Input Devices

- Translate data from **form** that humans understand to one that the computer can work with
- Most common are keyboard and mouse

Examples of Input Devices

1. Keyboard (QWERTY keyboard, ATMs keyboard)
   ATM: automatic teller machine
2. Mouse
3. Scanner
4. Pre-storage Devise (Disk, CD's, … etc.)
5. Optical mark recognition (Light Pin , Bar code scanners)
6. Microphone
7. Joystick .

Parts of a Computer Input Devices

- Mouse

- Keyboard

- Microphone

- Scanner

- Webcam

Trackball

Trackpoint

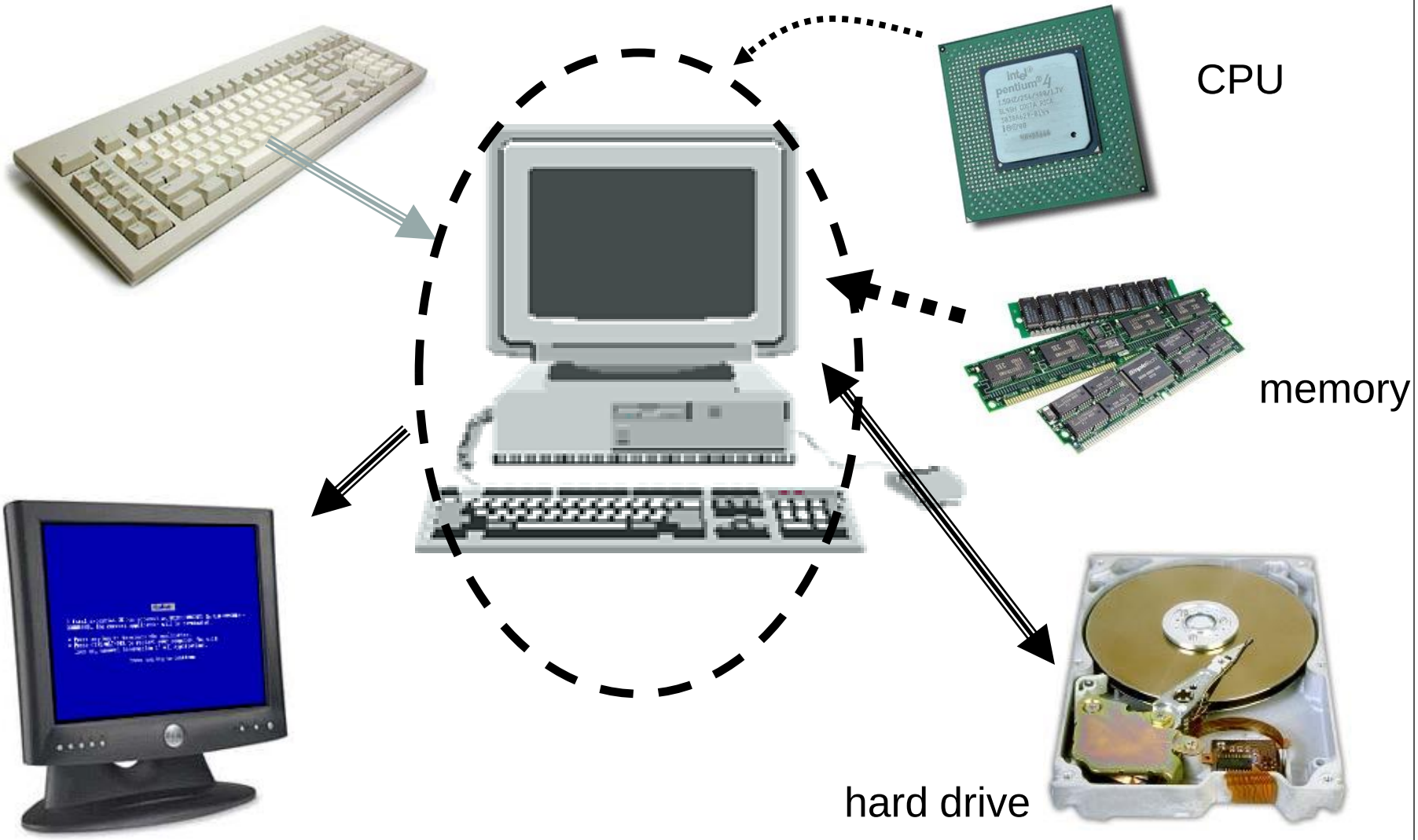
Digitizer Tablet and Pen

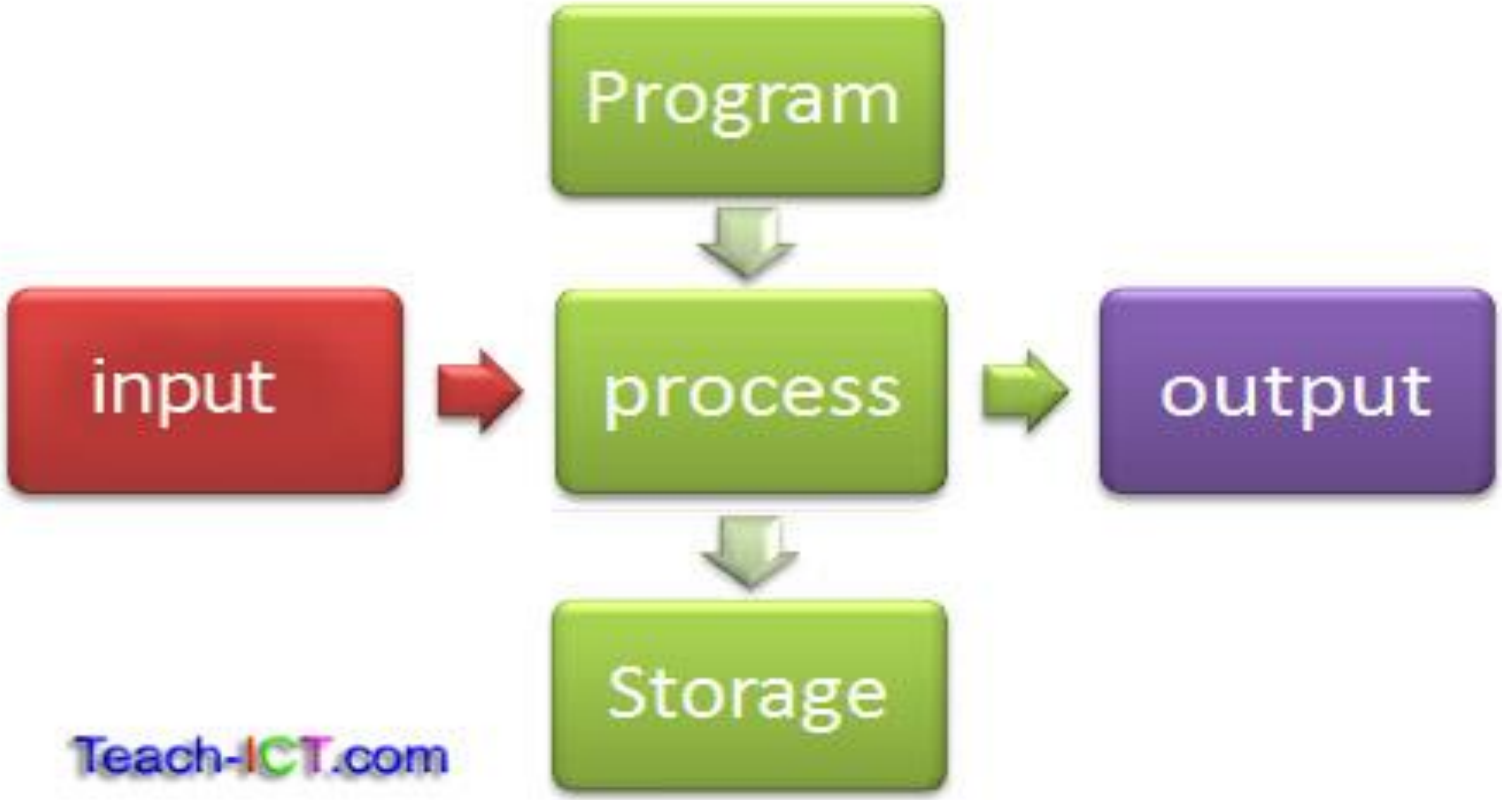
Photos Courtesy of:
- Imation Corporation
- Houston Instrument Div. AMETEK, Inc.
- Advanced Gravis Computer Technology Ltd.

Joystick

Trackpad

Hardware Organization

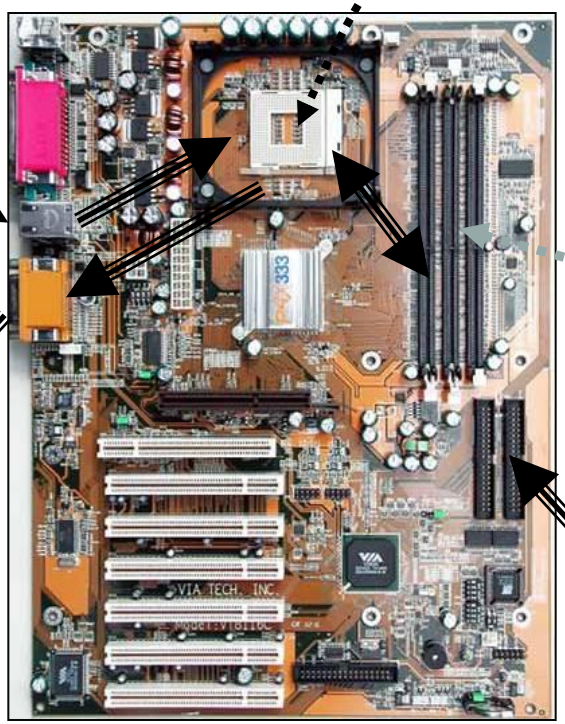



Program
input
process
output
Storage
Teach-ICT.com

The CPU consists of :

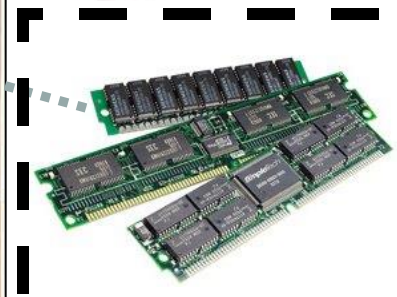
- Control Unit (CU)
- Arithmetic and Logical Unit (ALU)
- Some Registers

Hardware Organization



motherboard

CPU



memory

hard drive

Primary Memory

- Memory (fast, expensive, short-term memory): Enables a computer to store, at least temporarily, data, programs, and intermediate results.

- Two general parts:
  1. RAM
  2. ROM

Memory

Computer Memory

- millions/billions of on/off charges

Divided into:

- **Bits**0 or 1
- **Bytes** Groups of 8 bits
  A byte is the smallest unit of storage.
  (Can hold one text character)
- **Words** Groups of bits/bytes (8, 16, 32, 64-bits)

Memory

Storage is usually too large to be expressed in **bytes** or **words**. Instead we use:

- **Kilobyte (KB)** = 1024 bytes (2^{10} bytes)
- **Megabyte (MB)** = 1024 x 1024 bytes or one million bytes (2^{20} bytes)
- **Gigabyte (GB)** = 1024 x 1024 x 1024 bytes or one trillion bytes (2^{30} bytes)
- **Terabyte (TB)** = 1024 x 1024 x 1024 x 1024 bytes one quadrillion bytes (2^{40} bytes)

Memory

By number of bytes available for storage ➢

Size Approximate	AbbreviationTerm
1 thousand bytes	KB or KKilobyte
1 million bytes	MBMegabyte
1 billion bytes	GBGigabyte
1 trillion bytes	TBTerabyte

RAM (Main Memory)

- its a primary storage or random access memory (RAM).
- it temporarily holds data and programs for use during processing (volatile)
- Any information stored in RAM is lost when the computer is turned off.
- RAM is the memory that the computer uses to temporarily store the information as it is being processed. The more information being processed the more RAM the computer needs.

ROM: Read Only Memory

ROM is part of memory

- Programmed at manufacturing time
- Its contents cannot be changed by users
- It is a permanent store

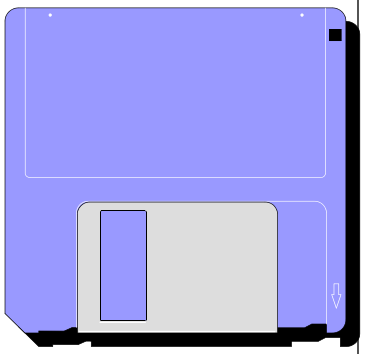
DIFFERENCES BETWEEN RAM AND ROM

	RAM	ROM
Data and program	Stores during and after processing	Stored by manufacturer
Content	Stores information temporarily	Stores instructions (Information) permanently
Processing time	Very fast, but uses a lot of power	Fast, but uses very little power
Volatility	Volatile	Non-volatile

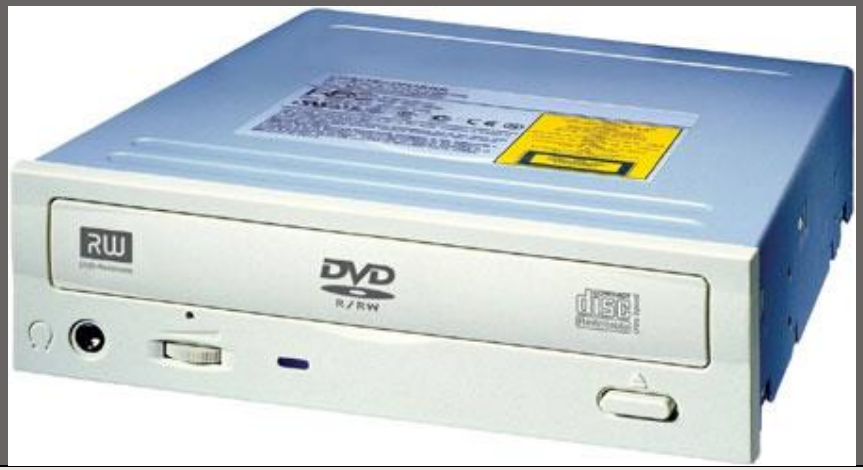
Secondary Storage

- Stores data and programs permanently: its retained after the power is turned off
- Examples
  - Hard Drive (Hard Disk)

    Located outside the CPU, but most often contained in the system cabinet
  - Floppy Disk
  - Optical Laser Discs
    - CD-ROM, CD-RW, and DVD



Kinds of Disk Drives

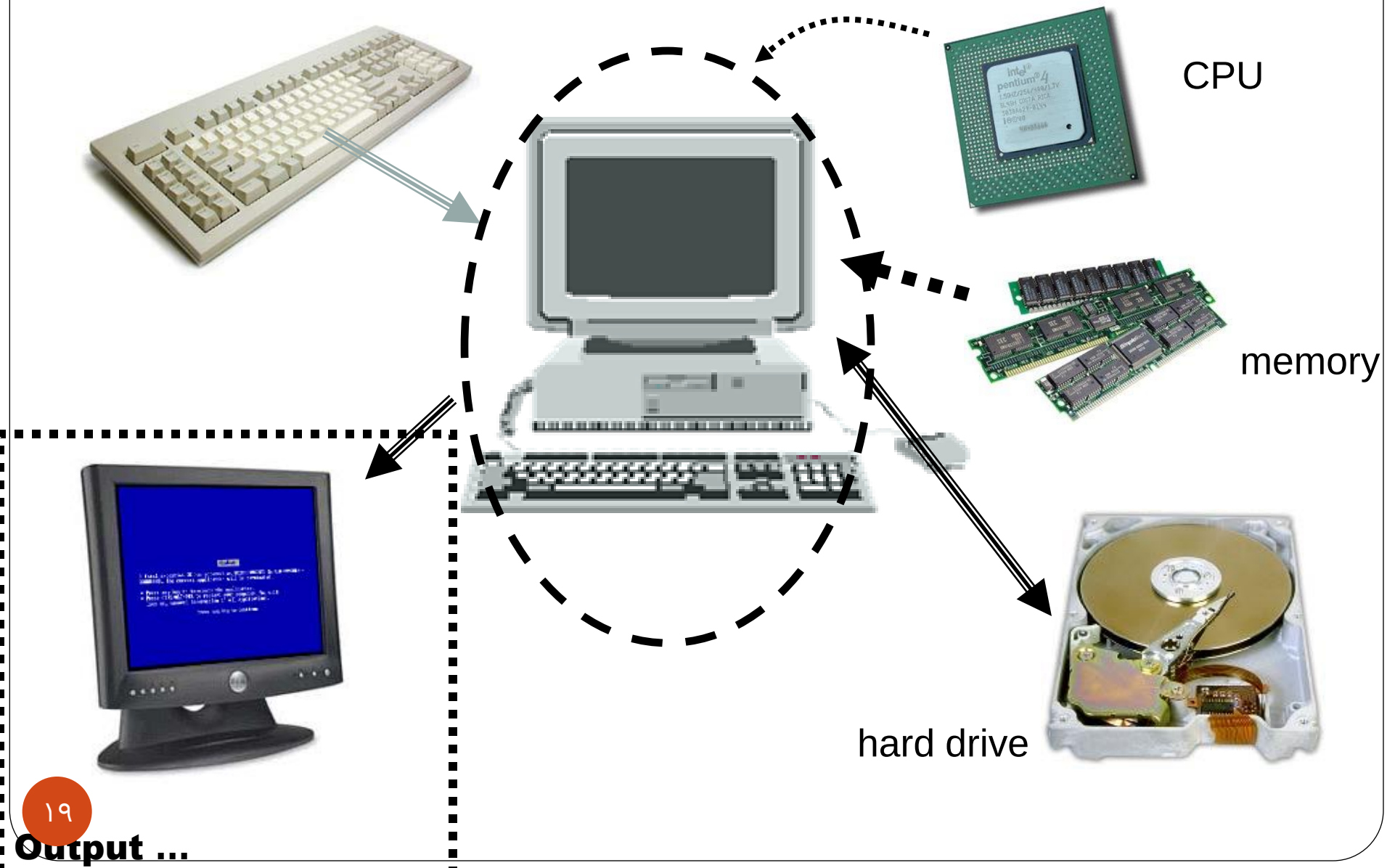


Common Secondary Media

- Optical Laser Discs

- CD ROM & DVD's
  - Data is represented as pits and lands
  - Some kinds are read only (CD-ROM) and some Kinds are rewritable (CD-RW)
  - Significantly more capacity and faster operating than diskettes

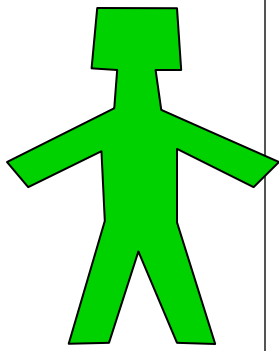
Hardware Organization



Output Devices

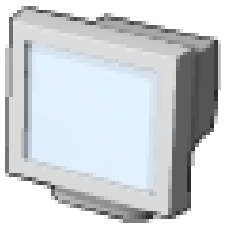
Pieces of equipment that translate the processed information from the CPU into a form that humans can understand.

Processed information



Parts of a Computer Output Devices

- **Monitor**



- **Printer**

- **Speaker/Headphone**