

COURSE-BCA PART III, PAPER-XVII,

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TOPIC- PERSONAL COMPUTER HARDWARE

1.1 INTRODUCTION

In today's world we are all connected. People with ideas can communicate instantly with others to make those ideas a reality. News events and discoveries are known worldwide in seconds. Everyone has a chance to connect, to share and to make a difference. As participants in this human network, we are more powerful together than any of us could be apart. The human network has changed the way we live, learn, work and play.

At the center of it all are the teams of network designers, engineers and technicians that keep the human network connected. In this course you will learn the basic networking skills as you connect home and small business network.

1.2 HOW AND WHERE COMPUTERS ARE USED

Computers play an increasingly important and nearly indispensable role in everyday life.

Computers are used all over the world and in all types of environments. They are used in businesses, manufacturing environments, homes, government offices and non-profit organizations. Schools use computers for instruction and for maintaining student records. Hospitals use computers to maintain patient records and to provide medical care.

In addition to these types of computers, there are also many customized computers designed for specific purposes. These computers can be integrated into devices such as televisions, cash registers, sound systems, and other electronic devices. They can even be found embedded in appliances such as stoves and refrigerators and used in automobiles, and aircraft.

Where are computers found within your environment?

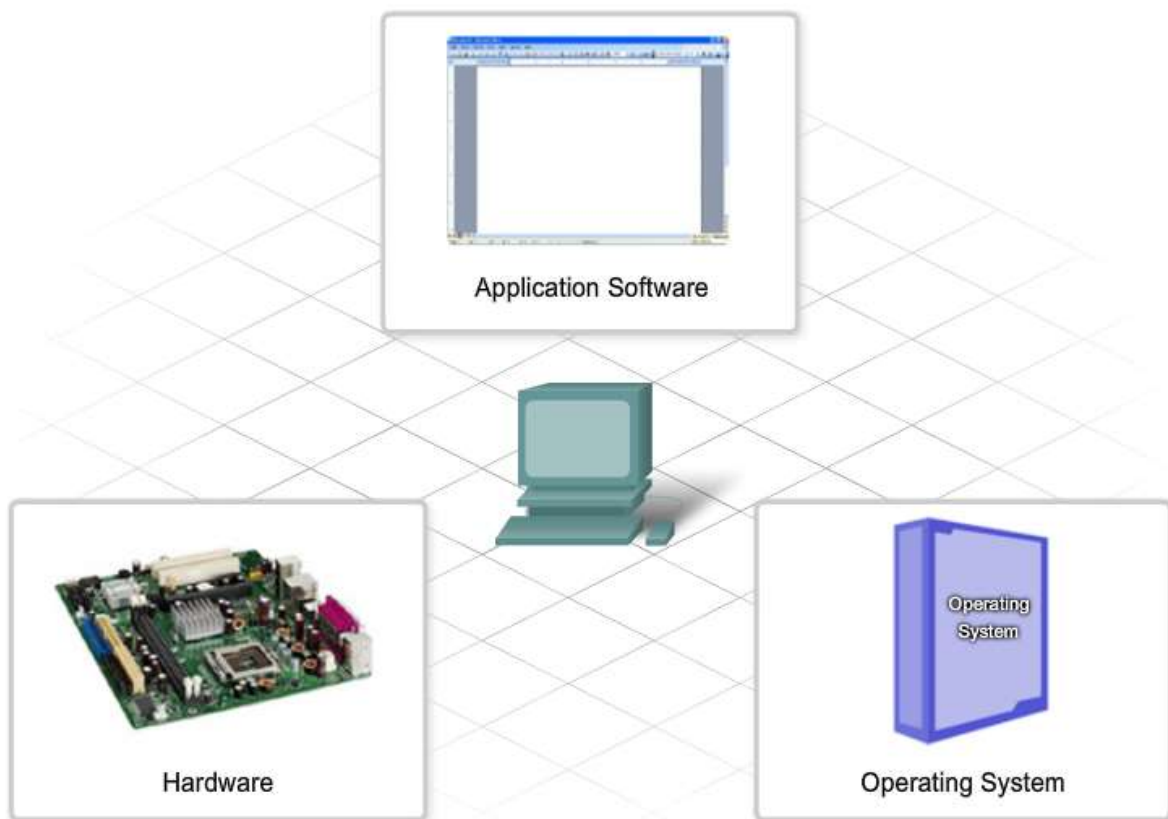


Computers are used for many reasons and in many different places. They may be of different sizes and processing power, but all computers have some features in common. In order for most computers to perform useful functions, there are three things that have to work together:

1. Hardware - the physical components, both internal and external, that make up a computer.

2. Operating System - a set of computer programs that manages the hardware of a computer. An operating system controls the resources on a computer, including memory and disk storage. An example of an operating system is Windows XP.

3. Application Software - programs loaded on the computer to perform a specific function using the capabilities of the computer. An example of application software is a word processor or a computer game.



1.3 LOCAL AND NETWORK APPLICATIONS

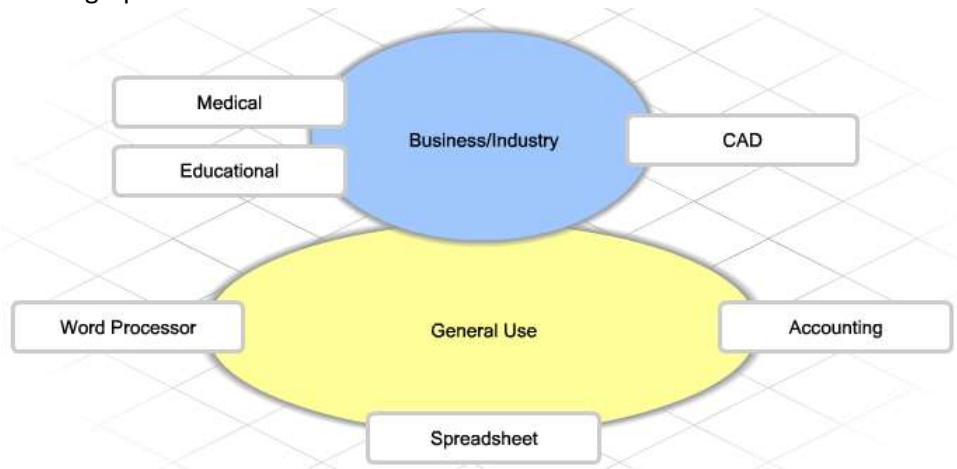
The computer is only as useful as the program or application on it. Applications can be divided into two general categories:

Business/Industry Software - Software designed for use by a specific industry or market. Examples include: medical practice management tools, educational tools and legal software.

General Use Software - Software used by a wide range of organizations and home users for various purposes. These applications can be used by any business or individual.

General use software includes integrated applications packages known as Office Suites. They usually include applications such as word processing, spreadsheet, database, presentation and email/contacts/schedule management.

Other popular applications include graphics editing software and multimedia authoring applications. These tools allow users to manipulate photos as well as create rich media presentations that use voice, video and graphics.





In addition to Business/Industry and General Use software, an application can be classified as local or networked.

Local application - A local application is a program, such as a word processor, that is stored on the hard disk of the computer. The application runs only on that computer.

Network application - A network application is one that is designed to run over a network, such as the Internet. A network application has two components, one that runs on the local computer and one that runs on a remote computer. Email is an example of a network application.

Most computers have a combination of local and network applications installed.

	
Local application	Network application

1.4 CLASSES OF COMPUTERS

There are many different types of computers available including:

- Mainframes
- Servers
- Desktops
- Workstations
- Laptops
- Hand-held portable devices

Each type of computer has been designed with a particular purpose in mind, such as portable access to information, processing of detailed graphics, and so on.

The most common types of computers used in homes and businesses are servers, workstations, desktops, laptops and other portable devices. Mainframes, on the other hand, are large centralized computers found in sizeable enterprises and purchased through specialized resellers.



1.5 SERVERS ,DESKTOPS AND WORKSTAIONS

Servers

Servers are high performance computers used in businesses and other organizations. Servers provide services to many end users or clients.

Server hardware is optimized for quick response time to multiple network requests. Servers have multiple Central Processing Units (CPUs), large amounts of Random Access Memory (RAM) and multiple high capacity disk drives that provide very fast information retrieval.

The services provided by a server are often important and may need to be available to users at all times. Servers, therefore, often contain duplicate, or redundant, parts to prevent them from failing. Automatic and manual backup of data is also usually done on a regular basis. Servers are usually kept in secure areas where access is controlled.

Their design may be one of several types: they can be a standalone tower design, be rack mounted, or have a blade design. Since a server is typically used as a storage point and not a day-to-day end-user device, it may not have a monitor or keyboard, or may share a monitor and keyboard with other devices.

Common services found on a server include file storage, email storage, web pages, print sharing and others.



Blade Server



Rack Mount Server



Standalone server

Desktops

Desktops support many options and capabilities. A wide variety of cases, power supplies, hard drives, video cards, monitors and other components are available. Desktops can have many different connection types, video options, and a wide array of supported peripherals.

Desktops are commonly used to run applications such as word processing, spreadsheets and networked applications such as email and web browsing.

There is another type of computer that may look similar to a desktop, but is much more powerful: the workstation.

Workstation

Workstations are high-powered business computers. They are designed for specialized, high-end applications like engineering programs such as CAD (Computer Aided Design). Workstations are used in 3-D graphics design, video animation and virtual reality simulation. They may also be used as management stations for telecommunications or medical equipment. As with servers, workstations typically have multiple CPUs, large amounts of RAM and multiple, high-capacity disk drives that are very fast. Workstations usually have very powerful graphics capabilities and a large monitor or multiple monitors.

Servers, desktops and workstations are all designed as stationary devices. They are not portable, like laptops.

1.6 PORTABLE DEVICES

In addition to various types of stationary computers, there are many portable electronic devices available.

These portable devices vary in size, power and graphic capability and include:

- Laptop or notebook PC
- Tablet PC
- Pocket PC
- Personal Digital Assistant (PDA)
- Gaming device
- Cell phones

Laptops, also called notebooks, are comparable to desktops in usage and processing capability. However, they are portable devices built to be lightweight and use less power, with a built-in mouse, monitor and keyboard. Laptops can also be plugged into a docking station which allows the user to utilize a larger monitor, mouse, full-sized keyboard and have more connection options.

Despite this, laptops have a limited number of configurations available, such as video options and connection types. They are also not as easily upgradeable as the desktop.



Laptop PC

Other portable devices, such as PDAs or pocket PCs, have less powerful CPUs and less RAM. They have small screens with limited display capabilities and may have a small input keyboard.

The key advantage of portable computers is that information and services are available immediately, almost anywhere. For example, mobile phones have built-in address books for contact names and telephone numbers. PDAs are available with built-in telephone, web browser, email, and other software.

The functions of these individual devices can be combined into one multifunction device. The multifunction device can combine a PDA, cell phone, digital camera, and music player. It can provide Internet access and wireless networking capability, but has limited processing power similar to the PDA.



Tablet PC

A Tablet PC is typically a wireless device with an LCD touch screen that allows a user to write on it using a special stylus pen. The notes or handwritten text can be digitized using built-in handwriting recognition software. Tablet PCs have a convertible screen that allows it to function like a laptop or the screen can be rotated down and folded down over the integrated keyboard. Tablet PCs run a special OS such as Microsoft's Windows XP Tablet Edition.



Pocket PC

A pocket PC is scaled down version of a laptop, with a less powerful CPU, less RAM and no hard disk. Most Pocket PCs have small QWERTY-style keyboards and color display screen with fairly good resolution. They use memory cards to store user documents and photographs. They run a special OS such as Microsoft mobile. They are typically about the size of a candy bar and weigh less than 7 ounces. Features can include : mini-application such as PowerPoint Viewer and Mobile Excel, cellular phone, wireless networking, persistent storage, memory card storage, touch screen, megapixel camera, camrecorder voice recorder and high-speed internet capability.




PDA

PDA's (personal digital assistant) are also known as handhelds or Palmtops. These are generic items that are often applied to any small portable devices that provides storage for personal information, such as calendars and contacts. They use primarily touch screen technology although some also have a small keyboard. The distinction between these devices and the Pocket PCs is blurred. PDA's are increasingly being combined with cell phones and PC-like functionally. Some PDA's are Microsoft Windows CE and others use a proprietary OS such as Palm OS or blackberry OS.



Game Device

Portable gaming devices are small computers that are dedicated to playing various computer games. They have good quality displays and increasingly more powerful, with some having wireless capabilities to allow multi-person gaming. Examples include Sony PlayStation Portable (PSP) and Nintendo DS(dual screen). Gaming devices run a proprietary OS and games are written for this specific OS and device.

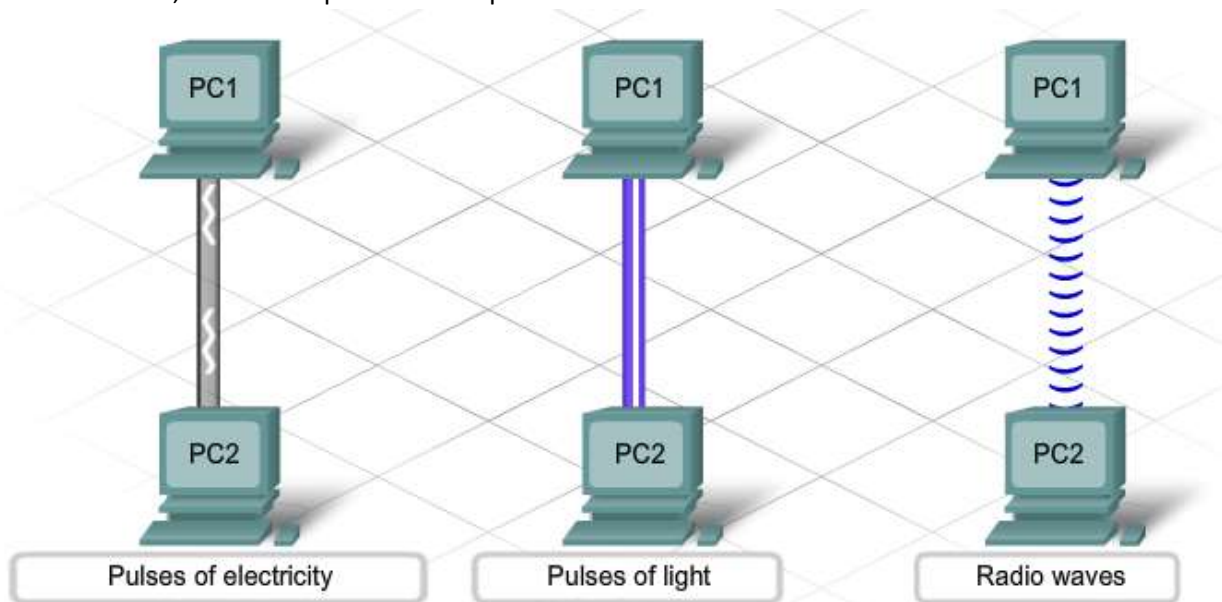
	<p>Cellular phones (cell phones) are in use everywhere and are replacing regular land line phones in some areas. They are becoming increasingly powerful but they do not have a keyboard and lack a large enough screen to display quality graphics. Newer cell phones have many features of more advanced handheld PDAs and pocket PCs including: calendars, contact information, memory card storage, digital camera, camcorder, MP3 player, games, wireless networking capabilities and Internet access.</p>
<p>Cell Phone</p>	

1.7 SPEED, RESOLUTION AND FREQUENCY

One of the advantages of digital information is that it can be transmitted over long distances without the quality becoming degraded. A modem is used to convert the binary information into a form suitable for transmitting through the medium.

Commonly used media are:

- Cables, which use pulses of electricity through copper wires
- Fiber optics, which use pulses of light over fibers made from glass or plastic
- Wireless, which uses pulses of low-power radio waves

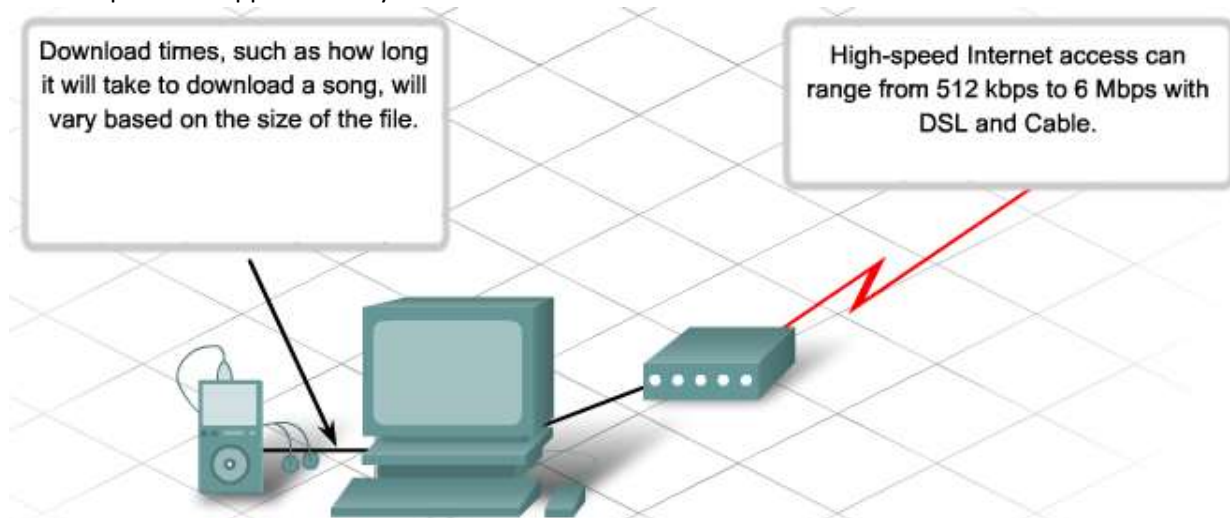


There are two measures for the size of a file: bits (b) and bytes (B). Communication engineers think in terms of transferring bits, whereas computer users think in terms of file sizes, which are usually measured in Bytes (such as kilobytes, megabytes, etc). There are eight bits to one byte.

The data rate determines how long it will take to transfer a file. The larger the file, the longer it takes, because there is more information to transfer. Data transfer rates are measured in thousands of bits per second (kbps) or millions of bits per second (Mbps). Notice, that in the kbps abbreviation, a lower case k is used instead of the upper case K. This is because when talking about the transfer of data, most engineers round the number down. So a kbps actually refers to the transfer of 1000 bits of information in one second, whereas a Kbps would refer to the transfer of 1024 bits of information in one second. A DSL or a cable modem can operate in ranges of 512 kbps, 2 Mbps or higher depending on the technology being used.

Download time

Calculated download times are theoretical and depend on cable connection, computer processor speed and other overheads. To get an estimate of the length of time it takes to download a file, divide the file size by the data rate. For example, how long will it take to transfer a low resolution digital photo of 256KB via a 512kbps cable connection? First step, convert the file size into bits: $8 \times 256 \times 1024 = 2097152$ bits. 256KB corresponds to 2097 kb. Notice that the 2097152 is rounded to the nearest 1000, so lower case k is used. The download time is then 2097 kb divided by 512 kbps, which equates to approximately 4 seconds.



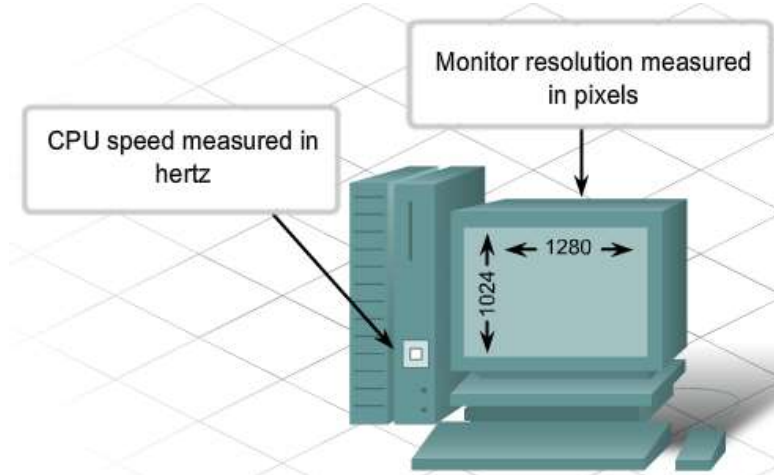
In addition to storage capacity and data transfer speed, there are other units of measure when working with computers.

Computer Screen Resolution

Graphics resolution is measured in pixels. A pixel is a distinct point of light displayed on a monitor. The quality of a computer screen is defined by the number of horizontal and vertical pixels that can be displayed. For example a widescreen monitor may be able to display 1280 x 1024 pixels with millions of colors. As for image resolution in digital cameras, it is measured by the number of mega pixels that can be captured in a photograph.

Analog Frequencies

Hertz is a measurement of how fast something cycles or refreshes. One hertz represents one cycle per second. In computers, the speed of the computer processor is measured by how fast it can cycle in order to execute instructions, measured in hertz. For example, a processor that runs at 300 MHz (megahertz) executes 300 million cycles per second. Wireless transmissions and radio frequencies are also measured in hertz.



To Be Continued.....