Chapter Summary

- How a computer works
- Inside the computer
- How to speed up your computer
Data and Program Representation

Computers are binary digital systems \(^{(84)}\)

- Only understand 0 and 1
- Hi = 0100100001001001
- Bit is either a 0 or a 1
- Byte = 8 bits
- Coding Systems \(^{(87)}\)
  - ASCII
  - EBCDIC
  - Unicode
- Parity Bit
Byte Terminology

Byte = 8 Bits

Kilobyte \approx 1,000 \text{ Bytes}

Megabyte \approx 1,000,000 \text{ Bytes}

Gigabyte \approx 1,000,000,000 \text{ Bytes}

Terabyte \approx 1,000,000,000,000 \text{ Bytes}

Petabyte \approx 1,000,000,000,000,000 \text{ Bytes}

Exabyte \approx 1,000,000,000,000,000,000 \text{ Bytes}
Other types of Data

- Graphics
  - Bitmap
  - Pixels
- Audio
- Video

Machine Language

- 0101100001110000000000001000000010 ← instruction
Inside the System Unit

Motherboard

- CPU
- Memory
- Buses
- System Expansion
- Ports
Central Processing Unit (also called Processor)

- Most made by Intel or AMD
- Made up of transistors

**Processing speed**

- Measured in MegaHertz (Mhz)
- 1979: 5 Mhz
- 2003: 3200 Mhz (3.2 Ghz)

**Word Size**
Memory

- Volatile
- Non-Volatile

Random Access Memory (RAM)

Cache Memory

Registers

ROM

Flash Memory
Buses

Internal Bus

System Bus

Expansion Buses

- ISA
- PCI
- AGP
- USB
- FireWire
System Expansion

For Desktop PCs

- Expansion Card
- Expansion Slot

For Notebooks

- PC Card (PCMCIA)

For Handheld and Mobile Devices
<table>
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<th>Port Type</th>
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CPU Components (108)

Arithmetic & Logic Unit

Registers

Control Unit

Decode Unit

Prefetch Unit

Internal Cache

Bus Interface Unit
Speeding Up Your System Today

Add more memory

Perform System Maintenance
  - Uninstall
  - Defragmentation

Buy a larger hard drive

Upgrade your internet connection

Upgrade your video card

Upgrade your CPU
Strategies for Making Computers Speedier

Multi-Processor and Parallel Processing