# ICT for Library and Information professionals:
## A Training Package for Developing Countries

Editor: Professor John Andrew Large
McGill University, Canada

# Module 1

# Introduction to Information and Communication Technologies

Lourdes T. David

Information and Informatics Unit
UNESCO Bangkok
Thailand 2001

**David, Lourdes T.**
**Introduction to Information and Communication Technologies. Module 1. Bangkok, UNESCO Information and Informatics Unit, 2001.**

**1. Computers 2.Information technology 3. Telecommunication Systems 1. Title.**

**The materials presented do not imply the expression of any opinion whatsoever on the part of UNESCO.**

# Teacher's Guide

## Module 1. Introduction to Information and Communication Technologies

## Introductory note

This is Module 1 of the *ICT for Library and Information Professionals (ICTLIP) Training Package for Developing Countries*. This Package is intended to provide the knowledge and skills required to deal with the application of ICT to library and information services. It is meant for library and information personnel who may become trainers in the area. The Package has been developed by the UNESCO Asia & Pacific Regional Office with funding from the Japanese Fund in Trust for Communication and Information. It contains six modules:

Module 1 - Introduction to Information and Communication Technologies
Module 2 - Introduction to Integrated Library Systems
Module 3 - Information Seeking in an Electronic Environment
Module 4 - Database Design, and Information Storage and Retrieval
Module 5 - The Internet as an Information Resource
Module 6 - Web Page Concept and Design: Getting a Web Page Up and Running

All the modules have a Teacher's Guide and a Student's Guide. The Student's Guide maybe copied by the students in electronic format. The Teacher's Guide should not be distributed to the students.

The Teacher's Guide includes the following:

- Module Introduction
  - Introductory note
  - Learning outcomes
  - General guidelines for the teachers
  - Course outline
  - Learning environment
  - Duration
  - Course content and schedule
  - Course evaluation
  - Selection criteria for participants
  - Typographical conventions
- Lessons
  - PowerPoint slides
  - Teaching tips
  - Activities
  - References and recommended further reading
- Glossary
- Evaluation forms

The Student's Guide contains the following:

- Module Introduction
  - Introductory note
  - Learning outcomes
  - Course outline
  - Learning environment
  - Duration
  - Course content and schedule
  - Typographical conventions
- Handouts: Lessons 1-7
- Glossary
- Activities
- List of references

**Learning outcomes**

Module 1 covers the basic concepts of information and communication technologies, the impact of ICT on society and the reasons why librarians need to acquire ICT knowledge and skills.

By the end of the course, students should be able to:

1. Describe how computers process information
2. Use a personal computer system for various tasks in libraries
3. Define how networks (LAN, WAN, intranet, Internet) operate
4. Recognize the significance of computers and networks in the creation, collection, consolidation and communication of information
5. Be aware of trends and ethical, legal and technological issues concerning the use of ICT in libraries and information centers

**Note:** The content of Module 1 must be understood by all students (either by students first completing Module 1, or as a result of prior knowledge of ICT) before they proceed with the remaining five modules in the *ICTLIP Training Package*.

**General guidelines**

1. Speak slowly and clearly to ensure that students can follow you – this is especially important if some or all the students do not have as their first language the language in which you are instructing.
2. Do not read your lecture noted verbatim – this is a sure way of losing your students' attention.
3. Always show an interest in what you are teaching – if you do not seem interested in the content, why should the students be interested.
4. The Modules have been carefully planned, with exercises and discussions as well as lectures. Try to follow the schedule as set out in the Module.
5. Try to use examples as often as possible to explain concepts. If the examples are taken from the students' own countries or regions, so much the better.

6. Try to keep within the daily timetable recommended for the Module – if you get behind in one lesson it may be difficult to make up time in a later lesson. Avoid extending the class beyond the time period allotted.
7. Be prepared to use back-up materials if for any reason the computer will not function during a lesson.
8. Try to answer all questions from students positively – never make students feel stupid for having asked a question, or they may never ask another question again. But if you do not know the answer to a question, it is better to admit it than to try and bluff.
9. Make sure that all equipment needed for a lesson is working properly before the lesson begins – things can often go wrong!
10. Be ready to stay behind for a few minutes after each lesson to answer questions that students may have but that they did not wish to ask in class.
11. The evaluation of the Module by the students is meant to help you improve your teaching and should be seen in this light rather than as a criticism of yourself. Make use of it to do an even better job next time.

**Course Outline**

***Lesson 1. Why do librarians need to know about ICT and acquire skill in its use?***

*Scope*

- What are ICT?
- What is the impact of ICT on Society?
- What is the impact of ICT on the library and other information centers?
- What is the impact of ICT on the librarian and on library education?
- What are the major trends and issues in libraries that resulted from ICT?

*Objectives*

At the end of this lesson, students should be able to:

- Identify the impact of ICT on the work environment in libraries
- Realize the impact of ICT on information formats, access and delivery
- Recognize ICT as tools that librarians can and must use to meet the information requirements of users

***Lesson 2. How do computers work?***

*Scope*

- What is a computer?
- What are the elements of a computer system?
- What are the different types of computer systems?
- What are the components of a data processing cycle?
- What is the role of a computer in the data processing cycle?
- What are some trends in the development of computers?

*Objectives*

At the end of the lesson, students should be able to:

- Describe how computers process information
- List the elements of a computer system
- Identify the different types of computer systems and their uses
- Explain the data processing cycle
- Define the role of computers in the data processing cycle
- Be aware of development trends in ICT

***Lesson 3. What are the hardware components of a computer?***

*Scope*

- What is hardware?
- What is an input device?
- What is a processor?
- What is an output device?
- What is a storage device?
- What other hardware are found in a computer?
- What are some general trends in the development of computers?

*Objectives*

At the end of this lesson, students should be able to:

- Identify the hardware components of a personal computer system
- List major input and output devices
- Explain the functions of processing, memory, storage and communication devices
- Realize the significance of each hardware component in processing information
- Be familiar with general trends in the development of the different hardware components of a computer

***Lesson 4. What are the software components of a computer?***

*Scope*

- What is software?
- What are the two kinds of software?
- What is programming?
- What are viruses and how do you deal with them?
- How do computers respond to different character sets?
- What are some general trends in software development?

*Objectives*

At the end of this lesson, students should be able to:

- Define the function of software in a computer system
- Distinguish between an operating system and an application system
- List different types of operating systems and application software
- Define what are programming languages
- Identify and avoid computer viruses
- Compare different character sets
- Be aware of general trends in software development

***Lesson 5. What are the components of a network?***

*Scope*

- What is a network?
- What are the components of a network?
- What are the different types of networks?
- What are the different LAN topologies?
- What is intranet? Internet?
- What are the trends and issues in the development of networks?

*Objectives*

At the end of this lesson, students should be able to:

- Define what is a network
- Identify the components of a network and their role in the network
- Describe the different types of networks
- Discuss the different LAN topologies
- Differentiate between WAN and LAN / intranet and Internet
- Enumerate trends and issues in the development of networks

***Lesson 6. What is the Internet?***

*Scope*

- What is the Internet?
- What Internet tools are available?
- What is the World Wide Web?
- What is e-mail? FTP? Chat?
- What are online information resources?
- Why is the Internet important to libraries?
- What are some issues and concerns in using the Internet?

*Objectives*

At the end of this lesson, students should be able to:

- Define what is the Internet and other Internet concepts and terms
- Describe Internet tools and services
- Identify information resources for libraries on the Internet
- Use online information resources on the Internet
- Realize the importance of Internet to libraries
- Discuss some issues and concerns regarding the use of Internet in libraries

***Lesson 7. What are some trends and issues that you need to know about ICT?***

*Scope*

- What are the legal and regulatory issues that affect ICT applications?
- What are the ethical and moral concerns in using ICT?
- What political, social, and economic factors should be considered in using ICT?
- What are the main security issues concerning computer use/Internet access?
- What technological concerns that must be addressed in using ICT in libraries?
- What are the main policy issues relating to ICT and which developments in ICT might affect library service?

*Objectives*

At the end of this lesson, students should be able to:

- Identify the trends and issues in ICT developments and applications.
- Be aware of the legal, ethical, moral, social, economic, and technological concerns relating to computer use/Internet access.
- Define various policy issues related to ICT in libraries
- Recognize developments in ICT that will affect library service

**Learning Environment**

The training room must have the facilities and technical support required to carry out the course. It should have computers with CD-ROM drives and online access to the Internet and other resources such as OPACs and CD-ROM databases. The Module should be conducted by a teacher who is knowledgeable and skilled in using computers, the Internet, CD-ROMs and a variety of electronic resources, and who is skilled in teaching courses of this nature.

**Duration**

The Module is designed for a one-week course of 40 hours: eight hours per day for five days.

**Course content and schedule**.

| Day | Lessons |
|---|---|
| Day 1 | Lesson 1. Why do librarians need to know about ICT and acquire skill in its use?<br>Lesson 2. How do computers work? |
| Day 2 | Lesson 3. What are the hardware components of a computer? |
| Day 3 | Lesson 4. What are the software components of a computer? |
| Day 4 | Lesson 5. What are the components of a network?<br>Lesson 6. What are the components of the Internet? |
| Day 5 | Lesson 7. What are some trends and issues that you need to know about ICT? |

**Selection criteria for participants (participants profile)**

Participants should be working in a library or information center, or in a school of library and information science. Participants with a degree in library and information science are preferred. Participants should normally have:

- A degree in library and information science or at least two years' experience working in a library
- A working knowledge of English
- A working knowledge of using computers in a Windows environment

**Course evaluation**

At the end of the course, ask your students to evaluate the course. The evaluation forms are included in this guide.

**Typographical conventions**

**Note**

**General note to the teacher and additional information**

**Tip**

**Teaching tips and supplemental materials**

**Activity**

**Activity for the students**

## Reference

**Reference and further reading materials**

## Glossary

**Glossary of terms used in the module**

# Lesson 1

## *Why do librarians need to know about ICT and acquire skill in its use?*

# Teacher's Guide

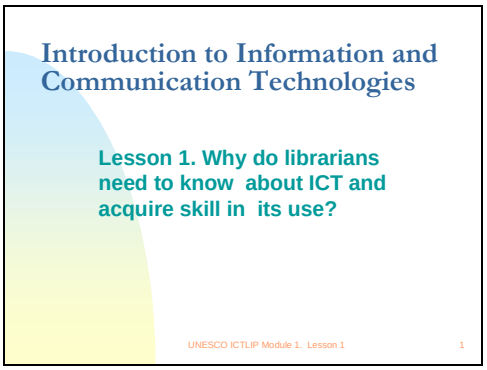
## Module 1. Introduction to Information and Communication Technologies

### Lesson 1. Why do librarians need to know about ICT and acquire skill in its use?

**Note**

The Teacher's Guide provides notes and tips for the PowerPoint presentation that you will use in conducting the course.

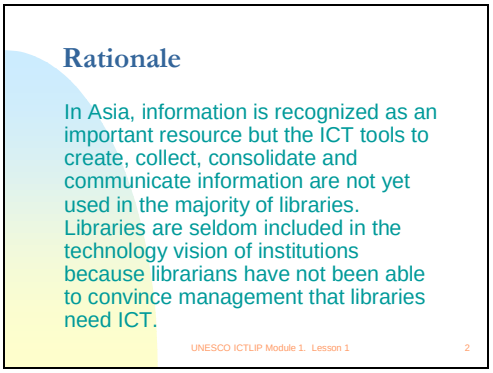
***Slide 1***



**Tip**

Establish rapport with the students by asking them to answer the question on the title slide. This will serve as a motivation activity by letting them know that you are interested in what they know and that you give importance to what they have to say. This will also encourage them to actively participate in the lecture / discussion. Their answers in turn, no matter how brief they are, will help you gauge their understanding of the subject matter. There is no need to discuss their answers at this point.

***Slide 2***



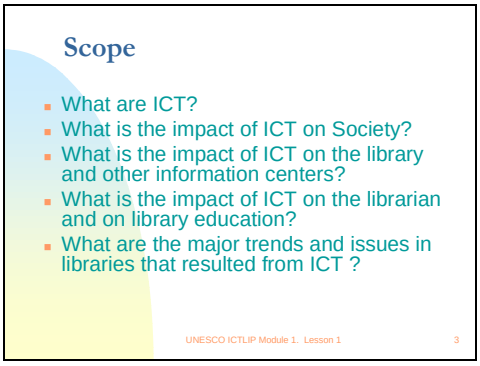
## Rationale

In Asia, many librarians have not obtained adequate training in ICT due to a lack of expertise among their ranks and in most library schools in the region. This module will attempt to provide adequate ICT knowledge and skill to the trainees to help them cope with the challenges and take advantage of the changes brought about by ICT in their work. It is also hoped that the students will gain enough knowledge so that they in turn will be able to train other library and information personnel in their workplace or even throughout the region.

**Note**

This slide will provide justification for the Lesson. You can also use it to learn about their own training and experiences with regards to the application of ICT to libraries.

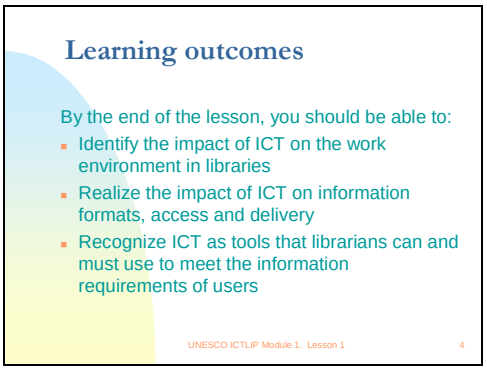
***Slide 3***




**Scope**

1. What are ICT?
2. What is the impact of ICT on society?
3. What is the impact of ICT on the library and other information centers?
4. What is the impact of ICT on the librarian and on library education?
5. What are the major trends and issues in libraries that resulted from ICT?

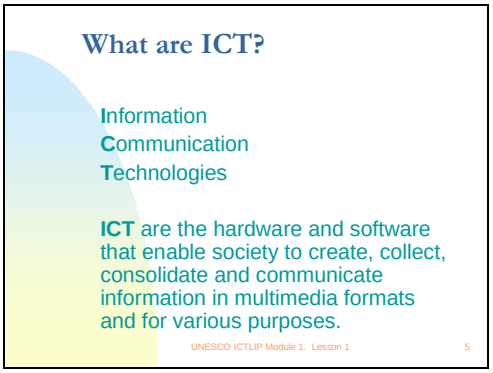
***Slide 4***



**Learning outcomes**

By the end of this lesson, students should be able to:
1. Identify the impact of ICT on the work environment in libraries.
2. Realize the impact of ICT on information formats, access and delivery.
3. Recognize ICT as tools that librarians can and must use to meet the information requirements of users.

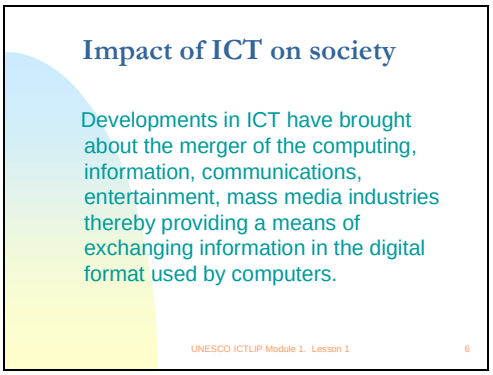
***Slide 5***




**What are ICT?**

Information Communications Technologies (ICT) - technologies that enable society to create, collect, consolidate, communicate, manage and process information in multimedia and various digital formats for different purposes i.e. computing and telecommunications technologies like the personal computer, CD-ROM, cable TV, cellular phones and the Internet.

***Slide 6***

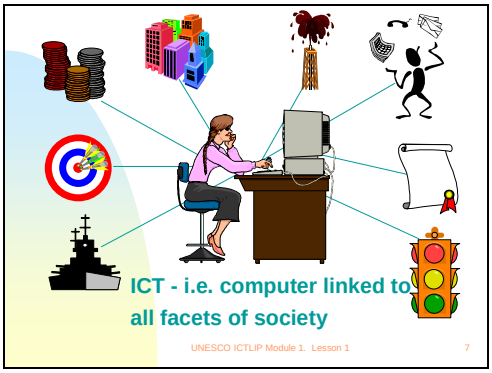



**Impact of ICT on society**

Developments in ICT have brought about the merger of the computing, information, communications, entertainment, and mass media industries thereby providing a means of exchanging information anytime, anywhere in the digital format used by computers.

This technological convergence has brought about an enormous impact on the way we live, work, think and play. These changes are quite prevalent in our everyday lives such as the use of e-mail and cellular phones at home and in the workplace and also linked to all facets of society: business, education, military, recreation, transportation, communication, scientific exploration, knowledge management, etc… as shown in slide 7.

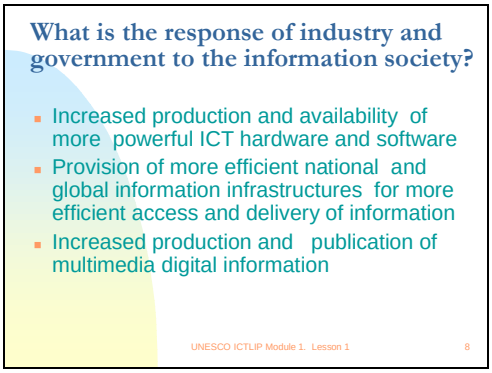
***Slide 7***



**Activity 1-1**

Ask the students to discuss the effects of ICT in their life. Cite two concrete examples and elaborate.

***Slide 8***



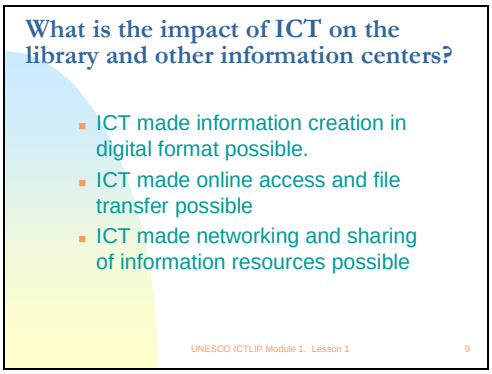

**Industry and government response to the information society**

- Increased production and availability of more powerful ICT hardware and software
- Provision of more efficient national and global information infrastructures for more efficient access and delivery of information
- Increased production and publication of multimedia digital information

Computing and telecommunications industries have (of course) responded enthusiastically to these changes and have been continuously working and introducing products into the market that are more powerful than the previous one. More innovative and useful applications of technology have found their way both into the corporate world and as consumer products.

Realizing the importance and the role that ICT play in society, each country has developed or is in the process of creating a policy, or is already implementing its own national information infrastructure initiatives that aim to use ICT as a vehicle for economic growth and stability. For example, to name just a few in Asia, Singapore's IT2000 - A Vision of an Intelligent Island, Malaysia's Multimedia Super Corridor, and the Philippines' Information Infrastructure Policy Study (PIIPS).

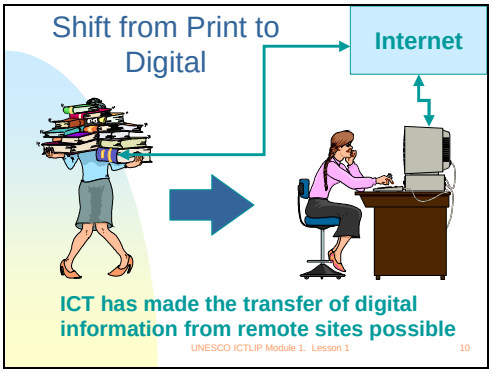
***Slide 9***




**Impact of ICT on the library and other information centers**

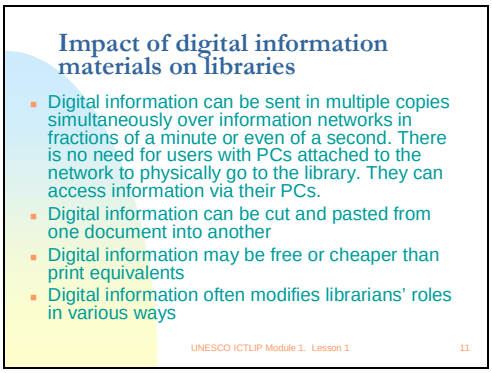
- ICT made information creation in digital format possible.
- ICT made online access and file transfer possible
- ICT made networking and sharing of information resources possible

***Slide 10***




The shift from print to digital information has a high impact on libraries, information centers and other institutions directly involved in processing information. This shift is generally attributed to the merging of computing, telecommunications technologies and other industries. Computers have permeated society because of their ability to perform high volume error-free repetitive tasks at speeds much faster than human beings, while recent and emerging developments in the area of computing; telecommunications, networking and resource sharing made access to information anytime, anywhere possible.

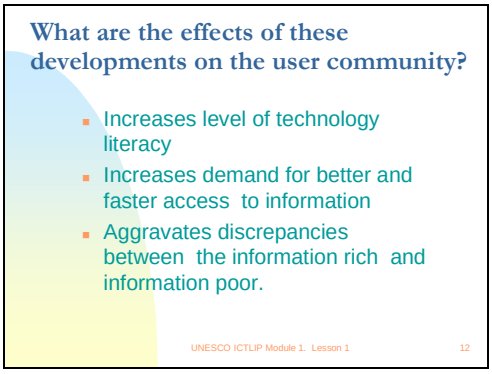
***Slide 11***




**Impact of digital information materials on libraries**

- Digital information can be sent in multiple copies simultaneously over information networks in fractions of a minute or even of a second. There is no need for users with PCs attached to the network to physically go to the library. They can access information via their PCs.
- Digital information can be cut/copied and pasted from one document into another
- Digital information may be free or cheaper than print equivalents
- Digital information often modifies librarians' roles in various ways

***Slide 12***

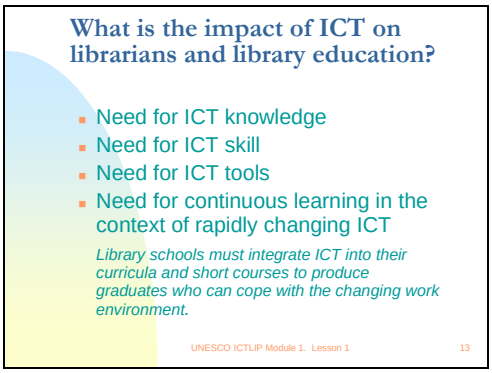



**Effects of these developments on the user community**

- Increases the level of technology literacy
- Increases demand for better and faster access to information
- Aggravates discrepancies between the information rich and information poor.

Exposed to different applications of technology in their life, users nowadays are more adept at its use and are expecting to have access to it in their times of need. In libraries, users that are knowledgeable in using computers and the Internet for their research demand nothing less than a computer with Internet access. However, this may not be true and not applicable to those who have no access to such technologies due to financial difficulties. Thus, two different kinds of users have emerged that libraries must cater for: the "haves" and "have-nots". Ideally a balance must be maintained in providing services for both groups so that all users will have equal access to information. This can be effectively done through the use of powerful and appropriate technologies.

***Slide 13***



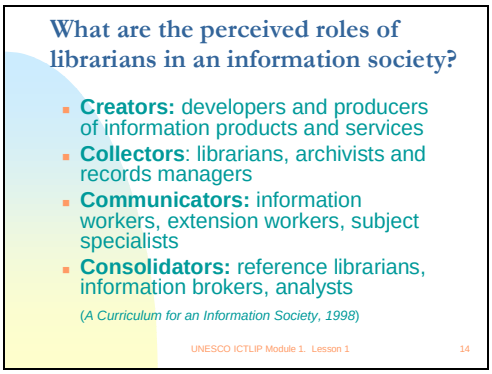

**Impact of ICT on librarians and library education**

- Need for ICT knowledge
- Need for ICT skill
- Need for ICT tools
- Need for continuous learning in the context of rapidly changing ICT

*Library schools must integrate ICT into their curricula and short courses to produce graduates who can cope with the changing work environment.*

The emergence of powerful technologies, vast amounts of information in multimedia and other digital formats, more technologically proficient users, and the widening "digital gap" means that libraries and librarians in particular are faced with the great challenge of dealing with this information revolution. Furthermore, the recent developments in the capability of computers to store, locate, retrieve and transfer huge amounts of digital data at high speed have contributed to the evolution of an information-based society. Libraries must respond to this development in order to remain relevant and important to the society they aim to serve. However, libraries and librarians must first educate and equip themselves with the necessary knowledge and skills before they can deal with this enormous challenge.

***Slide 14***




**Roles of librarians in an information society ***

- Creators: developers and producers of information products and services
- Collectors: librarians, archivists and records managers

- Communicators: information workers, extension workers, subject specialists
- Consolidators: reference librarians, information brokers, analysts

  * *A Curriculum for an Information Society / Nick Moore, Maureen Henninger, Edward Huck Tee Lim, Robert D. Stueart. -- Bangkok : UNESCO-PROAP, 1998.*

The roles of librarians in an information- based society have changed from relatively passive "gatekeeper" to proactive facilitator of knowledge and information. The profession is continuously evolving into something that is not only concerned with the traditional practices of processing information but also actively involved in the application of ICT in libraries and the development of new services using recent and emerging technologies.

***Slide 15***

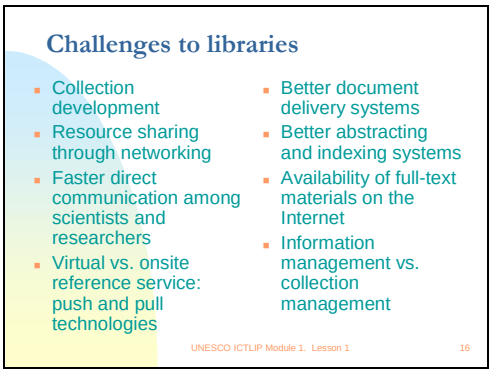
**Trends in the development of libraries**

The library will:

- be networked
- be stocked with a core collection that is multimedia
- have access to global information
- become digital
- become virtual

Libraries now and in the future will be quite different from the traditional libraries that we know today. We may still see books and other printed materials within the vicinity but many materials will be available and accessible in electronic format. These resources can be easily accessed and shared through LANs (local area networks), and WANs (wide area networks), of which the best example is the Internet. Most of the collections will be in multimedia and various digital formats. The libraries' collection will not be limited to what is inside the libraries since access to information globally is readily available. Eventually, digital libraries will become common and most of the resources will be digitized and available to anyone, anytime, anywhere. There is even a prediction of virtual libraries wherein all information resources and the library itself will no longer exist physically but will exist digitally in the virtual world.

***Slide 16***




**Challenges to libraries**

- Collection development
- Resource sharing through networking
- Faster direct communication among scientists and researchers
- Virtual vs. onsite reference service: push and pull technologies
- Better document delivery systems
- Better abstracting and indexing systems
- Availability of full-text materials on the Internet
- Information management vs. collection management

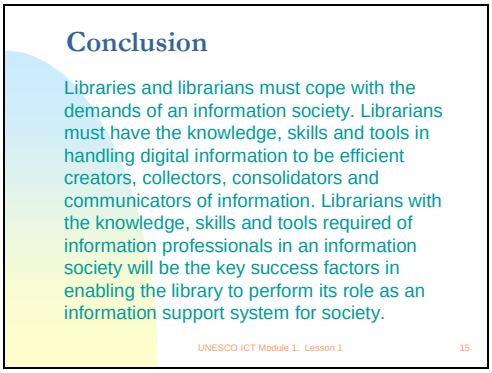
**Activity 1-2**

Form groups and discuss the effects of ICT developments on your libraries. Focus on what are the problems, possible solutions and opportunities brought by the changes. Wrap it up by asking each group to present to the class as a whole a summary of what they have discussed.

**Tip**

Before concluding the lesson, ask some questions to recall and reinforce the information and concepts taught in the lesson.

***Slide 17***



## Conclusion

Libraries and librarians must cope with the demands of an information society. Librarians must have the knowledge, skills and tools in handling digital information to be efficient creators, collectors, consolidators and communicators of information. Librarians with the knowledge, skills and tools required of information professionals in an information society will constitute the key success factor in enabling the library to perform its role as an information support system for society.

Technology alone is not the solution to efficient and effective information delivery, although it is the major contributor to the development of multimedia information and networks. The basic library education acquired in school is more important than the tools but the tools will make information creation, acquisition, consolidation and communication more efficient. ICT are powerful tools that can only be used effectively if the users - administrators librarians, and patrons in this case - have acquired adequate knowledge and skills and a certain level of competency according to their needs.

**Reference**

Consortium for Educational Technology for University Systems (C.E.T.U.S.) Discussion Series. *The Academic Library in the Information Age: Changing Roles*. Seal Beach, CA: The Trustees of the California State University, 18 p. Available [Online] URL: http://www.cetus.org/acad_lib.pdf

National Research Council. Commission on Physical Sciences, Mathematics, and Applications. Committee on Information Technology Literacy, Computer Science and Telecommunications Board. *Being Fluent with Information Technology*. Publication. (Washington, D.C.: National Academy Press, 1999) Available [Online] URL: http://search.nap.edu/html/beingfluent/

# Lesson 2

## *How do computers work?*

# Teacher's Guide

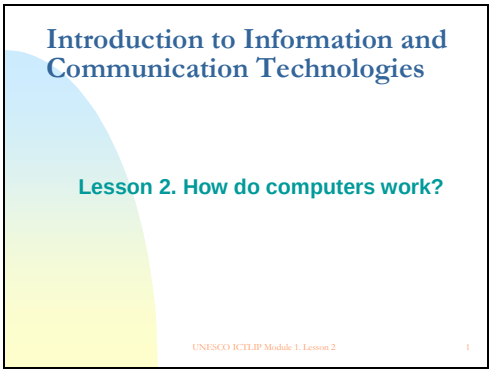
## Module 1. Introduction to Information and Communication Technologies

### Lesson 2. How do computers work?

**Note**

The Teacher's Guide provides notes and tips for the PowerPoint presentation that you will use in conducting the course.

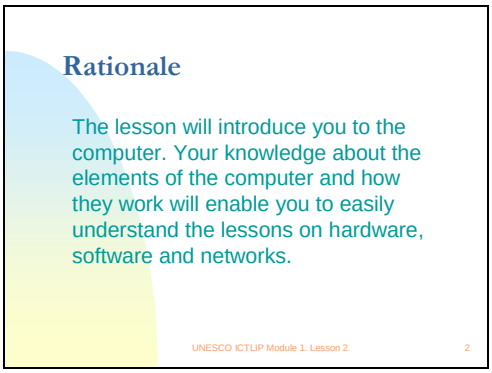
***Slide 1***



**Note**

This lesson will provide an overview of computers, their components and basic operations. It will also discuss how computing technology is used in data / information processing. This will give the students the knowledge and information needed to understand the basic concepts of information and communication technologies.

***Slide 2***

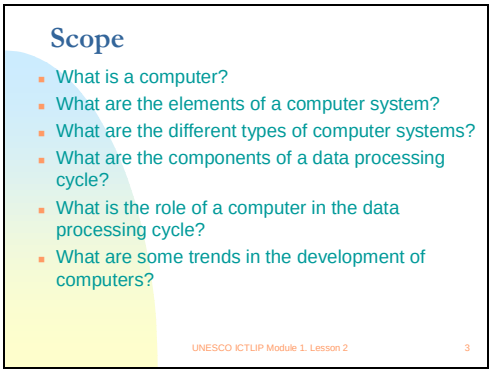


## Rationale

The lesson will introduce you to the computer. Your knowledge about the components of a computer system and how they work will enable you to easily understand the lessons on hardware, software and networks. Knowledge of hardware, software and networks, and skill in their use, is essential in applying ICT to library services.

Moreover, the student should understand that the computer is a machine and just like any other machine, its performance is dependent on the user of the machine and the performance limits of the machine.

***Slide 3***



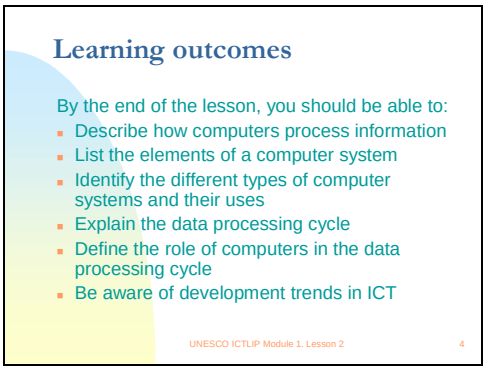

## Scope

1. What is a computer?
2. What are the elements of a computer system?
3. What are the different types of computer systems?
4. What are the components of a data processing cycle?
5. What is the role of a computer in the data processing cycle?
6. What are some trends in the development of computers?

**Note**

A thorough discussion of the technical aspects of a computer might prove to be a daunting task. However, this should not be the case, since a very basic level of discussion of computer concepts will be enough for most students, especially the beginners. A more comprehensive discussion of the elements of a computer system will be elaborated in subsequent lessons.

***Slide 4***

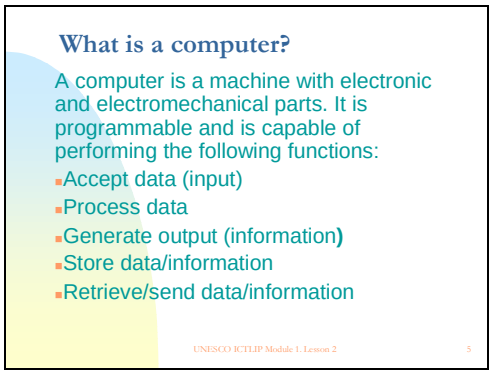



**Learning outcomes**

By the end of the lesson, students should be able to:

1. Describe how computers process information
2. List the elements of a computer system
3. Identify the different types of computer systems and their uses
4. Explain the data processing cycle
5. Define the role of computers in the data processing cycle
6. Be aware of development trends in ICT

***Slide 5***

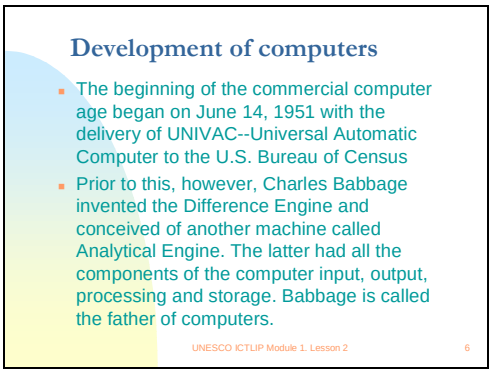



**What is a computer?**

A computer is a machine with electronic and electromechanical parts. It is programmable and is capable of performing the following basic computing functions:

- Accept data (input)
- Process data
- Generate output (information)
- Store data/information
- Retrieve/send data/information

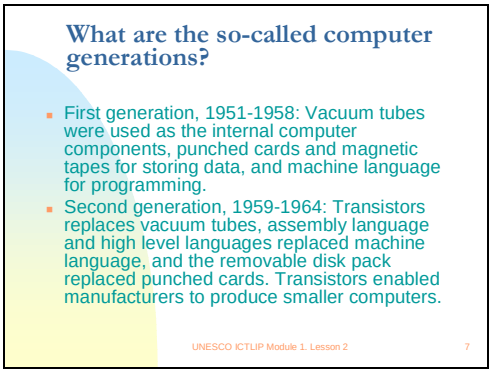
***Slide 6***




**Development of computers**

The beginning of the commercial computer age began on June 14, 1951 with the delivery of UNIVAC--Universal Automatic Computer to the U.S. Bureau of Census. Prior to this, however, Charles Babbage invented the Difference Engine and conceived of another machine called the Analytical Engine. The latter had all the components of the computer: input, output, processing and storage. Babbage is called the father of computers.

***Slide 7***

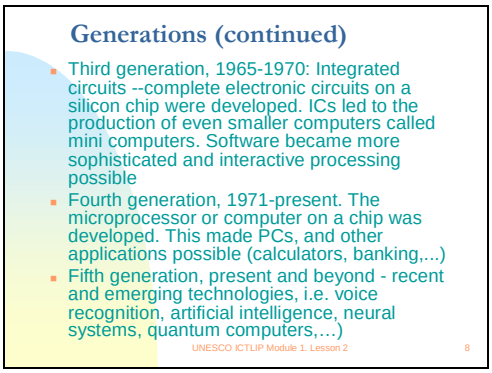



**Five generations of computers**

First generation, 1951-1958: Vacuum tubes were used as the internal computer components, punched cards and magnetic tapes for storing data, and machine language for programming.

Second generation, 1959-1964: Transistors replaces vacuum tubes, assembly language and high level languages replaced machine language, and the removable disk pack replaced punched cards. Transistors enabled manufacturers to produce smaller computers.

***Slide 8***




Third generation, 1965-1970: Integrated circuits --complete electronic circuits on a silicon chip were developed. ICs led to the production of even smaller computers called mini computers. Software became more sophisticated and interactive processing possible

Fourth generation, 1971-present. The microprocessor or computer on a chip was developed. This made PCs, and other applications possible (calculators, banking, etc)

Fifth generation - present and beyond. Still difficult to define since most of the technology is in its infancy - artificial intelligence, neural systems, voice recognition - while others are still at the experimental stage, such as quantum computers.

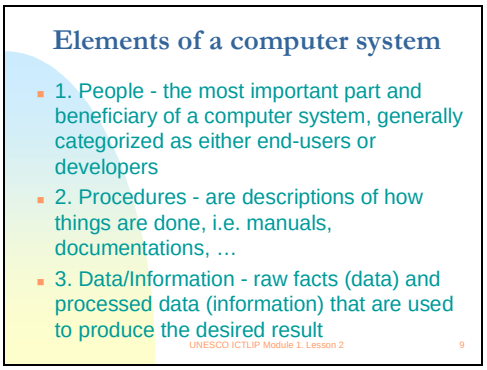
**Note**

Emphasize the development of the processors and how it has affected the size and efficiency of the computer.

**Activity 2-1**

Ask the students to read more about the history of the computer and its development by reading computer books and magazines. Make a timeline of important events in PC history.

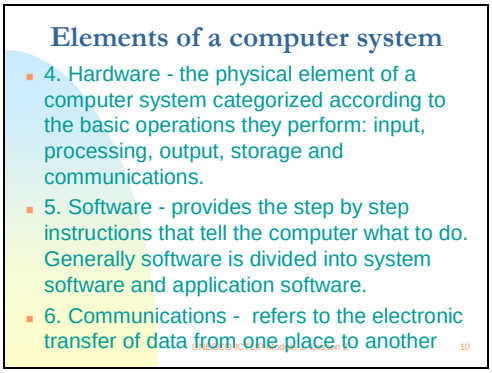
***Slide 9***



## Elements of a computer system

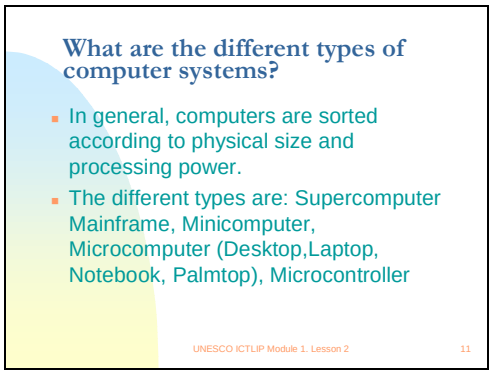
1. People - the most important part and beneficiary of a computer system, generally categorized as either end-users or developers
2. Procedures - are descriptions of how things are done, i.e. manuals, documentations, …
3. Data/Information - raw facts (data) and processed data (information) that are used to produce the desired result

***Slide 10***




4. Hardware - the physical element of a computer system categorized according to the basic operations performed: input, processing, output, storage and communications.
5. Software - provides the step-by-step instructions that tell the computer what to do. Generally software is divided into system software and application software.
6. Communications - refers to the electronic transfer of data from one place to another

***Slide 11***



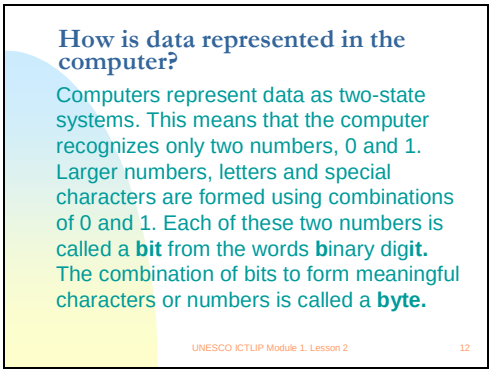

## Types of computer systems

In general, computers are sorted according to physical size and processing capabilities. Right now the size of a computer is no longer a good indicator of its processing power, but generally computers that occupy more physical space are more powerful since their bigger sizes allow them to accommodate more processors and other essential devices.

- Supercomputer - are the fastest and highest capacity computers
- Mainframe computer - less powerful, the most common in the late 1960's

- Minicomputer - also known as workstations mostly for scientific calculations
- Microcomputer - or personal computer, most widely used: Desktop, Laptop, Palm
- Microcontroller - embedded computers installed in smart appliances, toys, etc

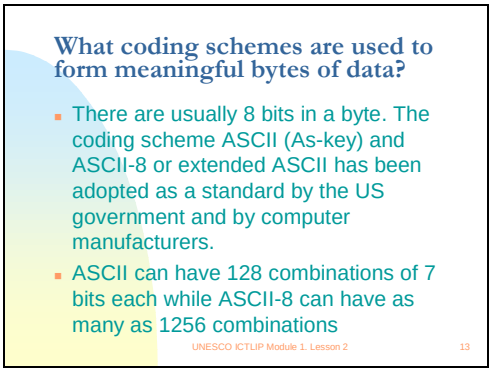
***Slide 12***




**How is data represented in the computer?**

Computers represent data as two-state systems. This means that the computer recognizes only two numbers, 0 and 1. Larger numbers, letters and special characters are formed using combinations of 0 and 1. Each of these two numbers is called a bit from the words binary digit. The combination of bits to form meaningful characters or numbers is called a byte.

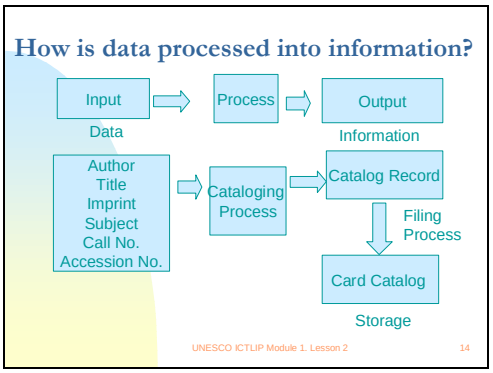
***Slide 13***



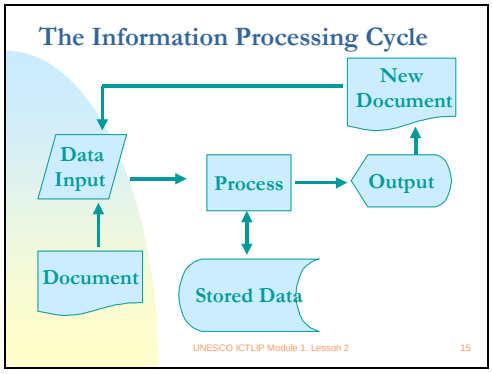

**Coding schemes are used to form meaningful bytes of data**

There are usually 8 bits in a byte. The coding scheme ASCII (As-key) and ASCII-8 or extended ASCII has been adopted as a standard by the US Government and by computer manufacturers. ASCII can have 128 combinations of seven bits each while ASCII-8 can have as many as 1256 combinations. The computer using this coding scheme will interpret the words, statements and paragraphs formed by these characters as a string or combination of bytes.

***Slide 14***



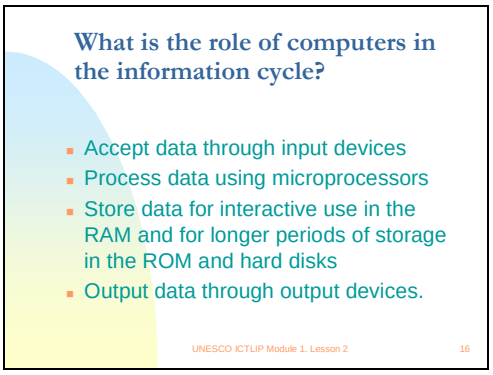

***Slide 15***




**The information processing cycle**

The information processing cycle is generally composed of three elements: input, process and output. In Slide 14 data is processed into information. Applied in a library setting, data which can be the author, title or all the bibliographic information of a book goes through the cataloging process, which will produce a catalog record as the output, that can also be produced in printed form as a card catalog. This output can be stored and later used as an input for further processing, thus repeating the cycle (Slide 15).

***Slide 16***



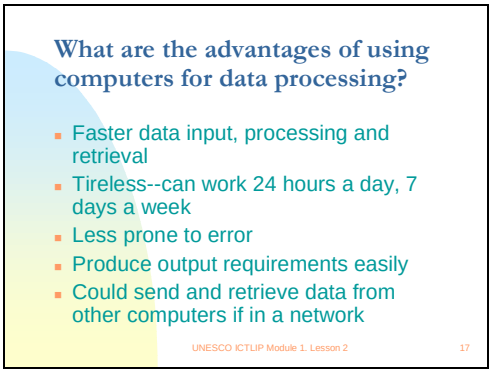

**Role of computer systems in the information cycle**

- Accept data through input devices
- Process data using microprocessors

- Store data for interactive use in the RAM and for longer periods of storage in the ROM and hard disks
- Output data through output devices.

In a computer system, data is captured and transformed into electronic signals that computers understand --into bytes as we have discussed earlier. Then data is processed through the central processing unit and main memory that manipulates data and transformed into information. The processed data produces an output that is displayed through the monitor and/or in printed form. That output could also be saved in storage devices. Of course, this is an oversimplified explanation of the very complex process happening within a computer but the general concept is basically the same. You'll know more about computer hardware after Lesson 3.

***Slide 17***



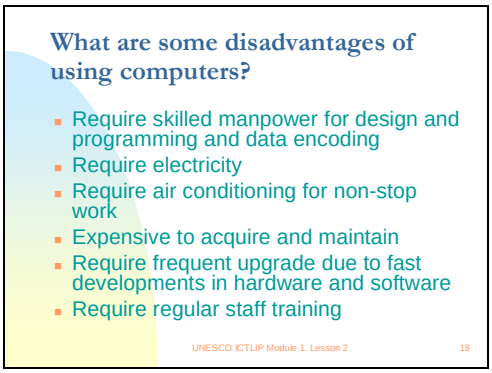

**Advantages of using computers for data processing**

- Faster data input, processing and retrieval
- Tireless--can work 24 hours a day, 7 days a week
- Less prone to error
- Produce output requirements easily
- Can send and retrieve data from other computers if in a network

This is evident in manual cataloging versus automated cataloging, in terms of speed in producing output either in cards or in electronic format that is accessible via the OPA.C

OPACs may be located inside the library (onsite) or outside the library through electronic means, Web or Telnet.

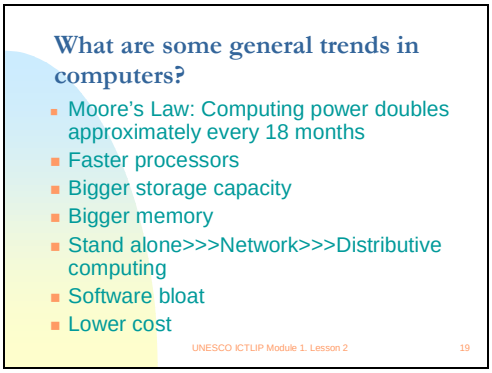
***Slide 18***




**Disadvantages of using computers**

- Require skilled manpower for design and programming and data encoding
- Require electricity
- Require air conditioning for non-stop work
- Expensive to acquire and maintain
- Require frequent upgrade due to fast developments in hardware and software
- Require regular staff training

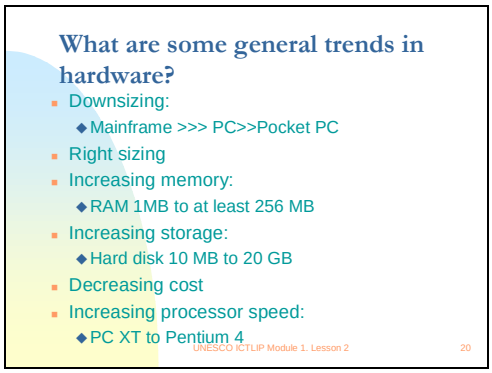
***Slide 19***




**Some general trends in computers**

- Moore's Law: Computing power doubles approximately every 18 months
- Faster processors
- Bigger storage capacity
- Bigger memory
- Stand alone>>>>Network>>>Distributed Computing
- More powerful but bloated software
- Lower cost

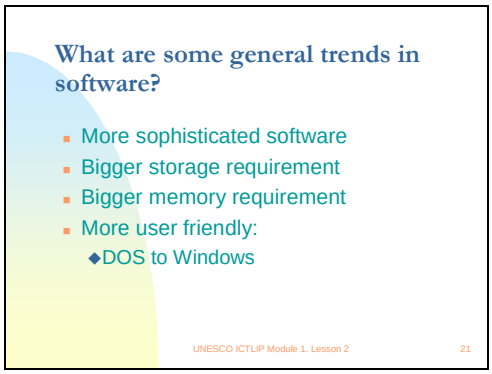
***Slide 20***




**Some general trends in hardware**

- Downsizing: Mainframe >>> PC>>>Wearable
- Right sizing
- Increasing memory: RAM 1MB to at least 256 MB
- Increasing storage: Hard disk 10 MB to 40 GB
- Decreasing cost
- Increasing processor speed: PC XT to Pentium 4

***Slide 21***



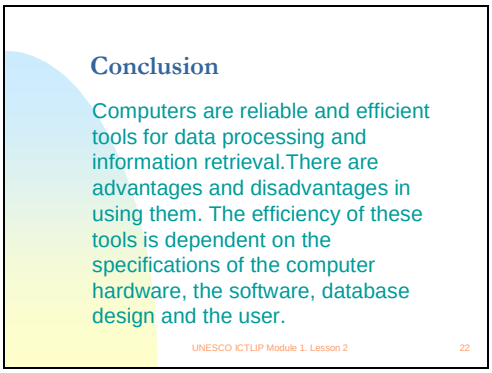

**Some general trends in software**

- More sophisticated software
- Bigger storage requirement
- Bigger memory requirement
- More user friendly:
  - DOS to Windows

**Activity 2-2**

Ask the students to make a timeline predicting what technology be like in the future. Write a short paragraph explaining and defending their predictions.

***Slide 22***




## Conclusion

Computers are reliable and efficient tools for data processing and information retrieval. There are advantages and disadvantages in using them. The efficiency of these tools is dependent on the specifications of the computer hardware, the software, database design and the user.

## Reference

Capron, H. L. (1996) Computers: Tools for an information age. (4th ed.) New York: The Benjamin/Cummings Publishing Company.

Hutchinson, S. E. & Sawyer, S. C. (2000). Computers, Communications & Information: A users introduction. (7th ed.) Boston: Irwin McGraw-Hill.

Norton, Peter. (1995) Peter Norton's Introduction to computers. (3rd ed.) New York: Glencoe McGraw-Hill.

Sawyer, Stacey C. (1997) Using Information technology: A practical introduction to computers & communications. (2nd ed.) Boston, Massachusetts: Irwin McGraw-Hill.

### Electronic Resources

Beard, J., Beaune, F. & Pradel, Zac. (2001) Computer Chronicles: From Stone to Silicon. *ThinkQuest Library of Entries*. Retrieved July 22, 200 from http://library.thinkquest.org/22522/

LaMorte, C., Lilly, J. Computers: history and development. *Jones Telecommunications and Multimedia Encyclopedia*. Retrieved August 10, 2000 from http://www.digitalcentury .com/encyclo/update/comp_hd.html.

# Lesson 3

## *What are the hardware components of a computer?*

# Teacher's Guide

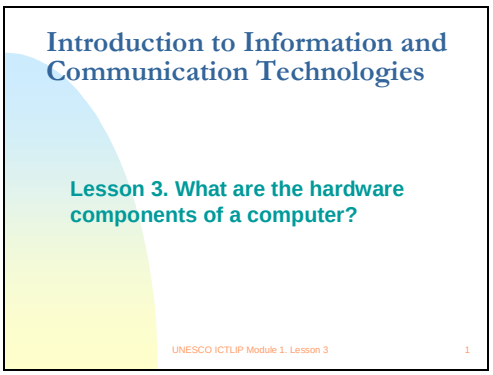
## Module 1. Introduction to Information and Communication Technologies.

### Lesson 3. What are the hardware components of a computer?

**Note**

The Teacher's Guide provides notes and tips for the PowerPoint presentation that you will use in conducting the course.

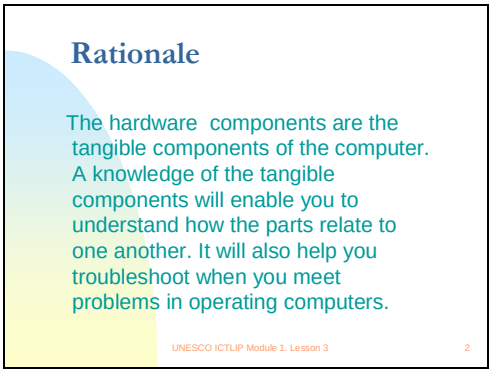
***Slide 1***



**Tip**

Finish the PowerPoint presentation before doing the hands-on exercises. This will give the students plenty of time to identify and experience using several hardware components of a personal computer system. As much as possible show / point to the actual object or provide pictures of the hardware being discussed.

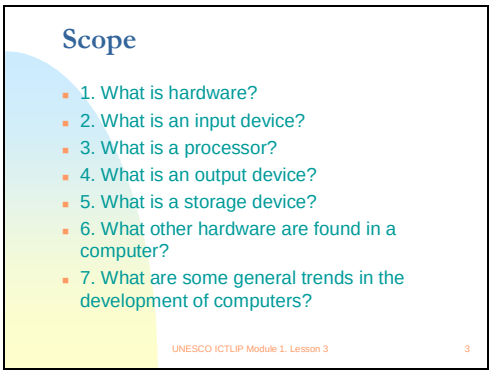
***Slide 2***



## Rationale

Computers are machines made up of different parts. The physical components are called hardware. Knowledge of these physical components and their functions will enable you to understand how the parts of a computer relate to one another. It will also help you troubleshoot when you meet problems in using computer systems.

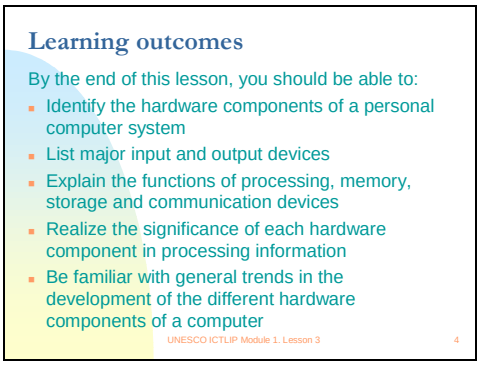
***Slide 3***




## Scope

1. What is hardware?
2. What is an input device?
3. What is a processor?
4. What is an output device?
5. What is a storage device?
6. What other hardware are found in a computer?
7. What are some general trends in the development of computers?

***Slide 4***



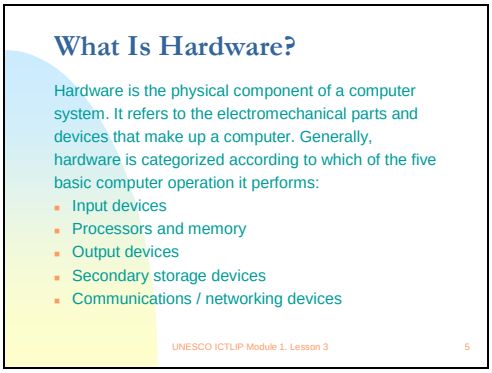

## Learning Outcomes

By the end of this lesson, students should be able to:

1. Identify the hardware components of a personal computer system
2. List and describe major input and output devices
3. Explain the functions of processing, memory, storage and communication devices
4. Realize the significance of each hardware component in processing information

5. Identify the general trends in the development of the different hardware components of a computer

***Slide 5***

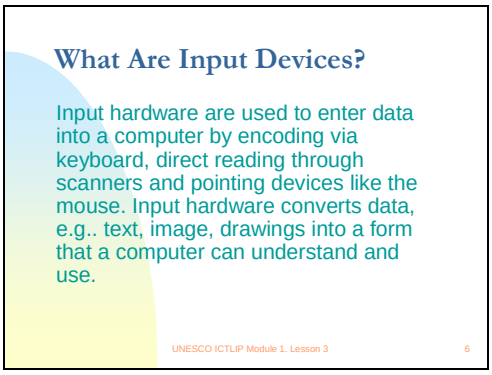



**What Is Hardware?**

Hardware is the physical component of a computer system. It refers to the electromechanical parts and devices that make up a computer. Generally, hardware is categorized according to which of the five basic computer operations it performs:

- Input - data is captured electronically into a form that can be processed by a computer
- Processing and memory - microprocessor, primary memory and other processing devices used for manipulating data into information
- Output - production of processed information into a usable form
- Secondary storage - data, information and programs are stored in computer-processable form
- Communications - enables the transfer of data from one place to another and facilitates resource sharing

***Slide 6***

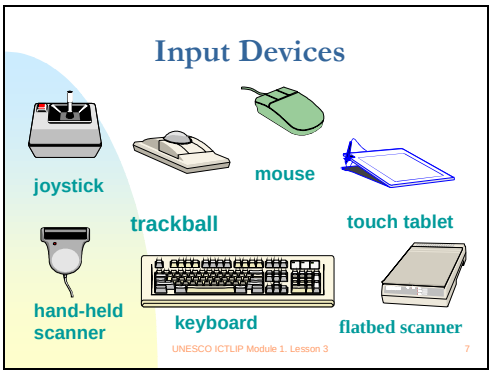



**Input Devices**

Input hardware are used to enter data into a computer by encoding via keyboard, direct reading through scanners and pointing devices like the mouse. Input hardware convert data, such as text, images and drawings into a form that a computer can understand and use. For

example, in libraries, the most commonly used input hardware in encoding bibliographic information of books and other materials are keyboards, barcode scanners for reading barcodes and patron IDs, and flatbed scanners for images and other documents. Some examples of input devices are shown in slide 7.

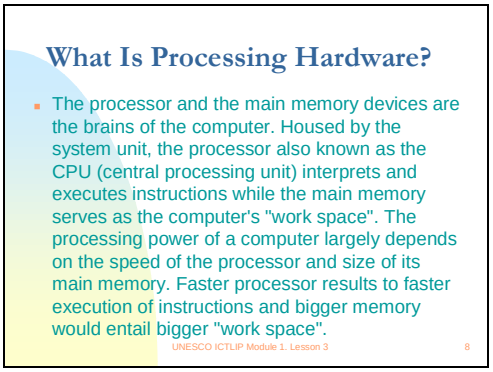
***Slide 7***




**Tip**

Demonstrate how input hardware work by using the keyboard, mouse, and other input devices such as scanners. Briefly talk about the relationship between input and output devices as discussed in lesson 2.

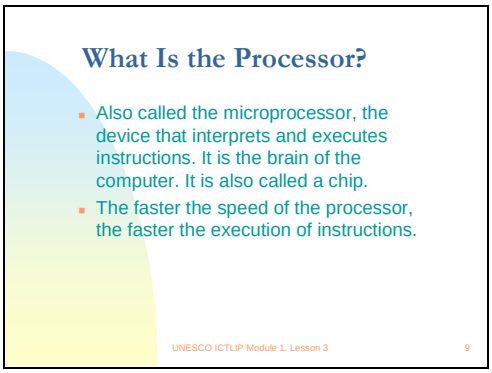
***Slide 8***




## Processing hardware

The processor and the main memory devices are the brains of the computer. Housed by the system unit, the processor, also known as the CPU (central processing unit), interprets and executes instructions while the main memory serves as the computer's "work space". The processing power of a computer largely depends on the speed of the processor and size of its main memory. Faster processors result in faster execution of instructions, and the bigger the memory, the more "work space" is available.

***Slide 9***

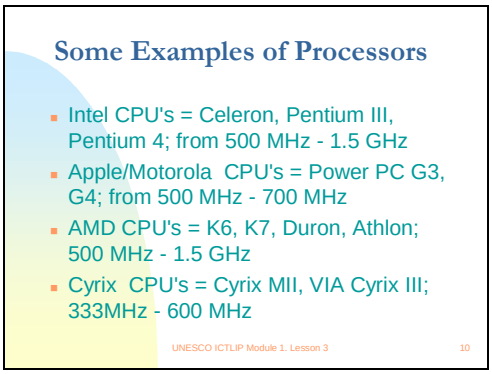



**Processor**

The processor is the device that interprets and executes instructions. It is the brain of the computer. The faster the speed of the processor, the faster the execution of instructions. In a computer- based information system the CPU controls and manipulates data into information.

In a PC (personal computer), the CPU is a very small single "chip" called a microprocessor, with electrical circuits printed on it. It is mounted to the system board, called the motherboard, together with the other necessary components. Types of processors vary according to their manufacturer, clock rate (execution of instruction per second) and processor generation.

***Slide 10***



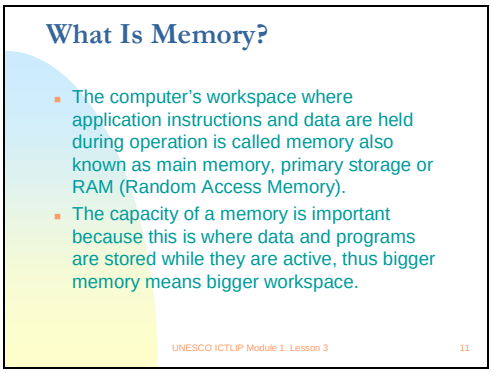

**Examples of Processors**

- Intel CPU's = Celeron, Pentium III, Pentium 4; from 500 MHz - 1.5 GHz
- Apple/Motorola CPU's = Power PC G3, G4; from 500 MHz - 700 MHz
- AMD CPU's = K6, K7, Duron, Athlon; 500 MHz - 1.5 GHz
- Cyrix CPU's = Cyrix MII, VIA Cyrix III; 333MHz - 600 MHz

**Tip**

Visit this article that discusses several processors - InfoHQ Desktop CPU Rundown [URL = http://www.infohq.com/Computer/IntelCPU.htm]

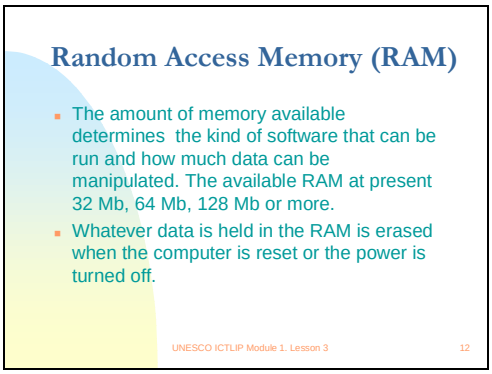
***Slide 11***




**Memory**

The computer's workspace where application instructions and data are held during operation is called memory, also known as main memory, primary storage or RAM (Random Access Memory). The capacity of a memory is important because this is where data and programs are stored while they are active, thus bigger memory means bigger workspace.

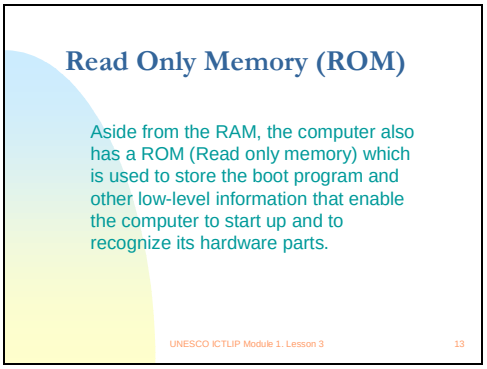
***Slide 12***




**Random Access Memory (RAM)**

The amount of memory available determines the kind of software that can be run and how much data can be manipulated. The available RAM at present ranges from 32 MB, 64 MB or 128 MB up to 1GB or more. Whatever data is held in the RAM is erased when the computer is reset or the power is turned off.

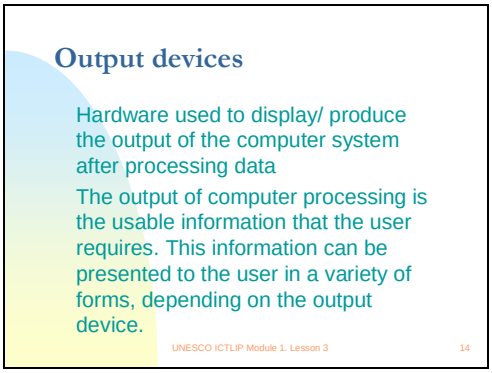
***Slide 13***



## Read Only Memory – (ROM)

Aside from the RAM, the computer also has a ROM (Read only memory), which is used to store the boot program, and other low-level information that enables the computer to start up and to recognize its hardware parts.

***Slide 14***



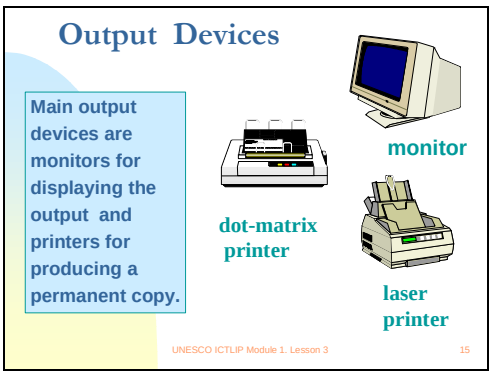

**Tip**
Visit this article on computer memory - How Computer Memory Works [URL http://www.howstuffworks.com/computer-memory.htm]

## Output Devices

Output devices comprise hardware used to display / produce the output from the computer system after data has been processed.

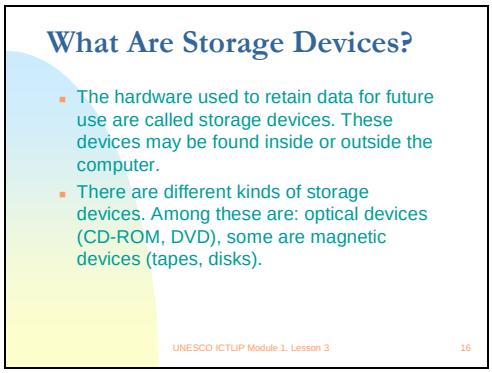
The output of computer processing is the usable information that the user requires. This information can be presented to the user in a variety of forms, depending on the output device.

***Slide 15***




Main output devices are monitors for displaying the output and printers for producing a permanent copy.

***Slide 16***

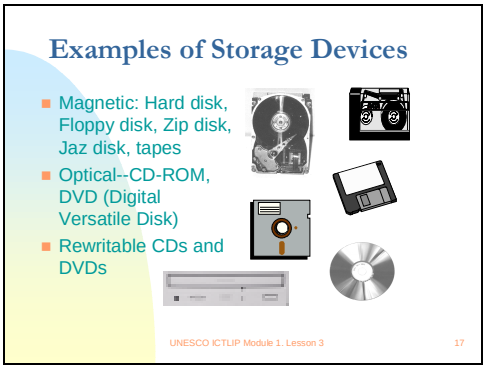



**Storage Devices**

The hardware used to retain data for future use are called storage devices. These devices may be found inside or outside the computer.

There are different kinds of storage devices. Among these are optical devices (CD-ROM, DVD), and magnetic devices (tapes, disks).

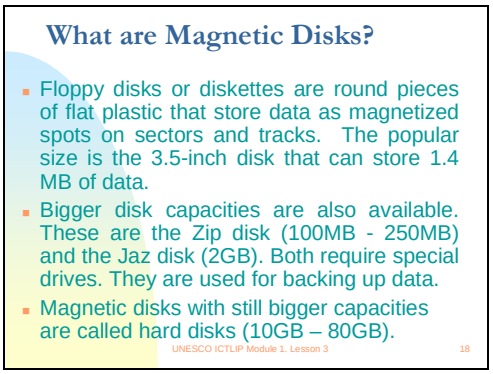
***Slide 17***




**Examples of Storage Devices**

- Magnetic: Floppy disk, Zip disk, Jaz disk, hard disk, tapes
- Optical Storage Devices --CD-ROM, DVD (Digital Versatile Disk) Rewritable CDs and DVDs

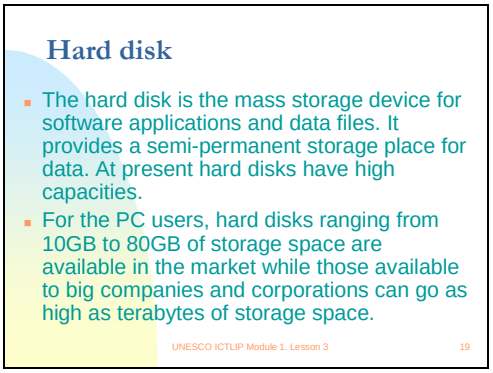
***Slide 18***



## Magnetic Disks

Diskettes (or floppy disks) are round pieces of flat plastic that store data as magnetized spots on sectors and tracks. The popular size is the 3.5-inch disk that can store 1.4 MB of data. Bigger disk capacities are also available. These are the Zip disk (100MB - 250MB) and the Jaz disk (2GB). Both require special drives. They are used for backing up data. Magnetic disks with still bigger capacities are called hard disks (10GB-80GB).

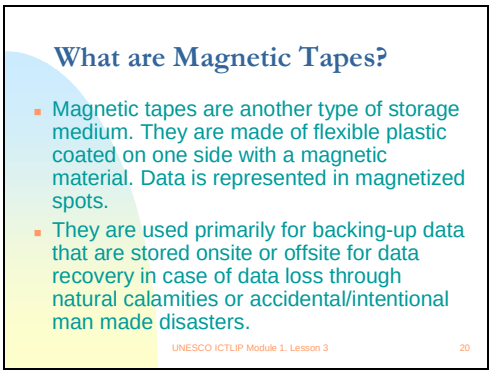
***Slide 19***




## Hard disk

The hard disk is the mass storage device for software applications and data files. It provides a semi-permanent storage place for data. At present hard disks have high capacities. For the PC users, hard disks ranging from 10GB to 80GB of storage space are available in the market while those available to big companies and corporations can go as high as terabytes of storage space.

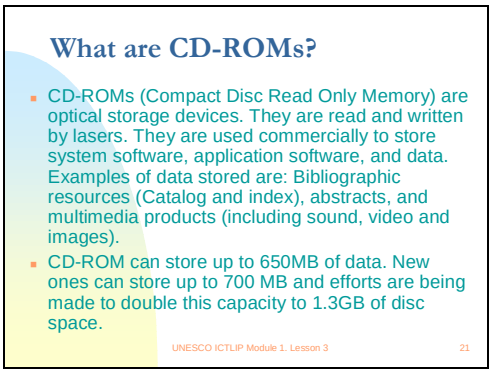
***Slide 20***




## Magnetic Tapes

Magnetic tapes are another type of storage medium. They are made of flexible plastic coated on one side with a magnetic material. Data is represented in magnetized spots. They are used primarily for backing-up data that are stored onsite or offsite for data recovery in case of data loss through natural calamities or accidental/intentional man made disasters.

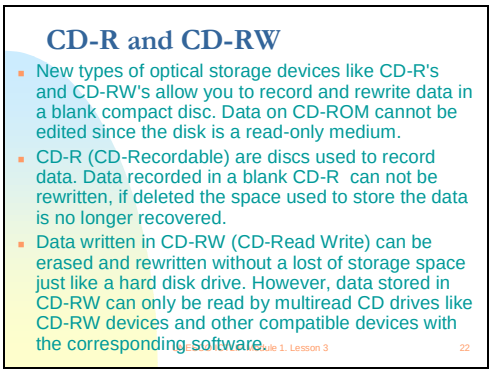
***Slide 21***




**CD-ROM (Compact Disc Read Only Memory)**

CD-ROMs are optical storage devices. They are read and written by lasers. They are used commercially to store system software, application software, and data. Examples of data stored are: Bibliographic resources (Catalogs and indexes), abstracts, and multimedia products (including sound, video and images). A CD-ROM can store at least 650MB of data, with newer ones storing up to 700 MB (and efforts are being made to double this capacity to 1.3GB of disc space).

***Slide 22***



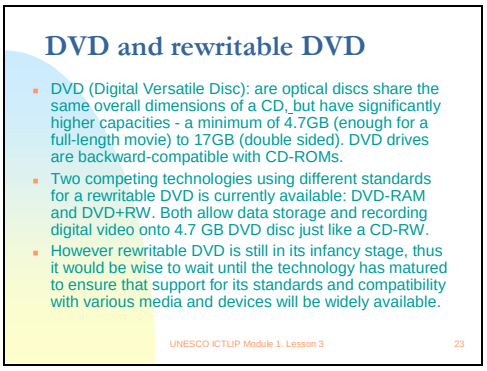

**CD-R and CD-RW**

New types of optical storage devices like CD-R's and CD-RW's allow you to record and rewrite data in a blank compact disc. Data on CD-ROM cannot be edited since the disk is a read-only medium.

CD-R (CD-Recordable) are discs used to record data. Data recorded in a blank CD-R cannot be rewritten, if deleted the space used to store the data is no longer recovered.

Data written in CD-RW (CD-Read Write) can be erased and rewritten without a lost of storage space just like a hard disk drive. However, data stored in CD-RW can only be read by multiread CD drives like CD-RW devices and other compatible devices with the corresponding software

***Slide 23***



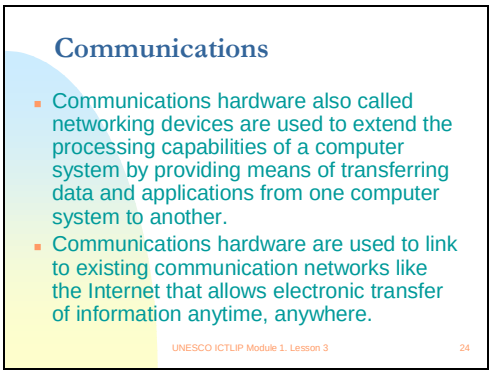

**DVD and rewritable DVD**

DVDs (Digital Versatile Discs) are optical discs that share the same overall dimensions of a CD, but have significantly higher capacities - a minimum of 4.7GB (enough for a full-length movie) to 17GB (double sided). DVD drives are backward-compatible with CD-ROMs.

Two competing technologies using different standards for a rewritable DVD are currently available: DVD-RAM and DVD+RW. Both allow data storage and recording of digital video on to 4.7 GB DVD discs (just like a CD-RW).

However, rewritable DVD is still in its infancy stage, thus it would be wise to wait until the technology has matured to ensure that support for its standards and compatibility with various media and devices are widely available.

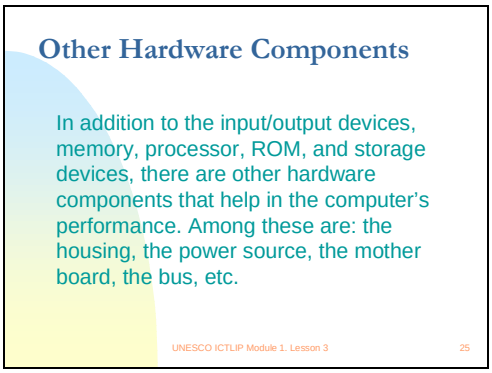
***Slide 24***




**Communications hardware**

Communications hardware, also called networking devices, are used to extend the processing capabilities of a computer system by providing means of transferring data and applications from one computer system to another. Communications hardware are used to link to existing communication networks like the Internet that allows electronic transfer of information anytime, anywhere.

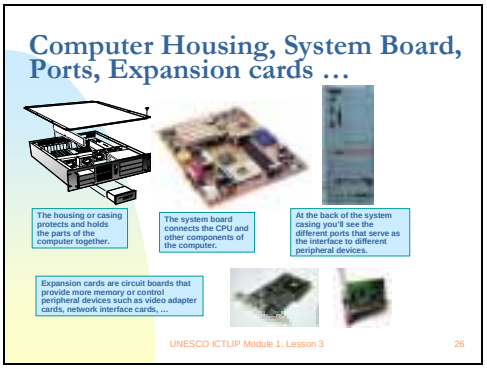
***Slide 25***




## Other Hardware Components

In addition to the input/output devices, memory, processor, ROM, and storage devices, there are other hardware components that help in the computer's performance. Among these are: the housing, the power source, the motherboard, ports, adaptor cards, etc.

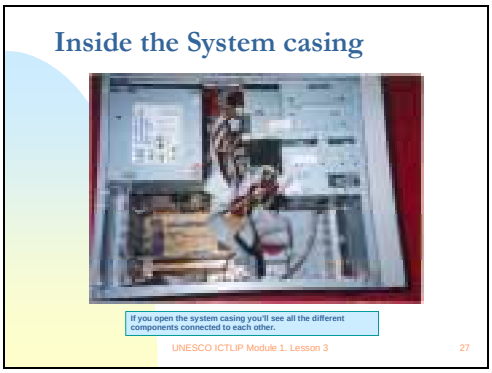
***Slide 26***




## Computer Housing

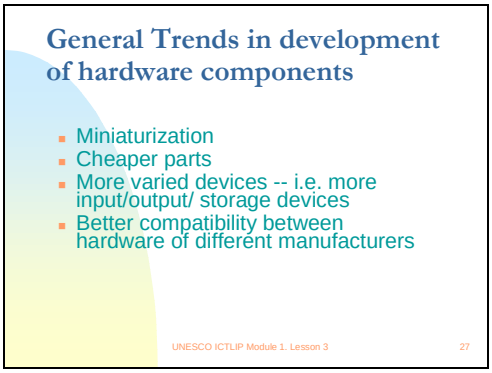
The housing or casing protects and holds the parts of the computer together. The motherboard connects the CPU and all the components of the computer. At the back of the system casing you will see the ports that serve as the interface to different peripheral devices. Expansion cards are circuit boards that provide more memory or control peripheral devices such as video adaptor cards, network interface cards, etc.

***Slide 27***



If you open the system casing you'll see all the different components connected to each other.

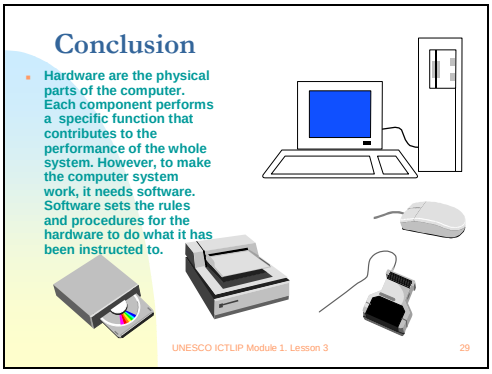
***Slide 28***




**General Trends in development of hardware components**

- Miniaturization
- Cheaper parts
- More varied devices -- i.e. more input/output/ storage devices
- Better compatibility between hardware of different manufacturers

***Slide 29***




**Conclusion**

Hardware are the physical parts of the computer. Each component performs a specific function that contributes to the performance of the whole system. However, to make the computer system work, it needs software. Software sets the rules and procedures for the hardware to do what it has been instructed to.

**Activity 3-1**

Do the hands-on exercises included in this lesson. (*lesson3exercise.doc*)

**Reference**

Visit the following Web sites that have very extensive and useful information on the subject matter:

Jan's Illustrated Computer Literacy 101: Computer basics
http://www.jegsworks.com/Lessons/lessonintro.htm

Marshall Brain's How Stuff works: How PCs Work by Jeff Tyson.
http://howstuffworks.lycos.com/pc.htm

Norton Online Fourth Edition Web Portal
http://www.glencoe.com/norton/online/index.phtml

PC Guide: Introduction to the PC
http://www.pcguide.com/intro/index.htm

| Lesson 3. What is Hardware? | Hands-on Exercises |
|---|---|

1. **Check if the hardware is connected to an AVR or a UPS that is connected to a power supply.**

2. **Turn on the AVR or UPS.**

3. **Switch on the computer by pushing the button marked power. Wait for the computer to finish "booting up."**

4. **View the computer' s basic system information flashed on the screen while booting up e.g. the operating system, processor type, installed RAM (random-access memory) etc.**

5. **View the computer' s desktop configuration: date & time, volume settings, desktop display options (e.g. background options, screen settings, screen saver options etc.).**

6. **Use the mouse to shut down the computer.**

7. **Close the AVR or UPS.**

8. **Remove the plug from the wall socket.**

# Lesson 4

## *What are the software components of a computer?*

# Teacher's Guide

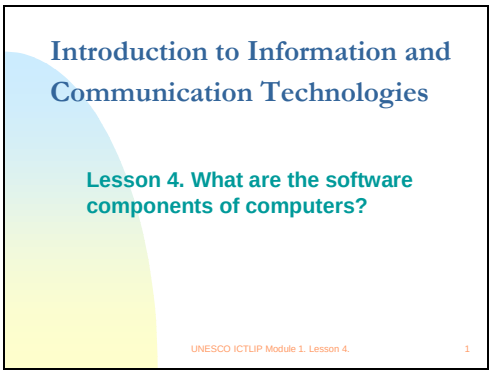
## Module 1. Introduction to Information and Communication Technologies.

### Lesson 4. What are the software components of a computer?

**Note**

The Teacher's Guide provides notes and tips for the PowerPoint presentation that you will use in conducting the course.

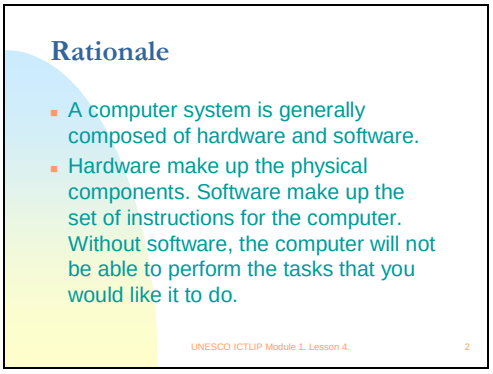
***Slide 1***



**Tip**

Hands-on exercises on Windows and MS Word, Excel, and PowerPoint are provided with this lesson.

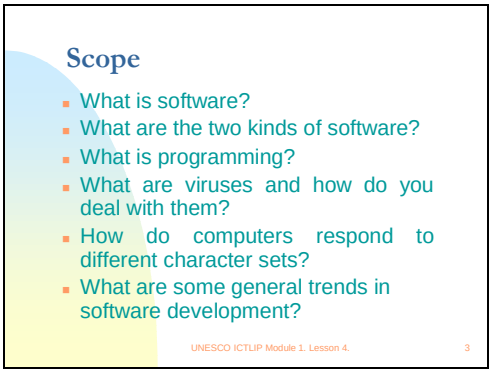
***Slide 2***



## Rationale

A computer system is generally composed of hardware and software. Hardware make up the physical components. Software make up the set of instructions for the computer. Without software, the computer will not be able to perform its tasks.

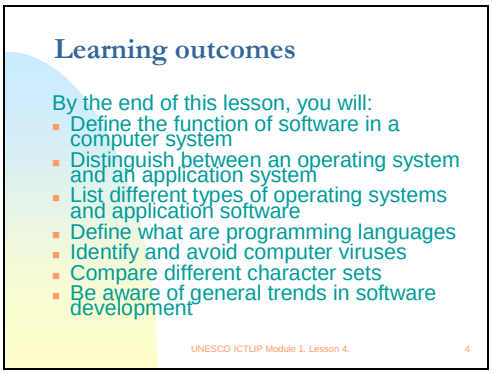
***Slide 3***




## Scope

1. What is software?
2. What are the two kinds of software?
3. What is programming?
4. What are viruses and how do you deal with them?
5. How do computers respond to different character sets?
6. What are some general trends in software development?

***Slide 4***

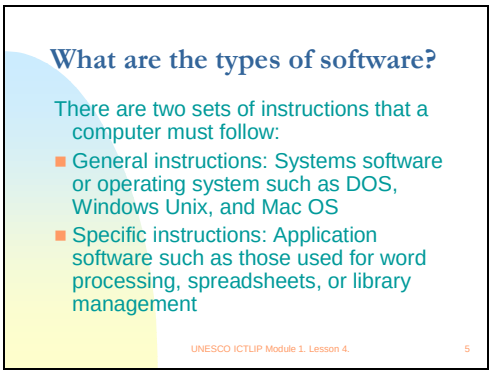



## Learning outcomes

By the end of this lesson, students should be able to:
1. Define the function of software in a computer system
2. Distinguish between an operating system and an application system
3. List different types of operating systems and application software
4. Define what are programming languages
5. Identify and avoid computer viruses
6. Compare different character sets

7. Be aware of general trends in software development

***Slide 5***




**What are the types of software?**

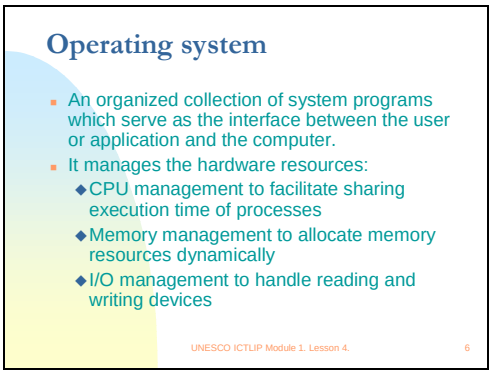
There are two sets of instructions that a computer must follow:

- General instructions: Systems software or operating system such as DOS, Windows and Unix
- Specific instructions: Application software such as that used for word processing, spreadsheets, or library management

**Tip**

The hands-on exercises are designed to familiarize students with the different types of software through the use of system software (Windows), and some application software (MS Word, Excel, and Power Point).

***Slide 6***



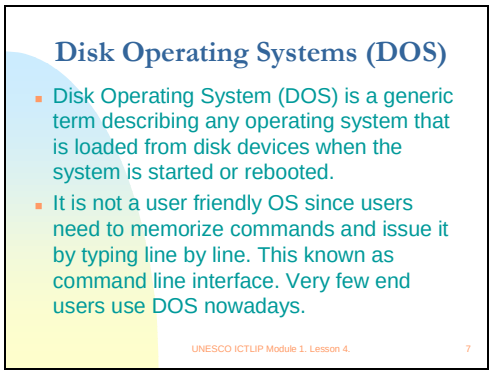

**Operating system**

The operating system is an organized collection of system programs, which serve as the interface between the user or application and the computer. It manages the hardware resources:

- The CPU - to facilitate sharing execution time of processes
- The memory - to allocate memory resources dynamically

- The I/O - to handle reading and writing devices

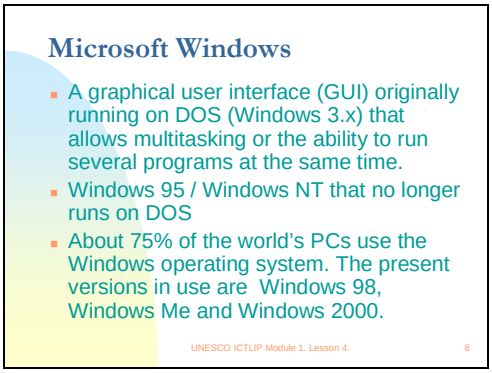
***Slide 7***




**Disk operating systems (DOS)**

Disk Operating System (DOS) is a generic term describing any operating system that is loaded from disk devices when the system is started or rebooted. It is not a user-friendly operating system (OS) since users need to memorize commands and issue them by entering them line-by-line. This is known as a command- line interface. Very few end users use DOS nowadays.

***Slide 8***



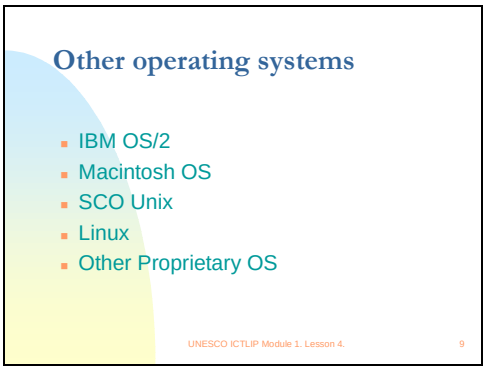

**Microsoft Windows**

Microsoft Windows is a graphical user interface (GUI) originally running on DOS (Windows 3.x) that allows multitasking or the ability to run several programs at the same time. About 75% of the world's PCs use the Windows operating system. The present versions in use are Windows 98 and Windows 2000.

**Tip**

Visit the Microsoft Web site to know more about these software. You should also visit the sites of the other operating systems.

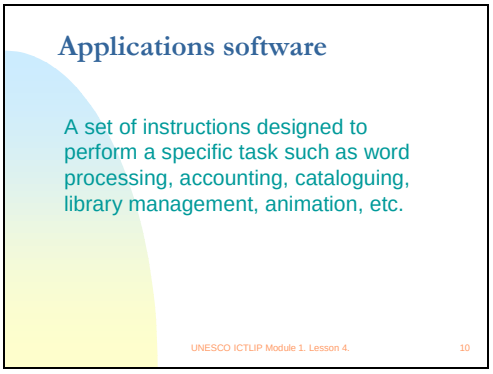
***Slide 9***




**Other operating systems**

- IBM OS/2
- Macintosh OS
- SCO Unix
- Linux
- Proprietary OS

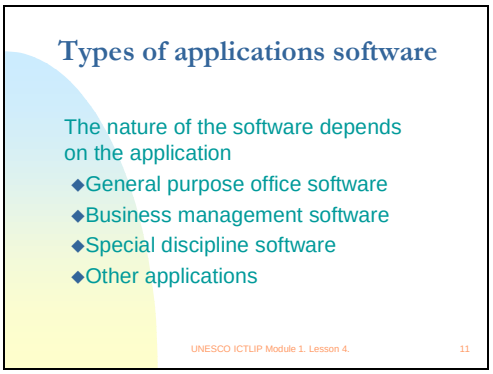
***Slide 10***




**Applications software**

Applications software comprise a set of instructions designed to perform a specific task such as word processing, accounting, cataloguing, library management, animation, etc.

***Slide 11***

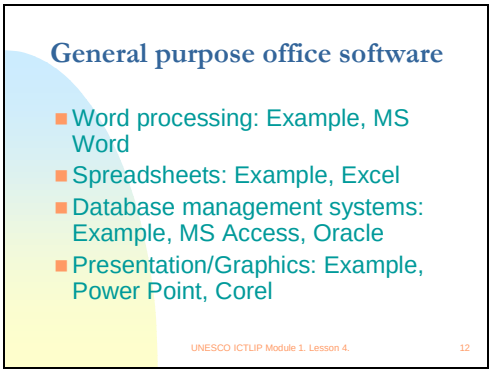


## Types of applications software

The nature of the software depends on the application

- General purpose office software
- Business management software
- Special discipline software
- Other applications

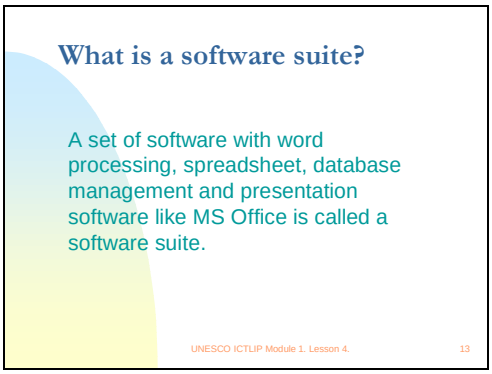
***Slide 12***




## General purpose office software

- Word processing: Example, MS Word
- Spreadsheets: Example, Excel
- Database management systems: Example, MS Access, Oracle
- Presentation/Graphics: Example, Power Point, Corel

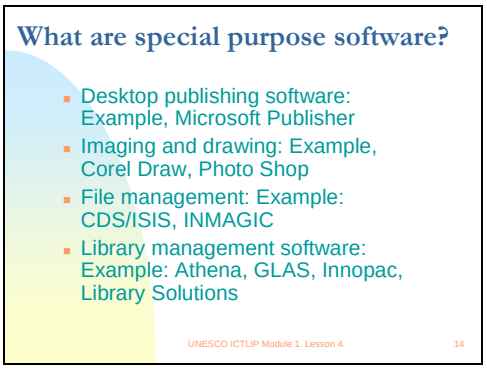
***Slide 13***




## What is a software suite?

A set of software with word processing, spreadsheet, database management and presentation software like MS Office is called a software suite.

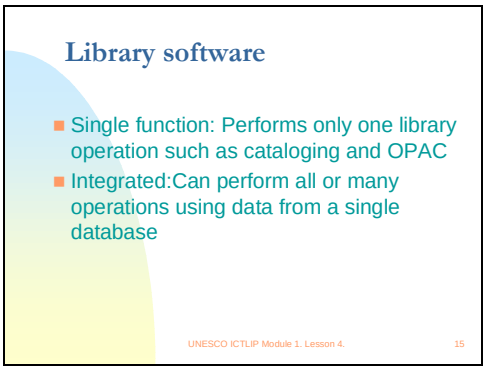
***Slide 14***




**What are some special purpose software?**

- Desktop publishing software: Example, Microsoft Publisher
- Imaging and drawing: Example, Corel Draw, Photo Shop
- File management: Example: CDS/ISIS, INMAGIC
- Library management software: Example: Athena, GLAS, Innopac, Library Solutions

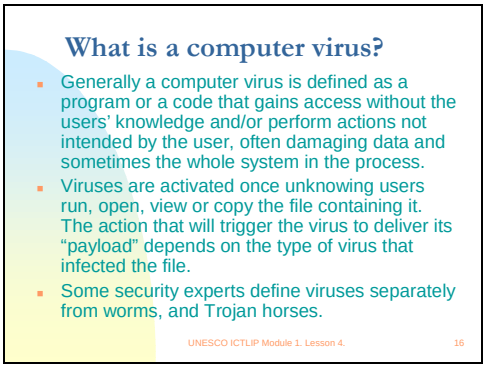
***Slide 15***




**Library software**

- Single function: Performs only one library operation such as cataloging and OPAC
- Integrated: Can perform all or many operations using data from a single database

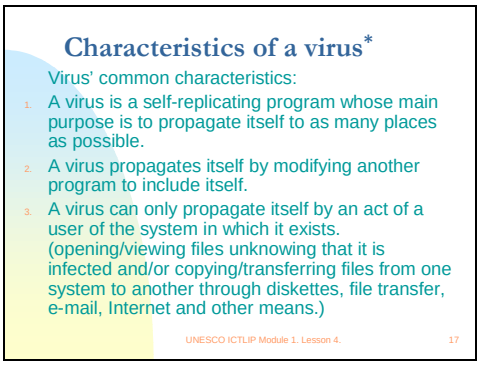
***Slide 16***



**What is a computer virus?**

Generally a computer virus is defined as a program or a code that gains access without the users' knowledge and/or perform actions not intended by the user, often damaging data and sometimes the whole system in the process. Viruses can be activated when users run, open, view or copy a file containing them. The action that will trigger the virus to deliver its "payload" depends on the type of virus that infected the file. Some security experts define viruses separately from worms, and Trojan horses.

***Slide 17***

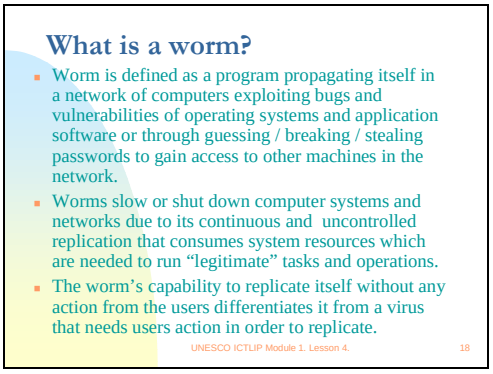



**Characteristics of a virus***

Virus' common characteristics:

- A virus is a self-replicating program whose main purpose is to propagate itself to as many places as possible.
- A virus propagates itself by modifying another program to include itself.
- A virus can only propagate itself by an act of a user of the system in which it exists. (opening/viewing files that are infected and/or copying/transferring files from one system to another through diskettes, file transfer, e-mail, Internet and other means.)

***Slide 18***

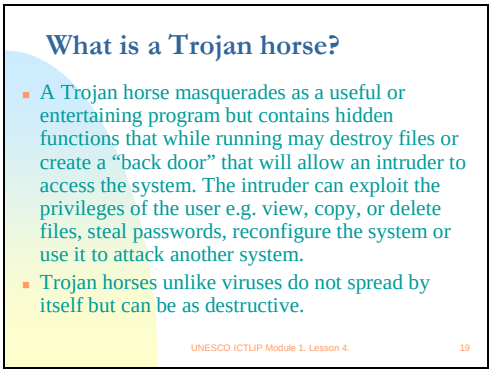



**What is a worm?**

A worm is defined as a program propagating itself in a network of computers, exploiting bugs and vulnerabilities of operating systems and application software or through guessing /

breaking / stealing passwords to gain access to other machines in the network. Worms slow or shut down computer systems and networks due to their continuous and uncontrolled replication that consumes system resources which are needed to run "legitimate" tasks and operations. The worm's capability to replicate itself without any action from the user differentiates it from a virus that needs a user's action in order to replicate.

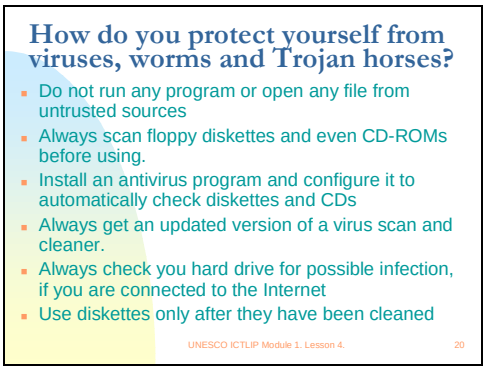
***Slide 19***




**What is a Trojan horse?**

A Trojan horse masquerades as a useful or entertaining program but contains hidden functions that while running may destroy files or create a "back door" that will allow an intruder to access the system. The intruder can exploit the privileges of the user e.g. view, copy, or delete files, steal passwords, reconfigure the system or use it to attack another system. Trojan horses, unlike do not spread by themselves but can be as destructive.

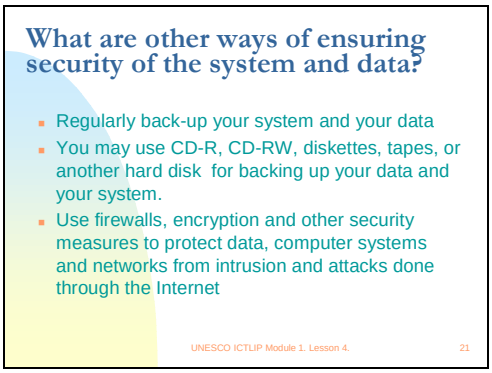
***Slide 20***




**How do you protect yourself from viruses?**

- Do not run any program or open any file from untrusted sources
- Always scan diskettes and even CD-ROMs before using.
- Install an antivirus program and configure it to automatically check diskettes and CDs
- Always get an updated version of a virus scanner and cleaner.
- Always check you hard drive for possible infection, if you are connected to the Internet
- Use diskettes only after they have been cleaned

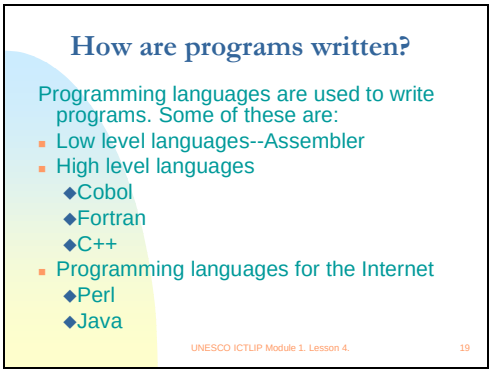
***Slide 21***




**What are some other ways of ensuring security of the system and data?**

- Regularly back-up your system and your data
- You may use CD-ROMs, diskettes, tapes, or another hard disk for backing up your data and your system.
- Use firewalls, encryption and other security measures to protect data, computer systems and networks from intrusion and attacks via the Internet

***Slide 22***

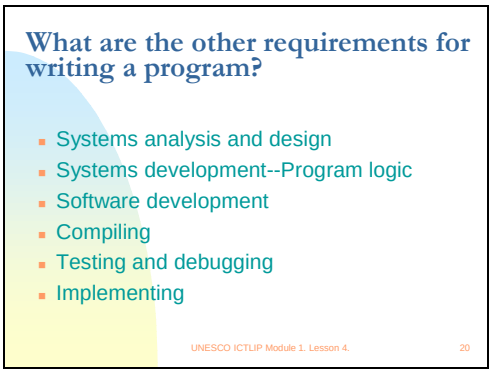



**How are programs written?**

Programming languages are used to write programs. Some of these are:

- Low level languages--Assembler
- High level languages
  - Cobol
  - Fortran
  - C++
- Programming languages for the Internet
  - Perl
  - Java

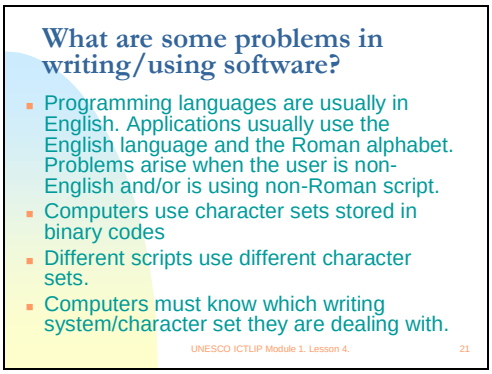
***Slide 23***




**What are the other requirements for writing a program?**

- Systems analysis and design
- Systems development--Program logic
- Software development
- Compiling
- Testing and debugging
- Implementing

***Slide 24***

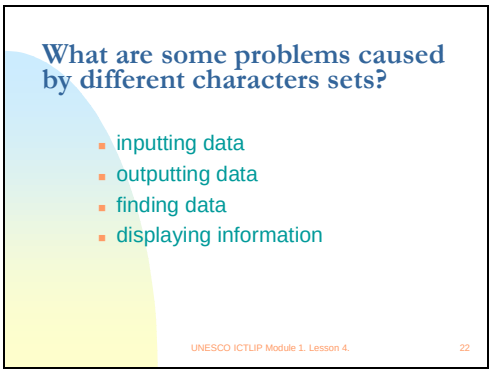



**What are some problems in writing/using software?**

Programming languages are usually in English. Applications usually use the English language and the Roman alphabet. Problems arise when the user is non-English and/or is using non-Roman script.

Computers use character sets stored in binary codes. Different scripts use different character sets. Computers must know which writing system/character set they are dealing with.

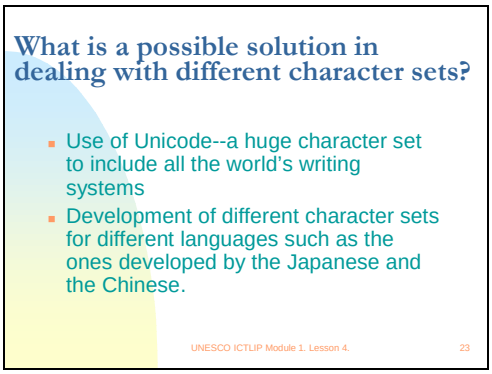
***Slide 25***




**What are some problems caused by different characters sets?**

- Inputting data
- outputting data
- finding data
- displaying information

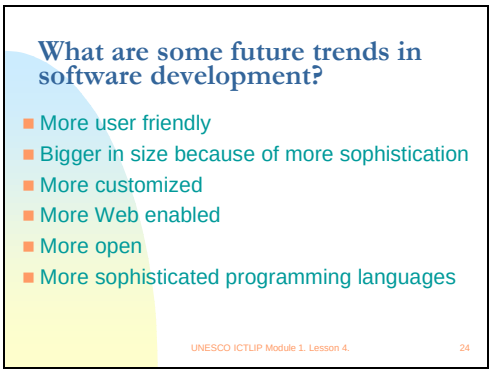
***Slide 26***




**What is a possible solution in dealing with different character sets?**

- Use of Unicode--a huge character set that includes all the world's writing systems
- Development of different character sets for different languages such as the ones developed by the Japanese and the Chinese.

***Slide 27***




**What are some future trends in software development?**

- More user friendly
- Bigger in size because of more sophistication
- More customized
- More Web enabled
- More open
- More sophisticated programming languages

**Activity 4-1**

Do the hands-on exercises included in this lesson. (*lesson4exercise.doc*)

**Reference**

Visit the following Web sites that have very extensive and useful information on the subject matter:

Getting Results Book with Microsoft® Office.
http://download.microsoft.com/download/office97pro/gresult/97/WIN98/EN-US/gresults.exe

Howstuffworks. Brain, Marshall. "How Computer Viruses and Worms Work" Online [URL] http://www.howstuffworks.com/virus.htm

The History of Computer Programming Languages
http://www.princeton.edu/~ferguson/adw/programming_languages.shtml

Introduction to Programming Languages
http://www.cs.adfa.edu.au/teaching/studinfo/itf/lect200015.html

| Lesson 4. What is Software? | Hands-on Exercises |
|---|---|

## Using an operating system (Windows)

- **Open computer.**
- **Click on the start button.**
- **Choose Windows Explorer and click to open the application.**
- **Explore the icons and what you can do with them.**
- **Select and move desktop icons. Create a desktop icon.**
- **Work with Windows. Recognize the toolbar, menu bar, status bar, scroll bar etc.**
- **Reduce a desktop window, enlarge a desktop window.**
- **Recognize the different parts of a desktop bar, toolbar, menu bar, status bar, scroll bar.**
- **Insert a diskette on the diskette drive. Format the diskette.**
- **Create a new folder. Label it with your name.**
- **Open the folder by pointing the mouse on it and clicking. You will not see anything in it.**
- **Open the "*my documents*" folder. Choose a file and drag the document to your folder.**
- **Open the folder with your name on it.**
- **Open the file in the folder by double clicking on it.**
- **Save the file in your folder on to your diskette.**
- **Drag your folder to your diskette.**

## Organizing files

- **Examine a directory/folder. View some of the attributes: name, size, date when last updated etc.**
- **Re-name files and directories/folders.**
- **Copy, Move, paste, delete files.**
- **Make backup copies of data onto a diskette.**
- **Use Cut and Paste functions to move files within**
- **directories/folders.**
- **Use the Find tool to locate a file or a directory/folder.**
- **Search by name, date created, file or directory/folder type**
- **Delete directory/folder**

## Using a word processing software

- **Open a word processing program by pointing and clicking on start, going to programs and then to word.**
- **Open an existing document. Close document.**
- **Open a new file.**

- **Compose a short description about yourself (about five sentences).**
- **Save the file by pointing at the "file" on menu bar and clicking on "save as". Give the file a name and save in the folder "my documents".**
- **Edit the file by using the icons or the menu under "format."**
- **Print the file.**
- **Save file onto a diskette.**
- **Close Word.**

## Other editing operations

- **Use insert command.**
- **Use undo command.**
- **Use insert command.**
- **Use select command.**
- **Use cope, paste, move commands.**
- **Use search and replace command.**
- **Change fonts, use italics, underlining, embolding.**
- **Use alignment and justification.**
- **Use lists.**
- **Use templates.**
- **Add headers and footers.**
- **Create tables.**
- **Import objects and resize.**
- **Use spell check and grammar check.**
- **Save file.**
- **Back-up by saving file on diskette.**
- **Prepare to print.**

## Using a spreadsheet

- **Open a spreadsheet application.**
- **Open an existing spreadsheet and make some changes and save.**
- **Open several spreadsheets. Close all files one by one.**
- **Create a new spreadsheet.**
- **Enter numbers in a cell.**
- **Enter text in a cell.**
- **Enter symbols or special characters in a cell.**
- **Enter simple formulas in a cell.**
- **Use the undo command.**
- **Select a cell or range of adjacent or non-adjacent cells.**
- **Use the Copy and Paste tools to duplicate cell contents in another part of a worksheet.**
- **Use the Cut and Paste tools to move cell contents within worksheet.**
- **Move cell contents between active worksheets.**

- **Move cell contents between active spreadsheets.**
- **Delete cell contents in a selected cell range.**
- **Insert rows and columns.**
- **Modify column width and row height.**
- **Delete selected rows or columns.**
- **Sort Data.**
- **Use basic arithmetic and logical formulas in a spreadsheet addition, subtraction, multiplication, and division.**
- **Use the sum function.**
- **Use the average function.**
- **Format cells to display different currency symbols.**

## Using a presentation software

- **Open a presentation application.**
- **Open an existing presentation document. Close.**
- **Create a new presentation.**
- **Choose a slide layout form.**
- **Choose background**
- **Add text.**
- **Add an image from an image library.**
- **Copy, Move, Delete text.**
- **Use the Copy and Paste tools to duplicate text, to duplicate a slide within the presentation or re-order slides within the presentation.**
- **Delete a slide/slides within the presentation. Use formatting commands.**
- **Re-size and move text box within a slide.**
- **Import images/slides from other files.**
- **Re-size and move an image in a slide.**
- **Import other objects to slide.**
- **Copy an imported object to a master slide.**
- **Number the slides.**
- **Print slides in various views and output formats.**
- **Add/change transition/preset animation effects to slides.**
- **View the slide show.**
- **Close application.**

# Lesson 5

## *What are the components of a network?*

# Teacher's Guide

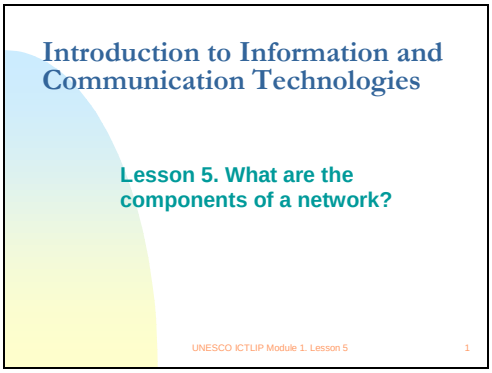
## Module 1. Introduction to Information and Communication Technologies.

### Lesson 5. What are the components of a network?

**Note**

The Teacher's Guide provides notes and tips for the PowerPoint presentation that you will use in conducting the course.

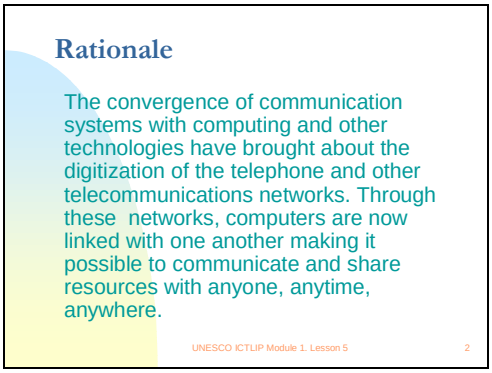
***Slide 1***



**Tip**

A comprehensive discussion of networks would require a lot of time and technical expertise in the subject matter. The following lesson is a very general discussion that will help the students to understand basic network concepts so that they can appreciate the roles played by networks in an information based society.

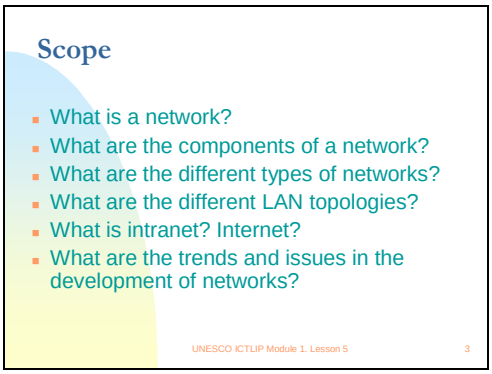
***Slide 2***



## Rationale

The convergence of communication systems with computing and other technologies have brought about the digitization of the telephone and other telecommunications networks. Through these networks, computers are now linked with one another, making it possible to communicate and share resources with anyone, anytime, anywhere.

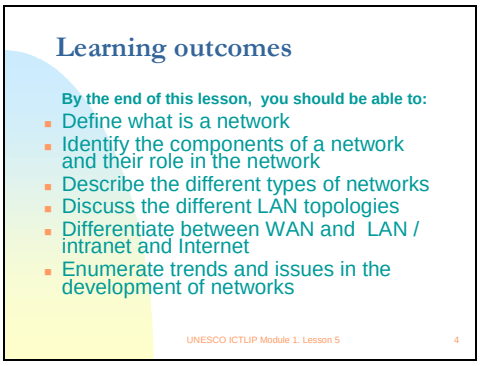
***Slide 3***




## Scope

1. What is a network?
2. What are the components of a network?
3. What are the different types of networks?
4. What are the different LAN topologies?
5. What is an intranet? Internet?
6. What are the trends and issues in the development of networks?

***Slide 4***

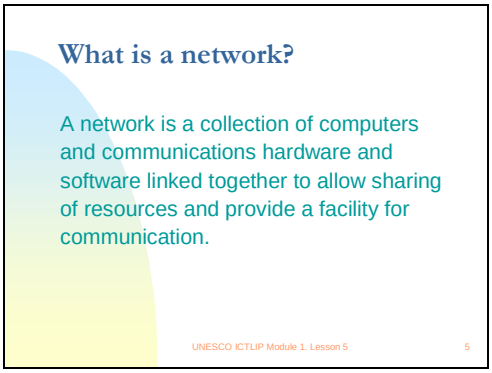



## Learning outcomes

At the end of the lesson, students should be able to:
1. Define what is a network
2. Identify the components of a network and their role in the network
3. Describe the different types of networks
4. Discuss the advantages and disadvantages of the different LAN topologies

5. Differentiate between WAN and LAN / intranet and Internet
6. Enumerate trends and issues in the development of networks

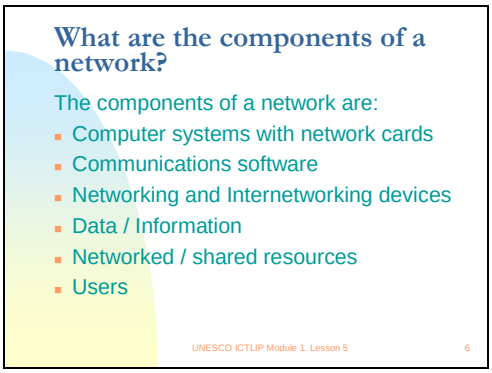
***Slide 5***




**What is a network?**

A network is a collection of computers, communications hardware and software linked together to allow sharing of resources and to provide a facility for communication.

***Slide 6***




**What are the components of a Network?**

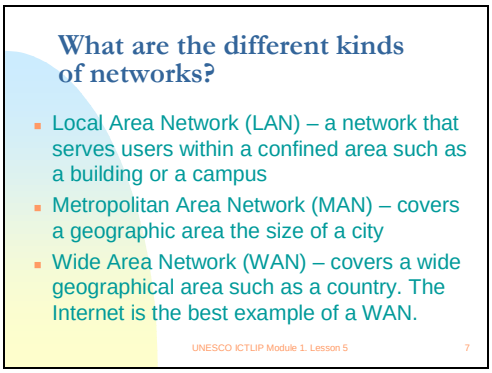
The components of a network are:

- Computer systems with network cards
- Communications software
- Networking and Internetworking devices
- Data / Information
- Networked / shared resources
- Users

**Note**

Discuss each component briefly and point the students to useful materials that are available on the Internet to have a more in-depth coverage of the concepts.

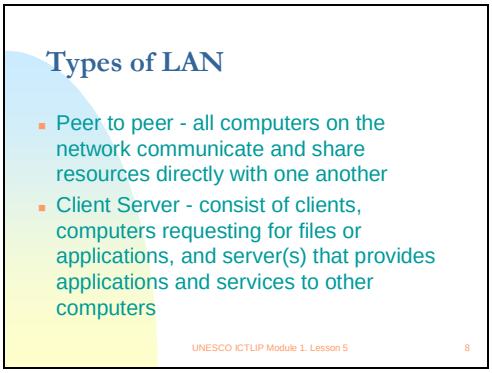
***Slide 7***




**What are the different kinds of networks?**

- Local Area Network (LAN) – a network that serves users within a confined area such as a building or a campus
- Metropolitan Area Network (MAN) – covers a geographic area the size of a city
- Wide Area Network (WAN) – covers a wide geographical area such as a country or the entire globe. The Internet is the best example of a WAN.

***Slide 8***



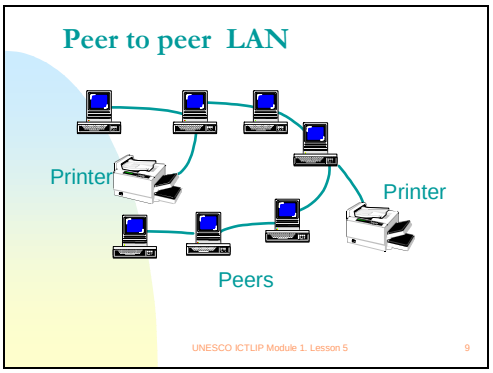

**Types of LAN**

- Peer to peer - all computers on the network communicate and share resources directly with one another (see slide 9)
- Client Server - consist of clients, computers requesting files or applications, and server(s) that provide applications and services to other computers (see slide 10)

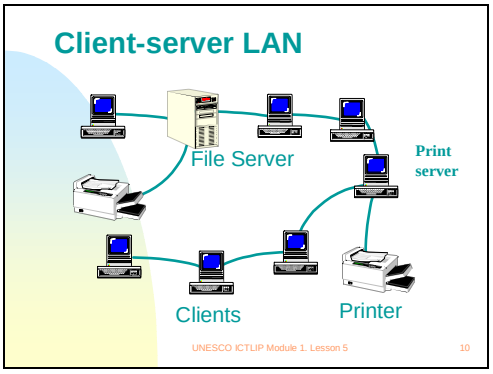
**Tip**

Networks can be classified in different ways based on architecture, topology, communication medium used, geographical coverage, and in many other ways. However, types of networks are generally classified according to how information and services are provided - peer-to-peer and client-server.

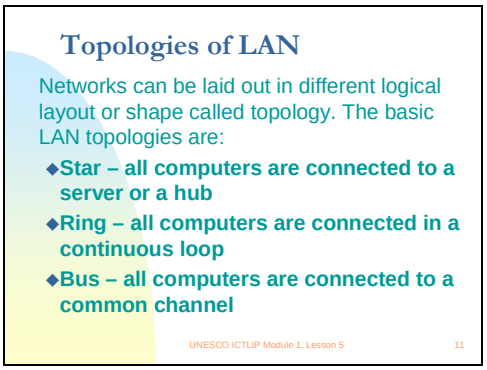
***Slide 9***




***Slide 10***




***Slide 11***

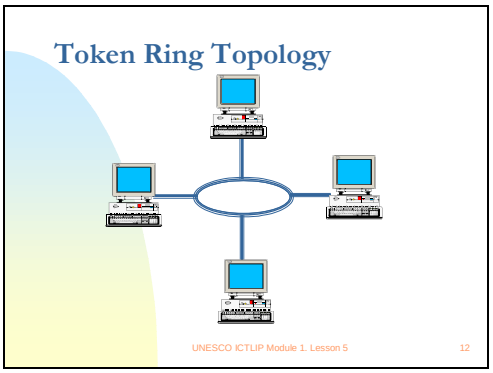



## Topologies of LAN

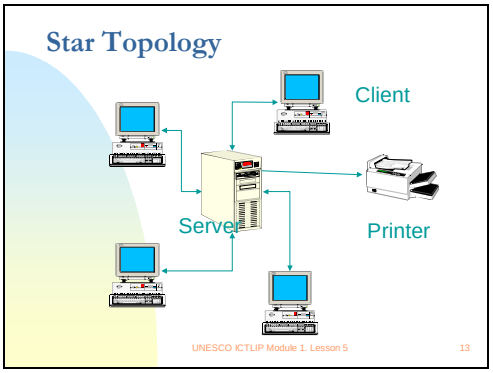
Networks can be laid out in a different logical layout or shape called a topology. The basic LAN topologies are:

- Star – all computers are connected to a server or a hub (see slide 12)
- Ring – all computers are connected in a continuous loop (see slide 13)
- Bus – all computers are connected to a common channel (see slide 14)

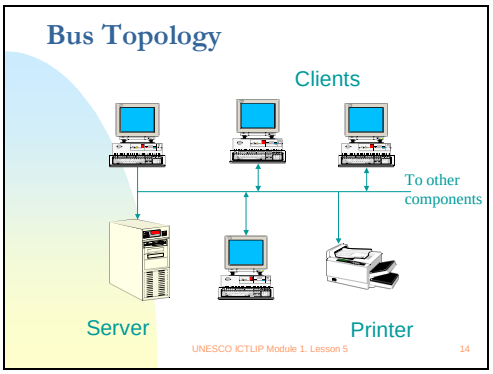
***Slide 12***



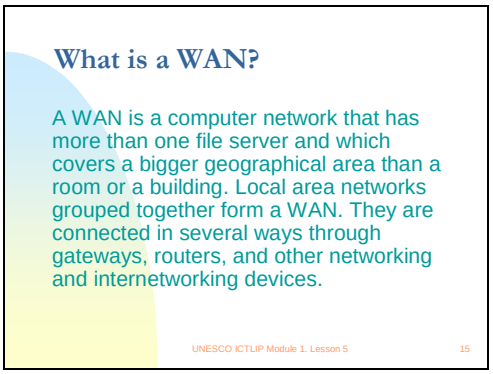

***Slide 13***




***Slide 14***



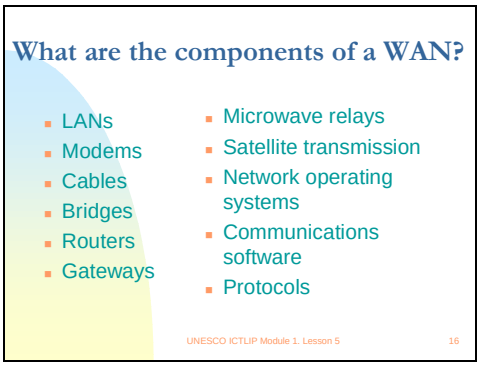

***Slide 15***



## What is a WAN?

A WAN is a computer network that has more than one file server and which covers a bigger geographical area than a room or a building. Local area networks grouped together form a WAN. They are connected in several ways through gateways, routers, and other networking and internetworking devices.

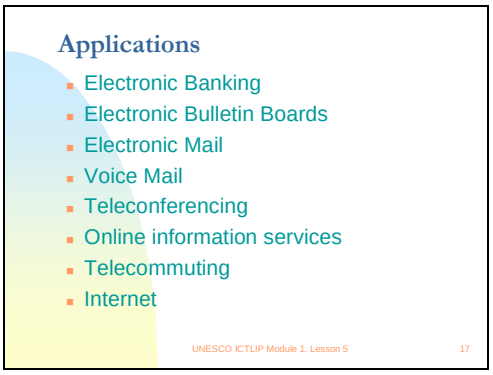
***Slide 16***




### What are the components of a WAN?

- LANs
- Modems
- Cables
- Bridges
- Gateways
- Microwave relays
- Satellite transmission
- Communications software
- Protocols

***Slide 17***




### Applications

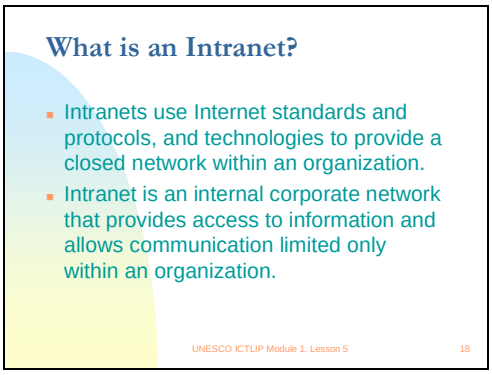
- Electronic Banking
- Electronic Bulletin Boards

- Electronic Mail
- Voice Mail
- Teleconferencing
- Online information services
- Telecommuting
- Internet

**Tip**

Visit the following sites:
1. Cisco Systems Networking Essentials. "The Building Blocks: Basic Components of Networks" [Online] URL: http://www.cisco.com/warp/public/779/smbiz/netguide/i_bldg_blocks.html
2. 3Com Small Business Learning Center [Online] URL: http://learningcenter.3com.com/courscat.asp (All the courses on this page are available for free; all you have to do is register before taking the course.)

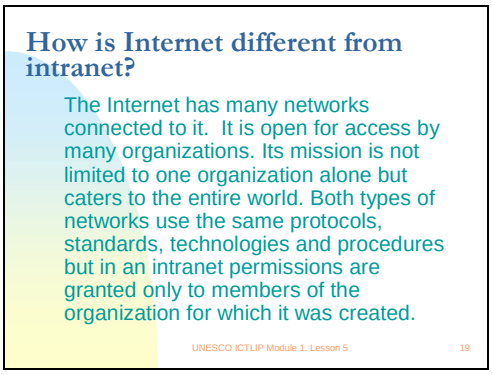
***Slide 18***




**What is an Intranet?**

Intranets use Internet standards, protocols and technologies to provide a closed network within an organization. An Intranet is an internal corporate network that provides access to information and allows communication limited only to within an organization.

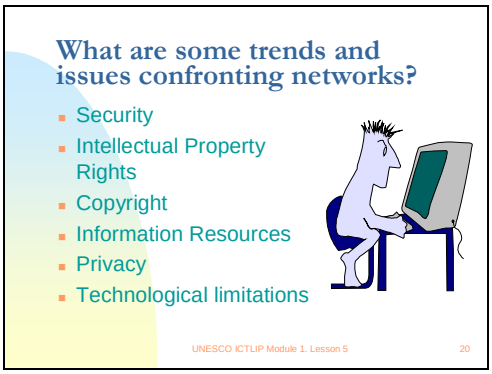
***Slide 19***



**How is Internet different from intranet?**

The Internet has many networks connected to it. It is open for access by many organizations. Its mission is not limited to one organization alone but caters to the entire world. Both types of networks use the same protocols, standards, technologies and procedures but in an intranet permissions are granted only to members of the organization for which it was created.

***Slide 20***




**What are some trends and issues confronting networks?**

- Security
- Intellectual property rights
- Copyright
- Information resources
- Privacy
- Technological limitations

**Activity 5-1**

1. Create a list of network and internetworking devices and provide a brief description / definition of each device. Enumerate as many as you can and provide pictures if possible.
2. Make a diagram on how the several components are connected to each other.

**Reference**

Capron, H. L. (1996) Computers: Tools for an information age. (4th ed.) New York: The Benjamin/Cummings Publishing Company.

Sawyer, Stacey C. (1997) Using Information technology: A practical introduction to computers & communications. (2nd ed.) Boston, Massachusetts: Irwin McGraw-Hill.

Hutchinson, S. E. & Sawyer, S. C. (2000). Computers, Communications & Information: A users introduction. (7th ed.) Boston: Irwin McGraw-Hill.

# Lesson 6

## *What is the Internet?*

# Teacher's Guide

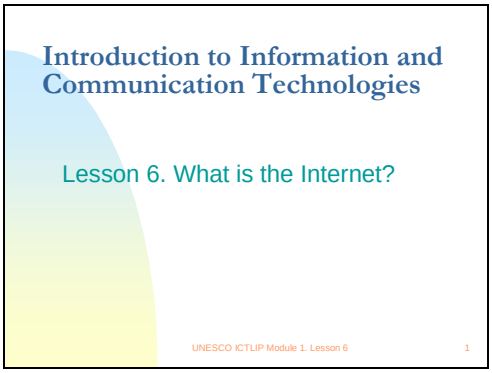
## Module 1. Introduction to Information and Communication Technologies.

### Lesson 6. What is the Internet?

**Note**

The Teacher's Guide provides notes and tips for the PowerPoint presentation that you will use in conducting the course.

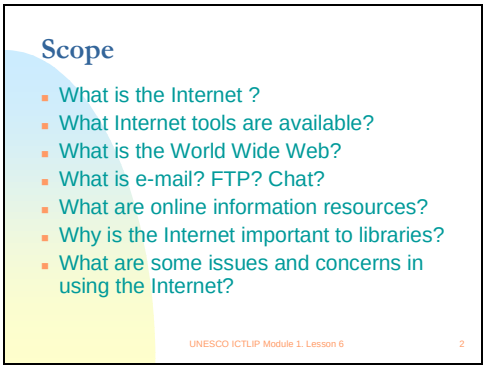
***Slide 1***



**Tip**

This is an introductory lesson about the Internet. More comprehensive lessons about the Internet will be found in Module 5: "The Internet as an information resource". This Lesson will be followed by a hands-on exercise dealing with using a Web browser to access the Internet and the World Wide Web.

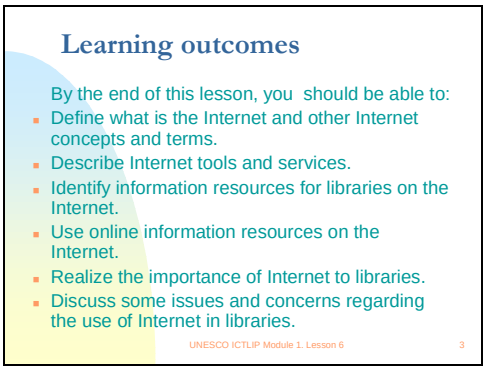
***Slide 2***



## Scope

1. What is the Internet?
2. What Internet tools are available?
3. What is the World Wide Web?
4. What is e-mail? FTP? Chat?
5. What are online information resources?
6. Why is the Internet important to libraries?
7. What are some issues and concerns in using the Internet?

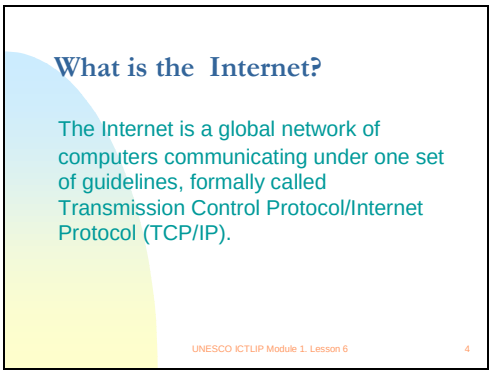
***Slide 3***




## Learning outcomes

By the end of the lesson, students should be able to:
1. Define what is the Internet and other Internet concepts and terms
2. Describe Internet tools and services
3. Identify information resources for libraries on the Internet
4. Use online information resources on the Internet
5. Realize the importance of the Internet to libraries
6. Discuss some issues and concerns regarding the use of the Internet in libraries

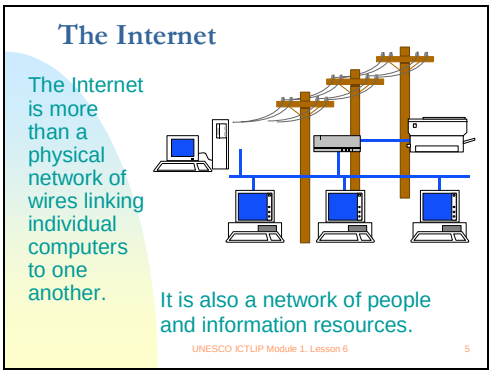
***Slide 4***



## What is the Internet?

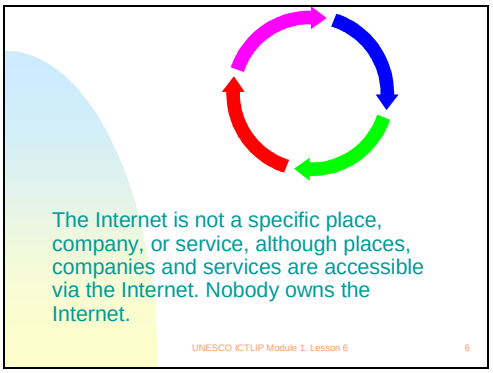
The Internet is a global network of computers communicating under one set of guidelines, formally called the Transmission Control Protocol/Internet Protocol (TCP/IP).

***Slide 5***



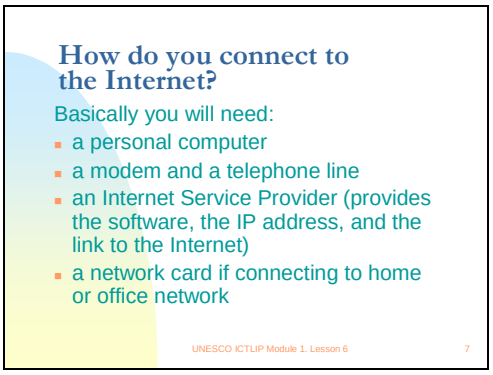

The Internet is more than a physical network of wires linking individual computers to one another. It is also a network of people and information resources.

***Slide 6***




The Internet is not a specific place, company, or service, although places, companies and services are accessible via the Internet. Nobody owns the Internet.

***Slide 7***



**How do you connect to the Internet?**

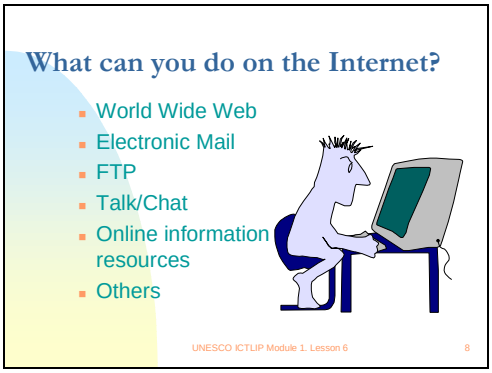
Basically you will need:

- a personal computer
- a modem and a telephone line
- an Internet Service Provider (provides the software, the IP address, and the link to the Internet)
- a network card, if connecting to home or to an office network

**Tip**

There are several different technologies that can be used to connect to the Internet. The most common and also the easiest and cheapest is to use a modem to connect to an ISP via a telephone line.

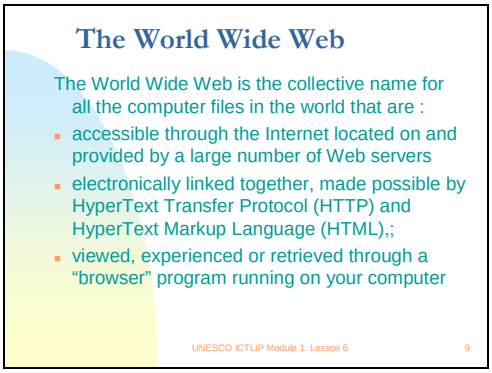
***Slide 8***




**What can you do on the Internet?**

- World Wide Web
- Electronic Mail
- FTP
- Talk / Chat
- Online information resources
- Other

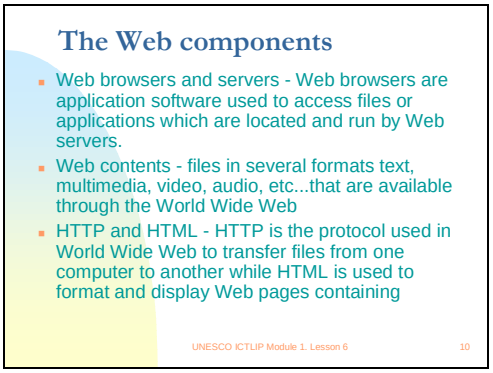
***Slide 9***



## The World Wide Web

The World Wide Web is the collective name for all the computer files in the world that are: accessible through the Internet and located on a large number of Web servers; electronically linked together through the HyperText Transfer Protocol (HTTP) and HyperText Markup Language (HTML); viewed, experienced or retrieved through a "browser" program running on your computer.

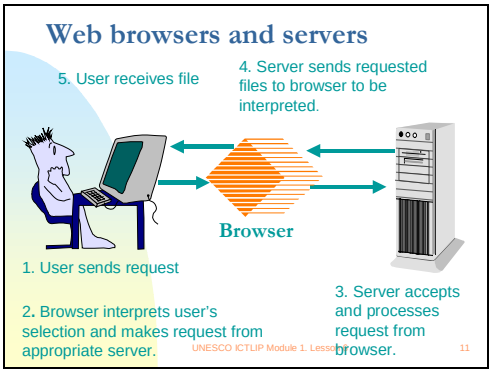
***Slide 10***




## The Web components

- Web browsers and servers - Web browsers are application software used to access files or applications, which are located and run by Web servers.
- Web contents - files in several formats - text, multimedia, video, audio, etc - that are available through the World Wide Web
- HTTP and HTML - HTTP is the protocol used on the World Wide Web to transfer files from one computer to another, while HTML is used to format and display Web pages

***Slide 11***

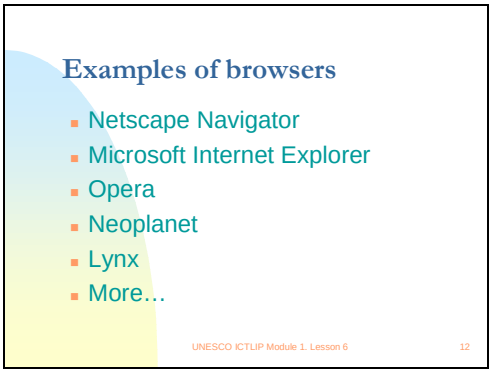



## Web Browsers and Servers

1. User sends request.
2. Browser interprets user's selection and makes request from appropriate server.
3. Server accepts and processes request from browser.

4. Server sends requested files to browser to be interpreted.
5. User receives file

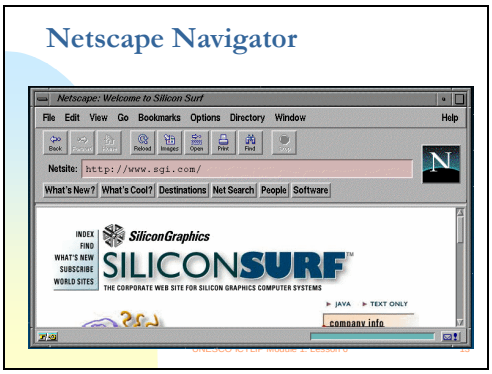
***Slide 13***




**Examples of browsers**

- Netscape Navigator
- Microsoft Internet Explorer
- Opera
- Neoplanet
- Lynx
- More …

***Slide 14***

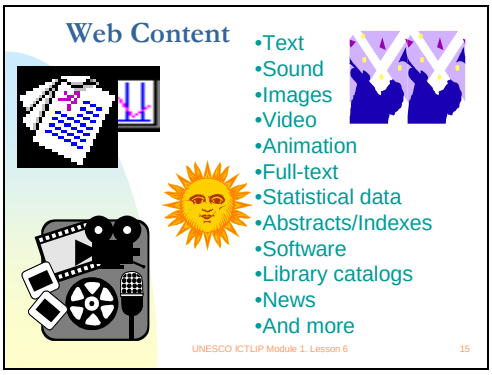



***Slide 15***

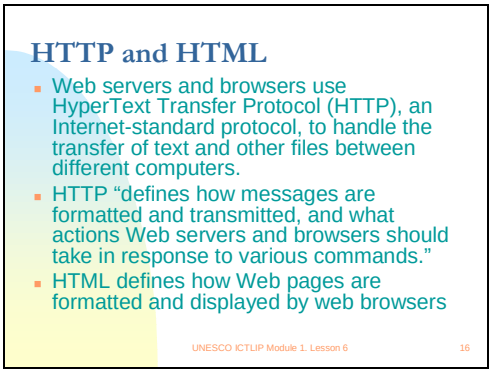
**Tip**

To know more about other browsers aside from those mentioned, go to this site: http://browserwatch.internet.com/browsers.html.

***Slide 16***



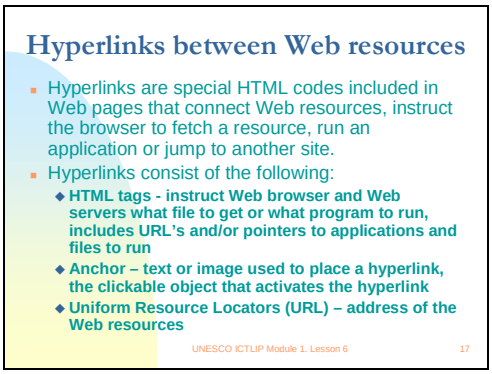

***Slide 17***




**HTTP and HTML**

- Web servers and browsers use HyperText Transfer Protocol (HTTP), an Internet-standard protocol, to handle the transfer of text and other files between different computers.
- HTTP defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands.
- HTML defines how Web pages are formatted and displayed by web browsers

***Slide 18***

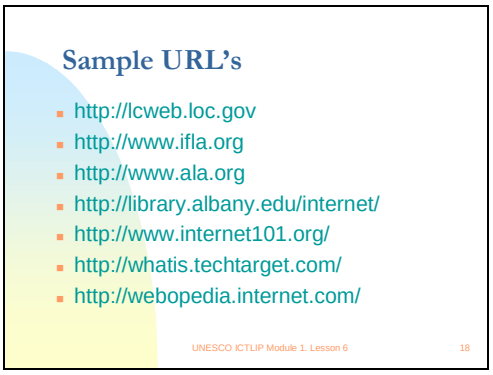


## Hyperlinks between Web resources

Hyperlinks are special HTML codes included in Web pages that connect Web resources, instruct the browser to fetch a resource, run an application or jump to another site.
Hyperlinks consist of the following:

- HTML tags - instruct Web browser and Web servers what file to get or what program to run, including URL's and/or pointers to applications and files to run
- Anchor text or images - used to place a hyperlink, the clickable object that activates the hyperlink
- Uniform Resource Locators (URL) – act as addresses for Web resources

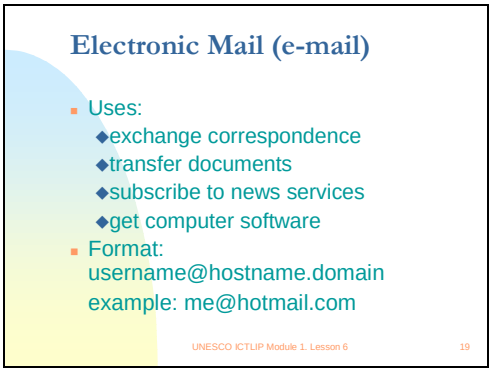
***Slide 19***




## Sample URL's

- http://lcweb.loc.gov
- http://www.ifla.org
- http://www.ala.org
- http://library.albany.edu/internet/
- http://www.internet101.org/
- http://whatis.techtarget.com/
- http://webopedia.internet.com/

***Slide 20***

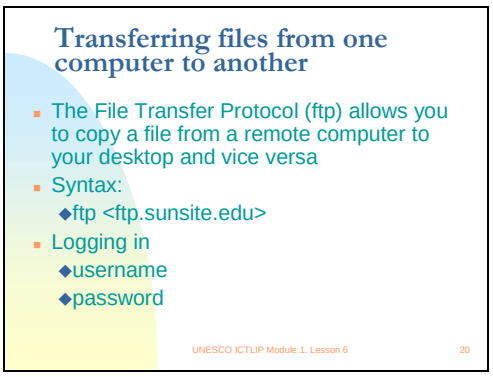


**Electronic Mail (e-mail)**

Uses:
- exchange correspondence
- transfer documents
- subscribe to news services
- get computer software

Format: username@hostname.domain
example: me@hotmail.com

***Slide 21***

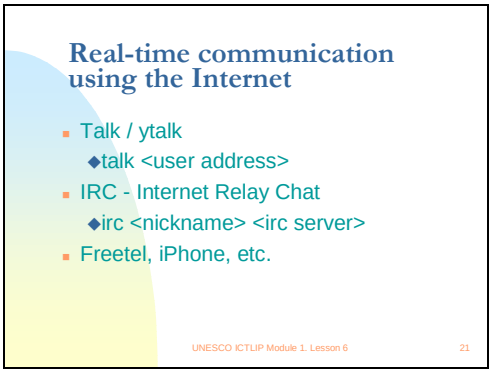



**Transferring files from one computer to another**

The File Transfer Protocol (ftp) allows you to copy a file from a remote computer to your desktop and vice versa.
Syntax:
- ftp <ftp site>

Logging in
- username
- password

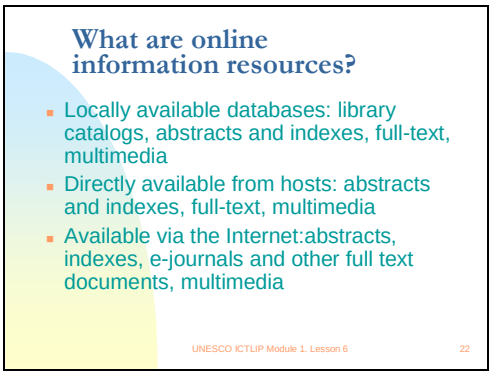
***Slide 22***




**Real-time Communication Using the Internet**
- talk/ytalk

- talk <user address>
- IRC - Internet Relay Chat
- irc <nickname> <irc server>
- Freetel, iPhone, etc.

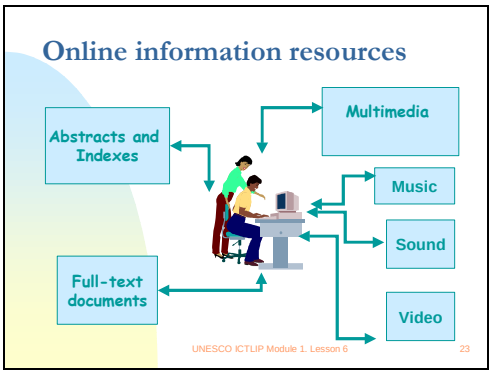
***Slide 23***



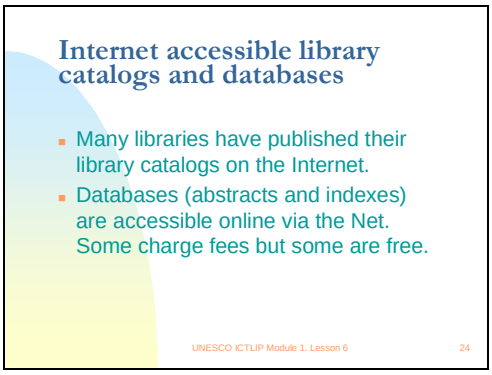

**What are online information resources?**

- Locally available databases: library catalogs, abstracts and indexes, full-text, multimedia
- Directly available from hosts: abstracts and indexes, full-text, multimedia
- Available via the Internet: abstracts, indexes, e-journals and other full- text documents, multimedia

***Slide 24***



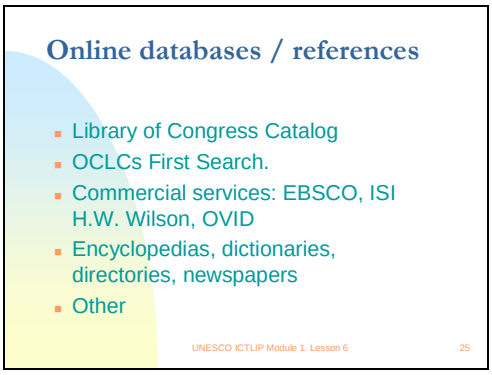

***Slide 25***



**Internet accessible library catalogs and databases**

- Many libraries have published their catalogs on the Internet.
- Databases (abstracts and indexes) are accessible online via the Net. Some charge fees but others are free.

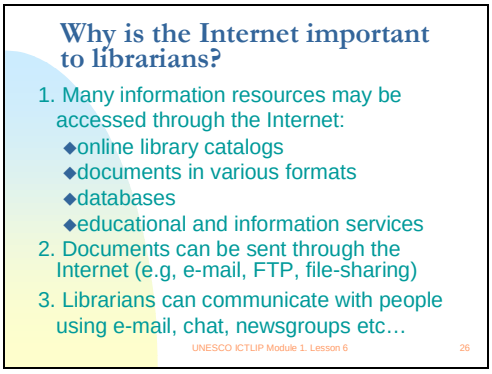
***Slide 26***




**Online databases / references**

- Library of Congress Catalog
- OCLCs First Search.
- Commercial services: EBSCO, ISI  H.W. Wilson, OVID
- Encyclopedias, dictionaries, directories, newspapers
- Other

***Slide 27***



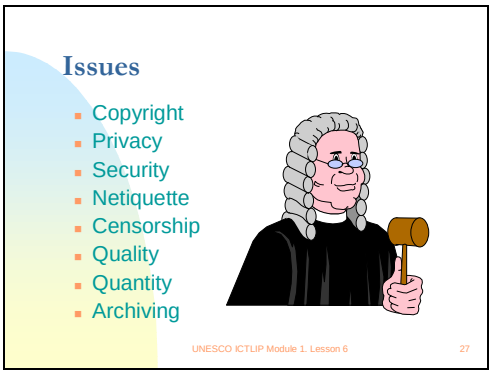

**Why is the Internet important to librarians?**

1. Many information resources may be accessed through the Internet:
- online library catalogs (OPACs)
- documents
- databases
- educational and information services

2. Documents can be sent through the Internet (e.g, inter-library loans)

3. Librarians can communicate with people using e-mail, chat, newsgroups, etc…

***Slide 28***




**Issues**

- Copyright
- Privacy
- Security
- Netiquette
- Censorship
- Quality
- Quantity
- Archiving

**Activity 6-1**

Hands on exercises in connecting to the Internet, World Wide Web, using Web browsers and using some Internet tools and services e.g. e-mail, ftp, etc…

As a starter, visit these sites:
1. Learn the Net: The animated Internet
http://www.learnthenet.com/english/animate/animate.htm

2. Learn the Net: The Web at-a-glance
http://www.learnthenet.com/english/web/000www.htm

3. University of Albany: Internet tutorials
http://library.albany.edu/internet/

4. Glencoe Norton Online
http://www.glencoe.com/norton/online/index.phtml

**Note**

During the hands-on session, just provide very simple instructions and let the students discover the Internet as they use it. Guide them along by recalling the basic concepts; point them to relevant sites on the Web containing information, and assist when they are using e-mail, ftp and other services.

**Reference**

Capron, H. L. (1996) Computers: Tools for an Information Age. (4th ed.) New York: Benjamin/Cummings Publishing Company.

Hutchinson, S. E. & Sawyer, S. C. (2000). Computers, Communications & Information: A Users Introduction. (7th ed.) Boston: Irwin McGraw-Hill.

Norton, Peter. (1995) Peter Norton's Introduction to Computers. (3rd ed.) New York: Glencoe McGraw-Hill.

Sawyer, Stacey C. (1997) Using Information Technology: A Practical Introduction to Computers & Communications. (2nd ed.) Boston, Massachusetts: Irwin McGraw-Hill.

# Lesson 7

## *What are some trends and issues you need to know about ICT?*

# Teacher's Guide

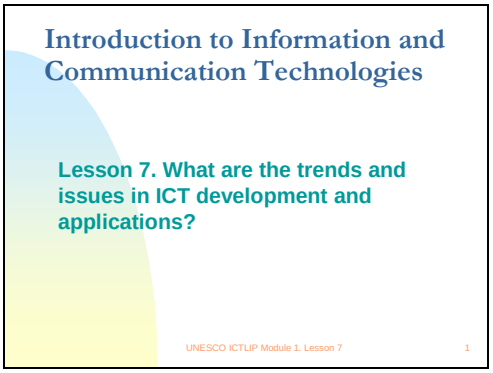
## Module 1. Introduction to Information and Communication Technologies.

### Lesson 7. What are some trends and issues that you need to know about ICT?

**Note**

The Teacher's Guide provides notes and tips for the PowerPoint presentation that you will use in conducting the course.

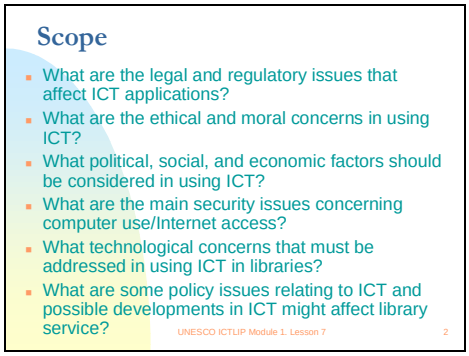
***Slide 1***



**Tip**

This is the last lesson for Module 1. Use this Lesson to recall and wrap up the concepts and lessons learned in the previous lessons, and to emphasize the trends and issues in using ICT.

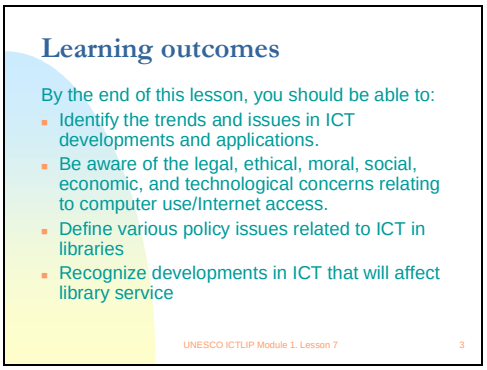
***Slide 2***



## Scope

1. What are the legal and regulatory issues that affect ICT applications?
2. What are the ethical and moral concerns in using ICT?
3. What political, social, and economic factors should be considered in using ICT?
4. What are the main security issues concerning computer use/Internet access?
5. What technological concerns must be addressed in using ICT in libraries?
6. What are the main policy issues relating to ICT and which developments in ICT might affect library service?

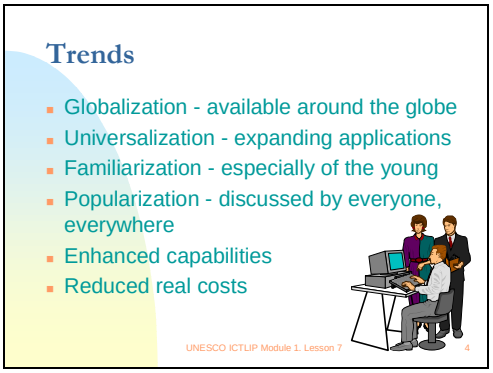
***Slide 3***




## Learning outcomes

At the end of this lesson, students should be able to:
1. Identify the trends and issues in ICT developments and applications.
2. Be aware of the legal, ethical, moral, social, economic, and technological concerns relating to computer use/Internet access.
3. Define various policy issues related to ICT in libraries
4. Recognize developments in ICT that will affect library service

***Slide 4***

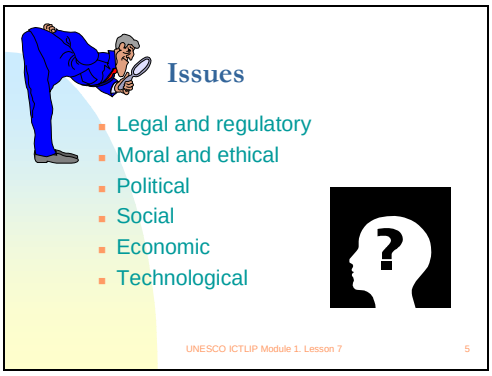



## Trends

- Globalization – available around the globe
- Universalization – expanding applications

- Familiarization-especially of the young
- Popularization – discussed by everyone everywhere
- Enhanced capabilities
- Reduced real costs

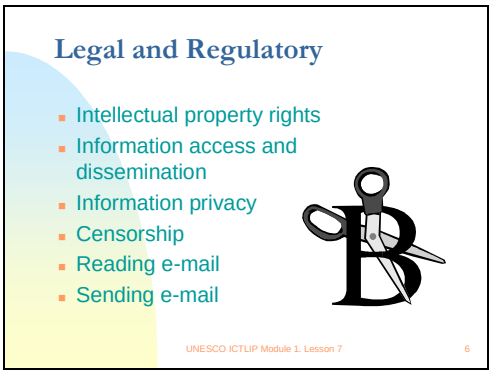
***Slide 5***




**Issues**

- Legal and regulatory
- Moral and ethical
- Political
- Social
- Economic
- Technological

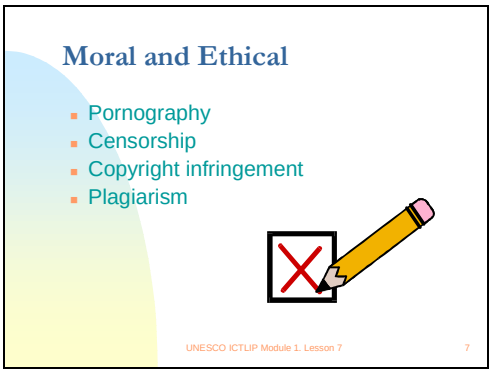
***Slide 6***




**Legal and Regulatory**

- Intellectual property rights
- Information access and dissemination
- Information privacy
- Censorship
- Reading e-mail
- Sending e-mail

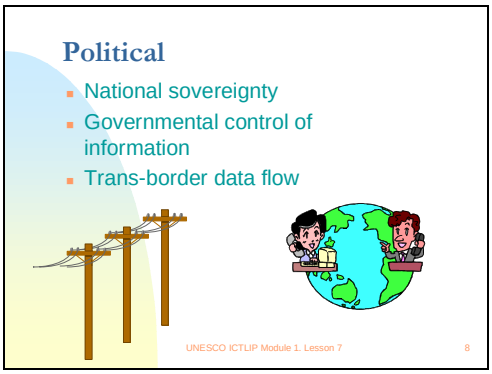
***Slide 7***




**Moral and Ethical**

- Pornography
- Censorship
- Copyright infringement
- Plagiarism

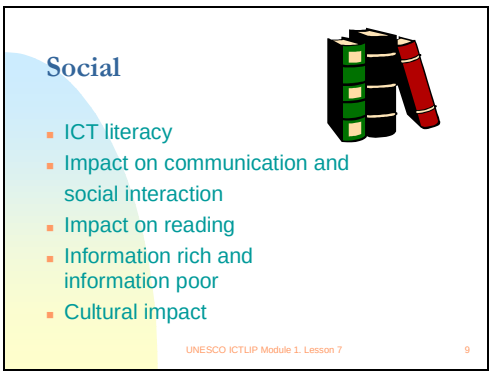
***Slide 8***




**Political**

- National sovereignty
- Governmental control of information
- Trans-border data flow

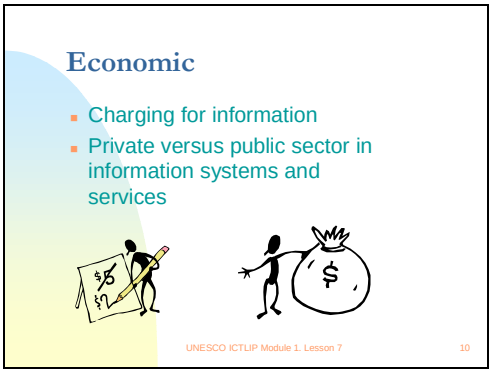
***Slide 9***



## Social

- ICT literacy
- Impact on communication and social interaction
- Impact on reading
- Information rich and information poor
- Cultural impact

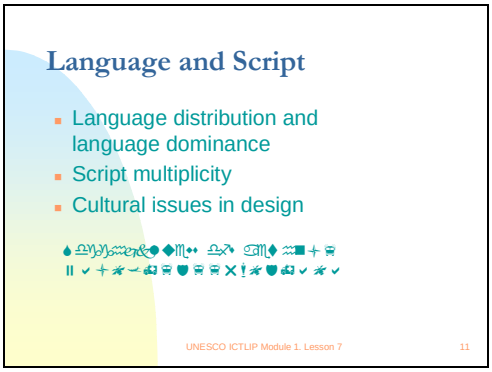
***Slide 10***




## Economic

- Charging for information
- Private versus public sector roles in information systems and services

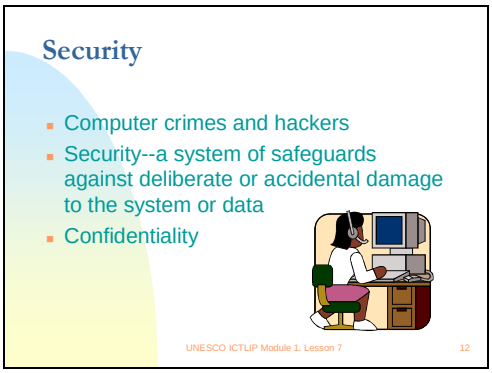
***Slide 11***




## Language and Script

- Language distribution and language dominance
- Script multiplicity
- Cultural issues in design

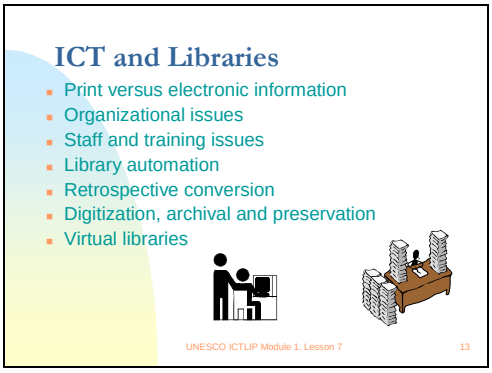
***Slide 12***




**Security**

- Computer crimes and hackers
- Security--a system of safeguards against deliberate or accidental damage to the system or data
- Confidentiality

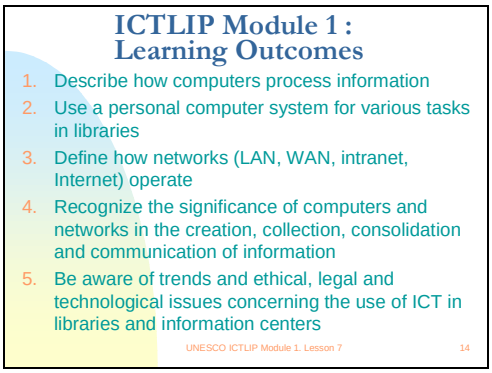
***Slide 13***




**ICT and Libraries**

- Print versus electronic information
- Organizational issues
- Staff and training issues
- Virtual libraries

***Slide 14***




**ICT Module – Learning outcomes**

1. Describe how computers process information
2. Use a personal computer system for various tasks in libraries
3. Define how networks (LAN, WAN, intranet, Internet) operate
4. Recognize the significance of computers and networks in the creation, collection, consolidation and communication of information
5. Be aware of trends and ethical, legal and technological issues concerning the use of ICT in libraries and information centers

**Note**

Wrap up Module 1 by recalling the learning outcomes and ask whether the outcomes were met after going through all the lessons.

**Activity 7-1**

Group discussion. Form into groups and list all issues and concerns regarding the use of computers and the Internet in libraries. Elaborate by citing cases and actual situations. Sum up by creating policy guidelines that could be used to address such issues and concerns.

**Reference**

The Digital Dilemma: Intellectual Property in the Information Age. Committee on Intellectual Property Rights in the Emerging Information Infrastructure, National Research Council [Online] http://books.nap.edu/html/digital_dilemma/

**Electronic Resources**

The New York Times: Technology [Online] http://www.nytimes.com/pages/technology/index.html

CNN Online [Online] http://www.cnn.com/TECH/

# Glossary of terms used in Module 1

- **Access.** Refers to the ability of the user to connect to a database, or Internet service.
- **Address.** A label that designates the location of data in a storage device.
- **Alphanumeric.** A term that is used to refer to a character set containing letters, digits, and special symbols.
- **Applications software.** A program that is designed to perform a specific task.
- **Arithmetic and logic unit**. That portion of the CPU that performs calculations and logical operations
- **ASCII.** The encoding system called American Standard Code for Information Interchange
- **Backup.** Pertains to a procedure or device to make a duplicate of a system or data for future use in the event of loss from the server or hard disk due to various factors
- **Barcode.** A code for representing data in the form of vertical bars.
- **Barcode scanners.** Hardware used to scan bar codes.
- **Binary notation.** A base two numbering system used to represent data.
- **Bit.** A shortened term used for binary digit
- **Boot**. The procedure used to start up the computer where the operating system is loaded from the hard disk to the RAM.
- **Byte**. A group of eight bits used to designate a character, a number or a symbol. It is also used to designate storage capacities, e.g., KB refers to 1000 bytes, MB to 1 Megabytes, and so on.
- **CD-ROM.** Compact Disk Read Only Memory, a type of laser disk used for storing data
- **Central processing unit.** The component of the computer that interprets instructions.
- **Character sets.** Groups of characters used to represent data.
- **Communications.** Consists of devices and systems for transmitting data over long distances.
- **Communication devices.** Hardware used to transmit data from one location to another.
- **Communications network.** Group of interconnected computers and communications devices so that data may be communicated back and forth. Examples are local area network (LAN) and wide area network (WAN).
- **Communications software.** A program that allows the computer to emulate a terminal and transfer files from one computer to another**.**
- **Compiler.** A software used to convert the source code into the Internal code of the computer
- **Computer.** A programmable electromechanical machine. Same as central processing unit. Same as processor.
- **Computer network.** Computers and computer systems that are linked together for purposes of sharing resources. Similar to a communications network.
- **Computer system.** A term used for the collection of hardware and software that includes the CPU, input devices, output devices, and storage devices.
- **Cursor.** The movable symbol on the screen that indicates where data may be entered next.

- **Data.** A representation of fact.
- **Data entry.** The encoding of data into machine-readable form.
- **Database.** The data resource for all computer-based information processing.
- **Desktop computer.** A personal computer that can be placed on top of a desk but could not be brought along conveniently like a laptop.
- **Digital.** Refers to information and/or communications signals represented in two states or in binary format—0 and 1 or on and off.
- **Diskette.** A thin flexible disk made of plastic that is used for the storage of data. Same as floppy disk.
- **DOS.** Disk operating system**.**
- **Electronic mail.** A communications tool used to send messages to and from computers. Also called e-mail.
- **Electronic library.** A library that makes use of ICT to create, collect, consolidate and communicate data and information. It has a collection of print, audio-visual and electronic materials and has the infrastructure to access the Internet and use it to transfer information.
- **Electronic resources.** Any information material that is stored in digital format in any of the secondary storage devices such as hard disk, floppy disk, CD-ROM, etc.
- **Electronic spreadsheets.** The software that permits recording of data in columns and rows and their manipulation using mathematical operators.
- **End user.** Same as user. The individual providing input or using output from the computer.
- **Flatbed scanners.** An input device that accepts imaging of sheets of paper or any flat piece of document
- **Hard copy.** A readable printed copy.
- **Hard disk.** A rigid metallic magnetic storage medium,
- **Hardware.** The physical devices that make up a computer system.
- **ICONS.** Pictographs that are used in a Windows environment to indicate operations such as copy, save, delete, etc.
- **ICT.** Information and communications technologies
- **I/O.** Input output devices
- **Information.** The output of information processing. Useful data
- **Information society**. A society that is very dependent on information. A society that treats information as a commodity that is necessary for survival.
- **Information system.** Generally a computer based system for storing and retrieving data and information.
- **Input**. Data encoded into the computer for processing
- **Input device.** Any hardware used to encode data such as the keyboard or the mouse
- **Integrated library system.** Two or more functions of a library are integrated into one library management system.
- **Intellectual property rights.** Recognized legal claim to ownership of recorded or manifested ideas.
- **Interactive.** Pertaining to online where there is immediate interaction between user and the computer.
- **Input hardware.** See input device.

- **Internet.** A global network of computers communicating under one set of guidelines formally called the TCP/IP.
- **Intranet.** An internal network belonging to an organization that uses TCP/IP with access limited only to members of the organization.
- **Joystick.** An input device that moves the cursor on the screen by pushing a vertical stick.
- **K.** An abbreviation for kilo or 1000 as in KB for kilobytes.
- **Keyboard.** A device for data entry that uses alphanumeric keys.
- **LAN.** An abbreviation for local area network or a system of computers located within a small area linked together to share resources.
- **Library science.** The discipline, which deals with the selection, acquisition, organization, storage, maintenance, retrieval, and dissemination of recorded information to meet the needs of a specific clientele. Often used synonymously with librarianship.
- **Magnetic disk.** See hard disk
- **Mainframe computer.** The second largest computer after the super computer. It is capable of great speeds of processing and big storage.
- **Memory.** Primary storage or random access memory (RAM)
- **Microprocessor.** A computer on a single chip.
- **Minicomputer.** A computer which is smaller than a main frame but bigger than a microcomputer
- **MIS.** Management information system. An information system generally designed for managers to aid them in making decisions.
- **Modem.** (Modulator-demodulator)A data transmission device used to convert signals from computers to data transmission lines and vice-versa.
- **Monitor.** A cathode ray tube used for display of soft copy output from a computer.
- **Motherboard.** A microprocessor circuit board that is used to house the microprocessor, memory and other electronic cards used to handle tasks performed by a computer. Also called a system board.
- **Mouse.** An input device that is moved across a smooth surface to point the cursor on an icon and initiate a particular task by clicking on it.
- **MS-DOS.** The disk operating system for a desk top
- **Multimedia.** Refers to information represented in more than one medium such as text, graphics, animation, video, etc.
- **Networks.** See computer network.
- **Numeric.** A reference to any of the digits 0-9
- **Online or on-line.** Refers to the connectivity of a computer to a network.
- **Online access.** Pertaining to the accessibility of a computer during the information processing cycle as differentiated from off-line.
- **Operating system.** The program that manages all the tasks performed by the computer.
- **OPACs. (**Online public access catalogs) Databases accessible to the public via a PC or terminal.
- **Output.** Information retrieved from the computer through an output device.
- **Output device.** The hardware used to produce an output from the computer.
- **Personal computer system.** A microcomputer such as the desktop and the laptop.
- **Pointing devices.** Hardware that are similar to a mouse and a joy stick in inputting data.
- **Processor.** Same as microprocessor or computer.

- **Primary storage.** The main memory or RAM where all programs and data reside during the processing.
- **Program.** A set of instructions for the computer to perform a particular function. Also called software.
- **Programmer.** A person who writes a program.
- **Programming language.** The codes used by the programmers in writing programs. The output of programming is a source code, which is later on compiled by the computer into machine language or object code. Examples are: COBOL, FORTRAN, etc.
- **RAM. (**Random Access Memory) See primary storage.
- **ROM.** (Read Only Memory) A storage device that can only be read not written to.
- **Software.** Same as program.
- **Soft copy.** Copy which is displayed on the monitor screen
- **Storage devices.** Hardware that are used to store data. It usually refers to secondary storage devices such as the hard disk.
- **Supercomputer.** Largest, fastest computer available.
- **System software.** Same as operating system.
- **Touch screen.** An input output device that is activated by touching the screen of the monitor.
- **Trackball.** An input device that is a variant of the mouse but looks like an inverted mouse.
- **User friendly.** Used to describe a user interface that enables the inexperienced user to interact successfully with the computer
- **VDT.** (Video Display unit) Similar to the CRT or the monitor.
- **WAN.** (Wide area network). A network of computer systems that is not confined to a single location
- **Web page.** A document in the World Wide Web formatted using HTML and displayed using a web browser.
- **Workstation.** A computer that permits interaction with a server. Expensive, powerful microcomputer.
- **WYSIWYG.** What you see is what you get. A term used to refer to printed output that is similar to the output on the monitor screen.

## Evaluation Form

To help us enhance the quality and effectiveness of this module, complete and return this evaluation form.

**Module:** _____
**Date:** _____
**Teacher:** _____

**Please rate the module on the following categories using the scales below by drawing a circle around the appropriate number.**

**5=Strongly Agree [SA] 4=Agree [A] 3=Neutral [N] 4=Disagree [D] 1=Strongly Disagree [SD]**

| Objectives and Content | SA | A | N | D | SD |
|---|---|---|---|---|---|
| Were the course objectives clearly stated? | 5 | 4 | 3 | 2 | 1 |
| Were the objectives achieved? | 5 | 4 | 3 | 2 | 1 |
| Were the topics presented relevant to your work? | 5 | 4 | 3 | 2 | 1 |
| Was the course structured in a logical way? | 5 | 4 | 3 | 2 | 1 |
| Were the activities appropriate to the content of this course? | 5 | 4 | 3 | 2 | 1 |
| Was the course easy to follow? | 5 | 4 | 3 | 2 | 1 |
| Was the course interesting and enjoyable? | 5 | 4 | 3 | 2 | 1 |
| Were your expectations met? | 5 | 4 | 3 | 2 | 1 |

| Presentation | SA | A | N | D | SD |
|---|---|---|---|---|---|
| Were the concepts and techniques explained clearly? | 5 | 4 | 3 | 2 | 1 |
| Were you encouraged to actively participate during the course? | 5 | 4 | 3 | 2 | 1 |
| Were your individual questions/problems discussed to your satisfaction? | 5 | 4 | 3 | 2 | 1 |
| Was the course well paced? | 5 | 4 | 3 | 2 | 1 |
| Were the lessons presented in a clear and well organized manner? | 5 | 4 | 3 | 2 | 1 |

| Teacher | SA | A | N | D | SD |
|---|---|---|---|---|---|
| Was the teacher knowledgeable in the subject matter? | 5 | 4 | 3 | 2 | 1 |
| Did the teacher present the material effectively? | 5 | 4 | 3 | 2 | 1 |
| Did the teacher show interest in and enthusiasm for the subject? | 5 | 4 | 3 | 2 | 1 |
| Was the teacher effective in answering questions clearly and constructively? | 5 | 4 | 3 | 2 | 1 |

| Learning Environment | SA | A | N | D | SD |
|---|---|---|---|---|---|
| Are the course materials easy to read? | 5 | 4 | 3 | 2 | 1 |
| Were the manual and the other handouts useful? | 5 | 4 | 3 | 2 | 1 |
| Were the visual aids useful? | 5 | 4 | 3 | 2 | 1 |
| Was the venue suitable for the course? | 5 | 4 | 3 | 2 | 1 |
| Was the time frame appropriate for the course? | 5 | 4 | 3 | 2 | 1 |

**The Training in General**

**Before the training began, how experienced were you with the subject of training?**
**1 (Novice) 2 (Intermediate) 3 (Advanced) 4 (Expert)**

**How useful was the training for your level of experience?**
**1 (Not Useful) 2 (Fairly Useful) 3 (Useful) 4 (Very Useful)**

**Do you feel you have gained new skills and knowledge? Yes No**

**What is the most important concept or skill conveyed in this training?**

_____

_____

**What is the least important concept or skill conveyed in this training?**

_____

_____

**What additional information should be included in the training?**

_____

_____

**What did you like most about the training materials?**

_____

_____

**What did you like least about the training materials?**

_____

_____

**Other comments or suggestions:**

_____

_____

_____

**THANK YOU!**

# Student's Guide

## Module 1. Introduction to Information and Communication Technologies

## Introductory note

This is Module 1 of the *ICT for Library and Information Professionals (ICTLIP) Training Package for Developing Countries*. This Package is intended to provide the knowledge and skills required to deal with the application of ICT to library and information services. It is meant for library and information personnel who may become trainers in the area. The Package has been developed by the UNESCO Asia & Pacific Regional Office with funding from the Japanese Fund in Trust for Communication and Information. It contains six modules:

Module 1 - Introduction to Information and Communication Technologies
Module 2 - Introduction to Integrated Library Systems
Module 3 - Information Seeking in an Electronic Environment
Module 4 - Database Design, and Information Storage and Retrieval
Module 5 - The Internet as an Information Resource
Module 6 - Web Page Concept and Design: Getting a Web Page Up and Running

The Student's Guide contains the following:

- Module Introduction
  - Introductory note
  - Learning outcomes
  - Course outline
  - Learning environment
  - Duration
  - Course content and schedule
  - Typographical conventions
- Handouts: Lessons 1-7
- Glossary
- Activities
- List of references

**Learning outcomes:**

Module 1 covers the basic concepts of information and communication technologies, the impact of ICT on society and the reasons why librarians need to acquire ICT knowledge and skills.

By the end of the course, students should be able to:

1. Describe how computers process information
2. Use a personal computer system for various tasks in libraries

3. Define how networks (LAN, WAN, intranet, Internet) operate
4. Recognize the significance of computers and networks in the creation, collection, consolidation and communication of information
5. Be aware of trends and ethical, legal and technological issues concerning the use of ICT in libraries and information centers

**Note:** The content of Module 1 must be understood by all students (either by students first completing Module 1, or as a result of prior knowledge of ICT) before they proceed with the remaining five modules in the *ICTLIP Training Package*.

**Course Outline**

***Lesson 1. Why do librarians need to know about ICT and acquire skill in its use?***

*Scope*

- What are ICT?
- What is the impact of ICT on Society?
- What is the impact of ICT on the library and other information centers?
- What is the impact of ICT on the librarian and on library education?
- What are the major trends and issues in libraries that resulted from ICT?

*Objectives*

At the end of this lesson, students should be able to:

- Identify the impact of ICT on the work environment in libraries
- Realize the impact of ICT on information formats, access and delivery
- Recognize ICT as tools that librarians can and must use to meet the information requirements of users

***Lesson 2. How do computers work?***

*Scope*

- What is a computer?
- What are the elements of a computer system?
- What are the different types of computer systems?
- What are the components of a data processing cycle?
- What is the role of a computer in the data processing cycle?
- What are some trends in the development of computers?

*Objectives*

At the end of the lesson, students should be able to:

- Describe how computers process information
- List the elements of a computer system

- Identify the different types of computer systems and their uses
- Explain the data processing cycle
- Define the role of computers in the data processing cycle
- Be aware of development trends in ICT

***Lesson 3. What are the hardware components of a computer?***

*Scope*

- What is hardware?
- What is an input device?
- What is a processor?
- What is an output device?
- What is a storage device?
- What other hardware are found in a computer?
- What are some general trends in the development of computers?

*Objectives*

At the end of this lesson, students should be able to:

- Identify the hardware components of a personal computer system
- List major input and output devices
- Explain the functions of processing, memory, storage and communication devices
- Realize the significance of each hardware component in processing information
- Be familiar with general trends in the development of the different hardware components of a computer

***Lesson 4. What are the software components of a computer?***

*Scope*

- What is software?
- What are the two kinds of software?
- What is programming?
- What are viruses and how do you deal with them?
- How do computers respond to different character sets?
- What are some general trends in software development?

*Objectives*

At the end of this lesson, students should be able to:

- Define the function of software in a computer system
- Distinguish between an operating system and an application system
- List different types of operating systems and application software
- Define what are programming languages
- Identify and avoid computer viruses

- Compare different character sets
- Be aware of general trends in software development

***Lesson 5. What are the components of a network?***

*Scope*

- What is a network?
- What are the components of a network?
- What are the different types of networks?
- What are the different LAN topologies?
- What is intranet? Internet?
- What are the trends and issues in the development of networks?

*Objectives*

At the end of this lesson, students should be able to:

- Define what is a network
- Identify the components of a network and their role in the network
- Describe the different types of networks
- Discuss the different LAN topologies
- Differentiate between WAN and LAN / intranet and Internet
- Enumerate trends and issues in the development of networks

***Lesson 6. What is the Internet?***

*Scope*

- What is the Internet?
- What Internet tools are available?
- What is the World Wide Web?
- What is e-mail? FTP? Chat?
- What are online information resources?
- Why is the Internet important to libraries?
- What are some issues and concerns in using the Internet?

*Objectives*

At the end of this lesson, students should be able to:

- Define what is the Internet and other Internet concepts and terms
- Describe Internet tools and services
- Identify information resources for libraries on the Internet
- Use online information resources on the Internet
- Realize the importance of Internet to libraries
- Discuss some issues and concerns regarding the use of Internet in libraries

***Lesson 7. What are some trends and issues that you need to know about ICT?***

*Scope*

- What are the legal and regulatory issues that affect ICT applications?
- What are the ethical and moral concerns in using ICT?
- What political, social, and economic factors should be considered in using ICT?
- What are the main security issues concerning computer use/Internet access?
- What technological concerns that must be addressed in using ICT in libraries?
- What are the main policy issues relating to ICT and which developments in ICT might affect library service?

*Objectives*

At the end of this lesson, students should be able to:

- Identify the trends and issues in ICT developments and applications
- Be aware of the legal, ethical, moral, social, economic, and technological concerns relating to computer use/Internet access
- Define various policy issues related to ICT in libraries
- Recognize developments in ICT that will affect library service

**Learning Environment**

The training room must have the facilities and technical support required to carry out the course. It should have computers with CD-ROM drives and online access to the Internet and other resources such as OPACs and CD-ROM databases. The Module should be conducted by a teacher who is knowledgeable and skilled in using computers, the Internet, CD-ROMs and a variety of electronic resources, and who is skilled in teaching courses of this nature.

**Duration**

The Module is designed for a one-week course of 40 hours: 8 hours per day for five days.

**Course content and schedule**.

| Day | Lessons |
|---|---|
| Day 1 | Lesson 1. Why do librarians need to know about ICT and acquire skill in its use?<br>Lesson 2. How do computers work? |
| Day 2 | Lesson 3. What are the hardware components of a computer? |
| Day 3 | Lesson 4. What are the software components of a computer? |
| Day 4 | Lesson 5. What are the components of a network?<br>Lesson 6. What are the components of the Internet? |
| Day 5 | Lesson 7. What are some trends and issues that you need to know about ICT? |

**Typographical conventions**

**Activity**

**Activity for the students**

**Reference**

**Reference and further reading materials**

**Glossary**

**Glossary of terms used in the module**

# Lesson 1

## *Why do librarians need to know about ICT and acquire skill in its use?*

# Introduction to Information and Communication Technologies

**Lesson 1. Why do librarians need to know about ICT and acquire skill in its use?**



## Rationale

In Asia, information is recognized as an important resource but the ICT tools to create, collect, consolidate and communicate information are not yet used in the majority of libraries. Libraries are seldom included in the technology vision of institutions because librarians have not been able to convince management that libraries need ICT.



## Scope

- What are ICT?
- What is the impact of ICT on Society?
- What is the impact of ICT on the library and other information centers?
- What is the impact of ICT on the librarian and on library education?
- What are the major trends and issues in libraries that resulted from ICT?

## Learning outcomes

By the end of this lesson, you should be able to:

- Identify the impact of ICT on the work environment in libraries
- Realize the impact of ICT on information formats, access and delivery
- Recognize ICT as tools that librarians can and must use to meet the information requirements of users



## What are ICT?

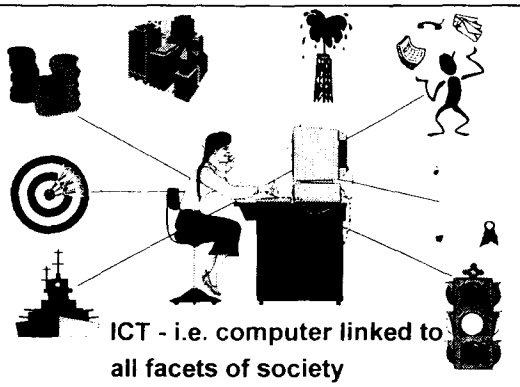
Information
Communication
Technologies

ICT are the hardware and software that enable society to create, collect, consolidate and communicate information in multimedia formats and for various purposes.



## Impact of ICT on society

Developments in ICT have brought about the merger of the computing, information, communications, entertainment, mass media industries thereby providing a means of exchanging information in the digital format used by computers.



ICT - i.e. computer linked to all facets of society



## What is the response of industry and government to the information society?

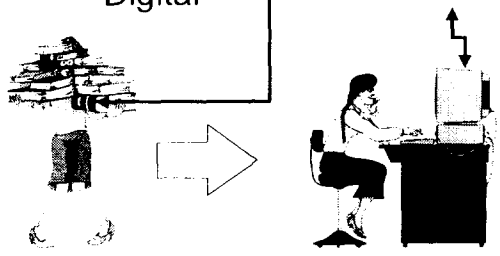
- Increased production and availability of more powerful ICT hardware and software
- Provision of more efficient national and global information infrastructures for more efficient access and delivery of information
- Increased production and publication of multimedia digital information



## What is the impact of ICT on the library and other information centers?

- ICT made information creation in digital format possible.
- ICT made online access and file transfer possible
- ICT made networking and sharing of information resources possible

## Shift from Print to Digital




**ICT has made the transfer of digital information from remote sites possible**



## Impact of digital information materials on libraries

- Digital information can be sent in multiple copies simultaneously over information networks in fractions of a minute or even of a second. There is no need for users with PCs attached to the network to physically go to the library. They can access information via their PCs.
- Digital information can be cut and pasted from one document into another
- Digital information may be free or cheaper than print equivalents
- Digital information often modifies librarians' roles in various ways



## What are the effects of these developments on the user community?

- Increases level of technology literacy
- Increases demand for better and faster access to information
- Aggravates discrepancies between the information rich and information poor.

## What is the impact of ICT on librarians and library education?

- Need for ICT knowledge
- Need for ICT skill
- Need for ICT tools
- Need for continuous learning in the context of rapidly changing ICT

*Library schools must integrate ICT into their curricula and short courses to produce graduates who can cope with the changing work environment.*



## What are the perceived roles of librarians in an information society?

- **Creators:** developers and producers of information products and services
- **Collectors**: librarians, archivists and records managers
- **Communicators:** information workers, extension workers, subject specialists
- **Consolidators**: reference librarians, information brokers, analysts

*(A Curriculum for an Information Society, 1998)*



## What will be the trends in the development of libraries?

The library will :

- be networked
- be stocked with a core collection that is multimedia
- have access to global information
- become digital
- become virtual

## Challenges to libraries

- Collection development
- Resource sharing through networking
- Faster direct communication among scientists and researchers
- Virtual vs. onsite reference service: push and pull technologies
- Better document delivery systems
- Better abstracting and indexing systems
- Availability of full-text materials on the Internet
- Information management vs. collection management



## Conclusion

Libraries and librarians must cope with the demands of an information society. Librarians must have the knowledge, skills and tools in handling digital information to be efficient creators, collectors, consolidators and communicators of information. Librarians with the knowledge, skills and tools required of information professionals in an information society will be the key success factors in enabling the library to perform its role as an information support system for society.

# Lesson 2

## *How do computers work?*

# Introduction to Information and Communication Technologies

**Lesson 2. How do computers work?**



## Rationale

The lesson will introduce you to the computer. Your knowledge about the elements of the computer and how they work will enable you to easily understand the lessons on hardware, software and networks.



## Scope

- What is a computer?
- What are the elements of a computer system?
- What are the different types of computer systems?
- What are the components of a data processing cycle?
- What is the role of a computer in the data processing cycle?
- What are some trends in the development of computers?

## Learning Outcomes

By the end of this lesson, you should be able to:

- Describe how computers process information
- List the elements of a computer system
- Identify the different types of computer systems and their uses
- Explain the data processing cycle
- Define the role of computers in the data processing cycle
- Be aware of development trends in ICT



## What is a computer?

A computer is a machine with electronic and electromechanical parts. It is programmable and is capable of performing the following functions:

- Accept data (input)
- Process data
- Generate output (information)
- Store data/information
- Retrieve/send data/information



## Development of computers

- The beginning of the commercial computer age began on June 14, 1951 with the delivery of UNIVAC--Universal Automatic Computer to the U.S. Bureau of Census
- Prior to this, however, Charles Babbage invented the Difference Engine and conceived of another machine called Analytical Engine. The latter had all the components of the computer input, output, processing and storage. Babbage is called the father of computers.

## What are the so-called computer generations?

- First generation, 1951-1958: Vacuum tubes were used as the internal computer components, punched cards and magnetic tapes for storing data, and machine language for programming.
- Second generation, 1959-1964: Transistors replaces vacuum tubes, assembly language and high level languages replaced machine language, and the removable disk pack replaced punched cards. Transistors enabled manufacturers to produce smaller computers.



## Generations (continued)

- Third generation, 1965-1970: Integrated circuits --complete electronic circuits on a silicon chip were developed. ICs led to the production of even smaller computers called mini computers. Software became more sophisticated and interactive processing possible
- Fourth generation, 1971-present. The microprocessor or computer on a chip was developed. This made PCs, and other applications possible (calculators, banking,...)
- Fifth generation, present and beyond - recent and emerging technologies, i.e. voice recognition, artificial intelligence, neural systems, quantum computers,...)



## Elements of a computer system

- 1. People - the most important part and beneficiary of a computer system, generally categorized as either end-users or developers
- 2. Procedures - are descriptions of how things are done, i.e. manuals, documentations, ...
- 3. Data/Information - raw facts (data) and processed data (information) that are used to produce the desired result

## Elements of a computer system

- 4. Hardware - the physical element of a computer system categorized according to the basic operations they perform: input, processing, output, storage and communications.
- 5. Software - provides the step by step instructions that tell the computer what to do. Generally software is divided into system software and application software.
- 6. Communications - refers to the electronic transfer of data from one place to another



## What are the different types of computer systems?

- In general, computers are sorted according to physical size and processing power.
- The different types are: Supercomputer Mainframe, Minicomputer, Microcomputer (Desktop,Laptop, Notebook, Palmtop), Microcontroller



## How is data represented in the computer?

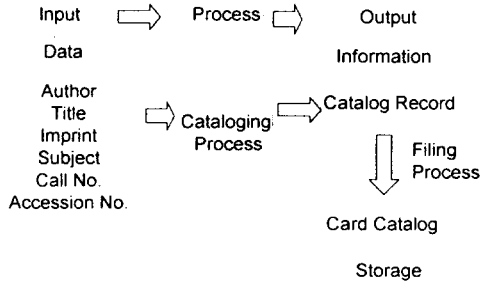
Computers represent data as two-state systems. This means that the computer recognizes only two numbers, 0 and 1. Larger numbers, letters and special characters are formed using combinations of 0 and 1. Each of these two numbers is called a **bit** from the words **b**inary dig**it.** The combination of bits to form meaningful characters or numbers is called a **byte.**

## What coding schemes are used to form meaningful bytes of data?

- There are usually 8 bits in a byte. The coding scheme ASCII (As-key) and ASCII-8 or extended ASCII has been adopted as a standard by the US government and by computer manufacturers.
- ASCII can have 128 combinations of 7 bits each while ASCII-8 can have as many as 1256 combinations

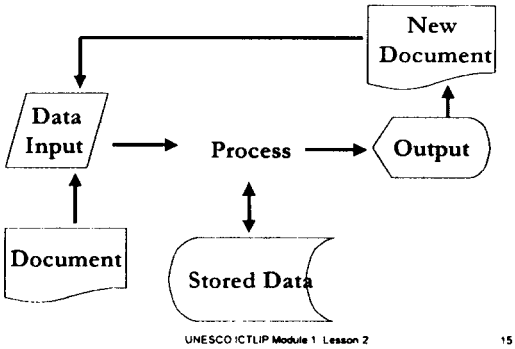


## How is data processed into information?






## The Information Processing Cycle



## What is the role of computers in the information cycle?

- Accept data through input devices
- Process data using microprocessors
- Store data for interactive use in the RAM and for longer periods of storage in the ROM and hard disks
- Output data through output devices.



## What are the advantages of using computers for data processing?

- Faster data input, processing and retrieval
- Tireless--can work 24 hours a day, 7 days a week
- Less prone to error
- Produce output requirements easily
- Could send and retrieve data from other computers if in a network



## What are some disadvantages of using computers?

- Require skilled manpower for design and programming and data encoding
- Require electricity
- Require air conditioning for non-stop work
- Expensive to acquire and maintain
- Require frequent upgrade due to fast developments in hardware and software
- Require regular staff training

## What are some general trends in computers?

- Moore's Law: Computing power doubles approximately every 18 months
- Faster processors
- Bigger storage capacity
- Bigger memory
- Stand alone>>>Network>>>Distributive computing
- Software bloat
- Lower cost



## What are some general trends in hardware?

- Downsizing:
  - Mainframe >>> PC>>Pocket PC
- Right sizing
- Increasing memory:
  - RAM 1MB to at least 256 MB
- Increasing storage:
  - Hard disk 10 MB to 20 GB
- Decreasing cost
- Increasing processor speed:
  - PC XT to Pentium 4



## What are some general trends in software?

- More sophisticated software
- Bigger storage requirement
- Bigger memory requirement
- More user friendly:
  - DOS to Windows

## Conclusion

Computers are reliable and efficient tools for data processing and information retrieval.There are advantages and disadvantages in using them. The efficiency of these tools is dependent on the specifications of the computer hardware, the software, database design and the user.

# Lesson 3

## *What are the hardware components of a computer?*

# Introduction to Information and Communication Technologies

**Lesson 3. What are the hardware components of a computer?**



## Rationale

The hardware components are the tangible components of the computer. A knowledge of the tangible components will enable you to understand how the parts relate to one another. It will also help you troubleshoot when you meet problems in operating computers.



## Scope

- What is hardware?
- What is an input device?
- What is a processor?
- What is an output device?
- What is a storage device?
- What other hardware are found in a computer?
- What are some general trends in the development of computers?

## Learning Outcomes

By the end of this lesson, you should be able to:

- Identify the hardware components of a personal computer system
- List major input and output devices
- Explain the functions of processing, memory, storage and communication devices
- Realize the significance of each hardware component in processing information
- Be familiar with general trends in the development of the different hardware components of a computer



## What is hardware?

Hardware is the physical component of a computer system. It refers to the electromechanical parts and devices that make up a computer. Generally, hardware is categorized according to which of the five basic computer operation it performs:

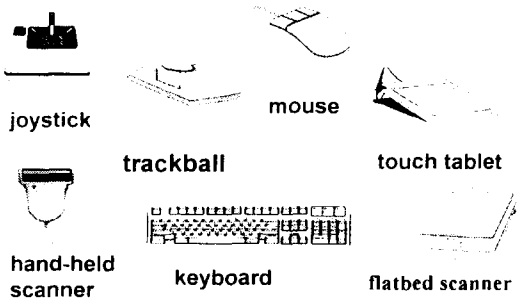
- Input devices
- Processors and memory
- Output devices
- Secondary storage devices
- Communications / networking devices



## What are input devices?

Input hardware are used to enter data into a computer by encoding via keyboard, direct reading through scanners and pointing devices like the mouse. Input hardware converts data, e.g.. text, image, drawings into a form that a computer can understand and use.

## Input Devices






## What is processing hardware?

- The processor and the main memory devices are the brains of the computer. Housed by the system unit, the processor also known as the CPU (central processing unit) interprets and executes instructions while the main memory serves as the computer's "work space". The processing power of a computer largely depends on the speed of the processor and size of its main memory. Faster processor results to faster execution of instructions and bigger memory would entail bigger "work space".



## What is the processor?

- Also called the microprocessor, the device that interprets and executes instructions. It is the brain of the computer. It is also called a chip.
- The faster the speed of the processor, the faster the execution of instructions.

## Some examples of processors

- Intel CPU's = Celeron, Pentium III, Pentium 4; from 500 MHz - 1.5 GHz
- Apple/Motorola CPU's = Power PC G3, G4; from 500 MHz - 700 MHz
- AMD CPU's = K6, K7, Duron, Athlon; 500 MHz - 1.5 GHz
- Cyrix CPU's = Cyrix MII, VIA Cyrix III; 333MHz - 600 MHz



## What is memory?

- The computer's workspace where application instructions and data are held during operation is called memory also known as main memory, primary storage or RAM (Random Access Memory).
- The capacity of a memory is important because this is where data and programs are stored while they are active, thus bigger memory means bigger workspace.



## Random Access Memory (RAM)

- The amount of memory available determines the kind of software that can be run and how much data can be manipulated. The available RAM at present 32 Mb, 64 Mb, 128 Mb or more.
- Whatever data is held in the RAM is erased when the computer is reset or the power is turned off.

## Read Only Memory (ROM)

Aside from the RAM, the computer also has a ROM (Read only memory) which is used to store the boot program and other low-level information that enable the computer to start up and to recognize its hardware parts.



## Output devices

Hardware used to display/ produce the output of the computer system after processing data

The output of computer processing is the usable information that the user requires. This information can be presented to the user in a variety of forms, depending on the output device.



## Output Devices

**Main output devices are monitors for displaying the output and printers for producing a permanent copy.**

**dot-matrix printer**



**monitor**

**laser printer**

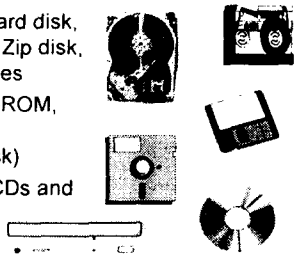
## What are storage devices?

- The hardware used to retain data for future use are called storage devices. These devices may be found inside or outside the computer.
- There are different kinds of storage devices. Among these are: optical devices (CD-ROM, DVD), some are magnetic devices (tapes, disks).



## Examples of storage devices

- Magnetic: Hard disk, Floppy disk, Zip disk, Jaz disk, tapes
- Optical--CD-ROM, DVD (Digital Versatile Disk)
- Rewritable CDs and DVDs





## What are magnetic disks?

- Floppy disks or diskettes are round pieces of flat plastic that store data as magnetized spots on sectors and tracks. The popular size is the 3.5-inch disk that can store 1.4 MB of data.
- Bigger disk capacities are also available. These are the Zip disk (100MB - 250MB) and the Jaz disk (2GB). Both require special drives. They are used for backing up data.
- Magnetic disks with still bigger capacities are called hard disks (10GB – 80GB).

## Hard disk

- The hard disk is the mass storage device for software applications and data files. It provides a semi-permanent storage place for data. At present hard disks have high capacities.
- For the PC users, hard disks ranging from 10GB to 80GB of storage space are available in the market while those available to big companies and corporations can go as high as terabytes of storage space.



## What are magnetic tapes?

- Magnetic tapes are another type of storage medium. They are made of flexible plastic coated on one side with a magnetic material. Data is represented in magnetized spots.
- They are used primarily for backing-up data that are stored onsite or offsite for data recovery in case of data loss through natural calamities or accidental/intentional man made disasters.



## What are CD-ROMs?

- CD-ROMs (Compact Disc Read Only Memory) are optical storage devices. They are read and written by lasers. They are used commercially to store system software, application software, and data. Examples of data stored are: Bibliographic resources (Catalog and index), abstracts, and multimedia products (including sound, video and images).
- CD-ROM can store up to 650MB of data. New ones can store up to 700 MB and efforts are being made to double this capacity to 1.3GB of disc space.

## CD-R and CD-RW

- New types of optical storage devices like CD-R's and CD-RW's allow you to record and rewrite data in a blank compact disc. Data on CD-ROM cannot be edited since the disk is a read-only medium.
- CD-R (CD-Recordable) are discs used to record data. Data recorded in a blank CD-R can not be rewritten, if deleted the space used to store the data is no longer recovered.
- Data written in CD-RW (CD-Read Write) can be erased and rewritten without a lost of storage space just like a hard disk drive. However, data stored in CD-RW can only be read by multiread CD drives like CD-RW devices and other compatible devices with the corresponding software.



## DVD and rewritable DVD

- DVD (Digital Versatile Disc): are optical discs share the same overall dimensions of a CD, but have significantly higher capacities - a minimum of 4.7GB (enough for a full-length movie) to 17GB (double sided). DVD drives are backward-compatible with CD-ROMs.
- Two competing technologies using different standards for a rewritable DVD is currently available: DVD-RAM and DVD+RW. Both allow data storage and recording digital video onto 4.7 GB DVD disc just like a CD-RW.
- However rewritable DVD is still in its infancy stage, thus it would be wise to wait until the technology has matured to ensure that support for its standards and compatibility with various media and devices will be widely available.



## Communications

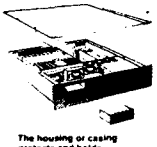
- Communications hardware also called networking devices are used to extend the processing capabilities of a computer system by providing means of transferring data and applications from one computer system to another.
- Communications hardware are used to link to existing communication networks like the Internet that allows electronic transfer of information anytime, anywhere.

## Other hardware components

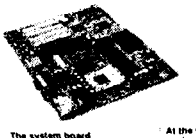
In addition to the input/output devices, memory, processor, ROM, and storage devices, there are other hardware components that help in the computer's performance. Among these are: the housing, the power source, the mother board, the bus, etc.



## Computer housing, system board, ports, expansion cards ...



The housing or casing protects and holds the parts of the computer together.



The system board connects the CPU and other components of the computer.

At the back of the system casing you'll see the different ports that serve as the interface to different peripheral devices.

Expansion cards are circuit boards that provide more memory or control peripheral devices such as video adapter cards, network interface cards, ...

## Inside the system casing

If you open the system casing you'll see all the different components connected to each other.

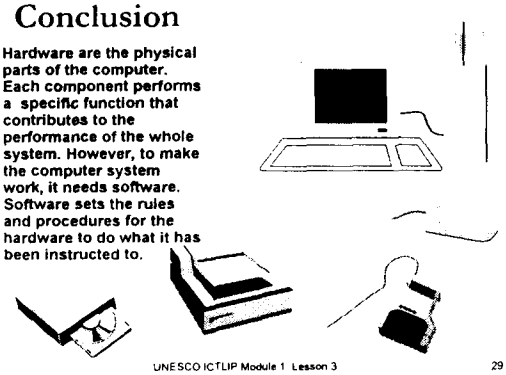
## General trends in development of hardware components

- Miniaturization
- Cheaper parts
- More varied devices -- i.e. more input / output / storage devices
- Better compatibility between hardware of different manufacturers



## Conclusion

- **Hardware are the physical parts of the computer. Each component performs a specific function that contributes to the performance of the whole system. However, to make the computer system work, it needs software. Software sets the rules and procedures for the hardware to do what it has been instructed to.**



# Lesson 4

## *What are the software components of a computer?*

# Introduction to Information and Communication Technologies

**Lesson 4. What are the software components of computers?**



## Rationale

- A computer system is generally composed of hardware and software.
- Hardware make up the physical components. Software make up the set of instructions for the computer. Without software, the computer will not be able to perform the tasks that you would like it to do.



## Scope

- What is software?
- What are the two kinds of software?
- What is programming?
- What are viruses and how do you deal with them?
- How do computers respond to different character sets?
- What are some general trends in software development?

## Learning outcomes

By the end of this lesson, you should be able to:

- Define the function of software in a computer system
- Distinguish between an operating system and an application system
- List different types of operating systems and application software
- Define what are programming languages
- Identify and avoid computer viruses
- Compare different character sets
- Be aware of general trends in software development



## What are the types of software?

There are two sets of instructions that a computer must follow:

- General instructions: Systems software or operating system such as DOS, Windows Unix, and Mac OS
- Specific instructions: Application software such as those used for word processing, spreadsheets, or library management



## Operating system

- An organized collection of system programs which serve as the interface between the user or application and the computer.
- It manages the hardware resources:
  - CPU management to facilitate sharing execution time of processes
  - Memory management to allocate memory resources dynamically
  - I/O management to handle reading and writing devices

## Disk Operating Systems (DOS)

- Disk Operating System (DOS) is a generic term describing any operating system that is loaded from disk devices when the system is started or rebooted.
- It is not a user friendly OS since users need to memorize commands and issue it by typing line by line. This known as command line interface. Very few end users use DOS nowadays.



## Microsoft Windows

- A graphical user interface (GUI) originally running on DOS (Windows 3.x) that allows multitasking or the ability to run several programs at the same time.
- Windows 95 / Windows NT that no longer runs on DOS
- About 75% of the world's PCs use the Windows operating system. The present versions in use are Windows 98, Windows Me and Windows 2000.



## Other operating systems

- IBM OS/2
- Macintosh OS
- SCO Unix
- Linux
- Other Proprietary OS

## Applications software

A set of instructions designed to perform a specific task such as word processing, accounting, cataloguing, library management, animation, etc.



## Types of applications software

The nature of the software depends on the application

- General purpose office software
- Business management software
- Special discipline software
- Other applications



## General purpose office software

- Word processing: Example, MS Word
- Spreadsheets: Example, Excel
- Database management systems: Example, MS Access, Oracle
- Presentation/Graphics: Example, Power Point, Corel

## What is a software suite?

A set of software with word processing, spreadsheet, database management and presentation software like MS Office is called a software suite.



## What are special purpose software?

- Desktop publishing software: Example, Microsoft Publisher
- Imaging and drawing: Example, Corel Draw, Photo Shop
- File management: Example: CDS/ISIS, INMAGIC
- Library management software: Example: Athena, GLAS, Innopac, Library Solutions



## Library Software

- Single function: Performs only one library operation such as cataloging and OPAC
- Integrated:Can perform all or many operations using data from a single database

## What is a computer virus?

- Generally a computer virus is defined as a program or a code that gains access without the users' knowledge and/or perform actions not intended by the user, often damaging data and sometimes the whole system in the process.
- Viruses are activated once unknowing users run, open, view or copy the file containing it. The action that will trigger the virus to deliver its "payload" depends on the type of virus that infected the file.
- Some security experts define viruses separately from worms, and Trojan horses.



## Characteristics of a virus*

Virus' common characteristics:

1. A virus is a self-replicating program whose main purpose is to propagate itself to as many places as possible.
2. A virus propagates itself by modifying another program to include itself.
3. A virus can only propagate itself by an act of a user of the system in which it exists. (opening/viewing files unknowing that it is infected and/or copying/transferring files from one system to another through diskettes, file transfer, e-mail, Internet and other means...)



## What is a worm?

- Worm is defined as a program propagating itself in a network of computers exploiting bugs and vulnerabilities of operating systems and application software or through guessing / breaking / stealing passwords to gain access to other machines in the network.
- Worms slow or shut down computer systems and networks due to its continuous and uncontrolled replication that consumes system resources which are needed to run "legitimate" tasks and operations.
- The worm's capability to replicate itself without any action from the users differentiates it from a virus that needs users action in order to replicate.

## What is a Trojan horse?

- A Trojan horse masquerades as a useful or entertaining program but contains hidden functions that while running may destroy files or create a "back door" that will allow an intruder to access the system. The intruder can exploit the privileges of the user e.g. view, copy, or delete files. steal passwords, reconfigure the system or use it to attack another system.
- Trojan horses unlike viruses do not spread by itself but can be as destructive.



## How do you protect yourself from viruses, worms and Trojan horses?

- Do not run any program or open any file from untrusted sources
- Always scan floppy diskettes and even CD-ROMs before using.
- Install a virus shield to automatically check diskettes and CDs
- Always get an updated version of a virus scan and cleaner.
- Always check you hard drive for possible infection, if you are connected to the Internet
- Use diskettes only after they have been cleaned



## What are other ways of ensuring security of the system and data?

- Regularly back-up your system and your data
- You may use CD-R, CD-RW, diskettes, tapes, or another hard disk for backing up your data and your system.
- Use firewalls, encryption and other security measures to protect data, computer systems and networks from intrusion and attacks done through the Internet

## How are programs written?

Programming languages are used to write programs. Some of these are:

- Low level languages--Assembler
- High level languages
  - Cobol
  - Fortran
  - C++
- Programming languages for the Internet
  - Perl
  - Java



## What are the other requirements for writing a program?

- Systems analysis and design
- Systems development--Program logic
- Software development
- Compiling
- Testing and debugging
- Implementing



## What are some problems in writing/using software?

- Programming languages are usually in English. Applications usually use the English language and the Roman alphabet. Problems arise when the user is non-English and/or is using non-Roman script.
- Computers use character sets stored in binary codes
- Different scripts use different character sets.
- Computers must know which writing system/character set they are dealing with.

## What are some problems caused by different characters sets?

- inputting data
- outputting data
- finding data
- displaying information



## What is a possible solution in dealing with different character sets?

- Use of Unicode--a huge character set to include all the world's writing systems
- Development of different character sets for different languages such as the ones developed by the Japanese and the Chinese.



## What are some future trends in software development?

- More user friendly
- Bigger in size because of more sophistication
- More customized
- More Web enabled
- More open
- More sophisticated programming languages

# Lesson 5

## *What are the components of a network?*

# Introduction to Information and Communication Technologies

**Lesson 5. What are the components of a network?**



## Rationale

The convergence of communication systems with computing and other technologies have brought about the digitization of the telephone and other telecommunications networks. Through these networks, computers are now linked with one another making it possible to communicate and share resources with anyone, anytime, anywhere.



## Scope

- What is a network?
- What are the components of a network?
- What are the different types of networks?
- What are the different LAN topologies?
- What is intranet? Internet?
- What are the trends and issues in the development of networks?

## Learning outcomes

**By the end of this lesson, you should be able to:**

- Define what is a network
- Identify the components of a network and their role in the network
- Describe the different types of networks
- Discuss the different LAN topologies
- Differentiate between WAN and LAN / intranet and Internet
- Enumerate trends and issues in the development of networks



## What is a network?

A network is a collection of computers and communications hardware and software linked together to allow sharing of resources and provide a facility for communication.



## What are the components of a network?

The components of a network are:

- Computer systems with network cards
- Communications software
- Networking and Internetworking devices
- Data / Information
- Networked / shared resources
- Users

## What are the different kinds of networks?

- Local Area Network (LAN) – a network that serves users within a confined area such as a building or a campus
- Metropolitan Area Network (MAN) – covers a geographic area the size of a city
- Wide Area Network (WAN) – covers a wide geographical area such as a country. The Internet is the best example of a WAN.

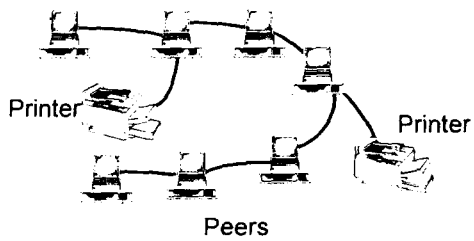


## Types of LAN

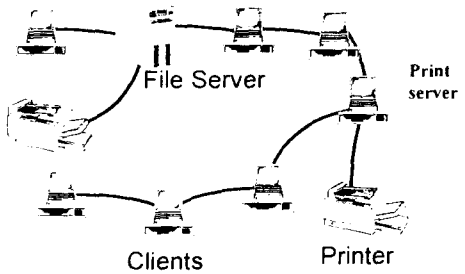
- Peer to peer - all computers on the network communicate and share resources directly with one another
- Client Server - consist of clients, computers requesting for files or applications, and server(s) that provides applications and services to other computers



## Peer to peer LAN



## Client-server LAN





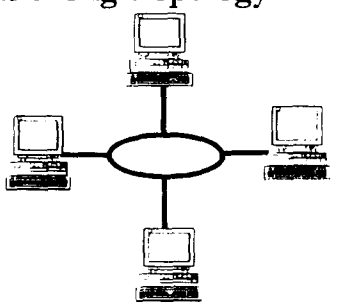

## Topologies of LANS

Networks can be laid out in different logical layout or shape called topology. The basic LAN topologies are:

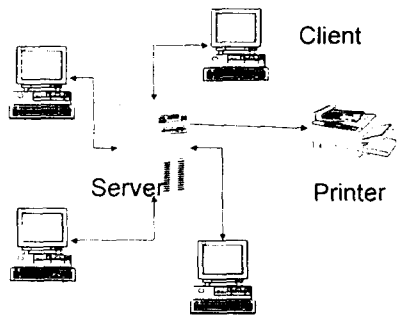
- **Star – all computers are connected to a server or a hub**
- **Ring – all computers are connected in a continuous loop**
- **Bus – all computers are connected to a common channel**



## Token Ring Topology

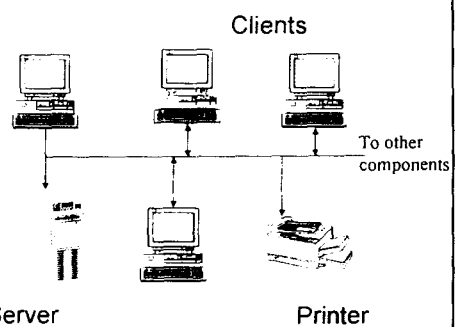


## Star Topology






## Bus Topology






## What is a WAN?

A WAN is a computer network that has more than one file server and which covers a bigger geographical area than a room or a building. Local area networks grouped together form a WAN. They are connected in several ways through gateways, routers, and other networking and internetworking devices.

## What are the WAN components?

- LANs
- Modems
- Cables
- Bridges
- Routers
- Gateways
- Microwave relays
- Satellite transmission
- Network operating systems
- Communications software
- Protocols



## Applications

- Electronic Banking
- Electronic Bulletin Boards
- Electronic Mail
- Voice Mail
- Teleconferencing
- Online information services
- Telecommuting
- Internet



## What is an Intranet?

- Intranets use Internet standards and protocols, and technologies to provide a closed network within an organization.
- Intranet is an internal corporate network that provides access to information and allows communication limited only within an organization.

## How is Internet different from intranet?

The Internet has many networks connected to it. It is open for access by many organizations. Its mission is not limited to one organization alone but caters to the entire world. Both types of networks use the same protocols, standards, technologies and procedures but in an intranet permissions are granted only to members of the organization for which it was created.



## What are some trends and issues confronting networks?

- Security
- Intellectual Property Rights
- Copyright
- Information Resources
- Privacy
- Technological limitations

# Lesson 6

## *What is the Internet?*

# Introduction to Information and Communication Technologies

**Lesson 6. What is the Internet?**



## Scope

- What is the Internet ?
- What Internet tools are available?
- What is the World Wide Web?
- What is e-mail? FTP? Chat?
- What are online information resources?
- Why is the Internet important to libraries?
- What are some issues and concerns in using the Internet?



## Learning outcomes

By the end of this lesson, you should be able to:

- Define what is the Internet and other Internet concepts and terms.
- Describe Internet tools and services.
- Identify information resources for libraries on the Internet.
- Use online information resources on the Internet.
- Realize the importance of Internet to libraries.
- Discuss some issues and concerns regarding the use of Internet in libraries.

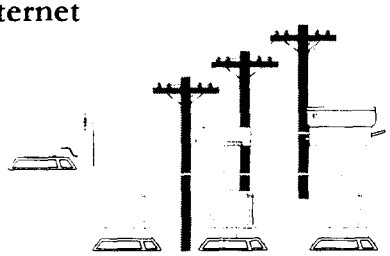
## What is the Internet?

The Internet is a global network of computers communicating under one set of guidelines, formally called Transmission Control Protocol/Internet Protocol (TCP/IP).



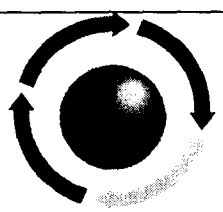
## The Internet

The Internet is more than a physical network of wires linking individual computers to one another.



It is also a network of people and information resources.





The Internet is not a specific place, company, or service, although places, companies and services are accessible via the Internet. Nobody owns the Internet.

## How do you connect to the Internet?

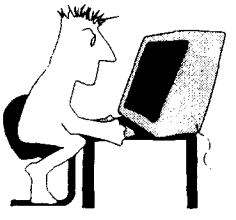
Basically you will need:

- a personal computer
- a modem and a telephone line
- an Internet Service Provider (provides the software, the IP address, and the link to the Internet)
- a network card if connecting to home or office network



## What can you do on the Internet?

- World Wide Web
- Electronic Mail
- FTP
- Talk/Chat
- Online information resources
- Others





## The World Wide Web

The World Wide Web is the collective name for all the computer files in the world that are :

- accessible through the Internet located on and provided by a large number of Web servers
- electronically linked together, made possible by HyperText Transfer Protocol (HTTP) and HyperText Markup Language (HTML),;
- viewed, experienced or retrieved through a "browser" program running on your computer

## The Web components

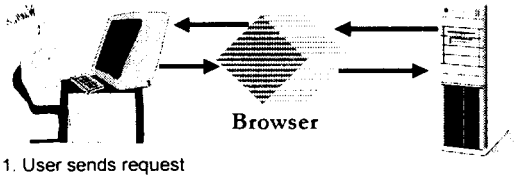
- Web browsers and servers - Web browsers are application software used to access files or applications which are located and run by Web servers.
- Web contents - files in several formats text, multimedia, video, audio, etc...that are available through the World Wide Web
- HTTP and HTML - HTTP is the protocol used in World Wide Web to transfer files from one computer to another while HTML is used to format and display Web pages containing



## Web browsers and servers

5. User receives file

4. Server sends requested files to browser to be interpreted.




1. User sends request

2. Browser interprets user's selection and makes request from appropriate server.

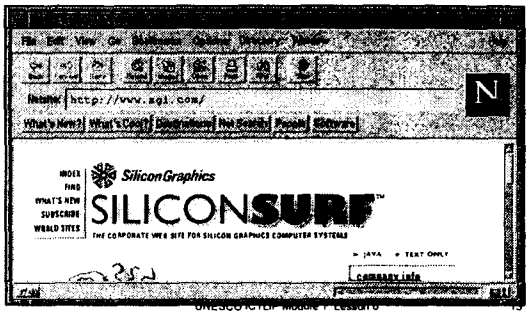
3. Server accepts and processes request from browser.



## Examples of browsers

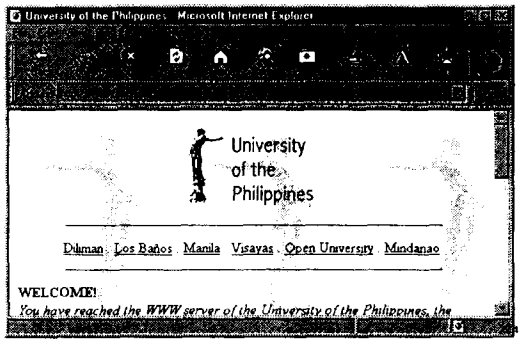
- Netscape Navigator
- Microsoft Internet Explorer
- Opera
- Neoplanet
- Lynx
- More...

## Netscape Navigator






## Microsoft Internet Explorer




## Web Content

- Text
- Sound
- Images
- Video
- Animation
- Full-text
- Statistical data
- Abstracts/Indexes
- Software
- Library catalogs
- News
- And more

## HTTP and HTML

- Web servers and browsers use HyperText Transfer Protocol (HTTP), an Internet-standard protocol, to handle the transfer of text and other files between different computers.
- HTTP "defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands."
- HTML defines how Web pages are formatted and displayed by web browsers



## Hyperlinks between Web resources

- Hyperlinks are special HTML codes included in Web pages that connect Web resources, instruct the browser to fetch a resource, run an application or jump to another site.
- Hyperlinks consist of the following:
  - **HTML tags - instruct Web browser and Web servers what file to get or what program to run, includes URL's and/or pointers to applications and files to run**
  - **Anchor – text or image used to place a hyperlink, the clickable object that activates the hyperlink**
  - **Uniform Resource Locators (URL) – address of the Web resources**



## Sample URL's

- http://lcweb.loc.gov
- http://www.ifla.org
- http://www.ala.org
- http://library.albany.edu/internet/
- http://www.internet101.org/
- http://whatis.techtarget.com/
- http://webopedia.internet.com/

## Electronic Mail (e-mail)

- Uses:
  - exchange correspondence
  - transfer documents
  - subscribe to news services
  - get computer software
- Format:
  username@hostname.domain
  example: me@hotmail.com



## Transferring files from one computer to another

- The File Transfer Protocol (ftp) allows you to copy a file from a remote computer to your desktop and vice versa
- Syntax:
  - ftp <ftp.sunsite.edu>
- Logging in
  - username
  - password



## Real-time communication using the Internet

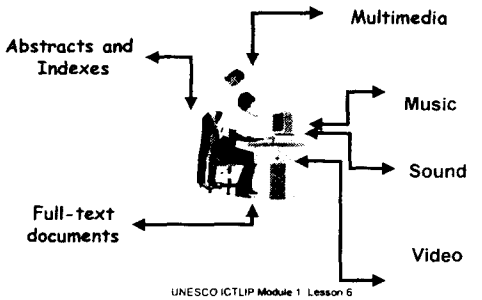
- Talk / ytalk
  - talk <user address>
- IRC - Internet Relay Chat
  - irc <nickname> <irc server>
- Freetel, iPhone, etc.

## What are online information resources?

- Locally available databases: library catalogs, abstracts and indexes, full-text, multimedia
- Directly available from hosts: abstracts and indexes, full-text, multimedia
- Available via the Internet:abstracts, indexes, e-journals and other full text documents, multimedia



## Online information resources






## Internet accessible library catalogs and databases

- Many libraries have published their library catalogs on the Internet.
- Databases (abstracts and indexes) are accessible online via the Net. Some charge fees but some are free.

## Online databases / references

- Library of Congress Catalog
- OCLCs First Search.
- Commercial services: EBSCO, ISI H.W. Wilson, OVID
- Encyclopedias, dictionaries, directories, newspapers
- Other



## Why is the Internet important to librarians?

1. Many information resources may be accessed through the Internet:
   - online library catalogs
   - documents in various formats
   - databases
   - educational and information services
2. Documents can be sent through the Internet (e.g, e-mail, FTP, file-sharing)
3. Librarians can communicate with people using e-mail, chat, newsgroups etc...



## Issues

- Copyright
- Privacy
- Security
- Netiquette
- Censorship
- Quality
- Quantity
- Archiving

# Lesson 7

## *What are some trends and issues you need to know about ICT?*

# Introduction to Information and Communication Technologies

**Lesson 7. What are the trends and issues in ICT development and applications?**



## Scope

- What are the legal and regulatory issues that affect ICT applications?
- What are the ethical and moral concerns in using ICT?
- What political, social, and economic factors should be considered in using ICT?
- What are the main security issues concerning computer use/Internet access?
- What technological concerns that must be addressed in using ICT in libraries?
- What are the main policy issues relating to ICT and which developments in ICT might affect library service?



## Learning outcomes

By the end of this lesson, you should be able to:

- Identify the trends and issues in ICT developments and applications.
- Be aware of the legal, ethical, moral, social, economic, and technological concerns relating to computer use/Internet access.
- Define various policy issues related to ICT in libraries
- Recognize developments in ICT that will affect library service

## Trends

- Globalization - available around the globe
- Universalization - expanding applications
- Familiarization - especially of the young
- Popularization - discussed by everyone, everywhere
- Enhanced capabilities
- Reduced real costs

## Issues

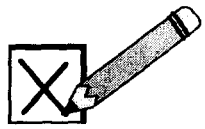
- Legal and regulatory
- Moral and ethical
- Political
- Social
- Economic
- Technological

## Legal and Regulatory

- Intellectual property rights
- Information access and dissemination
- Information privacy
- Censorship
- Reading e-mail
- Sending e-mail

## Moral and Ethical

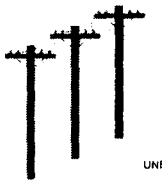
- Pornography
- Censorship
- Copyright infringement
- Plagiarism





## Political

- National sovereignty
- Governmental control of information
- Trans-border data flow



## Social

- ICT literacy
- Impact on communication and social interaction
- Impact on reading
- Information rich and information poor
- Cultural impact

## Economic

- Charging for information
- Private versus public sector in information systems and services

## Language and Script

- Language distribution and language dominance
- Script multiplicity
- Cultural issues in design



## Security

- Computer crimes and hackers
- Security--a system of safeguards against deliberate or accidental damage to the system or data
- Confidentiality

## ICT and Libraries

- Print versus electronic information
- Organizational issues
- Staff and training issues
- Library automation
- Retrospective conversion
- Digitization, archival and preservation
- Virtual libraries

## ICTLIP Module 1 : Learning Outcomes

1. Describe how computers process information
2. Use a personal computer system for various tasks in libraries
3. Define how networks (LAN, WAN, intranet, Internet) operate
4. Recognize the significance of computers and networks in the creation, collection, consolidation and communication of information
5. Be aware of trends and ethical, legal and technological issues concerning the use of ICT in libraries and information centers

# Glossary of terms used in Module 1

- **Access.** Refers to the ability of the user to connect to a database, or Internet service.
- **Address.** A label that designates the location of data in a storage device.
- **Alphanumeric.** A term that is used to refer to a character set containing letters, digits, and special symbols.
- **Applications software.** A program that is designed to perform a specific task.
- **Arithmetic and logic unit**. That portion of the CPU that performs calculations and logical operations
- **ASCII.** The encoding system called American Standard Code for Information Interchange
- **Backup.** Pertains to a procedure or device to make a duplicate of a system or data for future use in the event of loss from the server or hard disk due to various factors
- **Barcode.** A code for representing data in the form of vertical bars.
- **Barcode scanners.** Hardware used to scan bar codes.
- **Binary notation.** A base two numbering system used to represent data.
- **Bit.** A shortened term used for binary digit
- **Boot**. The procedure used to start up the computer where the operating system is loaded from the hard disk to the RAM.
- **Byte**. A group of eight bits used to designate a character, a number or a symbol. It is also used to designate storage capacities, e.g., KB refers to 1000 bytes, MB to 1 Megabytes, and so on.
- **CD-ROM.** Compact Disk Read Only Memory, a type of laser disk used for storing data
- **Central processing unit.** The component of the computer that interprets instructions.
- **Character sets.** Groups of characters used to represent data.
- **Communications.** Consists of devices and systems for transmitting data over long distances.
- **Communication devices.** Hardware used to transmit data from one location to another.
- **Communications network.** Group of interconnected computers and communications devices so that data may be communicated back and forth. Examples are local area network (LAN) and wide area network (WAN).
- **Communications software.** A program that allows the computer to emulate a terminal and transfer files from one computer to another**.**
- **Compiler.** A software used to convert the source code into the Internal code of the computer
- **Computer.** A programmable electromechanical machine. Same as central processing unit. Same as processor.
- **Computer network.** Computers and computer systems that are linked together for purposes of sharing resources. Similar to a communications network.
- **Computer system.** A term used for the collection of hardware and software that includes the CPU, input devices, output devices, and storage devices.
- **Cursor.** The movable symbol on the screen that indicates where data may be entered next.

- **Data.** A representation of fact.
- **Data entry.** The encoding of data into machine-readable form.
- **Database.** The data resource for all computer-based information processing.
- **Desktop computer.** A personal computer that can be placed on top of a desk but could not be brought along conveniently like a laptop.
- **Digital.** Refers to information and/or communications signals represented in two states or in binary format—0 and 1 or on and off.
- **Diskette.** A thin flexible disk made of plastic that is used for the storage of data. Same as floppy disk.
- **DOS.** Disk operating system**.**
- **Electronic mail.** A communications tool used to send messages to and from computers. Also called e-mail.
- **Electronic library.** A library that makes use of ICT to create, collect, consolidate and communicate data and information. It has a collection of print, audio-visual and electronic materials and has the infrastructure to access the Internet and use it to transfer information.
- **Electronic resources.** Any information material that is stored in digital format in any of the secondary storage devices such as hard disk, floppy disk, CD-ROM, etc.
- **Electronic spreadsheets.** The software that permits recording of data in columns and rows and their manipulation using mathematical operators.
- **End user.** Same as user. The individual providing input or using output from the computer.
- **Flatbed scanners.** An input device that accepts imaging of sheets of paper or any flat piece of document
- **Hard copy.** A readable printed copy.
- **Hard disk.** A rigid metallic magnetic storage medium,
- **Hardware.** The physical devices that make up a computer system.
- **ICONS.** Pictographs that are used in a Windows environment to indicate operations such as copy, save, delete, etc.
- **ICT.** Information and communications technologies
- **I/O.** Input output devices
- **Information.** The output of information processing. Useful data
- **Information society**. A society that is very dependent on information. A society that treats information as a commodity that is necessary for survival.
- **Information system.** Generally a computer based system for storing and retrieving data and information.
- **Input**. Data encoded into the computer for processing
- **Input device.** Any hardware used to encode data such as the keyboard or the mouse
- **Integrated library system.** Two or more functions of a library are integrated into one library management system.
- **Intellectual property rights.** Recognized legal claim to ownership of recorded or manifested ideas.
- **Interactive.** Pertaining to online where there is immediate interaction between user and the computer.
- **Input hardware.** See input device.

- **Internet.** A global network of computers communicating under one set of guidelines formally called the TCP/IP.
- **Intranet.** An internal network belonging to an organization that uses TCP/IP with access limited only to members of the organization.
- **Joystick.** An input device that moves the cursor on the screen by pushing a vertical stick.
- **K.** An abbreviation for kilo or 1000 as in KB for kilobytes.
- **Keyboard.** A device for data entry that uses alphanumeric keys.
- **LAN.** An abbreviation for local area network or a system of computers located within a small area linked together to share resources.
- **Library science.** The discipline, which deals with the selection, acquisition, organization, storage, maintenance, retrieval, and dissemination of recorded information to meet the needs of a specific clientele. Often used synonymously with librarianship.
- **Magnetic disk.** See hard disk
- **Mainframe computer.** The second largest computer after the super computer. It is capable of great speeds of processing and big storage.
- **Memory.** Primary storage or random access memory (RAM)
- **Microprocessor.** A computer on a single chip.
- **Minicomputer.** A computer which is smaller than a main frame but bigger than a microcomputer
- **MIS.** Management information system. An information system generally designed for managers to aid them in making decisions.
- **Modem.** (Modulator-demodulator)A data transmission device used to convert signals from computers to data transmission lines and vice-versa.
- **Monitor.** A cathode ray tube used for display of soft copy output from a computer.
- **Motherboard.** A microprocessor circuit board that is used to house the microprocessor, memory and other electronic cards used to handle tasks performed by a computer. Also called a system board.
- **Mouse.** An input device that is moved across a smooth surface to point the cursor on an icon and initiate a particular task by clicking on it.
- **MS-DOS.** The disk operating system for a desk top
- **Multimedia.** Refers to information represented in more than one medium such as text, graphics, animation, video, etc.
- **Networks.** See computer network.
- **Numeric.** A reference to any of the digits 0-9
- **Online or on-line.** Refers to the connectivity of a computer to a network.
- **Online access.** Pertaining to the accessibility of a computer during the information processing cycle as differentiated from off-line.
- **Operating system.** The program that manages all the tasks performed by the computer.
- **OPACs. (**Online public access catalogs) Databases accessible to the public via a PC or terminal.
- **Output.** Information retrieved from the computer through an output device.
- **Output device.** The hardware used to produce an output from the computer.
- **Personal computer system.** A microcomputer such as the desktop and the laptop.
- **Pointing devices.** Hardware that are similar to a mouse and a joy stick in inputting data.
- **Processor.** Same as microprocessor or computer.

- **Primary storage.** The main memory or RAM where all programs and data reside during the processing.
- **Program.** A set of instructions for the computer to perform a particular function. Also called software.
- **Programmer.** A person who writes a program.
- **Programming language.** The codes used by the programmers in writing programs. The output of programming is a source code, which is later on compiled by the computer into machine language or object code. Examples are: COBOL, FORTRAN, etc.
- **RAM. (**Random Access Memory) See primary storage.
- **ROM.** (Read Only Memory) A storage device that can only be read not written to.
- **Software.** Same as program.
- **Soft copy.** Copy which is displayed on the monitor screen
- **Storage devices.** Hardware that are used to store data. It usually refers to secondary storage devices such as the hard disk.
- **Supercomputer.** Largest, fastest computer available.
- **System software.** Same as operating system.
- **Touch screen.** An input output device that is activated by touching the screen of the monitor.
- **Trackball.** An input device that is a variant of the mouse but looks like an inverted mouse.
- **User friendly.** Used to describe a user interface that enables the inexperienced user to interact successfully with the computer
- **VDT.** (Video Display unit) Similar to the CRT or the monitor.
- **WAN.** (Wide area network). A network of computer systems that is not confined to a single location
- **Web page.** A document in the World Wide Web formatted using HTML and displayed using a web browser.
- **Workstation.** A computer that permits interaction with a server. Expensive, powerful microcomputer.
- **WYSIWYG.** What you see is what you get. A term used to refer to printed output that is similar to the output on the monitor screen.

**Lesson 1**

**Activity 1-1**

Discuss the effects of ICT in your life (e.g. at home, in the workplace). Cite two concrete examples and elaborate.

The effects of Information and Communication Technologies in everyday life:

1.

2.

**Activity 1-2**

Form groups and discuss the effects of ICT developments on your libraries. Focus on what are the problems, possible solutions and opportunities brought by the changes. Wrap it up and present to the class a summary of what your group have discussed.

The effects of Information and Communication Technologies in the libraries:

Uses of ICT in libraries:

Problems in using ICT in libraries:

Solutions and opportunities:

Summary

**Lesson 2**

**Activity 2-1**

Read more about the history of the computer and its development by reading computer books and magazines. Make a timeline of important events in PC history.

**Personal computer history:**

*For example visit this site: 20 Years of the IBM personal computer*
*http://www.pc.ibm.com/ww/pcanniversary/1981.html*

**Lesson 2**

**Activity 2-2**

Make a timeline predicting what technology is like in the future. Write a short paragraph explaining and defending your predictions.

Lesson 3

**Activity 3-1**
Do the hands-on exercises.

| Lesson 3. What is Hardware? | Hands-on Exercises |
|---|---|

1. **Check if the hardware is connected to an AVR or a UPS that is connected to a power supply.**

2. **Turn on the AVR or UPS.**

3. **Switch on the computer by pushing the button marked power. Wait for the computer to finish "booting up."**

4. **View the computer' s basic system information flashed on the screen while booting up e.g. the operating system, processor type, installed RAM (random-access memory) etc.**

5. **View the computer' s desktop configuration: date & time, volume settings, desktop display options (e.g. background options, screen settings, screen saver options etc.).**

6. **Use the mouse to shut down the computer.**

7. **Close the AVR or UPS.**

8. **Remove the plug from the wall socket.**

**Lesson 4**

**Activity 4-1**
Do the hands-on exercises.

| Lesson 4. What is Software? | Hands-on Exercises |
|---|---|

## Using an operating system (Windows)

- **Open computer.**
- **Click on the start button.**
- **Choose Windows Explorer and click to open the application.**
- **Explore the icons and what you can do with them.**
- **Select and move desktop icons. Create a desktop icon.**
- **Work with Windows. Recognize the toolbar, menu bar, status bar, scroll bar etc.**
- **Reduce a desktop window, enlarge a desktop window.**
- **Recognize the different parts of a desktop bar, toolbar, menu bar, status bar, scroll bar.**
- **Insert a diskette on the diskette drive. Format the diskette.**
- **Create a new folder. Label it with your name.**
- **Open the folder by pointing the mouse on it and clicking. You will not see anything in it.**
- **Open the "*my documents*" folder. Choose a file and drag the document to your folder.**
- **Open the folder with your name on it.**
- **Open the file in the folder by double clicking on it.**
- **Save the file in your folder on to your diskette.**
- **Drag your folder to your diskette.**

## Organizing files

- **Examine a directory/folder. View some of the attributes: name, size, date when last updated etc.**
- **Re-name files and directories/folders.**
- **Copy, Move, paste, delete files.**
- **Make backup copies of data onto a diskette.**
- **Use Cut and Paste functions to move files within directories/folders.**
- **Use the Find tool to locate a file or a directory/folder.**
- **Search by name, date created, file or directory/folder type**
- **Delete directory/folder**

## Using a word processing software

- **Open a word processing program by pointing and clicking on start, going to programs and then to word.**
- **Open an existing document. Close document.**
- **Open a new file.**
- **Compose a short description about yourself (about five sentences).**
- **Save the file by pointing at the "file" on menu bar and clicking on "save as". Give the file a name and save in the folder "my documents".**
- **Edit the file by using the icons or the menu under "format."**
- **Print the file.**
- **Save file onto a diskette.**
- **Close Word.**

## Other editing operations

- **Use insert command.**
- **Use undo command.**
- **Use insert command.**
- **Use select command.**
- **Use cope, paste, move commands.**
- **Use search and replace command.**
- **Change fonts, use italics, underlining, and embolding.**
- **Use alignment and justification.**
- **Use lists.**
- **Use templates.**
- **Add headers and footers.**
- **Create tables.**
- **Import objects and resize.**
- **Use spell check and grammar check.**
- **Save file.**
- **Back-up by saving file on diskette.**
- **Prepare to print.**

## Using a spreadsheet

- **Open a spreadsheet application.**
- **Open an existing spreadsheet and make some changes and save.**
- **Open several spreadsheets. Close all files one by one.**
- **Create a new spreadsheet.**
- **Enter numbers in a cell.**
- **Enter text in a cell.**
- **Enter symbols or special characters in a cell.**
- **Enter simple formulas in a cell.**

- **Use the undo command.**
- **Select a cell or range of adjacent or non-adjacent cells.**
- **Use the Copy and Paste tools to duplicate cell contents in another part of a worksheet.**
- **Use the Cut and Paste tools to move cell contents within worksheet.**
- **Move cell contents between active worksheets.**
- **Move cell contents between active spreadsheets.**
- **Delete cell contents in a selected cell range.**
- **Insert rows and columns.**
- **Modify column width and row height.**
- **Delete selected rows or columns.**
- **Sort Data.**
- **Use basic arithmetic and logical formulas in a spreadsheet addition, subtraction, multiplication, and division.**
- **Use the sum function.**
- **Use the average function.**
- **Format cells to display different currency symbols.**

## Using a presentation software

- **Open a presentation application.**
- **Open an existing presentation document. Close.**
- **Create a new presentation.**
- **Choose a slide layout form.**
- **Choose background**
- **Add text.**
- **Add an image from an image library.**
- **Copy, Move, and Delete text.**
- **Use the Copy and Paste tools to duplicate text, to duplicate a slide within the presentation or re-order slides within the presentation.**
- **Delete a slide/slides within the presentation. Use formatting commands.**
- **Re-size and move text box within a slide.**
- **Import images/slides from other files.**
- **Re-size and move an image in a slide.**
- **Import other objects to slide.**
- **Copy an imported object to a master slide.**
- **Number the slides.**
- **Print slides in various views and output formats.**
- **Add/change transition/preset animation effects to slides.**
- **View the slide show.**
- **Close application.**

**Lesson 5**

**Activity 5-1**

1. Create a list of network and internetworking devices and provide a brief description / definition of each device. Enumerate as many as you can and provide pictures if possible.
2. Make a diagram on how the several components are connected to each other.

Network and Internetworking devices:

Illustration of a network:

**Lesson 6**

**Activity 6-1**

Hands on exercises in connecting to the Internet, World Wide Web, using Web browsers and using some Internet tools and services e.g. e-mail, ftp, etc...

As a starter, visit these sites:

1. Learn the Net: The animated Internet
http://www.learnthenet.com/english/animate/animate.htm

2. Learn the Net: The Web at-a-glance
http://www.learnthenet.com/english/web/000www.htm

3. University of Albany: Internet tutorials
http://library.albany.edu/internet/

4. Glencoe Norton Online
http://www.glencoe.com/norton/online/index.phtml

**Lesson 7**

**Activity 7-1**

Group discussion. Form into groups and list all issues and concerns regarding the use of computers and the Internet in libraries. Elaborate by citing cases and actual situations. Sum up by creating policy guidelines that could be used to address such issues and concerns.

Issues and concerns:

Policy guidelines:

## Lesson 1

**Reference**

Consortium for Educational Technology for University Systems (C.E.T.U.S.) Discussion Series. *The Academic Library in the Information Age: Changing Roles*. Seal Beach, CA: The Trustees of the California State University, 18 p. Available [Online] URL: http://www.cetus.org/acad_lib.pdf

National Research Council. Commission on Physical Sciences, Mathematics, and Applications. Committee on Information Technology Literacy, Computer Science and Telecommunications Board. *Being Fluent with Information Technology*. Publication. (Washington, D.C.: National Academy Press, 1999) Available [Online] URL: http://search.nap.edu/html/beingfluent/

## Lesson 2

**Reference**

Capron, H. L. (1996) Computers: Tools for an information age. (4th ed.) New York: The Benjamin/Cummings Publishing Company.

Hutchinson, S. E. & Sawyer, S. C. (2000). Computers, Communications & Information: A users introduction. (7th ed.) Boston: Irwin McGraw-Hill.

Norton, Peter. (1995) Peter Norton's Introduction to computers. (3rd ed.) New York: Glencoe McGraw-Hill.

Sawyer, Stacey C. (1997) Using Information technology: A practical introduction to computers & communications. (2nd ed.) Boston, Massachusetts: Irwin McGraw-Hill.

### Electronic Resources

Beard, J., Beaune, F. & Pradel, Zac. (2001) Computer Chronicles: From Stone to Silicon. *ThinkQuest Library of Entries.* [Online] URL http://library.thinkquest.org/22522/

LaMorte, C., Lilly, J. Computers: history and development. *Jones Telecommunications and Multimedia Encyclopedia*. [Online] URL http://www.digitalcentury .com/encyclo/update/comp_hd.html.

Runwal, R. *Engineering Design Graphics and Computer Aided Design: History and Development of Computers*. [Online] URL: http://mane.mech.virginia.edu/~engr160/Graphics/CompHist.html

## Lesson 3

**Reference**

Visit the following Web sites that have very extensive and useful information on the subject matter:

Jan's Illustrated Computer Literacy 101: Computer basics
http://www.jegsworks.com/Lessons/lessonintro.htm

Marshall Brain's How Stuff works: How PCs Work by Jeff Tyson.
http://howstuffworks.lycos.com/pc.htm

Norton Online Fourth Edition Web Portal
http://www.glencoe.com/norton/online/index.phtml

PC Guide: Introduction to the PC
http://www.pcguide.com/intro/index.htm

## Lesson 4

**Reference**

Download the free "Getting Results Book with Microsoft® Office" Online [URL]: http://download.microsoft.com/download/office97pro/gresult/97/WIN98/EN-US/gresults.exe

Howstuffworks. Brain, Marshall. "How Computer Viruses and Worms Work" Online [URL] http://www.howstuffworks.com/virus.htm

The History of Computer Programming Languages Online [URL]:
http://www.princeton.edu/~ferguson/adw/programming_languages.shtml

Introduction to Programming Languages Online [URL]:
http://www.cs.adfa.edu.au/teaching/studinfo/itf/lect200015.html

## Lesson 5

**Reference**

Capron, H. L. (1996) Computers: Tools for an information age. (4th ed.) New York: The Benjamin/Cummings Publishing Company.

Sawyer, Stacey C. (1997) Using Information technology: A practical introduction to computers & communications. (2nd ed.) Boston, Massachusetts: Irwin McGraw-Hill.

Hutchinson, S. E. & Sawyer, S. C. (2000). Computers, Communications & Information: A users introduction. (7th ed.) Boston: Irwin McGraw-Hill.

**Lesson 6**

**Reference**

Capron, H. L. (1996) Computers: Tools for an Information Age. (4th ed.) New York: Benjamin/Cummings Publishing Company.

Hutchinson, S. E. & Sawyer, S. C. (2000). Computers, Communications & Information: A Users Introduction. (7th ed.) Boston: Irwin McGraw-Hill.

Norton, Peter. (1995) Peter Norton's Introduction to Computers. (3rd ed.) New York: Glencoe McGraw-Hill.

Sawyer, Stacey C. (1997) Using Information Technology: A Practical Introduction to Computers & Communications. (2nd ed.) Boston, Massachusetts: Irwin McGraw-Hill.

**Lesson 7**

**Reference**

The Digital Dilemma: Intellectual Property in the Information Age. Committee on Intellectual Property Rights in the Emerging Information Infrastructure, National Research Council [Online] URL: http://books.nap.edu/html/digital_dilemma/

The New York Times: Technology [Online] URL: http://www.nytimes.com/pages/technology/index.html

CNN Online [Online] URL: http://www.cnn.com/TECH/