TK [level 1]

Lesson 1

OBJECTIVES

1 - What is a computer and what it does
2 - Difference between Hardware and Software
3 - The Various types of computers in use today
4 - Windows, Mac and Linux

TK [level 1]

INTRODUCTION

(Video)

1 - What is a computer and what it does

A computer is one if not the most amazing invention made by mankind. Computers are all sort of electronic devices that have the primary function of storing information that can be processed and handled at a later stage. At the beginning computers used to be huge in shape and occupy entire rooms, their calculations were also limited.

IMAGE 1 - The Eniac 1949

Its construction began in 1943 and was not completed until 1946. The ENIAC occupied about 1,800 square feet, used 17,468 vacuum tubes, 15,000 relays, weighed almost 50 tons, uses 200 kilowatts of electricity, and cost about $500,000.

1 - What is a computer and what it does

Today a mobile phone can rest in the palm of our hand and can perform calculations 1 billion time faster and in a much more accurate way than the massive computers that were used in the beginning of the computer era which is around the 1950's.

While most of today's electronics devices are in fact computers as they can perform all the mentioned data storing and handling tasks, we normally refer to the word computer to what we usually use at home or at work, hence the word, "Personal Computer". A computer for our personal use.

IMAGE 2 - The iPhone 2007

1 - What is a computer and what it does

Whilst old computers were limited in their capability and performance today's Computers can do incredible things, here are just a few examples:

- Allow us to view web pages and web content on the internet.
- Allow us to type elaborated documents and edit digital images.
- Allow to talk and view in real time with someone on the other side of the world.
- Receive our request via audio and apply the solution.
- Drive a plane or a car without human interaction.
- Calculate the trajectory of a spacecraft in order to reach another "moving" celestial body such as a planet or an asteroid located in our solar system.

IMAGE 3 - a Soyuz Spacecraft

2 - Difference between Hardware and Software

HARDWARE is the physical aspect of computers, routers, cable boxes and other devices. The term arose as a way to distinguish the "box" and the electronic circuitry and components of a computer from the program you put in it to make it do things, (software).

- Physical parts of the computer are called hardware.
- You can touch, see and feel hardware.
- Hardware is constructed using physical materials or components.
- Computer is hardware, which operates under the control of a software.
- If hardware is damaged, it is replaced with new one.
- Hardware is not affected by computer viruses.
- Hardware cannot be transferred from one place to another electronically through network.
- User cannot make new duplicate copies of the hardware.

IMAGE 4 - Hardware parts Inside a Computer

2 - Difference between Hardware and Software

SOFTWARE is the arrangement of digital instructions that guide the operation of computer hardware. Software is loaded from storage (flash, disk, network, etc) into the computer's operating memory (RAM) on demand, and is designed to be easy to change.

- A set of instructions given to the computer is called software.
- You cannot touch and feel software.
- Software is developed by writing instructions in programming language.
- The operations of computer are controlled through software.
- If software is damaged or corrupted, its backup copy can be reinstalled.
- Software is affected by computer viruses.
- Software can be transferred from one place to another electronically through network.
- User can make many new duplicate copies of the software.

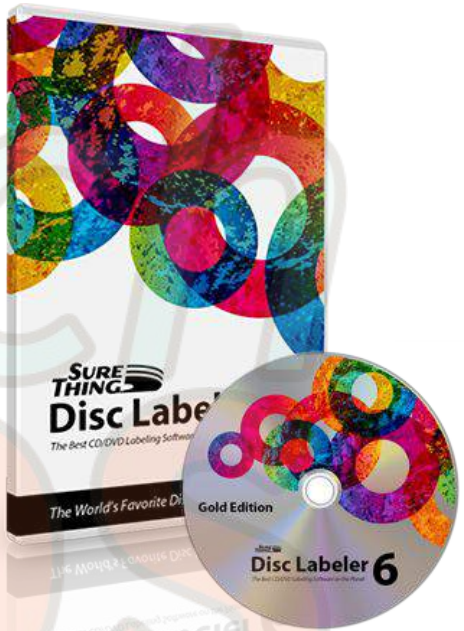

IMAGE 5 - Software on DVD

2 - Difference between Hardware and Software

SOFTWARE / FIRMWARE

A type of software that provides control, monitoring and data manipulation of engineered products and systems.

Typical examples of devices containing firmware are embedded systems (such as traffic lights, consumer appliances, remote controls and digital watches), computers, computer peripherals, mobile phones, digital cameras as well as the BIOS (the boot code) of your PC.

The firmware contained in these devices provides the low-level control program for the device. As of 2013, most firmware can be updated.

IMAGE 6 - SoC System On Chip

3 - The Various types of computers in use today

COMPUTER DEFINITION

A computer is a machine that can be programmed to manipulate symbols. Its principal characteristics are:

- It responds to a specific set of instructions in a well-defined manner.
- It can execute a prerecorded list of instructions (a program).
- It can quickly store and retrieve large amounts of data.

Therefore computers can perform complex and repetitive procedures quickly, precisely and reliably. Modern computers are electronic and digital. The actual machinery (wires, transistors, and circuits) is called hardware; the instructions and data are called software.

IMAGE 7 - Personal Computer

3 - The Various types of computers in use today

All general-purpose computers require the following hardware components:

- **Central processing unit (CPU):** The heart of the computer, this is the component that actually executes instructions organized in programs ("software") which tell the computer what to do.
- **Memory (fast, expensive, short-term memory):** Enables a computer to store, at least temporarily, data, programs, and intermediate results.
- **Mass storage device (slower, cheaper, long-term memory):** Allows a computer to permanently retain large amounts of data and programs between jobs. Common mass storage devices include disk drives and tape drives.
- **Input device:** Usually a keyboard and mouse, the input device is the conduit through which data and instructions enter a computer.
- **Output device:** A display screen, printer, or other device that lets you see what the computer has accomplished.

In addition to these components, many others make it possible for the basic components to work together efficiently. For example, every computer requires a bus that transmits data from one part of the computer to another.

3 - The Various types of computers in use today

COMPUTER SIZE AND POWER

Computers can be generally classified by size and power as follows, though there is considerable overlap:

- **Personal computer:** A small, single-user computer based on a microprocessor.
- **Workstation:** A powerful, single-user computer. A workstation is like a personal computer, but it has a more powerful microprocessor and, in general, a higher-quality monitor.
- **Server:** A computer that provides functionality for other devices, called "clients". Web Pages are normally stored on servers.
- **Mainframe**: A powerful multi-user computer capable of supporting many hundreds or thousands of users simultaneously.
- **Supercomputer:** An extremely fast computer that can perform hundreds of millions of instructions per second.

IMAGE 8 - IBM Mainframe Computer

3 - The Various types of computers in use today

PERSONAL COMPUTER IN DETAILS

It can be defined as a small, relatively inexpensive computer designed for an individual user. In price, personal computers range anywhere from a few hundred dollars to over five thousand dollars. All are based on the microprocessor technology that enables manufacturers to put an entire CPU on one chip. Businesses use personal computers for word processing, accounting, desktop publishing, and for running spreadsheet and database management applications. At home, the most popular use for personal computers is for playing games and recently for surfing the Internet.

IMAGE 9 - Home Personal Computer

3 - The Various types of computers in use today

BEGINNING OF PERSONAL COMPUTERS

Personal computers first appeared in the late 1970s. One of the first and most popular personal computers was the Apple II, introduced in 1977 by Apple Computer. During the late 1970s and early 1980s, new models and competing operating systems seemed to appear daily. Then, in 1981, IBM entered the fray with its first personal computer, known as the IBM PC. The IBM PC quickly became the personal computer of choice, and most other personal computer manufacturers fell by the wayside. P.C. is short for personal computer or IBM PC. One of the few companies to survive IBM's onslaught was Apple Computer, which remains a major player in the personal computer marketplace. Other companies adjusted to IBM's dominance by building IBM clones, computers that were internally almost the same as the IBM PC, but that cost less. Because IBM clones used the same microprocessors as IBM PCs, they were capable of running the same software. Over the years, IBM has lost much of its influence in directing the evolution of PCs.

IMAGE 10 - Apple 2GS year 1986

3 - The Various types of computers in use today

BEGINNING OF PERSONAL COMPUTERS/2

Today, the world of personal computers is basically divided between Apple Macintoshes and PCs.

The principal characteristics of personal computers are that they are single-user systems and are based on microprocessors. However, although personal computers are designed as single-user systems, it is common to link them together to form a network. In terms of power, there is great variety. At the high end, the distinction between personal computers and workstations has faded.

High-end models of the Macintosh and PC offer the same computing power and graphics capability as low-end workstations by Sun Microsystems, Hewlett-Packard, and DEC.

IMAGE 11 - IBM Portable PC Computer 5155 model 68

3 - The Various types of computers in use today

PERSONAL COMPUTER TYPES

Actual personal computers can be generally classified by size and chassis / case. The chassis or case is the metal frame that serves as the structural support for electronic components.

Every computer system requires at least one chassis to house the circuit boards and wiring. The chassis also contains slots for expansion boards. If you want to insert more boards than there are slots, you will need an expansion chassis, which provides additional slots. There are two basic flavors of chassis designs–desktop models and tower models–but there are many variations on these two basic types. Then come the portable computers that are computers small enough to carry. Portable computers include notebooks, ultrabooks, tablets, and mobile phones. Here are a few features features for each of those categories.

IMAGE 12 - Personal & Portable Computers

3 - The Various types of computers in use today

PERSONAL COMPUTER / TOWER MODEL

The term refers to a computer in which the power supply, motherboard, and mass storage devices are stacked on top of each other in a cabinet. This is in contrast to desktop models, in which these components are housed in a more compact box. The main advantage of tower models is that there are fewer space constraints, which makes installation of additional storage devices easier.

IMAGE 13 - PC Tower

PERSONAL COMPUTER / DESKTOP MODEL

A computer designed to fit comfortably on top of a desk, typically with the monitor sitting on top of the computer. Desktop model computers are broad and low, whereas tower model computers are narrow and tall. Because of their shape, desktop model computers are generally limited to three internal mass storage devices. Desktop models designed to be very small are sometimes referred to as slimline models.

IMAGE 14 - Desktop PC

3 - The Various types of computers in use today

PERSONAL COMPUTER / ALL IN ONE

Also known as (AIO), these are desktop computer that houses every component except the keyboard and mouse inside the same case as the monitor. Its primary advantage is saving space.

The all-in-one computer design debuted with the Apple iMac in 1998. The early all-in-one PC computers were expensive and bulky, all-in-one PCs have become much slimmer, lighter and cheaper with the advent of LCD monitors and smaller, less expensive desktop system components.

While being stylish and more appealing to the eye than the desktop or tower counterparts all-in-ones have a disadvantage because they're built to be thin. That means less space for components and cooling. As a result, the all in one market is full of desktops that have low-power versions of desktop processors, or even mobile processors inside.

IMAGE 15 - All in One PC

3 - The Various types of computers in use today

PORTABLE / NOTEBOOK & LAPTOP COMPUTER

An extremely lightweight personal computer. Typically weigh less than 6 pounds and are small enough to fit easily in a briefcase. In terms of computing power, modern notebook computers are nearly equivalent to personal computers. They have the same CPUs, memory capacity, and disk drives. However, because of the portability, they cost about twice as much as equivalent regular-sized computers. Notebook computers come with battery packs that enable you to run them without plugging them in. However, the batteries need to be recharged every few hours.

IMAGE 16 - Laptop

PORTABLE / ULTRABOOK COMPUTER

A portable computer for the “on the go”, lighter and slimmer than a full-sized notebook computer. Typically, ultrabooks computers have removed the DVD / optical drive reader in order to save in shape and weight and have batteries that last longer than notebooks, but are otherwise equivalent to notebook computers in terms of processing power.

IMAGE 17 - Ultrabook

3 - The Various types of computers in use today

TABLET

A portable computer that is small enough to be held with one hand. Although extremely convenient to carry, tablet computers have not replaced notebook computers because of their on screen keyboards and small screens. The most popular Tablets are the Apple iPad and the Samsung Galaxy Tab. Tablets use a touch screen technology, and are normally used to consume media content such as watching videos, reading ebooks, listening music and playing games. Some manufacturers are trying to solve the small keyboard problem by creating so called hybrids. These hybrids are tablets that also have a keyboard that can snap into the tablet with magnetic clips and effectively transform them into small laptop.

IMAGE 18 - Tablet

MOBILE PHONE

Smaller than tablets but with the same features, mobile phones also have cellular capability. These are today the most common computers and we carry them with us at all times. With Mobile phones we connect to the internet and socialize in many different networks, we take photos, we play games, we take notes, use them for in car navigation and do many more things.

IMAGE 19 - Mobile Phone

3 - The Various types of computers in use today

WORKSTATION COMPUTER

It is a type of computer used for engineering applications (CAD/CAM), desktop publishing, software development, and other types of applications that require a moderate amount of computing power and relatively high quality graphics capabilities. Workstations generally come with a large, high-resolution graphics screen, at large amount of RAM, built-in network support, and a graphical user interface. Most workstations are also connected to a mass storage device such as an external network disk drive were to backup all the important data. Like personal computers, most workstations are single-user computers, when used in an office with more than one user, workstations are typically linked together to form a local-area network, although they can also be used as stand-alone systems.

IMAGE 20 - Workstation

N.B.: In networking, workstation refers to any computer connected to a local-area network. It could be a workstation or a personal computer.

3 - The Various types of computers in use today

MAINFRAME COMPUTER

A Mainframe is a very large and expensive computer capable of supporting hundreds, or even thousands, of users simultaneously.

- The difference between a supercomputer and a mainframe is that a supercomputer channels all its power into executing a few programs as fast as possible, whereas a mainframe uses its power to execute many programs concurrently.
- In some ways, mainframes are more powerful than supercomputers because they support more simultaneous programs. But supercomputers can execute a single program faster than a mainframe.

IMAGE 21 - Mainframe

3 - The Various types of computers in use today

SERVER COMPUTER

Servers operate within a client-server architecture. Servers are computer programs running to serve the requests of other programs, the clients.

- Thus, the server performs some tasks on behalf of clients. It facilitates the clients to share data, information or any hardware and software resources.
- Multiple servers can run on the same machine (example: Apache, MySQL, ecc.) Server can refer to both server software and machines designed to run that software. Database servers or application servers are considered to be software. And any computer can be a server, (hardware), if it's running a server software.

IMAGE 22 - Google Datacenter

3 - The Various types of computers in use today

SUPERCOMPUTERS

Supercomputer is a broad term for one of the fastest computers currently available.

- A supercomputer is a computer with a high-level computational capacity compared to a general-purpose computer. Supercomputers are very expensive and are employed for specialized applications that require immense amounts of mathematical calculations (number crunching).
- For example, astronomical research or weather forecasting requires a supercomputer. Other uses of supercomputers are scientific simulations, (animated) graphics, fluid dynamic calculations, nuclear energy research, electronic design, and analysis of geological data (e.g. in petrochemical prospecting). As of June 2016, the fastest supercomputer in the world is the Sunway TaihuLight, in mainland China.

IMAGE 23 - Sunway TaihuLight Supercomputer

4 - Windows, Mac and Linux

WINDOWS

Windows is a series of graphical interface operating systems developed, marketed, and sold by Microsoft.

- Microsoft introduced Windows on November 20, 1985 ands since then it has changed and constantly updated to perform with today's computers.
- Windows is an Operating System for IBM compatible type of computers.
- Windows has an operating system for personal computers, servers and mobile phones.

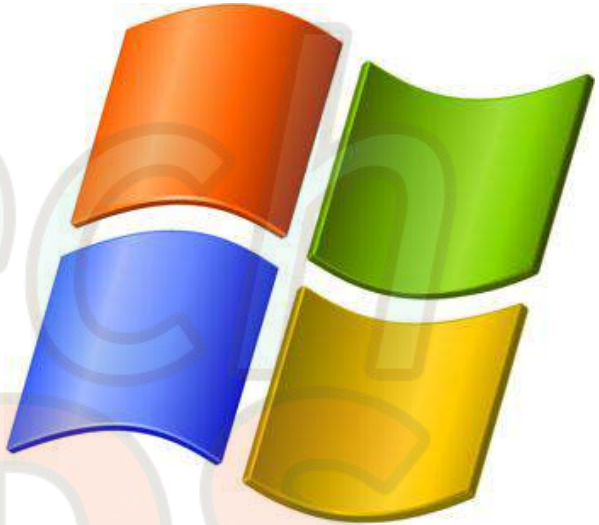

IMAGE 24 - Microsoft Windows Logo

4 - Windows, Mac and Linux

MAC

The Macintosh, (branded as Mac since 1998), is a series of personal computers (PCs) designed, developed, and marketed by Apple Inc.

- Apple Inc. is an American multinational technology company headquartered in Cupertino, California, that designs, develops, and sells consumer electronics, computer software, and online services.
- Its hardware products include the iPhone smartphone, the iPad tablet computer, the Mac personal computer, the iPod portable media player, the Apple Watch smartwatch, and the Apple TV digital media player.

IMAGE 25 - Apple Logo

4 - Windows, Mac and Linux

LINUX

Linux is a Unix-like computer operating system (OS) assembled under the model of free and open-source software development and distribution.

- Linux is an open source, free to use operating system widely used for computer hardware and software, game development, tablet PCS, mainframes etc.
- Unix is an enterprise operating system commonly used in internet servers, workstations and PCs by Solaris, Intel, HP etc.

IMAGE 26 - Linux Logo

Your notes:

Lesson 1

EXERCISES

1 - Visit our website and login to your account
2 - Select lesson 1 from the TK [level 1] course
3 - Take the Phase 1 Quiz
4 - Checkmark Completed