Ch.1 Computer System Overview

▼ What is the main function of the computer?

to execute programs

▼ What are the 4 structural elements of a computer?

1. Processor
    a. it controls the operation of the computer and performs its data processing functions
    b. it exchanges data with memory
2. Main Memory
    a. it stores data and programs
    b. this memory is typically volatile (when the computer is shut down, the contents of the memory are lost)
    c. it is referred to as real or primary memory
3. I/O modules
    a. they move data between the computer and its external environment (devices, disks aka secondary memory devices, communications equipment, and terminals)
4. System bus
    a. it provides for communication among processors, main memory and I/O modules

▼ Where there is only one processor, what is it called?

the CPU or central processing unit

▼ Are the contents of disk memory saved even when the computer is shut down?

yes

▼ To exchange data with memory, the processor makes use of two internal registers. What are they?

- a memory address register (MAR) specifies the address in memory for the next read or write
- a memory buffer register (MBR) contains the data to be written into memory, or receives the data read from memory

▼ What is a register?

- high-speed memory internal to the CPU.
- some registers are available to the programmer via the machine instruction set; others are only used by the CPU

▼ What is an I/O address register (I/OAR)?

it specifies a particular I/O device

▼ What is an I/O buffer register (I/OBR)?

it used for the exchange of data between an I/O module and the processor

▼ A memory module consists of

a set of locations (that can be interpreted as instructions or data) defined by sequentially numbered addresses

▼ An I/O module contains internal buffers for what?

temporarily storing data

▼ What do multiprocessors contain?

each chip called a socket contains multiple processors called cores, each with multiple levels of large memory caches, and multiple logical processors sharing the execution units of each core

▼ As of 2010, what do laptops contain?

- 2-4 cores

- each core with 2 hardware threads
- total: 4 or 8 logical processors

▼ What do GPUs or Graphical Processing Units do?

- they provide efficient computation on arrays of data using Single-Instruction Multiple Data (SIMD) techniques pioneered in supercomputers
- they are used for general numerical processing

▼ CPUs are gaining the capability of operating on arrays of data...how?

- with powerful vector units integrated into the processor architecture of the x86 and AMD64 families

▼ What are Digital Signal Processors (DSPs)?

they are embedded in I/O devices to deal with streaming signals like audio or video

▼ What do fixed function units do?

they support computations like encoding/decoding speech and video, encryption and security

▼ What is System on a Chip (SoC)?

putting the components of a system on the same chip to satisfy the requirements of handheld devices

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