

Chapter 1: What is and how does a computer function?

Chapter 1 Sections:

Section 1: What is a computer?

1.1 Computer Definition

Section 2: Computer Components

Section 3: How is a computer used?

At the end of this chapter the student will be able to:

- Describe what a computer is
- Identify the parts of a computer
- Explain how a computer may help with your daily activities

Section 1: What is a computer?

1.1.1 Computer Definition

Computer:

A computer is an electronic machine capable of creating and saving documents, calculating mathematical operations and logistics at great speed, and can be programmed for:

- Accepting data (input)
- Processing data
- Producing necessary information (output) and;
- Storing information for future use.

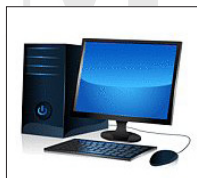
The computer is also called an organizer or PC. PC comes from the English name “Personal Computer”. There are also portable computers known as “laptop”, that are easy to carry from one place to another because of their smaller size.

Generally, all computers have the same basic computer parts such as: monitor, keyboard, mouse, USB unit, CD ROM unit, CPU (Central Processing Unit).

Section 2: Computer Components

Any type of computer will always have two principal components: Hardware and Software.

Hardware:



The Hardware are the physical components or tangible parts of a computer all those mechanical parts or electronic parts that we can see and touch, like the monitor, the mouse, or the keyboard. Through the hardware, the computer works out the process of inputting, processing, storing, and outputting the information.

Image 1.1: Example of Hardware

Software:



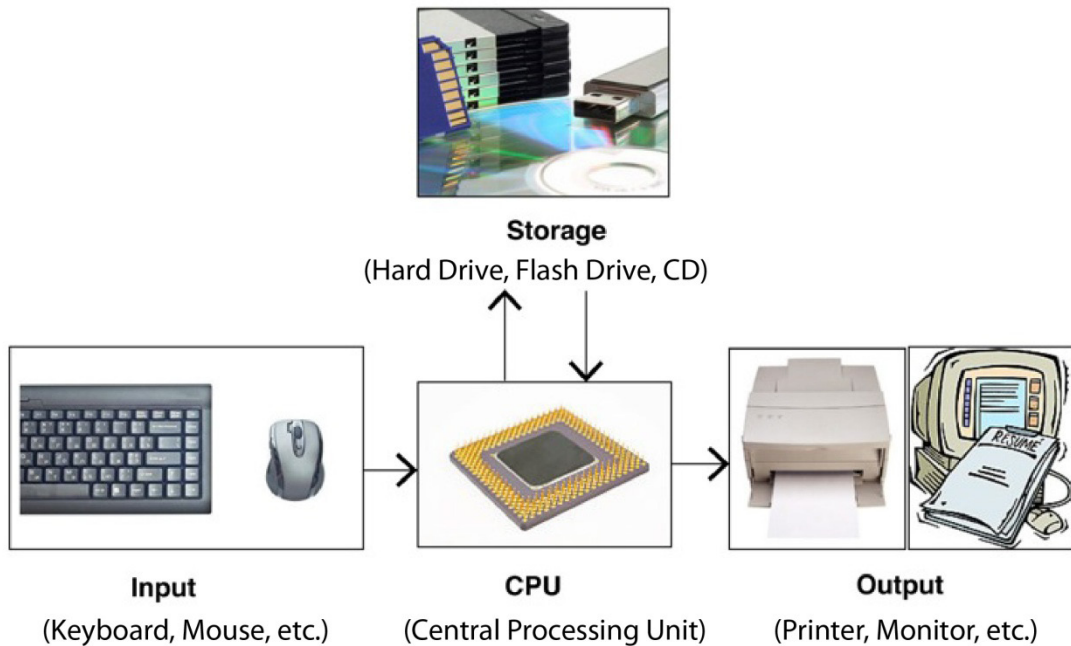
The Software are the instructions that the computer requires. Because the computer can not perform any function by itself, the software is necessary to direct and organized the operations that it must perform. These instructions, grouped as programs, are stored in the computer's memory and are called software.

Image 1.2: Example of Software

The software is a component that allows the computer to complete a task. It provides the instruction for telling a computer what to do and how to do it. It is the software that tells the hardware how and under what logical sequence to do calculations and what data manipulations are introduced. Without software,

the computer would be a useless tool.

In this section we will look at how each part of the computer is used for the functions mentioned:
(INPUT PROCESSING STORAGE OUTPUT)



- **Definition of each function:**

Input: Entry is any type of data you enter into the computer, like when you type words and numbers in a document, insert pictures, or put a CD into the computer to play music.

Parts we use to enter data into the computer:

Keyboard, Mouse, Scanner, Microphone, Web cam.

Processing: means to use or to analyze input data to produce a result. To accomplish this task the computer uses the processor and memory. They are in the central processing unit (CPU). The CPU is considered the “brain” of the computer, and we may find the memory (RAM) system.

Parts we use to process the information on a computer:

Random Access Memory - RAM, and, Central Processing Unit- CPU

Storage: The computer stores or saves data that it needs to process. Depending on use, data can be stored in:

- The memory system, which is a short-term memory that stores information the computer is currently using.
- The primary storage device is the Hard Drive on the computer. Information is stored here permanently, or until the user deletes it.
- The secondary storage devices CD/DVD, or USB, where information is stored permanently or temporarily until you delete it. For instance, if the computer doesn't need to process that information at a specific time, then those “files” are saved on these devices for future reference.

Each computer has its own storage space in the hardware, and therefore not all computers have the same amount of archived information.

Parts we use to store information on your computer:
Hard Drive, USB Flash drive, CD/ DVD.

Output: is any information or result generated by the computer by processing the input data. The outputs can take the form of reports, documents, graphics, and images that we see on the monitor or printed on paper.

Parts we use to view information on the computer info:
Monitor, Printer, Speakers, Modem.

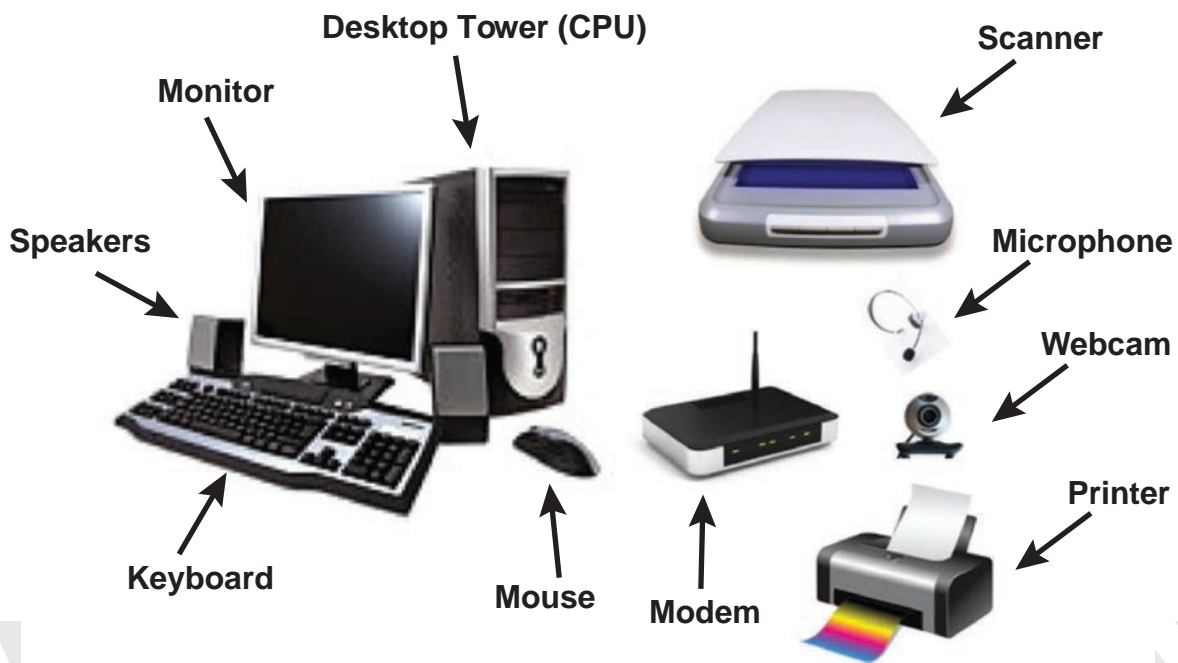


Illustration 1.2: Example of a computing system

Input Devices:

- Keyboard
- Mouse
- Scanner
- Microphone
- Webcam
- Infrared port and Bluetooth

• **Keyboard:**

Is the main input device through which you enter data and instructions to the computer. The computer keyboard is similar to a typewriter and handles four types of keys: Alphanumeric (letters and numbers), numeric, special function, and control.



Image 1.3: Keyboard

- **Mouse:** designed to facilitate handling the keyboard. The mouse is activated by sliding on a flat surface while displaying a pointer (cursor) on the monitor screen. The pointer movement is controlled by the mouse movement, ie: moving in the same direction. It is given the name "mouse" because its oval shape resembles the body of a mouse. There are different types of mice.



Image 1.4: Mouse

Types of Mouses:

Optical: It does not use the famous rubber ball at the bottom as the common mouse, instead of the ball it uses optical sensors that detect where the movement takes place. It is regarded as one of the most modern types of mouses, and is easier to handle

Wireless: It does not use cables with the computer. It only uses a receiver that connects to the computer through a USB port. Generally, this receiver gives the point of concentration of the wireless signal that is produced by the mouse. Thanks to this signal, it recognizes any movement. It is especially used for laptops and when there is not much room to move. Using a wireless mouse avoids the problems associated with common mouse connector cables.

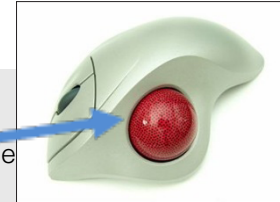


Image 1.5: Wireless Mouse with Scroll Ball

Scroll Ball

In order to move the pointer with this device, the user places one or more fingers on the ball. This type of mouse seems to be falling into disuse.

Middle Mouse Button

This device looks like a pencil eraser and is located in the center of the keyboard of a laptop. A finger is used in order to move the pointer in the desired direction.

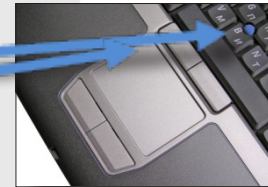


Image 1.6: Middle Mouse Button and Mouse Pad

Mouse Pad

Is a surface sensitive to movement and pressure. Some laptops include it instead of the mouse. The fingertips of the fingers are used to "point" and there are 1 or 2 buttons next to the "pad" that allow you to "click" and "select". It is also called touch pad or track pad.

- **Scanner:** Is a device similar to a printer, but instead of copying the image on paper, it transfers into an electronic document, which saves it to the computer. Photographs, ads, magazines, text, and other print advertisements can be captured or entered into the computer through a scanner. **A scanner requires special software to run and to modify the captured images.**



Image 1.7: Scanner

- **Microphone:** Is a part of the computer that transmits sound captured by the computer. The music can be reproduce, saved, etc.

Image 1.8: Microphone



- **Webcam:** A camera with small dimensions and great capacity. It must be connected to the computer in order to be able to function. To connect the camera you must use one of the computers USB inputs. Webcams are generally used for online conferences, which are usually called video conferences. By having the right software, you can record videos like a regular camera and take still photos. Some are already installed on your computer, or you may fit an external webcam.

Image 1.9: Webcam



- **Infrared and Bluetooth ports:**

The infrared ports and bluetooth are considered devices or parts mainly for input and output data. Through them, we can receive information and get processed information. These ports are

found in laptops and cell phones. Infrared: is a simple communication device that uses a small red light, usually transmitted in a linear manner. Such a system is operated by remote extra space, remote controls for stereo, sound or TV.



Bluetooth: is a more complicated communication device, similar to wireless. The range is greater in a circular area and with a higher speed transmission than the infrared port. Bluetooth devices are mostly seen in storage devices and they only transmit. They are widely used with cell phones and modern cars.

Image 1.10: Bluetooth

Processing Devices:

- RAM
- CPU

- **RAM:** The memory system known as the RAM (Random Access Memory, or short-term memory), it temporarily stores programs and data that the computer is currently using. Once the computer is off, the RAM is empty, so it is said to be short-term memory. All programs and data must go through the memory before being processed. When the computer reads them, they occupy part of the memory. Then, when you close a program, it frees the memory space it occupied.

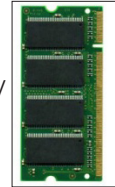


Image 1.11: RAM

Usually the more RAM the computer has, the more it is possible to perform simultaneous tasks.

Note: It is very important to consider this feature when making a purchase decision, as the amount of memory can vary. Depending on the operating system, the RAM should not be less than the 512 MB. For more advanced computing needs it requires 1 GB or more of RAM.

For more information about these devices visit:

<http://www.intel.com/content/www/us/en/homepage.html#>

- **CPU:** is one of the most important parts of the computer. It is responsible for reading and executing instructions, for carrying out the work that the user wants, and for determining the speed with which the computer receives and executes the commands that were given. The CPU (Central Processing Unit) is always found inside the desktop tower of the computer. Note: It is important to identify this part because, at the time of purchasing, a specific brand can make the difference in the cost of the computer. The most common brands are: Intel Core Duo, Centrino, AMD, Celeron, and Pentium. To find out more about these devices go to: <http://www.intel.com/content/www/us/en/homepage.html#>

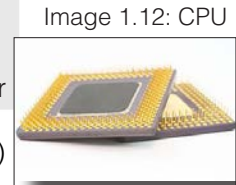


Image 1.12: CPU

Storage:

- Hard drive
- USB Flash drive
- CD / DVD

- **Hard Drive:** is the most important storage device. It is characterized by the ability to permanently store the information that the computer is not using at the time, usually fixed inside the CPU, desktop computer (or just tower). There are also portable hard drives or external memories, and removable USB memories (you can connect and disconnect from the computer), and CD/DVDs which are also removable. Storage for hard drives varies quite a bit. This feature will allow you to decide on the right computer equipment. The more memory you have in your hard drive, the better your performance. Measures exist to determine the ability of these components, for instance, how much information can be stored in storage devices. The unit used to measure the storage space on a computer is called a "byte". The units of measurement of storage devices are:



Image 1.13: Hard Drive

Kilobytes	= Kb	=	1024 bytes
Megabytes	= Mb	=	1024 kilobytes (1 MB)
Gigabytes	= Gb	=	1024 megabytes (1 GB)

Terabytes = Tb = more than 1024 gigabytes (1 TB)
 These same units are used to measure the files.

- USB Flash Drive: USB stands for Universal Serial Bus. This device is a port used to connect peripherals such as mice, keyboards, scanners, digital cameras, mobile phones, media players, printers, external hard drives, and sound cards, among others. A scanner or a digital camera usually connects to this port, and it is the means by which these components and the computer communicate.



Image 1.14: USB Flash Drive

- CD/DVD: CD-ROM (Compact Disk- Read Only Memory) is a storage device with high capacity. Like the floppy disk or USB memory, the CD/DVDs are used to collect and store information from a portable medium. In this case a CD (compact disc) or DVD (digital versatile disc) is especially designed for use on the computer. Units exist only to read information from a CD or DVD, and others can also record or “burn”.



Image 1.15: CD/ DVD

Currently, all recent manufactured computers have integrated the CD/DVD drive. Nonetheless, this device is external. Therefore, it can be bought to adapt to your computer and be used.

Output devices:

- Monitor
- Printer
- Speakers
- Modem



Image 1.16: Monitor

- Monitor: Is a screen that allows us to see the work and the information that is stored or being used on the computer. This device is important so that one can see the information that was processed. However the design does not depend on your purchase of a processor. The decision will depend on the needs and preferences of the person. Monitors vary in size in inches. The most commonly used monitors are 15 “and 17”. Now, we typically use flat screen monitors, as older monitors occupy more space. It is also possible to use more than one monitor at a time with an operating system.
- Printer: is an output device that can generate hard copies of information that has been stored on the computer. There are different types of printers, depending on the mechanism to use (impact, inkjet or laser).



Image 1.17: Printer

- Speakers: they are output devices that generate audio. Through the speakers, we can hear the sounds generated by programs that are installed on the computer and internet web sites.



Image 1.18: Speakers

- Modem: This part of the computer can be categorized as an input and output device. It is a communication device that converts the signals coming in and going out of a computer to send and receive information. There are internal and external modems that allow you to receive signals both wired and wireless. The speed of a modem to transmit and receive data can be measured in units called bits per second (bps). The more bits per second a modem can transmit, the faster it is. Some modems are placed inside the computer itself (internal), and others are placed outside (external).



Image 1.19

Modem

Section 3: How is a computer used?

Remember that the software is one of the programs that is used to direct the operation of the computer. A computer may be used for different tasks, for example:

- Perform calculations
- Create Documents
- Create Presentations
- Control other computers

Among other things, depending on the task undertaken, the computer may require the use of different types of software or programs.

We often refer to programs or data as the same thing. They are not.

Programs: are instructed to perform tasks to hardware or provide a connection with other software.

Data: only exist for eventual use by a program.

The software can be grouped into three major categories:

SYSTEM:	DEVELOPMENT:	APPLICATION:
Windows	Visual Basic	Word Processor
Macintosh	Java	Electronic Worksheets
Unix	C++	Data Bases
		Presenters Others

Note: This course will explain the types of system and application software. The following three categories will be described briefly in this chapter.

- Software System

Is a set of programs designed to facilitate the use of the computer. It indicates how to use components to carry out the instructions of the user. In other words, it serves as a liaison between the computer and the user.

What is a Software System?

The operating system that the computer you are using has is called Windows because it is made up of windows that are easy to handle. Software Systems are essential to control the basic functions of the computer. When burned, the operating system is loaded into the memory and remains there until the computer turns off.

Examples of Software Systems

Some examples of operating systems are Microsoft Windows 95, 98, 2000, NT, XP, ME, Vista, Windows 7 and Macintosh, and Unix, among others.

- Software Development

What is Software Development?

This type of software is used to create programs that must function using the computer.

Why is it a software development?

For example: in a supermarket each time a cashier charges a product to a customer, it goes through a code reader that feeds a program which charges products. This program is created in a development software under certain programming language. Examples of Software Development are: C++, Java, Delphi, Progress, Visual Basic, among others.

- **Software Application**

What is Software Application?

It is a software developed under certain characteristics which allows us to do an activity or task.

How do we use an Application Software?

This program is used by the user to simplify your life, whether you decide to write a book, a thesis or a memorandum, or to handle large volumes of data, or programs that serve to give you a list of companies. These programs are the most sought after by most computer users because of the benefits or services they receive.

Examples of Software Applications

The most widely used application software on the market can be divided into several categories, the main ones are:

- Word Processor: used to create documents (like Word)
- Electronic Spreadsheets: a tool to make calculations (like Excel)
- Data bases: a tool to store and organize data (like Access)
- Presentations: a tool to create graphic presentations (like PowerPoint)
- Communication: a tool to exchange information electronically (like Outlook, Hotmail, Yahoo, Gmail) and to browse the Internet (like Internet Explorer and Mozilla Firefox, Google Chrome, Apple Safari).

We will explore the ways in which these programs serve us

Word Processor:

Specific tasks performed with this software are:

- Writing texts (letters, articles, general documents);
- Text editing (changes in position and appearance of text); and
- Grammar and Spelling revision.

These are some Word Processors: Microsoft Word, Writer and Word Perfect

Electronic Spreadsheet:

Allow us to organize, calculate, and analyze numerical information in a structure of rows and columns, and to generate graphs.

Some of the best known software are: Microsoft Excel, Lotus 1-2-3 and Quattro Pro.

Data bases:

This software is used to manage and organize data stored in the computer. Although the electronic spreadsheet also helps you organize information, a database with more sophisticated features is essential for more effective management of large quantities of information. It is common for companies to have information about employees, customers, and suppliers organized in databases.

Examples of this type of software: Microsoft Access and FoxPro

Presentations:

Allow a generation of visual aids (computer images and slide shows with effects and sound, fact sheets) with high quality audio.

Among the most known are: Microsoft PowerPoint, Aldus Persuasion and Lotus Freelance Graphics.

Graphic Editing:

Illustrations are used to create and edit, like Paint, Adobe Photoshop, or Adobe Illustrator.

Multimedia Packages:

Used to incorporate images, text, sound, animation and video into one file, such as on Macromedia Director.

Communication Software:

Allows a computer to transmit data to another computer. For this communication to be carried out, it is necessary to have the required software, communication equipment, and a connection (like a phone line or broadband Internet).

Major communication software are: E-mail and web browsers.

Electronic mail, or E-mail, allows us to send and receive messages via the Internet (the largest computer network in the world). An example of this is: Outlook, Hotmail, Yahoo, Gmail, etc...

Browsers allow the user to access information from the Internet (World Wide Web) in a structured manner. The most commonly used are: Internet Explorer, Google Chrome, Apple Safari, and Mozilla Firefox.

Conclusion:

Now that we know what a computer is, what the basic parts and functions are, and which programs are used to perform certain activities, it is important that we practice what we have learned. We must use the knowledge we now have, and share with someone else. We can help those who do not know about computers, teach them to investigate and obtain more information. Be sure to do the exercises in this chapter. It would also be a great idea to walk down the computers aisle of your favorite store and familiarize yourself with the characteristics of all the equipment. Practice your knowledge on familiar equipment, and review what you already know.

Remember, the most important features for making a good buying decision are:

- Memory Processor
- RAM Memory
- Hard Disk Capacity

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Activity 1

Description: The questions on this activity will allow you to reinforce the knowledge acquired in Chapter 1.

Instructions:

1. Read each question carefully.
2. On a sheet of paper, write the question number and the answer you selected.
3. Then send your work to the tutor via Internet.

QUIZ:

1. Which of the following responses are examples of equipment that store computer information?
 - a) Monitor, Keyboard, RAM
 - b) Scanner, Modem, Printer
 - c) USB Memory, Hard Drive, CD/DVD
 - d) Mouse, Keyboard, Scanner
2. Mention the types of Software.
 - a) Input, Process, Storage, Output
 - b) Programs, Data
 - c) Hardware, Software
 - d) System, Development, Application
3. An electronic machine capable of performing arithmetic and logical operations at high speed, can be programmed to: accept data (input), process and store information for future use, and produce useful information (outputs).
 - a) The Abacus
 - b) The Computer
 - c) The Analytical Engine
 - d) The Pascaline Machine
4. Which of the following answers contain the means to enter data into the computer?
 - a) Monitor, Keyboard, RAM
 - b) Scanner, Modem, Printer
 - c) CPU, Hard Drive, CD-DVD
 - d) Mouse, Keyboard, Scanner
5. What is a easy storage device that you can use and transport and which allows students to save documents on to a computer?
 - a) USB Memory
 - b) CD-DVD
 - c) Diskette
 - d) Hard Drive
6. What is a logically ordered set of instructions that tells the computer how to perform the function you want?
 - a) Software
 - b) The Abacus
 - c) Hardware
 - d) The Computer

7. Which of the following responses include what we use to get a computer-generated result?
 - a) Keyboard, RAM
 - b) Monitor, Printer
 - c) CPU, Hard Drive
 - d) Mouse, Keyboard

8. What do you call the physical components of a computer - the mechanical or electronic parts that can be seen and touched, such as monitor, mouse or keyboard?
 - a) Software.
 - b) The computer.
 - c) Hardware.
 - d) The Abacus

9. Which of the following answers contain all examples of software application?
 - a) Word, Excel, PowerPoint, Access.
 - b) Internet Explorer, Outlook, Visual Basic, Java.
 - c) Windows, Unix, Java.
 - d) Word, Excel, Windows, Visual Basic.

10. Which of the following responses include everything we use to process data on the computer?
 - a) CPU, RAM
 - b) Scanner, Modem, Printer
 - c) CPU, Hard Drive, CD/DVD
 - d) Mouse, Keyboard, Scanner

11. What does the acronym CPU stand for?
 - a) Uniform Computational Process
 - b) Personal Computer Only
 - c) Central Processing Unit
 - d) Uniform Personal Communication.

12. Which of the following is the correct order of functions performed by the computer?
 - a) Output, Input, Storage, Processing.
 - b) Storage, Output, Processing, Input.
 - c) Processing, Storage, Output, Input.
 - d) Input, Processing, Storage, Output.

13. Software that lets you send and receive electronic messages through the Internet.
 - a) Data Base; Access
 - b) Word Processor; Word
 - c) Electronic Spreadsheet; Excel
 - d) E-mail; Outlook, Hotmail, etc.