

COMPUTER INFORMATION SHEET

A computer is a programmable machine. The two principal characteristics of a computer are:

- ◆ It responds to a specific set of instructions in a well-defined manner.
- ◆ It can execute a prerecorded list of instructions (a program).

Modern computers are electronic and digital. The actual machinery (circuit boards, hard drives, and monitors) is called hardware; while the instructions or programs are called software.

There are main four categories of computers:

1. Super Computers and Main Frames (shared terminals)
2. Mini-Computers (shared terminals)
3. Workstations (single user)
4. Micro Computers (single user)

Since this course involves teaching you to use Micro Computers, we will focus on Microcomputers.

Computer systems are comprised of the following two categories:

Computer Software - A set of instructions, or a computer program that tells the computer what to do.

1. Software is stored electronically and digitally.
Software is often divided into two main categories:
 - ◆ **System Software:** Includes the operating system and all the utilities that enable the computer to function. Examples include Windows 2000, Windows XP, and Vista.
 - ◆ **Applications Software:** Includes programs that do specific tasks for users. For example, word processors, spreadsheets, and database management systems fall under the category of applications software.
 - a. **Word Processing** - is used for typing letters, reports, and other documents. Two popular word processing programs are Microsoft Word and Word Perfect.
 - b. **Spreadsheets** - are generally used to perform repeated mathematical calculations and to create graphs and charts that visually represent numeric data. Popular spreadsheet programs include Microsoft Excel, Quatro Pro, and Lotus.
 - c. **Databases** - are used to organize and arrange data. Database software can categorize, alphabetize and filter data. Microsoft Access is an example of a database program.
2. **Computer Hardware** - Refers to objects that you can actually touch, like disks, disk drives, display screens, keyboards, printers, circuit boards, and chips.

Parts of the Computer

1. **Bus** - A collection of “wires” or etched lines in a circuit board through which data is transmitted from one part of a computer to another. You can think of a bus as a highway on which data travels within a computer. When used in reference to personal computers, the term bus usually refers to internal bus. This is a bus that connects all the internal computer components to the CPU and main memory.
2. **CPU** - Central Processing Unit, pronounced as separate letters. The CPU is the brain of the computer. Sometimes referred to simply as the processor or central processor, the CPU is where calculations take place. In terms of computing power, the CPU is the most important element of a computer system. On personal computers and small workstations, the CPU is housed in a single chip called a microprocessor.

Two typical components of a CPU are:

- A. The **arithmetic logic unit (ALU)**, performs arithmetic (+, -, x, /), logical operations (AND, OR, NOT, true, false) and all comparison operations (<, >, =).
 - B. The **control unit** extracts instructions from memory and decodes and executes them, calling on the ALU when necessary.
 - C. A **math coprocessor** performs mathematical computations, particularly floating-point operations. Computers with the Pentium 1 chip or later come with math coprocessors built in..
3. **Computer Memory** - refers to the parts of the computer that stores information and data. There are two categories of computer memory.

- A. **Main memory** (main storage, primary memory, primary storage) refers to physical memory that is internal to the computer. The computer can manipulate only data and instructions that are in main memory. Therefore, every program you execute and every file you access must be copied from a auxiliary storage device into main memory. The amount of main memory on a computer is crucial because it determines how many programs can be executed at one time and how much data can be readily available to a program. Main memory is divided into a large number of individual memory locations. Each location can hold a certain amount of data. Each location has an address, which the CPU uses to designate which location to store data in or to retrieve data from. Information can be accessed in billionths of a second.

The following are the two categories of main memory:

1. **RAM** (Random Access Memory) is a type of computer memory that can be accessed randomly; that is, any byte of memory can be accessed without touching the preceding bytes. RAM is the most common type of main memory found in computers and other devices, such as printers. RAM is volatile, meaning that they lose their contents when the power is turned off. RAM is actually Read – Write Memory, because you can write information to a memory location and access that location to read the information stored in that address.
- B. **Auxiliary Memory** is used the long-term storage files. Auxiliary memory is generally capable of storing larger files than main memory. The following are a few of the different types of auxiliary memory used for computers:

1. **Magnetic Tape** is a magnetically coated strip of Mylar on which data can be encoded. Storing data on tapes is considerably cheaper than storing data on disks. Accessing data on tapes, however, is much slower than accessing data on disks. Tapes are sequential-access media, which means that to get to a particular point on the tape, the tape must go through all the preceding points. In contrast, disks, CDs, DVDs, USB drives are random-access media because they can access any memory location without sequentially passing through intervening points. Because tapes are so slow, they are generally used only for long-term storage and backup. Data to be used regularly is almost always kept on a disk or newer device.
2. **Disks** are round Mylar circles on which data can be encoded. Accessing data from a disk is not as fast as accessing data from main memory, but disks are cheaper and more stable. Unlike RAM, disks hold on to data even when the computer is turned off. Consequently, disks are the storage medium of choice for most types of data. Data stored on disks can be accessed randomly, making it faster than magnetic tape. There are two basic types of disks: magnetic disks and optical disks.

On a magnetic disk the data is encoded as magnetized patterns of North and South polarities on the disk's surface. You can record and erase data on a magnetic disk any number of times, just as you can with a cassette tape. Magnetic disks come in a number of different forms:

- A. **Floppy disk:** A typical 3½-inch floppy normally stores 1.44MB of data.
- B. **Hard drive:** can store anywhere from 60Gb to more than 1 Terabyte. Hard drives are also faster than floppy disks.
- C. **Optical disks** record data by burning microscopic holes in the surface of the disk with a laser. To read the disk, another laser beam shines on the disk and detects the holes by changes in the reflection pattern. Optical disks have a much larger data capacity than magnetic disks, but they are slower. The most common form of an optical disk is the CD-ROM.
- D. **CD-ROM:** CD-ROMs are read-only. When you purchase them, they are already filled with data, or you can “burn” your own CD-ROM with your own data files or music.. You can read the data from a CD-ROM, but you cannot modify or delete it. CD-RWs let you read, write, and erase information over and over again.
- E. **DVD:** Short for digital versatile disk or digital video disk, a DVD holds a minimum of 4.7GB (gigabytes). The DVD specification supports disks with capacities of from 4.7GB to 17GB and access rates of 600KBps to 1.3 MBps. DVD-

RWs let you read, write, and erase information over and over again.

4. **Input and Output** Devices interface between a computer and the outside world.

- A. **Input devices** include any device that sends data into a computer. For example, a keyboard is an input device, whereas a display monitor is an output device. Mice, keyboards, touch screens, scanners, microphones, game controllers, modems and graphics tablets are all input devices.
- B. **Output devices** include any device capable of getting information from a computer. This includes computer monitors, printers, modems, plotters, and speakers.

Printers fall into the following categories:

1. **Ink jet printers** are a type of printer that works by spraying ionized ink at a sheet of paper. Ink-jet printers are capable of producing high quality print approaching that produced by laser printers. A typical ink-jet printer provides a resolution of 300 dots per inch, although some newer models offer higher resolutions. In general, the price of ink-jet printers is lower than that of laser printers. However, they are also considerably slower. Another drawback of ink-jet printers is that they require a special type of ink that is apt to smudge on inexpensive copier paper. Color ink-jet printers provide an inexpensive way to print full-color documents.
2. **Laser printers** are a type of printer that utilizes a laser beam to produce an image on a drum. The drum is then rolled through a reservoir of toner and the toner is transferred to the paper through a combination of heat and pressure. This is also the way copy machines work. Laser printers produce very high-quality print and are capable of printing an almost unlimited variety of fonts. In addition to text, laser printers are very adept at printing graphics.

Other Computer Terms To Know

MHz is an abbreviation for **megahertz**. One MHz represents one million cycles per second. The speed of microprocessors (CPU), called the clock speed, used to be measured in megahertz, but now are measured in gigahertz. For example, a microprocessor that ran at 933MHz executes 933 million cycles per second. Each computer instruction requires a fixed number of cycles, so the clock speed determines how many instructions per second the microprocessor can execute. To a large degree, this controls how powerful the microprocessor is. Another chief factor in determining a microprocessor's power is its data width (that is, how many bits it can manipulate at one time).

GHz is an abbreviation for **gigahertz**. One GHz represents one billion cycles per second. The speed of a microprocessor (CPU), called the clock speed, is measured in gigahertz. For example, a microprocessor that ran at 3GHz executes 3 billion cycles per second.

Modem is an acronym for modulator-demodulator. A **modem** is a device that enables a computer to transmit data over telephone lines. Computer information is stored digitally, whereas information transmitted over telephone lines is transmitted in the form of analog waves. A modem converts between these two forms. You can have a dial-up modem, a DSL modem, or a cable modem depending upon how you connect to the Internet.

DSL refers collectively to all types of digital subscriber lines generally used to connect to the Internet. This technology uses the existing copper pair wiring that exists in almost every home and office. DSL offers much higher speeds than traditional modem Internet connections but requires short telephone line runs to a central telephone office (usually less than 20,000 feet). Another advantage of DSL is that you can be connected to the Internet and use the same phone line to make and receive phone calls at the same time.

KBPS stands for kilobits per second (thousands of bits, not bytes) and refers to how fast the modem can transmit and receive data. At slow rates, modems are measured in terms of baud rates. Dial-up modems run at 56 **kbps**, while DSL modems can receive (download) data at up to 6,000 **kbps** and can upload data at up to 768 **kbps**.

MBPS stands for megabits per second (millions of bits, not bytes) and refers to how fast the modem can transmit and receive data. DSL modems can receive (download) data at up to 6 **mbps** while cable modems can receive (download) data at up to 5 **mbps**.

Booting-up a computer refers to loading the first piece of software that starts a computer. Because the operating system is essential for running all other programs, it is usually the first piece of software loaded during the boot process. Boot is short for bootstrap, which in olden days was a strap attached to the top of your boot that you could pull to help get your boot on. Short for bootstrap, the starting-up of a computer, which involves loading the operating system and other basic software. A **cold boot** is when you turn the computer on from an off position. A **warm boot (reboot)** is when you reset a computer that is already on without using the power switch, usually by depressing a combination of predetermined keys simultaneously (Control, Alt, & Delete for most PC's).

ASCII is an acronym for the American Standard Code for Information Interchange. ASCII is a code for representing English characters as numbers, with each letter assigned a number from 0 to 127. For example, the ASCII code for uppercase M is 77. Most computers use ASCII codes to represent text, which makes it possible to transfer data from one computer to another.

A **bit** is short for **binary digit**, the smallest unit of information on a machine. A single bit can hold only one of two values: 0 or 1. More meaningful information is obtained by combining consecutive bits into larger units. For example, a byte is composed of 8 consecutive bits.

A **byte** is an abbreviation for **binary term**, a unit of storage capable of holding a single character. A byte is equal to 8 bits. Large amounts of memory are indicated in terms of kilobytes (1,024 bytes), megabytes (1,048,576 bytes), and gigabytes (1,073,741,824 bytes). A disk that can hold 1.44 megabytes, for example, is capable of storing approximately 1.4 million characters, or about 3,000 pages of information.

A **virus** is a computer program or a piece of code that secretly attaches itself to other programs and is activated when the host program is executed. A virus can replicate itself and be passed to other computers. All computer viruses are manmade. Viruses usually perform some unwanted action, ranging from a nuisance to destruction. A simple virus that can make a copy of itself over and over again is relatively easy to produce. Even such a simple virus is dangerous because it will quickly use all available memory and bring the system to a halt. Some viruses, for example, simply display a message at predetermined times. Other viruses attempt to reformat your hard disk and destroy all your data. Another dangerous type of virus is one capable of transmitting itself across networks and bypassing security systems. Since 1987, when a virus infected ARPANET, a large network used by the Defense Department and many universities, many antivirus programs have become available. These programs periodically check your computer system for the best-known types of viruses. However, if you receive your software from reliable sources, don't exchange disks or files with other computer users, don't download files from the internet, and you are not attached to a network, chances are greatly reduced that your system will be infected.