Chapter 1B

Looking Inside the Computer System

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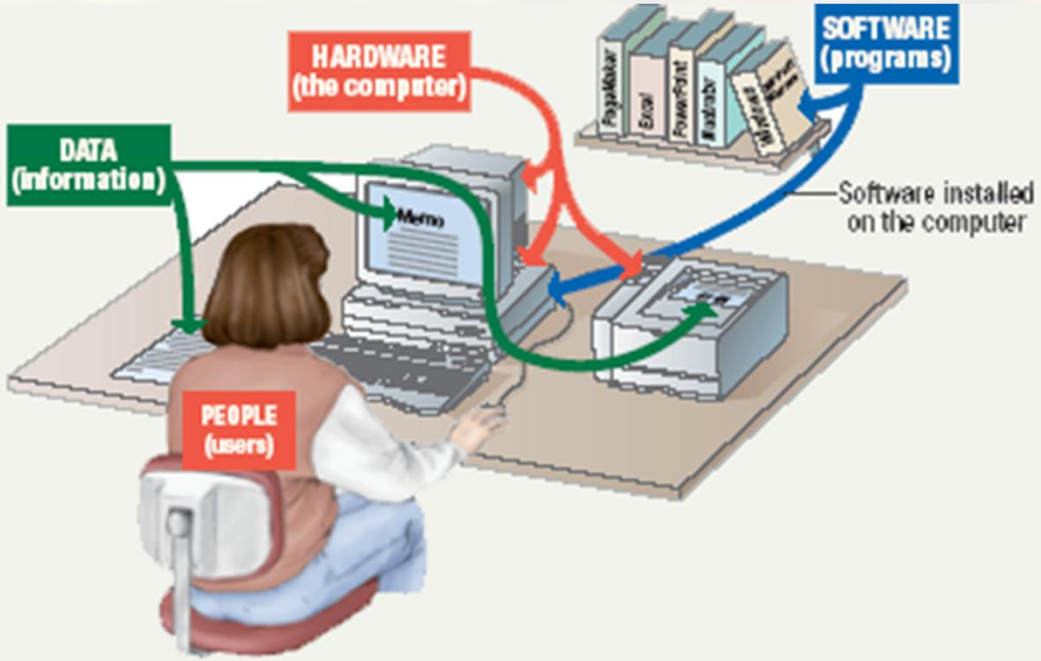
This lesson includes the following sections:

- The Parts of a Computer System
- Looking Inside the Machine
- Software: Bringing the Machine to Life

Parts of the Computer System

- Computer systems have four parts
  - Hardware
  - Software
  - Data
  - User



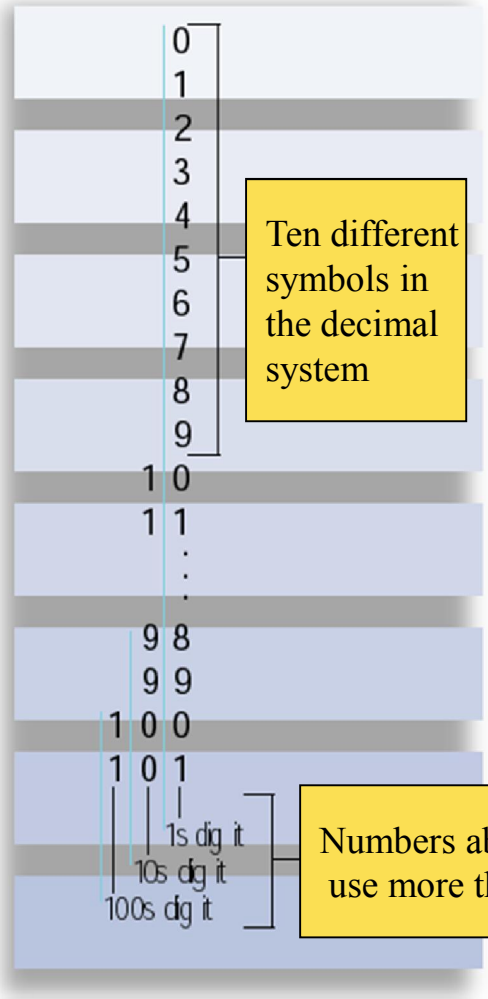
Parts of the Computer System

- Hardware
  - Interconnected Mechanical devices in the computer
  - Anything that can be seen & touched
- Software/ Program
  - Organized set of Instructions that tells the computer what to do
  - Some are for computer & some for user
  - Thousands of programs exist

Parts of the Computer System

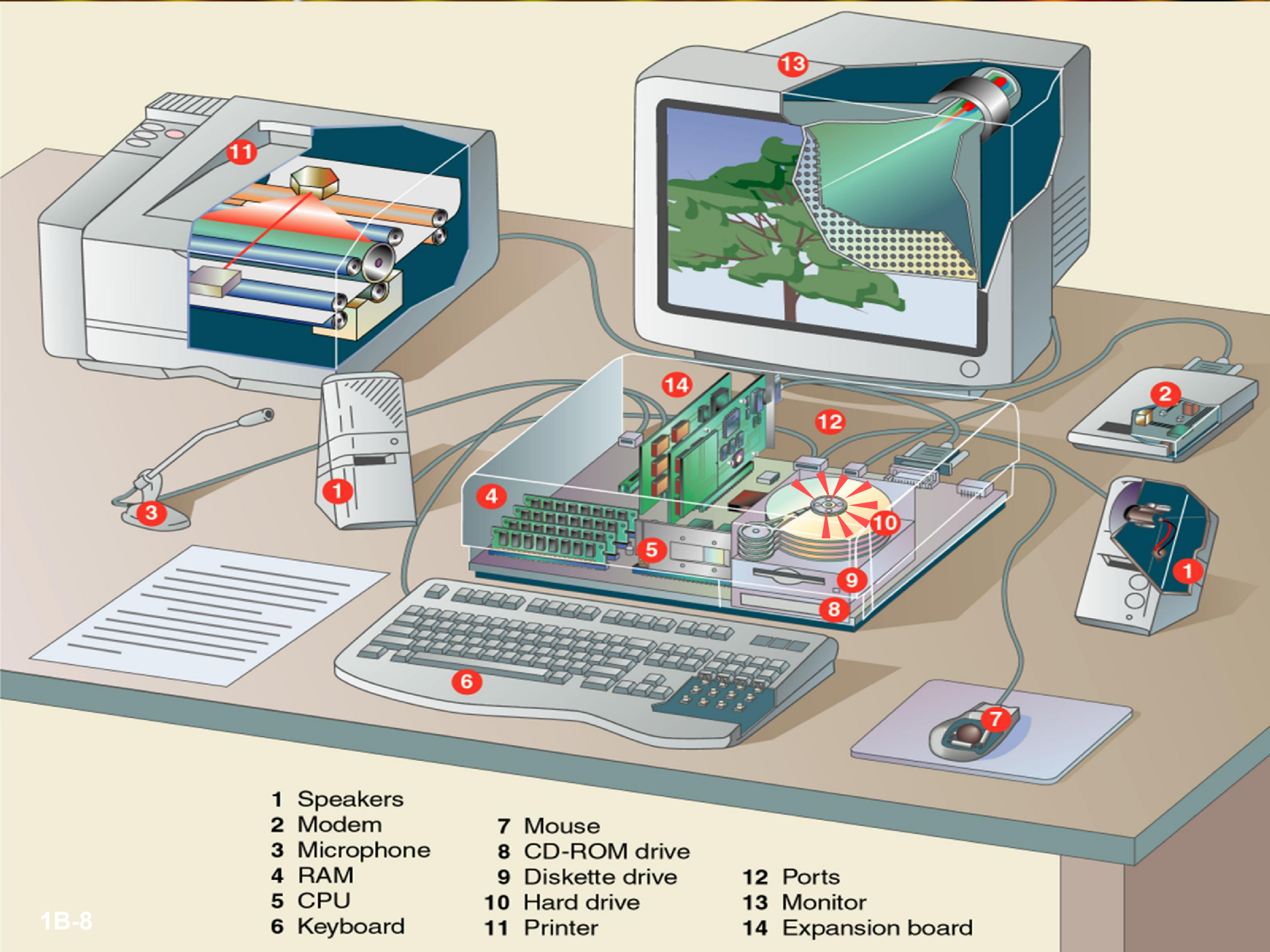
- Data
  - Raw facts and figures/Pieces of information
  - Computer manipulate and process into useful information that people can understand such as text,number,sounds etc.
  - Computerized data is digital, meaning that it has been reduced to digits, or numbers. The computer stores and reads all data as numbers.
  - Computer organize and present data

H	0100	1000
e	0110	0101
r	0111	0010
e	0110	0101
	0010	0000
a	0110	0001
r	0111	0010
e	0110	0101
	0010	0000
s	0111	0011
o	0110	1111
m	0110	1101
e	0110	0101
	0010	0000
w	0111	0111
o	0110	1111
r	0111	0010
d	0110	0100
s	0111	0011
.	0010	0001



Parts of the Computer System

- Users
  - People operating the computer
  - Most important part
  - Tell the computer what to do
  - Some types of computers can operate without much intervention from people, but personal computers are designed specifically for use by people.

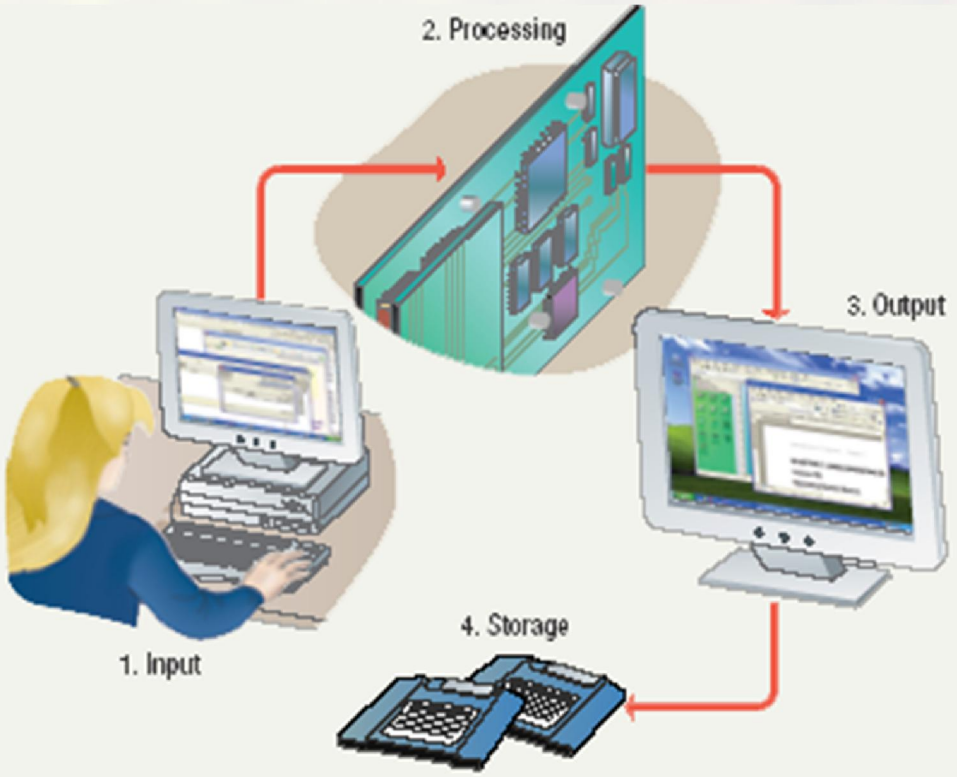

1 Speakers
2 Modem
3 Microphone
4 RAM
5 CPU
6 Keyboard
7 Mouse
8 CD-ROM drive
9 Diskette drive
10 Hard drive
11 Printer
12 Ports
13 Monitor
14 Expansion board

Information Processing Cycle

- Set of Steps followed by computer to receive data, process data according to instructions from a program, display resulting information from user and store the results
- Input
- Processing
- Output
- Storage

Information Processing Cycle

- Steps followed to process data
- Input
- Processing
- Output
- Storage



Looking Inside the Machine

- Types of Hardware
- The CPU
- Memory
- How Memory is Measured
- Input and Output Devices
- Storage Devices

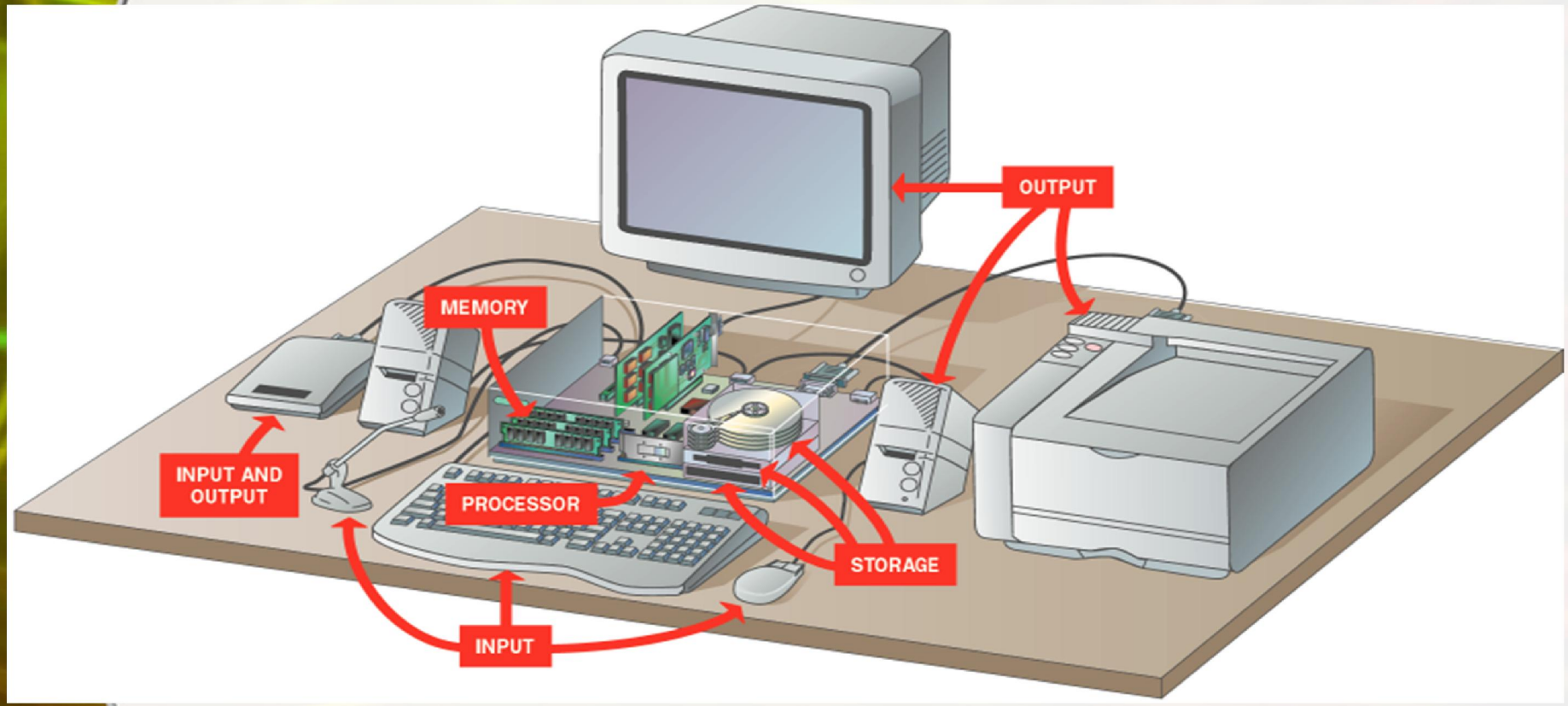
Looking Inside the Machine – Types of Hardware

A computer's hardware devices are categorized as follows:

- Processor
- Memory
- Input and output (I/O) devices
- Storage devices

Essential Computer Hardware

- Computers use the same basic hardware



Looking Inside the Machine - The CPU

The procedure that transforms raw data into useful information is called processing. This function is divided between the computer's processor and memory.

The processor is also called the central processing unit (CPU). It manages all devices and performs the actual processing of data.

The CPU consists of one or more chips attached to the computer's main circuit board (the motherboard).

Essential Computer Hardware

- Processing devices
  - Brains of the computer
  - Carries out instructions from the program
  - Manipulate the data
  - Most computers have several processors
  - Central Processing Unit (CPU)
  - Secondary processors
  - Processors made of silicon and copper

Essential Computer Hardware

- Memory devices
  - Stores data or programs
  - Random Access Memory (RAM)
    - Volatile
    - Stores current data and programs
    - More RAM results in a faster system
  - Read Only Memory (ROM)
    - Permanent storage of programs
    - Holds the computer boot directions

Looking Inside the Machine - Memory

- Memory also consists of chips attached to the motherboard.
- Memory holds data and program instructions as the CPU works with them. This memory is called Random Access Memory (RAM).
- The CPU can find any piece of data in RAM, when it needs it for processing.
- RAM is volatile, meaning it holds data only when the power is on. When the power is off, RAM's contents are lost.

Looking Inside the Machine - How Memory is Measured

- The smallest usable unit of measure for memory is the byte – the amount of memory required to hold one character, like the letter A or the numeral 2.
- Computers work with larger chunks of data, measured in multiple bytes, as shown below:

Unit (bytes)	Approx. Value (bytes)	Actual Value (bytes)
Kilobyte (KB)	1,000	1,024
Megabyte (MB)	1,000,000	1,048,576
Gigabyte (GB)	1,000,000,000	1,073,741,824
Terabyte (TB)	1,000,000,000,000	1,099,511,627,776

Essential Computer Hardware

Units of Measure for Computer Memory and Storage

Unit	Abbreviation	Pronounced	Approximate Value (bytes)	Actual Value (bytes)
Kilobyte	KB	KILL-uh-bite	1,000	1,024
Megabyte	MB	MEHG-uh-bite	1,000,000 (1 million)	1,048,576
Gigabyte	GB	GIG-uh-bite	1,000,000,000 (1 billion)	1,073,741,824
Terabyte	TB	TERR-uh-bite	1,000,000,000,000 (1 trillion)	1,099,511,627,776

Essential Computer Hardware

- Input and output devices
  - Allows the user to interact
  - Input devices accept data
    - Keyboard, mouse
  - Output devices deliver data
    - Monitor, printer, speaker
  - Some devices are input and output
    - Touch screens

Looking Inside the Machine – Input and Output Devices

- Input devices accept data and instructions from the user or from another computer system. The keyboard and mouse are examples of input devices.
- Output devices return processed data back to the user or to another computer system. The printer and monitor are examples.
- Communications devices (such as modems and network interface cards) perform both input and output, allowing computers to share information.

Essential Computer Hardware

- Storage devices
  - Hold data and programs permanently
  - Different from RAM
  - Magnetic storage
    - Floppy and hard drive
    - Uses a magnet to access data
  - Optical storage
    - CD and DVD drives
    - Uses a laser to access data

Looking Inside the Machine – Storage Devices

- Storage devices hold data not currently being used by the CPU. Data is commonly stored on a magnetic or optical disk. Each type uses a special medium for storing data on its surface.

- A disk drive is a device that reads data from and writes data to a disk. Most new computers feature a floppy disk drive, a hard disk drive, and an optical disk drive.

- The most common optical storage devices are CD-ROM and DVD-ROM drives.

Software Runs The Machine

- Tells the computer what to do
- Reason people purchase computers
- Two types
  - System software
  - Application software

Bringing the Machine to Life - What is Software?

- Software is a set of electronic instructions that tells the computer how to do certain tasks. A set of instructions is often called a program.
- When a computer is using a particular program, it is said to be running or executing the program.
- The two most common types of programs are system software and application software.

Bringing the Machine to Life - System Software

- System software exists primarily for the computer itself, to help the computer perform specific functions.
- One major type of system software is the operating system (OS). All computers require an operating system.
- The OS tells the computer how to interact with the user and its own devices.
- Common operating systems include Windows, the Macintosh OS, OS/2, and UNIX .

Software Runs The Machine

- System software
  - Most important software
  - Operating system
    - Windows XP
  - Network operating system (OS)
    - Allows computer to communicate & share data.
    - Windows Server 2003
  - Utility
    - A program that makes computer system easier to use & are for hardware troubleshooting.
    - Symantec AntiVirus

Bringing the Machine to Life - Applications

- Application software tells the computer how to accomplish tasks the user requires, such as creating a document or editing a graphic image.
- Some important kinds of application software are:

Word processing programs
Database management
Graphics programs
Web design tools and browsers
Communications programs

Entertainment and education

Spreadsheet software
Presentation programs
Networking software
Internet applications
Utilities

Multimedia authoring

Software Runs The Machine

- Application software
  - Accomplishes a specific task
  - Most common type of software
    - MS Word
  - Covers most common uses of computers

Computer data

- Fact with no meaning on its own
- Stored using the binary number system
- Data can be organized into files

Computer users

- Role depends on ability
  - Setup the system
  - Install software
  - Running Program
  - Mange files
  - Maintain the system
- “Userless” computers
  - Run with no user input
  - Automated systems

Chapter 1B

End of Chapter

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