**Computers Are Your Future**

- **Computer system** – A collection of related components that are designed to work together
  - A system includes hardware and software

**Understanding the Computer: Basic Definitions**

- **Computer** – A machine that performs the four basic operations of the information-processing cycle:
  - input
  - processing
  - output
  - storage

**How does it work?**

- **Input**
  - Data – Unorganized raw materials made up of words, numbers, images, or sounds
  - The first operation: input
    - Input devices enable the user to enter data into the computer
    - The computer accepts data
Input Devices
- Keyboard
- Mouse – pointing device
- Microphone – speech-recognition
- Digital Cameras

Processing: Transforming Data into Information

The second operation: processing
- Computers transform data into information
- Processing circuitry:
  - Central processing unit (CPU)
  - Random access memory (RAM)

Processing Devices
- Motherboard
- Expansion Card
- Central Processing Unit – CPU
- Random Access Memory – RAM

Output: Displaying Information

The third operation: output
- The computer shows the results of the processing operation in a way people can understand
- Output devices show the results of processing operations

Output Devices
- Monitor
- Printer
- Speakers
Storage: Holding Programs and Data for Future Use

- The fourth operation: storage
  - The computer saves the data or output so that it can be used again later
  - Storage devices hold all programs and data that the computer uses

Communications: Moving Data between Computers

- A fifth operation: communications
  - Moving data within the computer or between computers
    - Communications devices – Enable computers to connect to a computer network
    - Network – Two or more computer systems that are connected
    - Modem – A device that enables the computer to access other computers

Information

Information comes in many forms
- Words . . . Numbers . . .
  - Pictures . . . Sounds

- Computers only understand information in digital form
  - Information must be broken into bits

Bits, Bytes, and Buzzwords

- Common terms might describe file size or memory size:
  - Bit: smallest unit of information
  - Byte: a grouping of eight bits of information
More about Bits

- Each switch can be used to store a tiny amount of information, such as:
  - An answer to a yes/no question
  - A signal to turn on a light

- Larger chunks of information are stored by grouping bits as units
  - 8 bits (byte) = 256 different codes

“’That’s one small step for man, one giant leap for mankind’”

Bits as Codes

- ASCII - American Standard Code for Information Interchange
  - most widely used code, represents each character as a unique 8-bit code.

Encoding text

- ASCII character set
  - Assigns numbers to letters
    - 7 bits 128 is the standard ASCII
    - 8 bits 256 possible characters (only need about 150)
    - ’A’ is 65 and ’a’ is 97
    - ’S’ is 89
    - Bell is ?
  - 16 bit character set (65,000 possible characters)
    - An extension will include as many as a million characters
Encoding text

✓ Unicode
  ➢ 16 bit character set (65,000 possible characters)
  ➢ a unique number for every character, no matter what the platform,
    no matter what the program, no matter what the language.
  ➢ For "the principal written" languages
    * Includes Chinese with its more than 13,000 characters of normal use
      (50,000 total characters)

Unencoded Language sets

✓ Latin, Greek, Cyrillic, Armenian, Hebrew, Arabic, Devanagari, Bengali, Gurmukhi, Gujarati, Oriya, Tamil, Telugu, Kannada, Malayalam, Thai, Lao, Georgian, Tibetan, Japanese

✓ Kana, modern Korean Hangul

Unicode Standard

✓ does not define glyph images.
✓ defines how characters are interpreted, not how glyphs are visually displayed
✓ The software or hardware-rendering engine of a computer is responsible for the appearance of the characters on the screen.
✓ The Unicode Standard does not specify the size, shape, nor orientation of on-screen characters.

Bits as Instructions

✓ The computer stores programs as collections of bits.
  ➢ For instance, 01101010 might instruct the computer to add two numbers.

• Other bit instructions might include where to find numbers stored in memory or where to store them.

Don’t Be Intimidated by Hardware

✓ People feel threatened by computers because they fear computers are too complicated
✓ Computers should be treated in the same way as any other electrical device

That’s all folks!