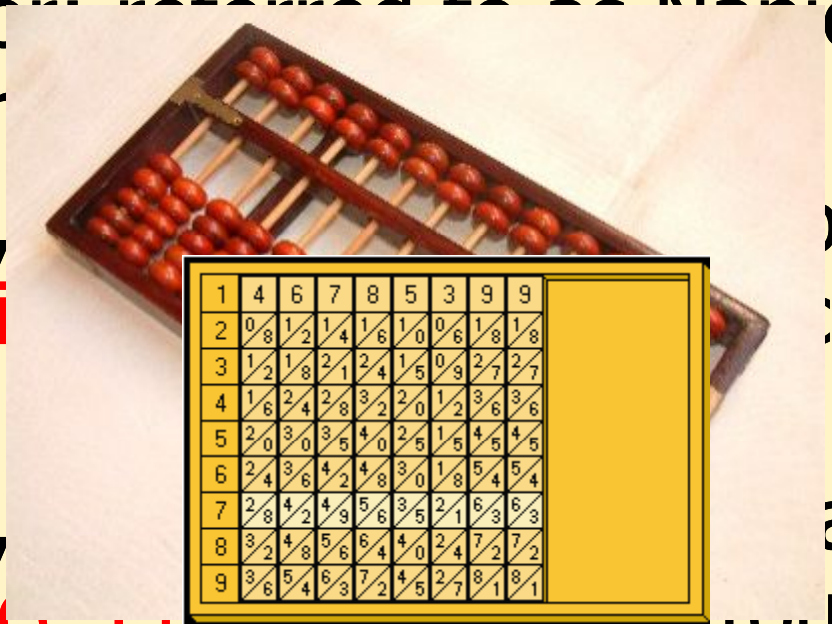
Computers

The evolution of the computer:

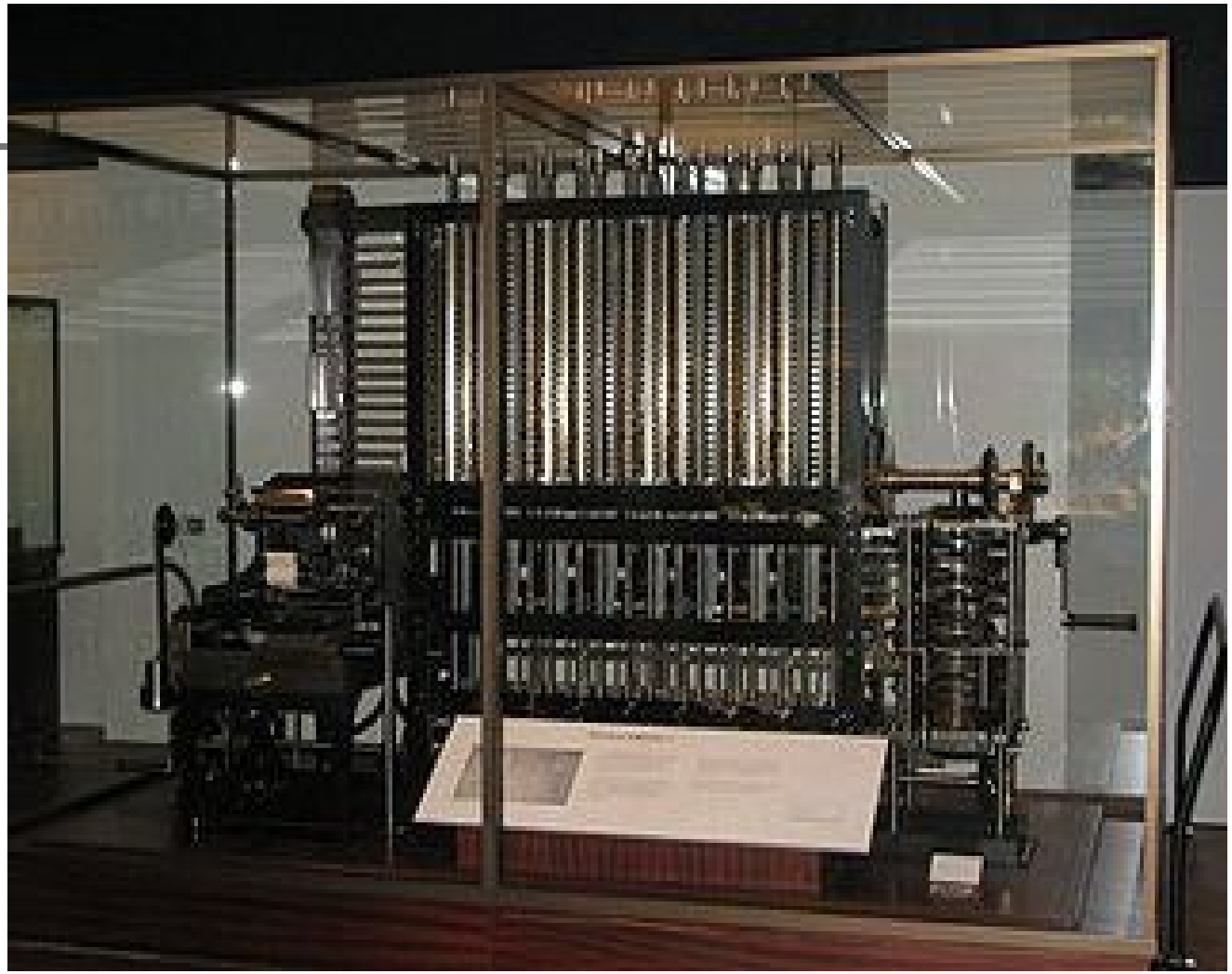
Early Years

- The first known device used to assist with mathematical calculation was the Abacus developed around 3000 BC
- In 1617, John Napier created a mechanical calculator referred to as Napier 's bones it was a cr
- In 1672, ped the first mechani capable of addition
- In 1822, ated the Difference Engine which is touted to be the first general purpose computing machine



Replica of Charles Babbage's Difference Engine

Based on the decimal number system and was powered by cranking a handle



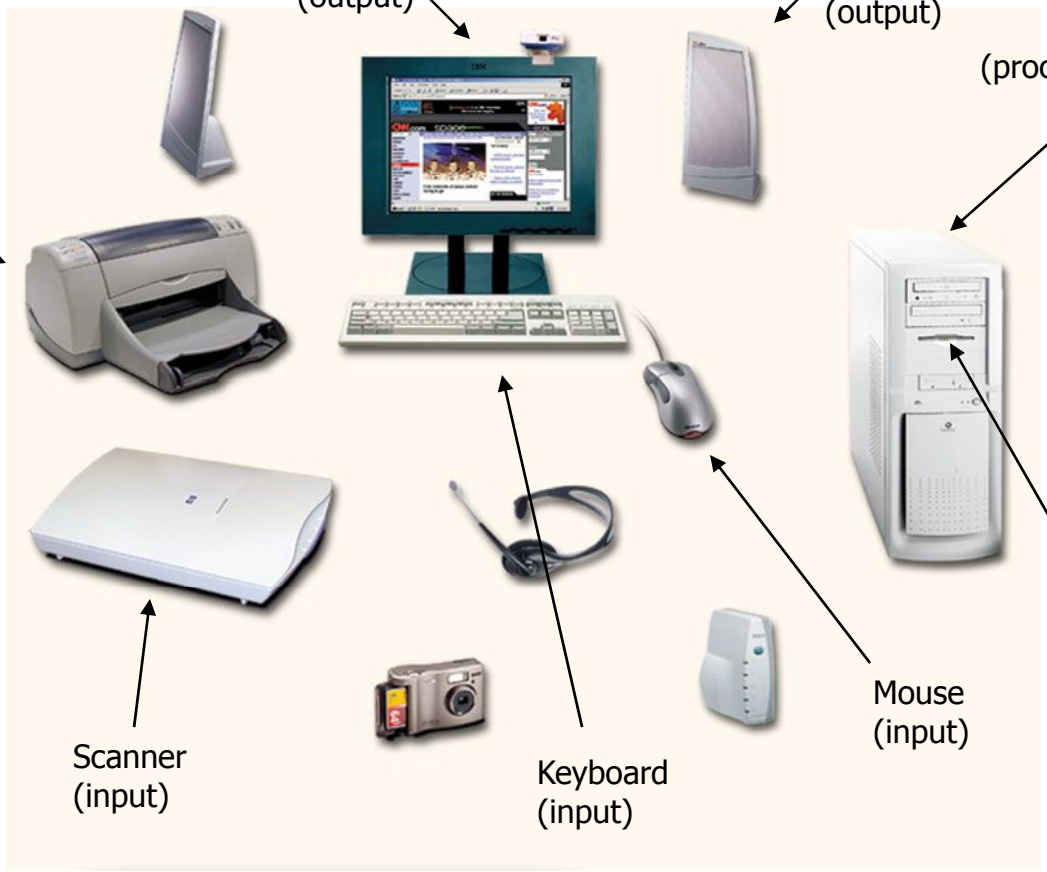
The London Science Museum

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.

Devices that comprise a computer system



What Does A Computer Do?

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

- **Input**
- **Process**
- **Output**
- **Storage**

What Do Computers Do?

Input, Process, Output, & Store data

Input → **Process** → **Output**

Process ↕ **Store Data**

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.**

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.

Three Major Components of an Information Processing System

- HARDWARE is the tangible part of a computer system.
- SOFTWARE is the non-tangible part that tells the computer how to do its job.
- PEOPLEWARE refer to people who use and operate the computer system, write computer programs, and analyze and design the information system.

Networks

- A network is a group of computers that share information and hardware.
- The computers are connected together using copper phone wires, fiber optic cables, or radio waves.
- Our computers are on a network here at school…Look under the table and see the blue wires that connect your computer to the network.
- The internet is many networks around the world that are all connected together to make 1 huge network.

Parts of a Computer

- **There are two basic parts that make up a computer…**

Hardware

Software

Hardware

- Hardware is basically anything that you can touch with your fingers.

Computer Case
CPU (central processing unit…Pentium chip)
Monitor
Keyboard & Mouse
Disk Drive, Zip Drive, CD-ROM, DVD,
Hard Drive
Memory (RAM)
Speakers
Printer

Hardware (Continued)

- There are three types/categories of hardware

1. Input Devices
2. Output Devices
3. Storage Devices

Input Devices

- Input basically means getting data into the computer to be processed.

Keyboard, Mouse,
Trackball, Touch Pad
Light Pen, Laser Scanner,
Pointing Stick
Touch Screen,
Bar Code Reader, Scanner
Microphone, Joystick

Output Devices

- Output basically means getting data out of the computer.

Monitor
Printer
Speakers
Headphones
Modem
Fax

Storage Devices

- Storage devices are both input and output devices in one. A storage device is a place to keep data that has been processed so that it can be retrieved at a later time to be used again.

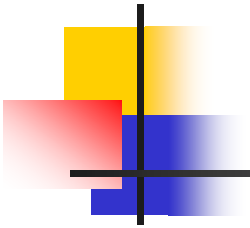
Hard Disk
Floppy Disk
CD's, DVD's
Magnetic Tape
Flash Memory, Jump Drive

Software

- Software is the programs and applications that tell the computer what to do and how to look.
- Computer programmers write the codes/instructions that make-up software applications/programs.
- HTML is a type of computer programming language that allows programmers to make web pages.

Basic Units of Measurement

- BIT is a unit of information equivalent to the result of a choice between only 2 possible alternatives in the binary number system.
- BYTE is a sequence of 8 bits (enough to represent one character of alphanumeric data) processed as a single unit for information.

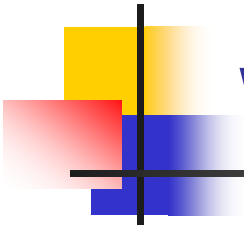


- A byte can be used to represent a single character, which can be:
  - A letter
  - A number
  - A special character or symbol, or
  - A space

Basic Units of Measurement

- 1,000 bytes =1 kilobyte (K or KB)
  1,000 KB =1 megabyte (MB)
  1,000 MB =1 gigabyte (GB)
  1,000 GB =1 Terabyte (TB)

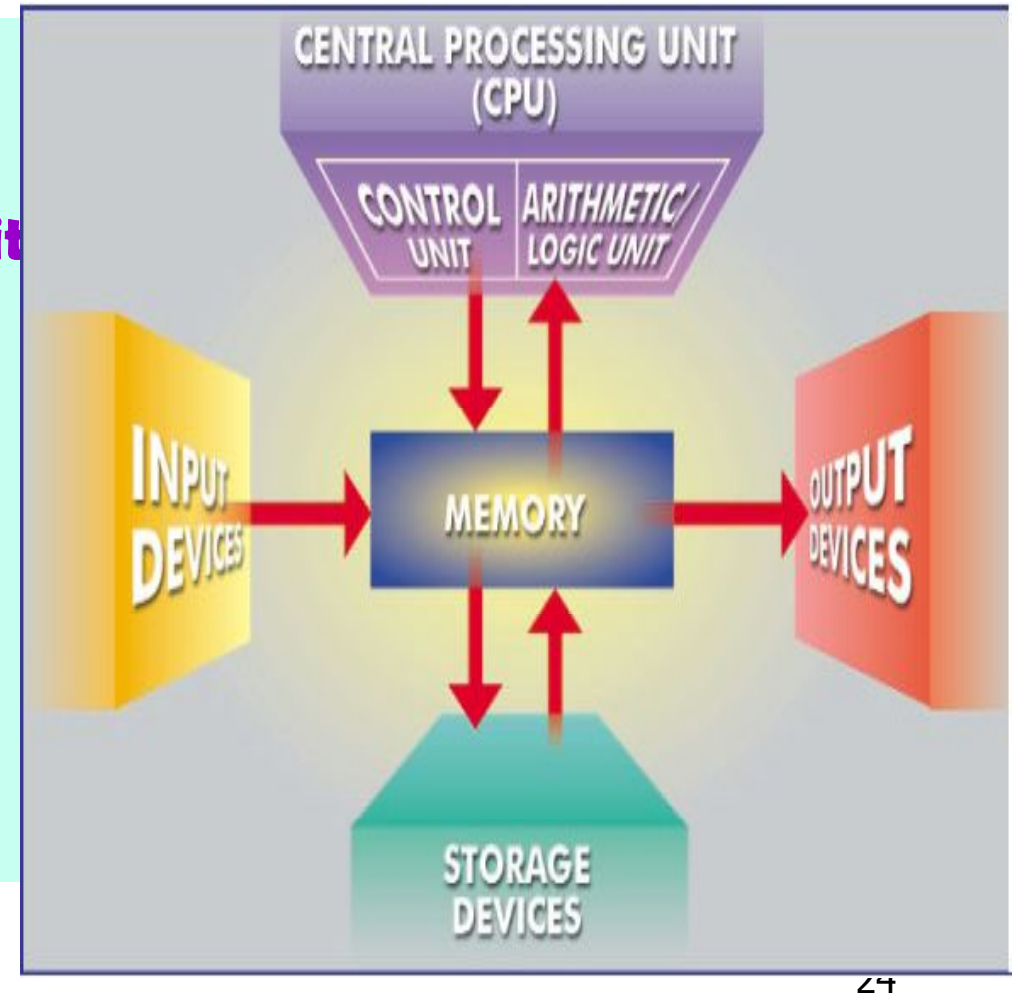
How Does a Computer Know what to do?



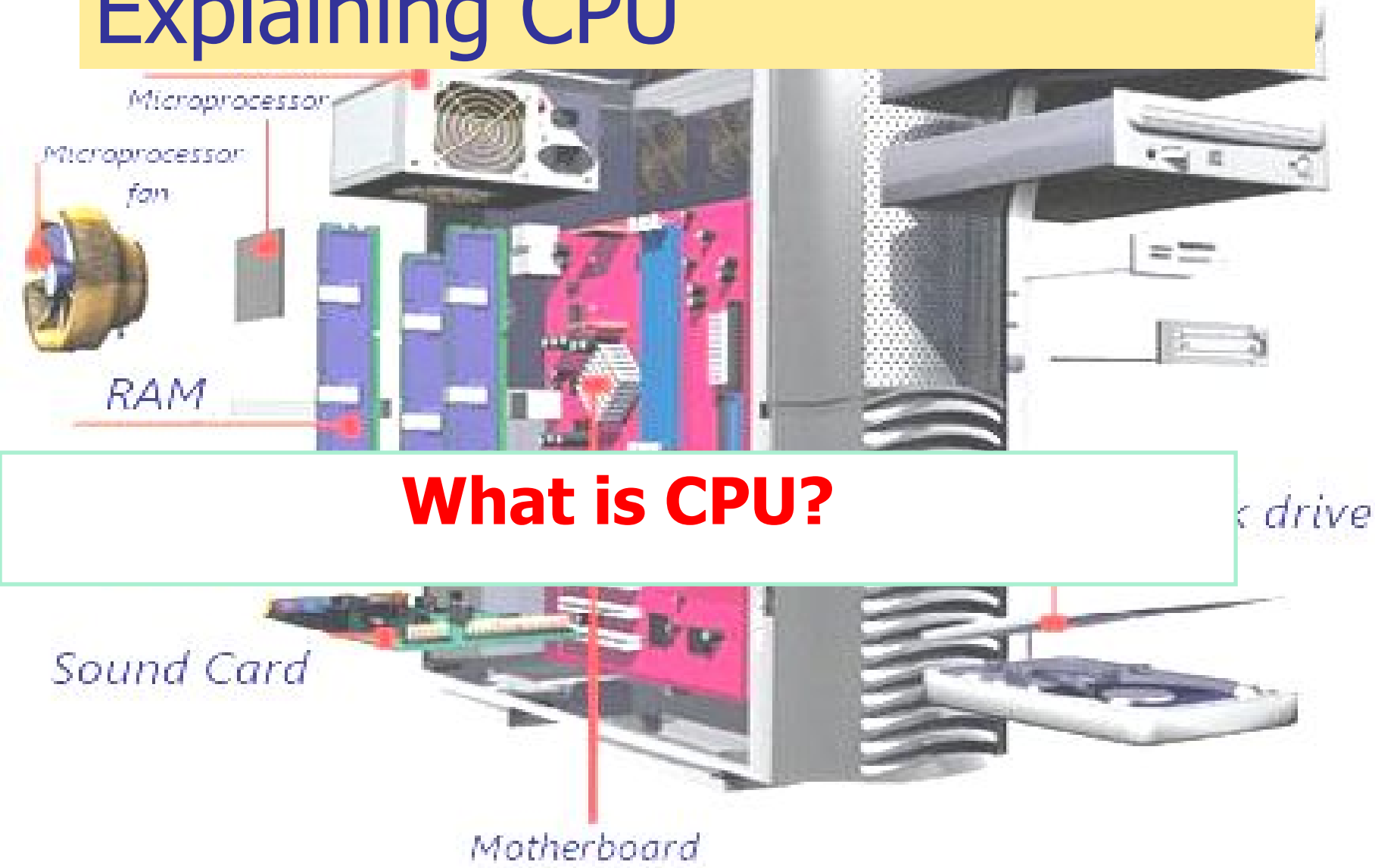
- It must be given a detailed list of instructions, called a **compute program** or **software**, that tells it exactly what to do.
- Before processing a specific job, the computer program corresponding to that job must be stored in memory.
- Once the program is stored in memory the compute can start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

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**.

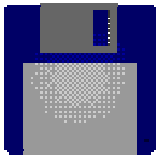


Explaining CPU



What is CPU?

Processor Unit

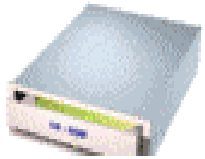


Two main parts:

CPU – where the actual processing takes place; and

Main memory – where data are stored.

The contents of main memory can be transferred to auxiliary storage devices such as hard disks, floppy diskettes, zip disks, compact disks, or USB flash disk.

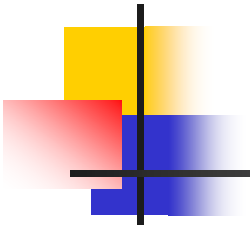


Central Processing Unit

- The microprocessor, the brains of the computer. Referred to a CPU or processor

  Housed on a tiny silicon chip

  Chip contains millions of switches and pathways that help your computer make important decisions.



CPU knows which switches to turn on and which to turn off because it receives its instructions from computer programs (software).

CPU has two primary sections:

Arithmetic/logic unit

Control unit

Arithmetic/logic unit (ALU):

- Performs arithmetic computations and logical operations; by combining these two operations the ALU can execute complex tasks.

  - Arithmetic operations include addition, subtractions, multiplication, and division.

  - Logical operations involve comparisons.

Control Unit: is the "boss" and coordinates all of the CPU's activities.

Uses programming instructions, it controls the flow of information through the processor by controlling what happens inside the processor.

We communicate with the computer through programming languages.

Examples: COBOL, C++, HTML, Java Script or VisualBasic.net

Memory

- Found on the motherboard
  - Short term

    Random Access Memory (RAM)
  - Long term

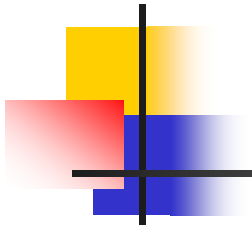
    Read Only Memory (ROM)

Random Access Memory (RAM)

Memory on the motherboard that is short term; where data, information, and program instructions are stored temporarily on a RAM chip or a set of RAM chips. Known as the main memory.

This memory is considered volatile.

The computer can read from and write to RAM.



When the computer is turned off or if there is loss of power, what ever is stored in RAM disappears.

"Temporary Memory" – Short Term

Read-Only Memory (ROM)

Memory on the motherboard that is long term; where the specific instructions that are needed for the computer to operate are stored.

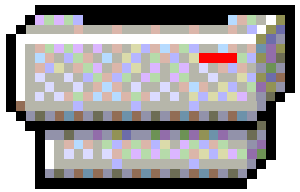
This memory is nonvolatile and your computer can only read from a ROM chip.

The instructions remain on the chip regardless if the power is turned on or off.

Most common is the BIOS ROM; where the computer uses instructions contained on this chip to boot or start the system when you turn on your computer.

"Permanent Memory" – Long Term

Output Unit



After the data has been processed, the results are output in the form of useful information.

Output units such as monitors and printers make the result accessible for use by people.

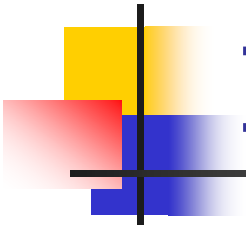
Computer Output Devices

Monitor: screen that display information such as text, numbers, and pictures-softcopy.

Printer: gives you information from the computer in printed form – hardcopy.

Speakers: allow you to hear voice, music, and other sounds from your computer.

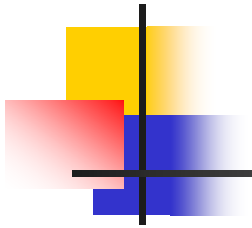
Modem: allows you to use your computer to communicate with other computers.



Input Devices

- Keyboard.
- Mouse.

The Parts of a Computer System



- **A complete computer system includes four distinct parts:**

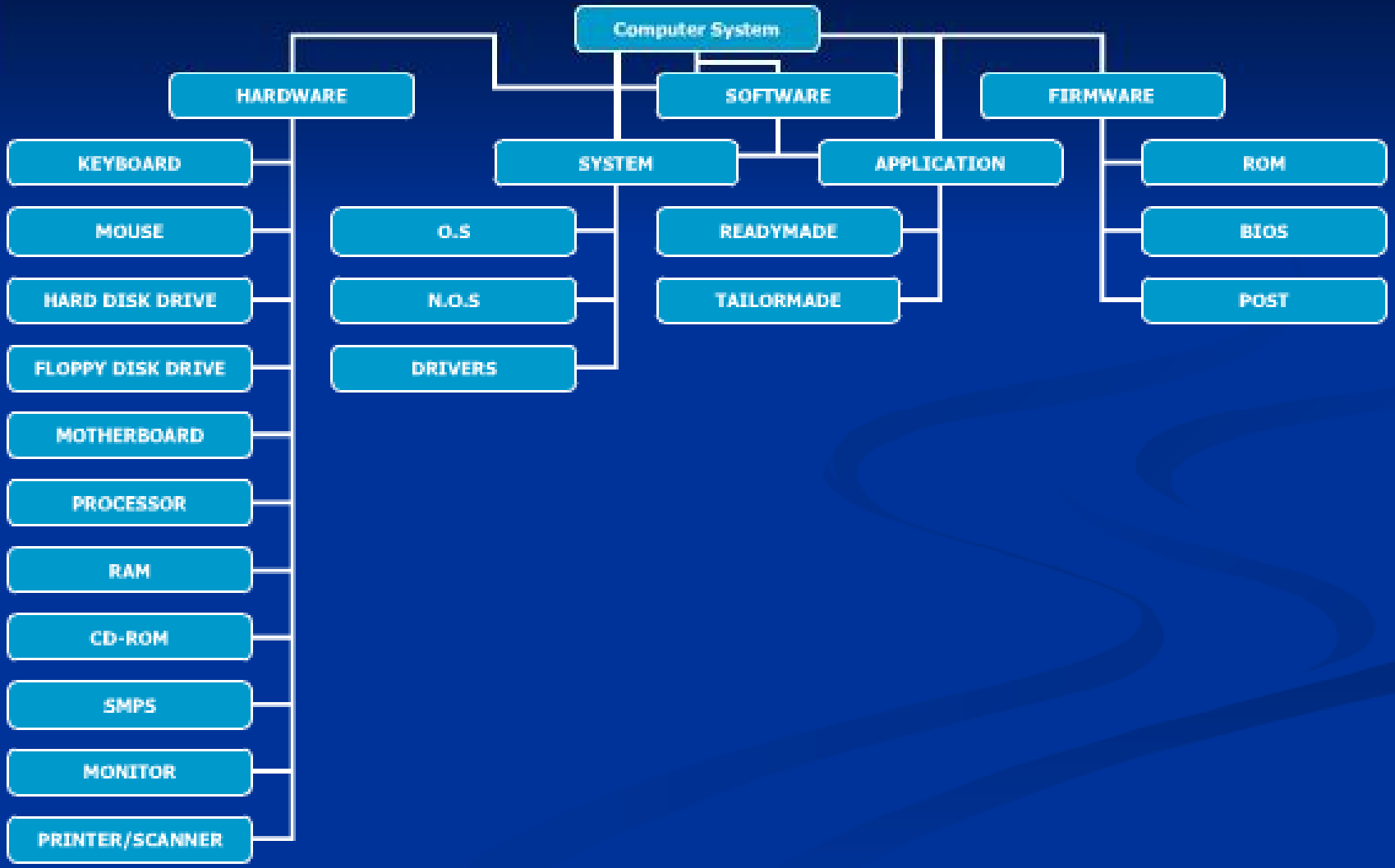
  Hardware

  Software

  Firmware

  User

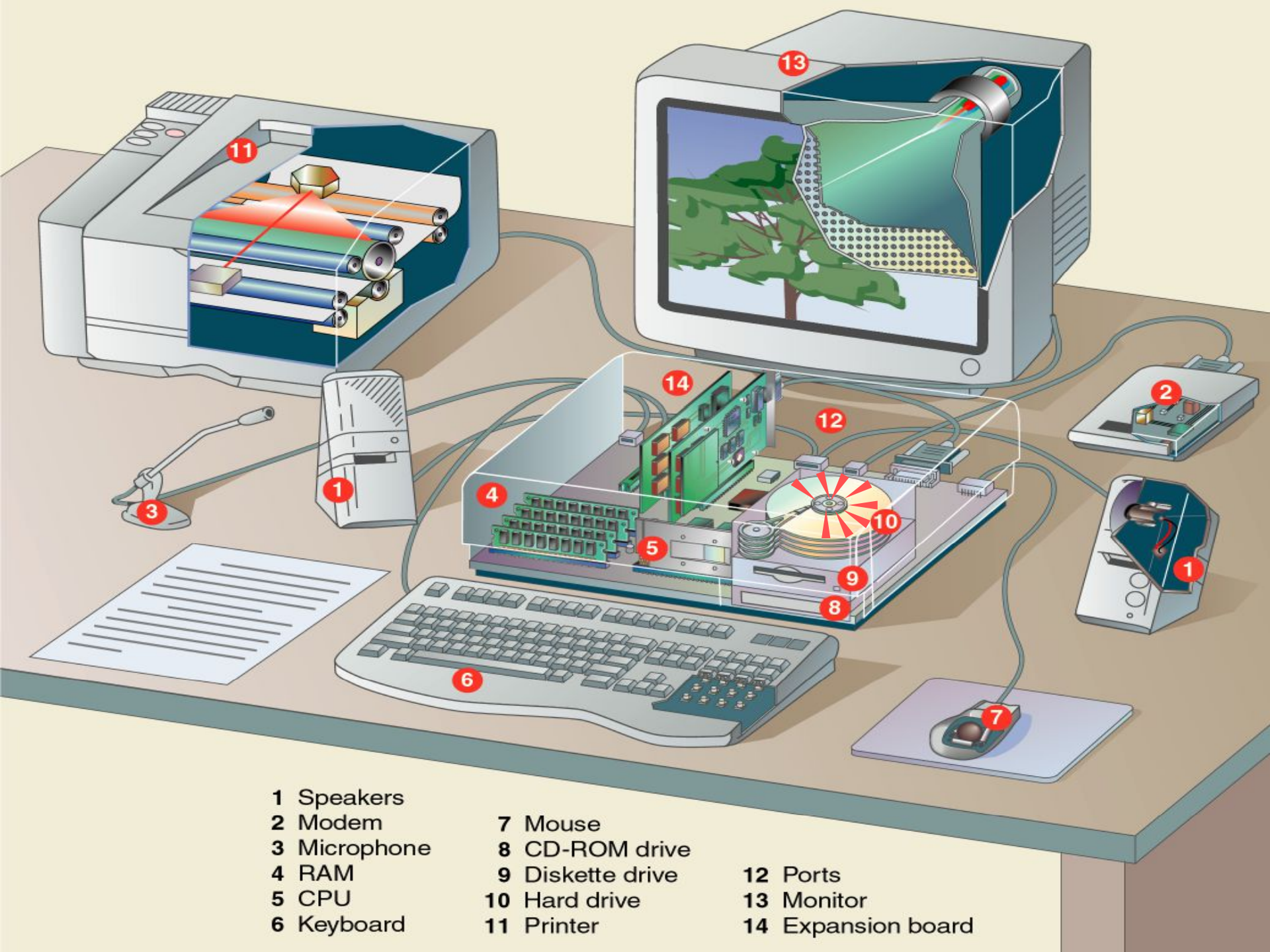
Computer System



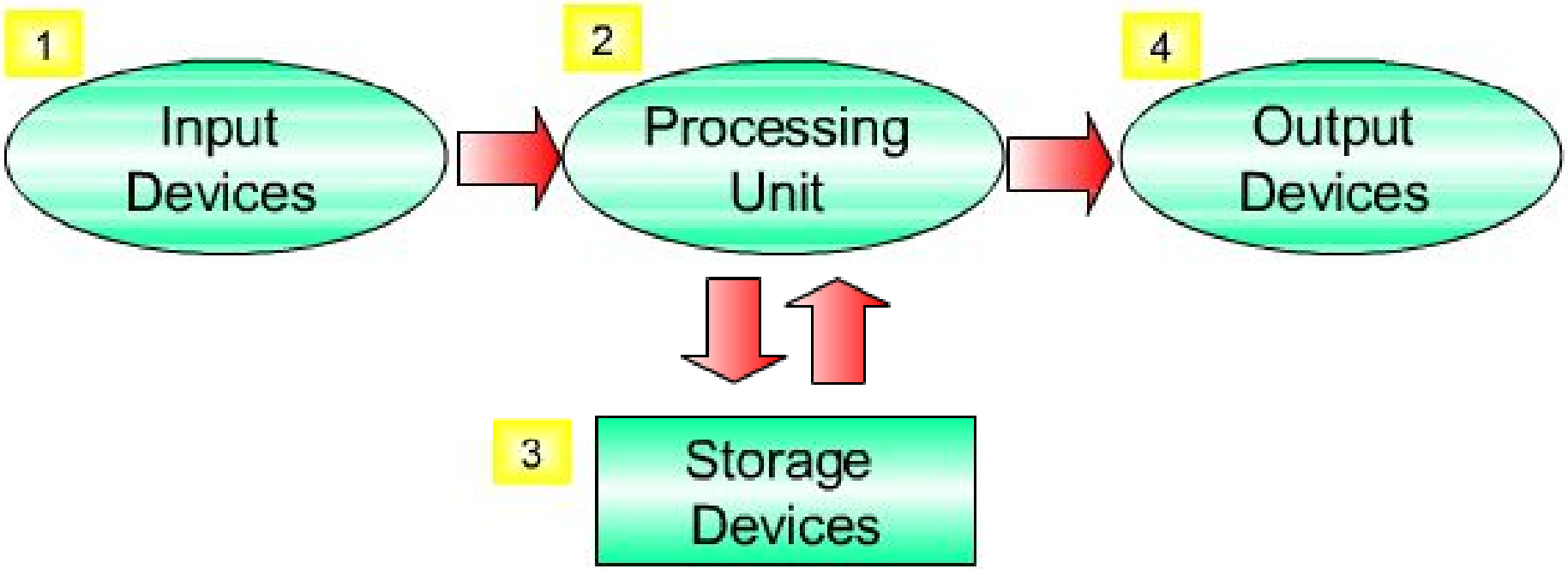
What is a Hardware?

- Hardware is the general term that is used to describe physical artifacts of a technology.

- A computer's hardware consists of electronic devices; the parts you can see and touch.


1 Speakers
2 Modem
3 Microphone
4 RAM
5 CPU
6 Keyboard
7 Mouse
8 CD-ROM drive
9 Diskette drive
10 Hard drive
11 Printer
12 Ports
13 Monitor
14 Expansion board

Classification of Hardware



1.KEYBOARD

Keyboard is the primary input device of the PC. You use the keyboard to enter commands and type text. The keyboards on computers are similar to typewriters. However, a computer has many additional keys. Computer keyboards have not changed a lot since they were introduced. The only changes have been additions to the number of keys in the original keyboards. Present day keyboards have 101 or more keys. Each of these keys performs a different operation.

Types of Keyboards

Type of Keys

Function Keys
Alphanumeric Keys
Numeric Keys
Navigation Keys
Punctuation Keys
Modification Keys
Special Keys
Windows Keys