

Chapter 2 The System Unit, Processing, and Memory Key Topics

- o Binary, Bits & Bytes
- o System Unit
- o Processing Devices
- o Memory

1 Binary, Bits & Bytes

- o All types of data must be converted into a form which can be processed by a computer.
- > Dual Core CPUs contain two cores
- Quad Core CPUs contain four cores
- Octa Core CPUs contain eight cores
- CPUs for servers can contain up to 64 cores

14 Processing Devices

Components of a CPU

- Core

15 Processing Devices

- o Processing performance of a computer mainly depends on:
 - CPU's Clock Speed – measured in Hz (typically in GHz)
 - CPU's Word Size – amount of data which can be handled at once – measured in bits (typically 32 bits or 64 bits)
 - Bus Width – number of wires/paths in a bus – measured in bits (typically 8, 16, 32 or 64 bits)
 - Memory Size– RAM and Cache – measured in Bytes (typically in GBs)

16 Processing Devices

- o Since processing related to graphics (images and videos) is very intensive, most computers have a separate processing device for graphics known as Graphics Processing Unit (GPU).

Common prefixes are:

- Kilo – Thousand (1,000)
- Mega – Million (1,000,000)
- Giga – Billion (1,000,000,000)
- Tera– Trillion (1,000,000,000,000)
- Peta – Quadrillion (1,000,000,000,000,000)
- Exa–Quintillion (1,000,000,000,000,000,000)

3 Encoding Data into Binary

1) Text data is encoded into binary using coding systems like ASCII and Unicode. Examples of compression include: For graphics, BMP files can be compressed into JPG For audio, WAV files can be compressed into MP3 For video, AVI files can be compressed into MP4

6 System Unit.

2) Graphics data (images and drawings) is encoded into binary by converting colour value of each pixel into binary.

4 Encoding Data into Binary

3) Audio data is encoded into binary by first converting sound waves into numerical form and then converting the numbers into binary.

19 Memory

- o In addition to RAM, other common types of memory include:
 - > Registers– volatile – fastest type of memory built into the CPU needed for storing data during processing.
- o Compression mostly involves removing unnecessary bits from the file while keeping quality at an acceptable level.
- > External hardware connects using Ports or wireless technologies.
- o Ports are used by devices which use wires to connect to the motherboard, Examples: HDMI port is used to connect a monitor.
- o CPU consists of circuitry and components packaged together and connected directly to the motherboard. They contain processing components (cores) of multiple independent processors on a single chip.

17 Processing Devices

- o Processing devices and other circuits can generate a lot of heat and require suitable cooling arrangements.

Prefixes:

- o Prefixes are often used to express larger quantities of bits and bytes.
- o System Unit houses the processing hardware for a computer and also contains other components such as storage devices.
- > Internal hardware is connected through electronic paths called Buses which are built into the motherboard.
- > USB ports connect USB devices.

Questions ???21