Master some English

Requirement

- ✓ Strong understanding of grammar's rules
- ✓ Review your vocabulary
- ✓ Read and understand any paper written in English
- ✓ Written about and present topic dealing with computer Science

Specific Objectives

By the end of the course, the student should:

Read fluently and understand any computer science article written in English

Be able to write or/and present small papers written in English dealing with computer science.

Specific Objectives of the course

The student should master:

The fundamentals of computer science

The computer nomenclature, the hardware, the software and the internet notion.

The student should be able to present an expose in English on theme dealing with computer science.

Presentation of the course : Inter actively and some exposes

Plan

I- Introduction

II-

Hardware and Software

Communication, Network, Internet and World Wide Web (WWW)

Security, Privacy, Ethic

III- EXPOSES

Exposes by groups (of students).

CHAPTER 1: OVERVIEW

Difference between Computer literacy and Information literacy

Define the term Computer, major components

Differents categories of computer

Differents system software and application software

Communications

Define information processing cycle - information system

INTRODUCTION

Computers play a key role in how we work and in our way of living. Computers help to operate more efficiently. They are used for different purposes such as educational entertainment and business. They also affect our life in many differents ways. The ability to use computers with other computers is changing the way we work and live.

We use them to communicate .Computers enabled us to access information and services around the world.

The computer systems help us to do the job faster more accurately and in some cases in way that previously not have been possible.

Computers are used in our days at house, at work and even in the fields.

I - COMPUTER AND INFORMATION LITERACY

Computer literacy, knowing how to use a computer, became a basic skill necessary to succeed in business or to function in our society.

The information literacy can be defined as knowing how to find, analyze and use information.

We believe that people should be computer literate as well as information literate in today society.

As we said, we know that on any topic, information is getting dense to dense and the source of those informations is spread around the world in diverse places. The source of those informations can be accessed by using computer.

With communication equipment's, computer can connect with online information service providers or directly to the internet. The computer because the two people use to access and manage. Many occupations now require the use of computers.

II - WHAT IS A COMPUTER

Definition

A computer is an electronic device operates under the control of instructions stored in memory unit. It can accept data, can process data arithmetically and logically, can produce results (output) and store the results for the future use.

Many of those computers have the capability to communicate with other computers by sending and receiving information and to connect to the internet.

Computer system

The term computer system is frequently used to describe the collections of devices that functions together to process data. The equipment of the system is computer hardware which is the input device, the output device, the storage device, the communication device and the central unit.

Describe each of the Unit.

Any device can work without the support of a set of instructions (software in general and driver in particular case).

As we should notice any computer performs generally the four operations (input, output, process and store). The (four) operations form what we call the *processing cycle*.

All computers general perform those four operations which are: input, process, output, storage.

The power of the computer

The computer power is derived from its capability of performing the information, processing cycle operation with speed, reliability, accuracy and capacity of storing large amount of information and data. We can also add its capacity to communicate with other computer.

The speed can be accomplished in billionth of a second.

The reliability is to produce accurate result on a consistent basic.

The accuracy is measured in the error that occurs during the numeric data manipulation.

The storage method should make very quickly available the data you retrieve and restore for the future use on the storage device. We may also need huge amount of storage capability.

Communication is related to the connectivity of the computer to another one. Which means also the speed in which the transferred of informations in the network.

The connectivity of the computer may be temporal or permanent.

According to their reliability , processing speed, storage capacity and their price, the computers are classified into five groups which are:

The micro-computer or personal computer (PC): it is used by one person (user) at the time

EX: notebook, laptop, desktop…

The server computers: may support computer network and this term is used to describe how the computer is used. It designed to be connected to one or more network. It may have a lot of CPU in order to shared processing ,large central memory capacity, and large disk storage capacity, high speed and external and internal

Big systems

- ✓ Mini computer
- ✓ Main frame
- ✓ Super computer

The mini-computers: is something used like a server but powerful than the server; it is more powerful than a PC, supports several users with different tasks performed; it used in university or town, the users are connected to the main system via terminal.

The mainframe computers: have the same operating way with the super minicomputer but more powerful. It can be used by users in a country, it support thousands of users at the time, storage amount of data and high, rate data transaction

The super computer: the most powerful and expensive category. it is used to connect users over the world.

NB: the server is a personal computer which is connected to one or more networks and the most powerful in network.

III – COMPUTER PROGRAM

A computer is directory by a series of instructions called computer program or software that tells computer what to do. Most of those programs are written by people called computer programmers.

The programmers followed a plan developed by system analyst who works with both the users and the programmers in order to determine and design the algorithm that will help to get the desire output of the program.

Algorithm: a set of step following and precise order that permit to solve a problem (a given). This will help to get the design output of the program.

We may classify the software into two categories:

We have three kind of system software:

- Operating system
- Utility
- Translator:

✓ Compiler

✓ Interpreter

General translator

<u>Application software</u>: the program that is used to process information (DATA)

Information cycle/process cycle

✓ Read the information

✓ Decode it

✓ Execute it

✓ storage

Information system

- Computer system | Hardware
  Software
- Correct data
- Users
- Experts
- Documentation

IV– COMMUNICATION

1- definition

It is refer to the transmission of data using communication channel. Technology is used in when there is change information from one computer to another one.

2- basic model

Is collection of terminal computer and order equipment used communication channel to share data information hardware and software

3- Applications of communication

- voicemail
- cell phone
- e-mail
- video conference
- telnet
- voice mail

4- NETWORK (topology, protocol)

Network can be classified in two groups

a- Local Area Network(LAN)

b- Wide Area Network(WAN)

We have too Metropolitan Area Network (MAN)

CHAPITER 2 : Hardware

Objective:

-**Input unit**

-Output unit

-Storage unit

-Communication unit

-System unit

Hardware: all equipments that we have in the system. We can classify them into 5 units which are: input, output, storage, communication and central units.

The equipments of input, output, storage and communication units form the peripheral elements of the computer.

I- INPUT UNIT

*All devices use to send information into the system.

A- Input information

*As input information, we can have:

-Instructions (programs) or command (from the keyboard) that directs the computer.

-Data refers to any fact like numbers, word, sound, video... that can be processed by computer into information.

-User Answers (from questions)

B- Different components of input unit:

The mostly used elements are keyboard, mouse and scanner.

1- Keyboard

- Numeric keypad

-cursor control keys

-function keys

-optional keys or toggle Keys

*num lock

*cap lock

*Insert lock

*scroll lock

-modifying keys (ctrl, alt, shift, alt gr)

B°) Mouse

A mouse is a pointing device; is very small like a palm size.

The top contains one or more buttons and on the bottom there is a ball.

To action the mouse we can :

-click “right”

-double click

-“Drive” or “Drag”

Others pointing devices

-Joystick

-Trackball

-Pointing stick

-Touch screen

-Touchpad

-pen input

2°) Source data automation

All those previous devices are used to send information up to the system.

Source data automation, or source data collection refers to procedures and equipment designed to make the input process more efficient by eliminating the manual entry of data.

This system eliminates the manual entering of data, captures data from its original form called source document.

A- Scanner (image scanner)

A scanner sometimes called page scanner is input devices that can electronically capture an entire page of text or image and converts the document into digital data that can be processed by a computer.

B- Optical recognition

The optical recognition device used a light source to read codes, marks and characters they converted them into digital data that can be processed by a computers.

Optical code's a pattern of symbols to represents data. The most common optical code used is the bar code.

-Optical code

-Optical Mark Recognition (OMR)

-Optical characters Recognition

Those types of devices are scanners the type writer, the computer printy.

Those types of devices as scanner that can scan the type writer, the computer print

C°) Some others input devices

-Sound input devices

-Voice input devices

Sound input devices converted sound into device data.

Voices input devices converted speech into digital data.

-Digital camera captured digital image of subject or object.

-Video input device converted digital videos into digital data.

II-Output unit

The output devices contest the result of processing data into a form that can be used.

Different types of output

In general, we have two types of output devices:

-the printer (hard copy)

-the screen (soft copy)

The output can be a report or a graphic, we have also:

Audio output and video output.

In generally, a report presents information in an organized form.

While the graphic is an output with mostly long text and some pictures.

Elements of output unit

a-) Display devices (soft copy)

They are the visual output device. We have two types of display devices:

-Monitor (Cathode Ray Tube)

-Flat panel display (Liquid Crystal Display or gas plasma)

b-) Printer (Hard copy)

A printer is used to have the hard copy of the output. Some printers can print 1000 pages by mn. They can be colour or monochrome printer. They also depend on the capacity of the memory (speed, page par minutes, characters par second

The printer can also classified into two big categories according to the printing. Method. We have

-the impact printer where information are transferred mechanically by shrinking the paper, the ribbon and characters together.

-the non impact printer which uses no mechanic. It's generally by jet, by laser bean or thermal transfer that information is printed.

C- Others output device

We have:

-Data projector

-Computers microfilm

Data projector is used to project and displays screen image to the group. The data projector use in general LCD technology computer out put technology. The microfilm, (COM) is an output equipment that stores and reduces the size of the image on cheat or road films.

(Fax) Facsimile which is a device

Multifunction Device

Dumb, intelligent or special purpose Terminal.

III- Storage unit

The storage unit is also called secondary or auxiliary memory. They are used to store data and program when that will be used in the future. The process of storing data is called written or recording data. When data are retrieved, the process is called reading data.

Storage device are used both as input device and output device. We have several types of storage equipment.

Some characteristics of the storage equipment are:

Its capacity which is measured in byte, kilobyte, megabyte, gigabyte and terabyte.

Its access time: the time that required locating the data and transferring it to the memory (central)

A- Magnetic disks storage

Magnetic disks storage is made of a round piece of plastic or metal covered by the magnetic material. We have different types of magnetic disks included floppy disks, hard disks and removable disks cartridge.

B- Compact Disk (CD)

The compact disks are optical; its uses the laser technology to large quantities of information. The original form was the CD-ROM with access time around 150 KB per second and capacity of about 4 MB.

Later on we have the CD-R which is a recordable compact disk. Today we have on the market the CD-RW on which we can make as many written and reading we want. In our days the CD known a lot development; the last form of CD is the DVD (digital video disk).

C- Magnetic Bands or Magnetic Tapes

Its consists of a thin ribbon of plastic, one side coasted with magnetic material is used to record data. The tapes are sequential storage media. They used often for the back up with the big system. We have two types of tape: cartridge tape and reel to reel tape.

D) Other Types of Storage Devices

We have:

USB key

Memory card

Special purpose cards like SIM card for mobile phone, Credit Card....

IV- System unit

The term system unit for some is used to describe the computer, because this is where the computing actually happens. It is in the system unit that the computer program instructions are executed and data is manipulated. The system unit contains the central processing unit, or CPU, memory and other electronics. To better understand how the system unit processes data, we will present first how data is represented in a computer.

A- HOW DATA IS REPRESENTED IN COMPUTER

Most computers are digital computers, the data they process whether it is text, sound, graphic or video, is first converted into digital value. The digital values used by the computer are 0 and 1. Each digital value is called a bit; It is the smallest unit of data that computer can manipulate. Using combination of eight bits called byte the unique code (ASCII or EBCDIC) can be assigned to 256 different possibilities of symbols. Because with Asian language we need more symbols, the coding used to catch all the symbols is called Unicode and uses 16 bit.

B- THE COMPONENTS OF THE SYSTEM UNIT

Components of the system unit are mother Board , microprocessor, memory, coprocessor, buses, expansion slots, ports and connector, power supply and sound components .....

The mother Board is a circuit board that most of the electronic components of the system unit.

The Microprocessor and CPU

The microprocessor is a chip that holds the CPU. The CPU contains the control unit and the arithmetic/logic unit.

The Memory

The Coprocessor

The Bus

Chapter 3: **Communication and Network.**

When the computers were first developed they were designed as stand-alone system. Today, even the smallest hand-held computers can communicate with other computers. This change has taken place for several reasons. The reasons are that communication equipments and software, once expensive option, now are standard components in most computer system and communications technology to access the information has increased.

I- COMMUNICATION

It refers to the transmission of data and information between two or more computers using a communication channel.

The communication technology is used for the following applications: electronic mail (e-mail), voice mail, fax, telecommunication, video conference, groupware, global positioning system (GPS), bulletin board system (BBS), on line services, the Internet and the World Wide Web.

A- Communication system model

A basic model for a communication system consists in of the following equipment:

A computer or a terminal

Communications equipment that sends (and usually can receive) data

Communications channel over which data is sent

Communications equipment that receives (and usually can send) data

Another computer or terminal

This basic model should also include communication software.

A communication channel is also called a communication link or data link or communication line. It is made up of one or more transmission media.

1- Transmission media

There are physical materials or other means used to establish a communication channel. We have two types:

Wireless media

Physical cabling media

a- Physical cabling media

We have three types:

- **Twisted pair cable**

It consists of pairs of plastic-coated copper wires that are twisted together. We have two types of twisted pair cable: shielded twisted pair (STP) cable and unshielded twisted pair (UTP) cable also called 10Base T cable.

- **Coaxial cable**

It is a hard quality communication line that consists of a copper wire conductor surrounded by three layers: a non-conducting insulator surrounded by outer wire conductor which is surrounded by a plastic outer coating. We have different grades and sizes of coaxial cables: one for the television cabling and the thin net or 10Base for computer network.

- **Fibber optic cable**

The fibber optic cable use smooth hair-thin strands of glass or plastic to transmit data as pulses of light. It has a lot of advantages as the increased speed of transmission, the number voice communications carried simultaneously but it difficult to install and modify.

2- Wireless media

We have the microwaves which are radio wave that can be used to provide high speed transmission of voice communication and digital signals.

Earth-based microwave transmission is called terrestrial microwave. Microwaves are limited to line of sight transmission; this means that no obstruction can exist between microwave stations.

Communications satellites receive microwave signals from earth-based communications facilities, amplify the signals, and retransmit the signals back to the communications facilities called earth stations. We notice the uplink and the down link.

The wireless communication uses carrier-connect radio, infrared light beam, or radio waves to transmit data.

2- CHARACTERISTIC OF COMMUNICATION CHANNEL

We have:

- **Type of signal**

The computer equipments are designed to process data that is as digital signal. In the telephone system the voice are transmitted as a continuous wave called analogue signal.

- **The transmission mode**

It can be asynchronous or synchronous which mean respectively that data is sent in individual bytes or by blocks at a regular interval.

- **The transmission direction**

In simplex transmission data flows in one direction only.

With half duplex data can flow either directions, but only one at a time

In full duplex data can flow either directions simultaneously.

The transmission bandwidth is the range of frequencies that a communication channel can carry.

The speed of transmission is expressed as bits per second.

B- COMMUNICATION SOFT WARE AND HARDWARE

1- The communication software is separated programs that manage the transmission of data between the computers.

2- The communications equipments have:

Modem can be internal or external. It converts the digital sign into analogy and analogy to digital. It is used if the transmission will occur along the telephone line.

Multiplexers combine two or more input signals from different devices into a single stream of data and transmit over a communication channel.

Front end Processor is in general a computer dedicated to handling the communications requirements of a larger computer case of polling, error checking and correction, and access security.

Network interface card (NIC) is a circuit card that fits in an expansion slot of computer, or other material, so that the device can be connected to the network.

Wiring Hubs called also a concentrator or multistation access unit (MAU) several devices to be connected. It usually contains connectors called port. A hub can be connected to another hub (stackable hub)

The below list is network connecting equipments:

- Bridge for similar networks
- Gateways for different types of networks

- Router intelligent network connecting; in case of a partial network failure, the routers smart enough to determine alternate routes.

II- NETWORK

A communication network is a collection of terminals, computer and other equipments that used communication channel to share data, information, hardware and software. Networks can be classified in two groups.

A- DIFERENT TYPES OF NETWORK

a- Local Area Network (LAN)

It is a network that covers a limited geographic area such as office, school, computer laboratory building, group of buildings and so on.

A LAN consists of a communication channel that connects a series of computer terminals to a central computer (server), or a group of computers connected to one another.

It is used to share hard ware resource soft ware resource and information resource. When the resources are store in central computer, computer is the server of the net work. We have to types of net works server:

-file server

-client server

When the LAN that no has a single server, we say that in peer to peer net work. Any computer can shear information the soft ware and the hard

ware located one any other computer in the net work. This type is peer to peer net work.

B-Wide Area Network (WAN)

It covers a large geographic region and use telephone cable, terrestrial microwave, satellite or other.

C- METROPOLITICAL AREA NET WORK

If the LAN is reducing to a city we say the MAN.

We have public area net work company refer to as career, we also talk abut added career company; there are common career with same additional such as faster data communication in communication service.

2. THE NET WORK CONFIGURATION

The way the equipment is linked. A topology is determined by a logical connect of device that is the path the data flow .The commends topology are:

-Star topology

-Bus topology

-Ring topology

A star topology net work as a central computer with one or more small connects to it.

In a bust topology of net work, all the devices the net work are connected to and shear a single data path.

In a ring topology, the device of net work is connected in continuous loop.

3. <u>THE COMMUNICATION PROTOCOL</u>

A protocol is a set of roods and procedure for exchanged information between in computer. The protocol defence how a communication link is established, how the information transmitted, how the error are detected and corrected. By using the same protocol different type and mark of computer can communicate to use other there are a numerous protocol same or can be used together.

Ethernet computer

Toking ring

<u>Chapter 4</u>: Software

Introduction

Referred to the end of Overview

System Software

To run an application in a computer, we need software that served as an interface between users of the application.

This software is referred to as operating software (OS).

The OS is just one a type of software called system software which controls the operation of the computer hardware. The system software consists of all programs that are related to control operations of computer and hardware. It performs also the system of computers, the loading, the executing and the storing of applications programs and storing of applications files.

The operating system

The operating system is a program that managed the operations of computer and functions as interface between the users's the application and computer software. The computer can't function without operating system. The canal also called supervisor or monitor is the set of essentials instructions that resided in memory while the operating commands. The commands contains in a resident portion

The mains functions of the operating system are: process management, memory management, input and output management and system administration.

The user interface

The user interface is a feature of operating system that determines how to interact with the computer. The user interface controls how you enter commands and data, how information is presenting on a screen. We have three types of user interface:

Command line

With the command line user interface, you enter command or data using your keyboard (in general). You press the enter key when you finish (to enter the information)

Menu driven

With the menu driven, we have a list of commands that is presented and from which you can select an option, using the keyboard or pointing device.

Graphical User Interface (GUI)

A graphical user interface use visual clues such as icons to help from tasks.

Functions of the OS

The process is a program or part of program that can be executed; it is also called task. We have different methods of process management:

Single tasking: it is a single program that can run at a time.

Multi tasking: it is a multiple programs that can run at a time. It is subdivided into three parts:

Context switching: user switches back and forth between programming only one processes is active.

Cooperative multiple: the switching back and forth is done automatically when the process logical bring print such as

Preemptive: the OS switches programs based on allocated among of a time in priority.

They can list symmetric and asymmetric multiprocessing.

Symmetric multiprocessing: tasks are shared to two CPU and all CPU have one memory.

Asymmetric multiprocessing: tasks are shared to a specific CPU and each CPU has his one memory.

Memory management

The OS has science the kernel, the application program, the data and the terminal result to area of memory. Data that have past been read into memory or his memory is stored in the memory area called the buffer. The virtual memory management increase the among of memory by using the set among of the space to store the information doing processing in addition existing memory.

Input and output management

The OS managed the input and output differently depending out the device. It used program called device driver to communicate the input or output device. The spooling increased both CPU and printer efficiently.

Plug-and-play technology permits to the OS to recognize a new device and assist in its installation. The system performance is measured in times of response time which is a time from the data is entered until the system response to answer the system security the OS alone and a password. Alone code is most program of the time optional. All OS

contains programs that perform functions related to disk and file management. Those functions are: remove, delete…

The popular OS

The first OS were developed by manufacturers for the computer in the product line. These OS called proprietary OS were limited to a specific bender or computer model. Today, the trend is toward the portable OS that we run in many computers. We can change computers models and retain software and data file. News versions of an OS usually called software contains data files this old OS versions. There are some OS:

DOS (Disk Operating System)

It was developed in the earliest of 1980 for IBM compatible personal computer. The improved versions of DOS included capability of running with a command line user interface, graphical and menu because it doesn't a full graphical interface that we called user interface and it can't take a full advantage of turning of bits microprocessors. DOS is no longer a widely use OS.

Windows

The first versions of Windows are Windows 3.x (1990) which are Windows 3.0, Windows 3.1, and Windows 3.11. Windows 3.x are in reality OS environment. An OS environment is a graphical user interface that work in combination with an OS in order to simplify its use.

Windows 95

Windows 95 was the first true OS with GUI used with IBM compatible PC with GUI. After Windows 95, we have Windows 98, Windows 2000, and Windows NT… with GUI used in IBM compatible PC.

Windows CE

Windows CE is designed for use on wireless combination device

Windows NT (New Technology)

Windows NT is a more sophisticate GUI with a client-server network. We have two versions of Windows NT: the server version and the workstation version.

Like all versions of Windows, the Windows NT is a complete OS but it also included the feature like preemptive multitasking, the capacity of working with multiprocessor using symmetric micro processing support of most medium networking communication protocol user and account user security. We also have to develop internet workspace and operating a web page server because they are more complete than the others of Windows NT. They required more memory disk space and more processors.

Macintosh

The Apple Macintosh is a multitasking OS. It was released in 1984. It was the first commercial OS with successful GUI. It has been the model form for most of new GUI developed for no Macintosh system. The latest version of Macintosh OS is called MAC-OS included built in network, electronical mail (E-mail) and on extensive step by step system called Apple.

OS_2

The OS_2 is the IBM's graphical user interface operating system designed to work with 22 bits microprocessors. It can run program written from DOS and most Windows 3.x program. The latest versions of OS_2 is called OS/2 included feature like GUI that display 3D sharedows icons. The capability of running with Java program, the capability of working with using multiprocessors preemptive with multitasking, speaker in depended voice recognition, desk object that you can use to input data. OS_2 has a strong networking support and has been most widely used with business like Windows NT; the second version exists for use on server.

UNIX

It is a multiuser, multitasking OS developed in the earliest of 1970 by scientists at Bell Laboratories. At beginning, UNIX was developed for big computers. And today, the versions of UNIX are available for most computers and others. UNIX has the capability of running a large volume of transaction in multiuser environment. It's used for network server specially server that used multiprocessors. UNIX witness are a command line OS. To move application software from one version to another, you may have to convert the program. Some version of UNIX do offered GUI environment.

Netware

It was developed by Novell widely used for client server network. It has two parts:

The server portion

The server portion allows sharing hardware devices attached to the server as well as any files or application software store on the server.

The client portion

The main jobs of the client portion are to communicate with server. The client computers also have a local OS.

Utilities

Utilities programs performs specific task related to managing computer resources or files.

Example antivirus program, uninstaller's screen server, diagnostic program or software, backup software, files operators software…

Translator

Those are programs that converted the programs in instructions written by programmers into binary code.

Example Compiler, Interpreter.

Application software

How to buy PC?

The first thing is to determine the application that we will use on the computer. This decision will help us on the type and size of your computers.

The second is to choose your software, some package run only under the operating system.

From the software, we may get the requirement on the memory, the disk space because there is some software that can't run under windows. Third, we should avoid the high cost which means some addition costs that associate with buying a computer, such as telephone line, and others things to use a modem, usb key, computers furniture.

Information privacy: refers to the right of a person or an organization to deny or to restrict the collection and the use information about it.

We have two issues related to information privacy:

- Authorized collection and use its information
- Employing monotony

The ethics and information age

Computer ethics are moral guideline that go the use of the computers and information system.

One area of computer ethic is the information accuracy.