# Personal Computing

COMPUTER LITERACY

What's inside a computer?

# Hardware

- System unit
- Storage devices
- Input device
- Output devices
- Communication devices

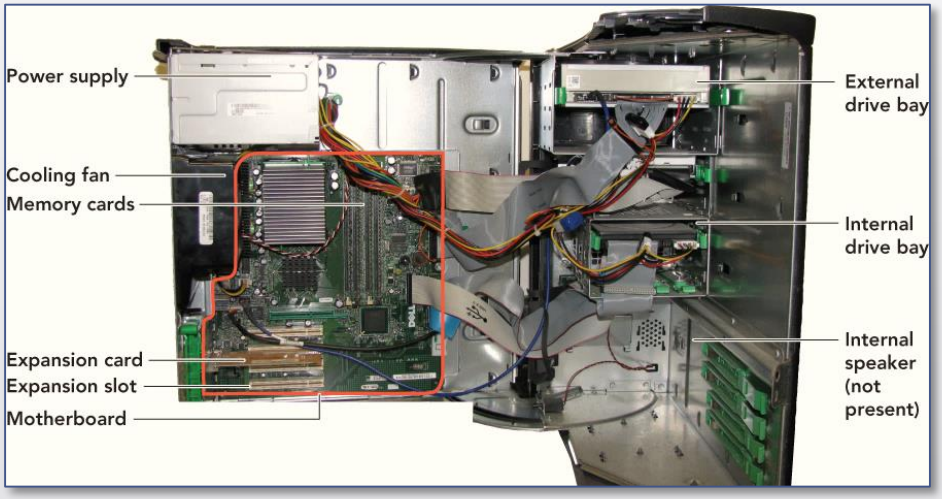
# System unit


All-in-one system unit
Notebook system unit
Desktop system unit
Smartphone system unit

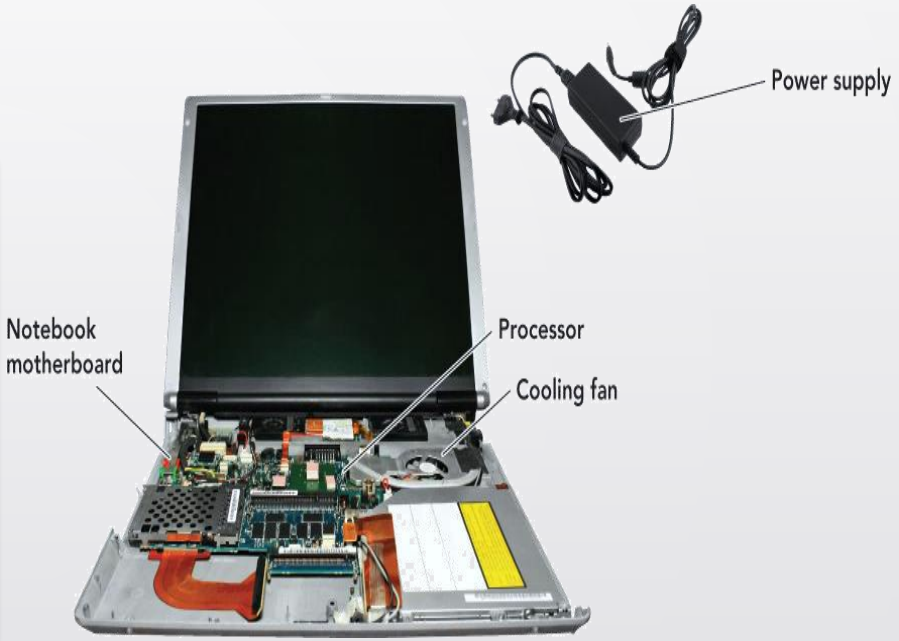
# Parts of the System Unit

- Motherboard
- Power Supply
- Cooling fans
- Internal Speaker
- Drive bays
- Expansion slots

# Inside the System Unit




Desktop system unit




Laptop system unit

# MOTHERBOARD

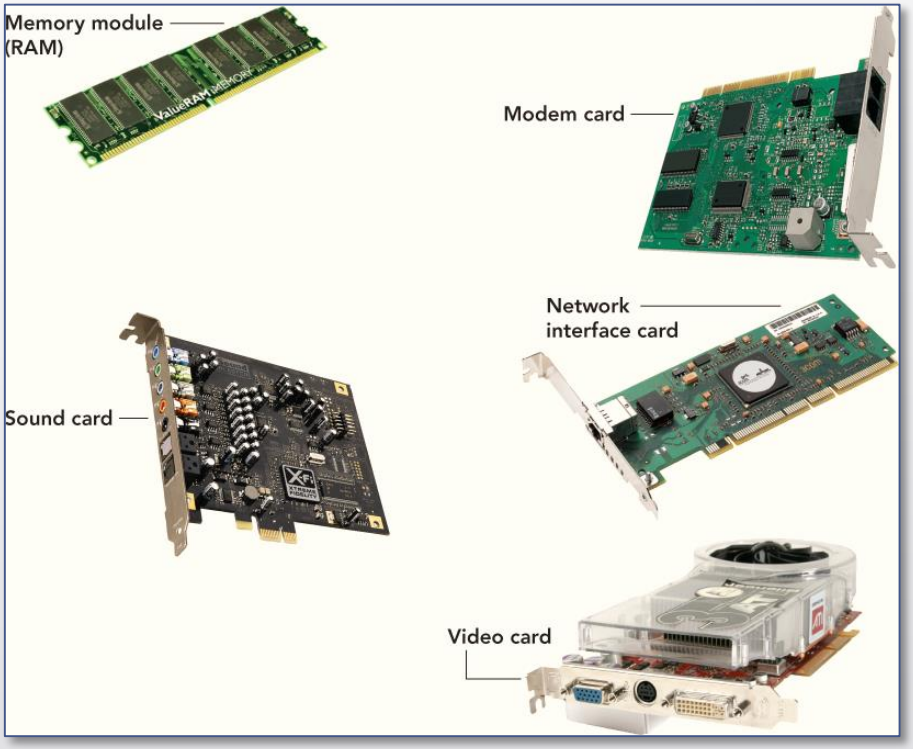
- Printed circuit board that contains the electrical circuitry for the computer.
- The majority of parts found on the motherboard are integrated circuits – miniaturized billion of transistors.

- **Components**
  - CPU
  - RAM
  - Interface cards
  - IO devices and display devices
  - Expansion cards

- **CPU** - A large square chip covered by a **heat sink** = A heat dissipating component

# What's on the Motherboard?

- CPU
- RAM
- Network Interface
- IO devices and display devices
  - Modem card
  - Video Card
- Expansion cards



# What's important when buying a computer?

- How important is the Processor speed?
- How much RAM does a computer need?
- Which type of drive is best?

# CPU: Central processing unit

- The **brain** of the computer
- Leading CPU manufacturers are Intel and AMD
- 32-bit or 64-bit processor
  - Number of bits a computer can handle at a time
- What is CPU clock speed (GHz)?
  - The higher the processor's speed, the faster the computer

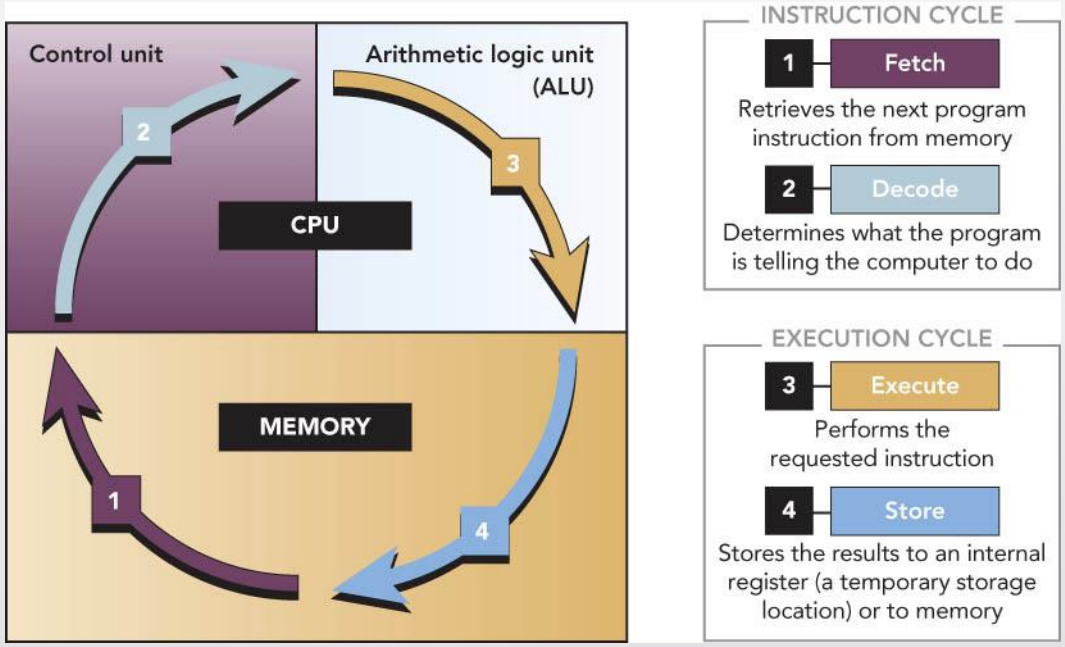
# CPU: Microprocessor

- Instruction – A single operation performed by the CPU
- Example of operations
  - Retrieve a character from the computer's memory
  - Find the largest number
- Instruction set – list of CPU instruction used by the program

# Inside the CPU – Control Unit

- Control Unit manages four basic operations
  - **FETCH:** Retrieve instructions from computer's memory
  - **DECODE:** Determine what the program is telling the computer to do
  - **EXECUTE:** Perform the requested instructions
  - **STORE:** Store the results
- The four-step process is called **machine cycle** or **processing cycle**
- **Registers**
  - operations require the control unit to store data temporary

# Processing Cycle



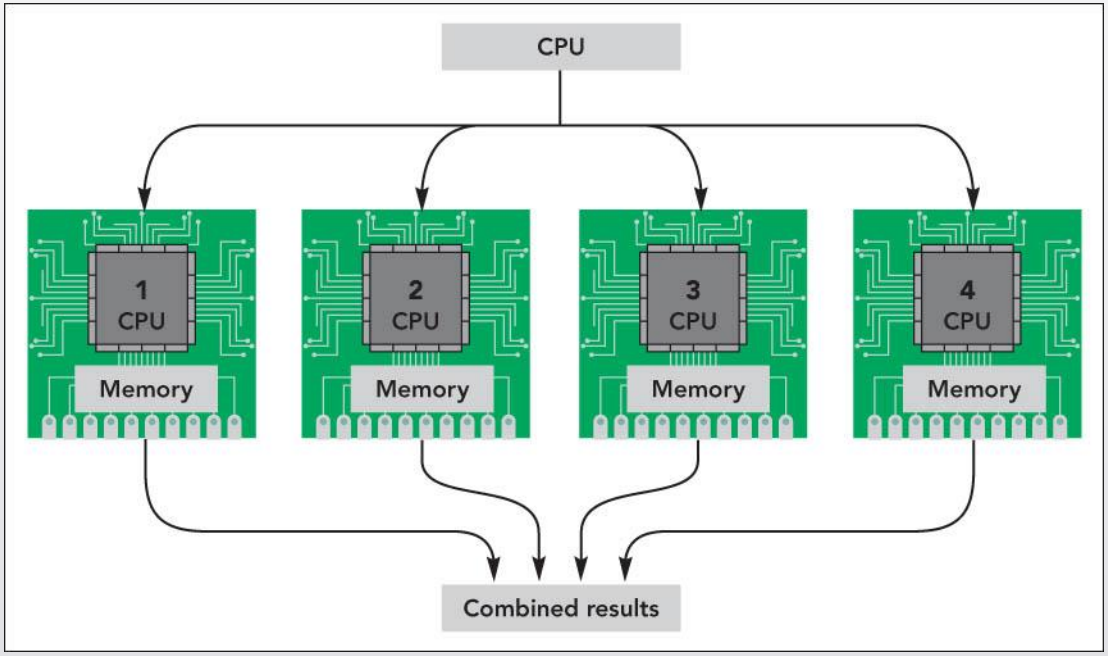
# Inside the CPU – ALU

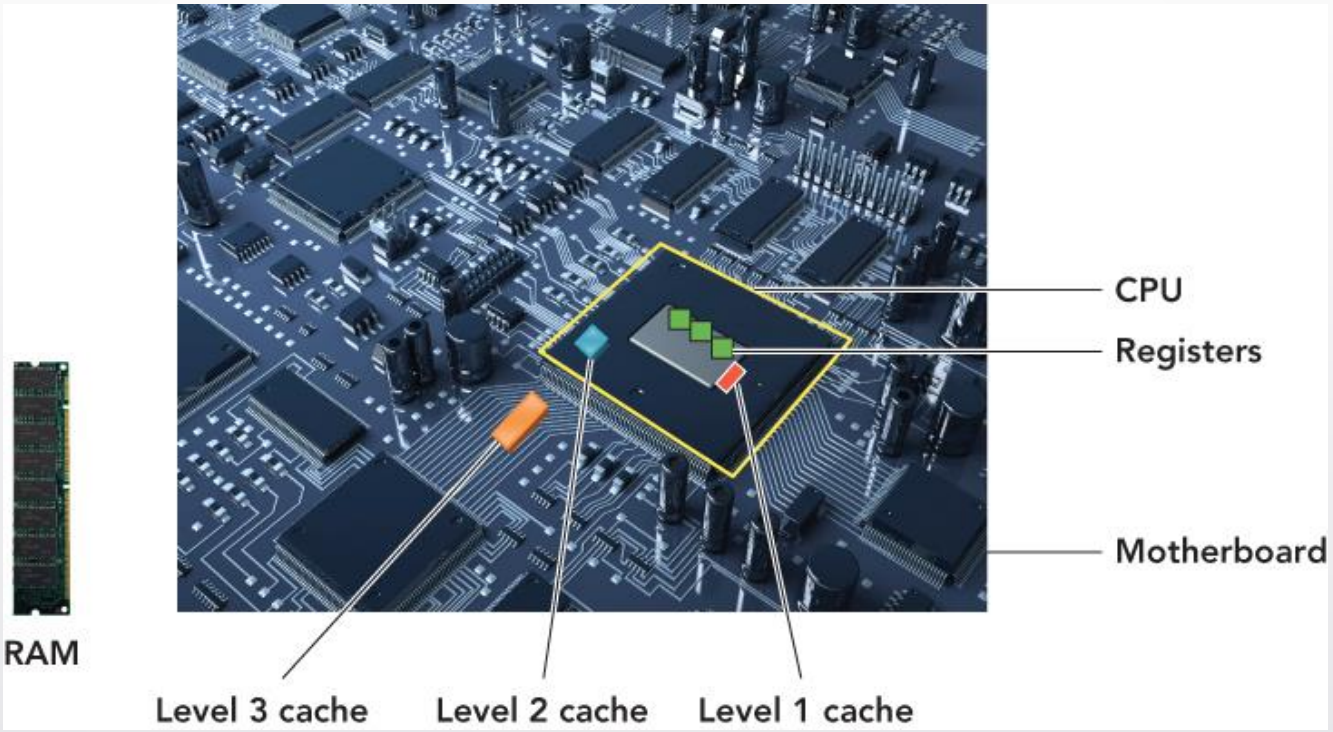
- **Arithmetic Logic Unit (ALU)**
- Performs arithmetic and logical operations
  - Involve adding, subtracting, multiplying, dividing
  - Logical operations involve comparisons between two or more data items.

# Parallel Processing

- Method where more than one processor performs at the same time—faster processing
- What does **core** mean?
  - Each core is a single CPU
  - A single-core 2GHz processor is slower than a four-core 2GHz processor
- Advantages of multicore
  - Processing time improved
  - Supports multiple threads of concurrent execution
- Types of multicore technology
  - Dual core: two processor CPU
  - Quad core: four processor CPU

# Parallel Processing – Continued





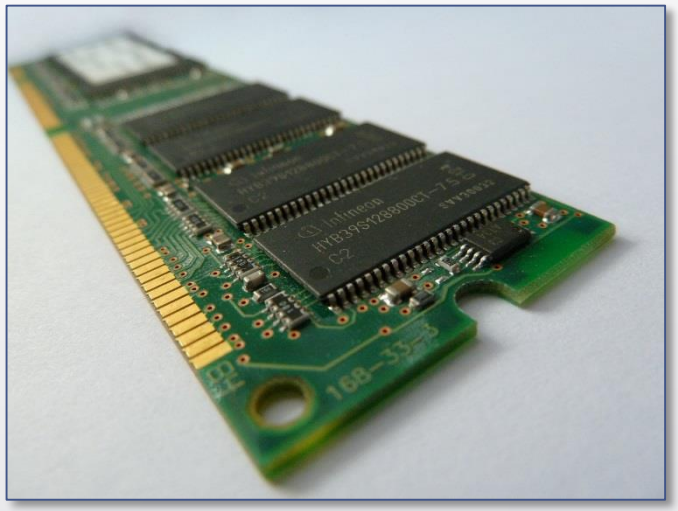

# Memory on the motherboard

# Cache

- Small unit of ultrafast memory built into or near the CPU
- Store frequently or recently access program instructions or data
- Three levels of cache on a system:
  - Level 1 (L1) cache (primary cache)
  - Level 2 (L2) cache (secondary cache)
  - Level 3 (L3) cache

# RAM (random access memory)

- RAM is temporary storage
  - Volatile
  - Data stored in RAM is lost when computer is turned off



# Hard drive vs. Solid State Drive

- Storage device where all files, images and other different files are stored
- Non-volatile
- Acts like file cabinet

Solid state drive:

- No moving parts
- Faster, more expensive

Hard drive (above):

- Contains moving parts
- Slower, but cheaper