

STUDY GUIDE

MASTER OF LIBRARY AND INFORMATION SCIENCES

INTRODUCTION TO LIBRARY AND INFORMATION SCIENCES

UNITS 1-9

CODE 5501



**DEPARTMENT OF LIBRARY AND INFORMATION
SCIENCES**

ALLAMA IQBAL OPEN UNIVERSITY

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ORGANISATION OF THE COURSE

STRUCTURE OF THE COURSE

The course has been structured to make it as easy as possible for you to complete the required course work. This course consists of nine units. Each unit consists of study material of one week if you study 12-16 hours in a week. This will include studying the prescribed reading material and carrying out the various self-learning assessments.

We have organized this course to enable you to acquire the skill of self-learning. You will find a course introduction at the end of this part, which will provide you an overall view of the course. This study guide has been written to enhance the foundation of sociological ideas and issues, which are presented in the textbook. A section *course introduction* consists of a brief review of the unit in paragraph form. An effort was made to simplify those concepts, which are covered in the compulsory readings, by giving examples of our own society. Specific learning *objectives* are given which identify the basic knowledge, explanation, comparison and understanding a student should have after studying the unit. Hence, the study guide is intended to be a concise preview and learning tool to accompany the compulsory reading. So the contents are introduced briefly in the study guide:

For each unit, prescribed reading material has been classified as compulsory and suggested reading. Studying all this material is compulsory for successful completion of the course. This study guide is based on prescribed reading. After listing required reading, we have given you a few self-assessment questions and activities. These questions are meant to facilitate you in understanding and self-assessment that how much you have learned.

For this course, *weekly tutorials* are arranged in university's prescribed centres. These tutorials are not formal lectures given in any formal university, rather these are meant for group and individual discussion with the course tutor to facilitate you. So before going to attend a tutorial, prepare yourself to discuss course material with your tutor.

After completing the study of first 4 units the * Assignment No. 1 is due. Second assignment is due after the completion of next units. The student will have to present final assignment in the workshop.

HOW TO USE READING MATERIAL

As this is a course through distance education so we have organized the required course work in the following manner to help you in evolving a self-learning process in absence of formal classroom teaching.

- a. Course introduction and objectives
- b. Unit introduction and objectives
- c. The major theme of the unit is divided into sub-themes. They are listed in the beginning of every unit. A brief and simplified introduction of major topic is given in the study guide so that you can get acquainted with the material.
- d. Required reading for each unit is listed as compulsory and suggested reading.
- e. At the end of every unit we have given you few self-assessment questions for each topic or theme. These questions are not only meant to facilitate you in understanding the required reading but also to provide you an opportunity to assess yourself how far you have learned.

Although you choose your own way of studying the required reading material, you are advised to follow the steps, which are given here.

STUDY CHART

- Step 1. For clear identification of your reading material, thoroughly read description of the course.
- Step 2. Read carefully the way the reading material is to be used.
- Step 3. Complete the first quick reading of your required study materials.
- Step 4. Carefully make the second reading and note down some of the points you were not able to fully understand.
- Step 5. Carry out the self-assessment question with the help of your study material.
- Step 6. Revise your notes. It is quite possible that many of those points which you did not understand previously become clearer to you during the process of carrying out self assessment questions.

- Step 7 Prepare yourself for the tutorial meeting i.e. note down the points for discussion with other members of your group and with your course tutor.
- Step 8 Make a third and final reading of your study material. At this stage, you are also advised to keep in view the homework assignments. These assignments are compulsory for the successful completion of the course.

HOW TO ATTEND A TUTORIAL

Before attending the tutorial you are required to prepare yourself in the following manner to get maximum benefit. The first tutorial is an 'introductory tutorial' for which you are required to do following work.

- Step 1 Go through first part of the study guide, which includes.

- i. organization of the course
- ii. structure of the programme
- iii. how to use the reading material, and
- iv. assessment

- Step 2 Read carefully course introduction 2-3 times to have a better understanding of the course. It will give you an overview of the whole course. Make notes of those points which you could not fully understand or wish to discuss with your course tutor.

In tutorials 2-9 you will complete course work containing 18 study units. The way we have arranged these tutorials, it will give you an opportunity to discuss two units in one tutorial. Please see schedule of the tutorial meetings.

- Step 3 Read summary of the main themes of the concerned units around which the units is constructed.

- Step 4 Study required reading and make notes of those points you are not able to fully understand and wish to discuss with your course tutor.

METHODS OF ASSESSMENT

For each course the registered student will be assessed as following.

ASSIGNMENTS

Assignments are written exercises that you are required to complete while being at home or place of work after having studied the required material prescribed in the study guide. They are designed in a way to motivate you in reading the required readings and enabling you to relate your reading with the objectives.

After completion, you will send the assignments to your tutor within a time schedule for assessment and necessary guidance. The tutor is supposed to return the same after marking and providing necessary academic guidance and supervision. Remember that you have to present your final assignment in the workshop.

The successful completion of assignments will make you eligible to take final examination to be held at the end of the semester. To qualify each assignment, you have to obtain a minimum 40 % marks.

WORKSHOPS

Workshops are compulsory component of the post-graduate programmes. The university, near the end of every semester, will organise the workshops. Detail of the workshops will be sent to you with the course materials.

Final Assessment

Final examination (a three hour written examination) will take place at the end of the semester.

These two components (assignments and final examination) contribute 30:70 to get students final course grade.

The condition to qualify each component are given below:

- i. A minimum of 40 % in assignments
 - ii. A minimum of 33 % of the final written examination
 - iii. An aggregate of 40% of the both components i.e. assignments and final examination
 - iv. To take final examination the student has to pass assignment component.
 - v. The grade will be determined as follow
- | | |
|-----------|---|
| 40% - 54% | C |
|-----------|---|

55% - 69 %	B
70% - 79%	A
80% and above	A+

INTRODUCTION TO THE COURSE

It is half credit course comprising 9 units and is meant for the MLIS students of first semester.

The Harrods' Librarian's Glossary defines library science as "a generic term for the study of libraries and information units; the role they play in society; their various component routines and processes; and their history and future development. Used in the United States in preference to the British term *librarianship*." So the term library science may interchangeably be used with librarianship. In other words library science and librarianship are of the one and same meaning. Collection of reading material, its processing, organization and dissemination started with the advent of library. The knowledge and its implementation in respect of library may therefore be called library science or librarianship.

From the papyrus, parchment, rolls, clay tablets and paper form information we have now moved to electronic era of 21st century. It is during 20th century that a lot work of library development has taken place. The city, tablet libraries after covering a lot of distance have now crossed the age of electronic and virtual libraries.

The library was created to meet certain social necessities, and that its development is closely related not only to intellectual history but also to change in the organizational structure and the value system of its supporting culture, should be apparent from even a cursory reading of the record. The school and academic libraries of today can trace their lineage back to the tradition of the neighborhood or neighborhood club, and the medieval universities profoundly influenced them.

The mid 19th century leaders of the movement of the public libraries were well aware that they were implementing the largest changes in the human adventure—the attempt to qualify an entire population to participate in the control of political and economic systems in which they lived. It is axiomatic that the library as social instrumentality is as it has always been, conditioned and shaped by the social milieu within which it functions.

For centuries libraries have been the traditional institutions in charge of acquiring and storing recorded information for those who wish to use it. In the past they served mainly the scholarly and educated and had no great problems in delivering satisfactory service. In 20th century has witnessed major structural

changes and greater advances in education, research, science, and technology than in any previous period in history.

Information Science is offshoot of Library Science. Though it is young discipline yet it has gained unimaginable popularity in the recent past. Now it is being treated integral part of library science and the new nomenclature has emerged as Library and Information Sciences. Most of the Library Schools in Pakistan have opted this new nomenclature.

The earliest formal use of the term information science dates back to 1958 when the Institute of Information Scientists (US) was formed in the United Kingdom. According to its founder, Jason Farradane, the use of the term information scientist may have intended to differentiate information scientists from laboratory scientist, since the main concern of the members was with the management of scientific and technological information. By calling themselves information scientists the members of US obviously wanted to stress the importance of the scientific information and the processes involved in handling scientific communication, whereby their work was continuation of previous theoretical and empirical attempts to address problems of organization, growth and dissemination of recorded knowledge carried out prior to the 2nd world war.

As far as Information Science is concerned, it is an applied science directed towards the development of Information Systems that augment human functions and facilitate the generation, use and transfer of knowledge directed towards solving problems and making decisions.

Some people wrongly regard Information Science as computers added to library procedures especially to information storage and retrieval. Often, Information Science is regarded as the scientific study of the communication of information in society.

The following problems can be identified in Information Science

- terminological problems,
- information systems,
- interdisciplinary nature,
- distinction between library and information science, and
- education and training for information professionals.

Library and information science consider communication of, mainly, recorded information, between human generators and human users. It aims at

conceptualizing and understanding information environments, information needs of, and seeking, individuals and groups, and the organization of information resources for facilitating access to desired information. Systems of organizing information include e.g. libraries, information services and databases.

Although information science is concerned primarily with the relationship between content of document and the work tasks of users, this does not imply only satisfaction of users, which is an extension, though perhaps more active of traditional librarianship. The library is the laboratory of the information scientist.

Computers and associated technologies are becoming increasingly important to both types of institutions i.e. libraries and non-libraries. In libraries the use of these technologies is labeled library automation, in non-library agencies, information retrieval. Neither term is precise or discrete, but the distinction is made to provide a convenient division of responsibilities for discussion.

A computer has two major components i.e., hardware and software. These components work together. This course emphasizes the working of the personal computer (PC). Thus only capabilities of PC will be discussed. A PC usually consists of a System Unit, Keyboard and a Monitor. The student should not be confused with the term microcomputer. It is PC that consists of central processing unit (CPU) and number of peripherals. These when concocted together are known as computer system.

The student should be well familiar with the term network. A network can be defined as any system composed of one or more computers or terminals. Most networks are composed of multiple terminals and possibly multiple computers, to enable the network to function efficiently. To understand in simple words the network is linking of two or more computers together with help of cables, telephone lines etc. Mainly there are two types of networks Local Area Network (LAN) and Wide Area Network (WAN). Their detail is available in the relevant unit.

Information is always stored so that it is retrieved when needed. It is thus very important that information is stored in a way that when needed be economically retrieved. For example when decision is made to acquire a book by a library, bibliographic information be stored in accordance with the laid down standards. So that its output/bibliographic information could multiply be utilized, e.g., for placing order, for cataloguing and classification, for reference service or for any other purpose. Preparing database is the best way to store information. As

data once fed be used repeatedly. That is why the importance of computerized storage needs careful consideration. Upon critically examining large databases storage one would certainly feel that these are stored according to a prescribe standard.

Information retrieval is a generic term that covers a broad range of activities more concerned with the analysis and dissemination of the contents of parts (i.e. articles in journals) than with whole document. It involves use of the computer in abstracting, indexing extracting, content analysis, SDI, current awareness and retrospective searching, and related activities that help to make the information available to users.

Graphics and spreadsheets are very useful utilities. Many of the presentation graphics programmes now also include a spreadsheet making it easier to enter figures that drive the content of graphs and charts. Harvard Graphics include a small spreadsheet specifically for this purpose. Microsoft's global coverage of all applications in their office suite includes a graphing components that makes it possible to literally cut figures right out of Excel and create a chart or graph for use in Word document.

The recent merger of telecommunications and computers is a significant technological event. As a result we are able to transport the computer's power from special computer rooms to remote locations. Most of the minicomputers and mainframes sold or leased have communications capabilities. The data processing and communication industries have become closely integrated, bring computing power to all parts of the business and commercial world.

In the early 1970's the computing industry began to shift its emphasis from offline, batch-oriented data processing to the development of online systems that process requests for information entered at remote terminals in time-sharing environment. As with offline search system, a requester's information requirements are delineated and a search strategy, consisting of commands and search terms, is formulated. But rather than being batched for later input, the search strategy is entered at an online terminals, and an immediate indication of the number of presumably relevant citations is obtained. Online searching has become so popular that there emerged a market to provide services. These are called vendors of online search services like DIALOG. Large databases have been established which are marketing their products online like ERIC. Pakistan is lagging far behind in this area.

CD-ROM (compact disk read only memory) is well familiar concept now. It is a shiny plate made of plastic. A CD is a fairly simple piece of plastic about 1.2 mm thick. It consists of mostly a moulded piece of clear polycarbonate plastic. There are single, dual, quad, 6X, X-speed CD-ROMs that make it possible to view movie clips on your computer's screen just as if you were watching TV or movies. These are becoming increasingly popular for distributing information, games and programmes.

Internet is a vast network of networks that physically interconnects thousands of networks worldwide. It has evolved from an experimental network, to a research-oriented network, and now to an open, global network that provides access to thousands of diverse information resources and services.

The term **E-Mail** has become so common that every computer literate understands the concept. But it is new term for those who don't have access to computer or they are computer illiterate. For the students of library and information it is essential to learn the technique and use the Internet in libraries as it has become part and parcel of information science. The term E-mail is derived from the word mail being commonly used with relation to post offices. Like post offices deliver letters to individuals, similarly every person or organization has to have mail box address called E-Mail address. E-Mail is a facility to electronically transfer messages from one computer to another. The two computers can be in the same room or on different subcontinents. But the information exchanged is usually text based. E-Mail packages include the capacity to attach files containing graphics, texts, pictures etc.

OBJECTIVES OF THE COURSE

After studying the course the students will be able to

1. Define library and information science, and the relationship between the two.
2. Describe computer hardware and software, information storage, retrieval and dissemination.
3. Describe and use computer spreadsheet and graphics.
4. Understand data communication, CD-ROM and online searching.
5. Explain E-mail and Internet, and their use in libraries.

REQUIRED READINGS

1. Abdullah Ahsan. Internet and Pakistan: 2nd ed. [n.p]. 1996. pp. 1-11, 81-125.
2. Columbus, Louis. Learn computers in a day. New Delhi: BPB Publications, 1997. pp.37-49.
3. De Faber, Jolanda. Electronic mail...Den Haag: Socrates, 1994. pp.7-14.
4. The Encyclopedia Americana. Danbury: Grolier Incorporated. 1998. vol.15 pp.161-165.
5. Encyclopedia of Library and Information Science. New York: Marcel Dekker, 1995-98. vol.56(19). pp. 137-170. vol 59(22) pp. 145-49.
6. Heder, Sajjad. Fundamentals of computer Islamabad: National Book Foundation, 1995. pp. 120-125.

UNIT-1

LIBRARY SCIENCE: AN INTRODUCTION

INTRODUCTION

The Harrods' Librarian's Glossary defines library science as "a generic term for the study of libraries and information units, the role they play in society, their various component routines and processes, and their history and future development. Used in the United States in preference to the British term *librarianship*". So the term library science may interchangeably be used with librarianship. In other words library science and librarianship are of the one and same meaning. Collecting reading material, its processing, organization and dissemination started with the advent of library. The knowledge and its implementation in respect of library may therefore be called library science or librarianship.

It is commonly believed by scholars that civilization has its beginnings in the fertile valleys of the Tigris and Euphrates Rivers. It was in the complex organized life of the cities around 3500 BC that the wonderful instrument of writing was invented, apparently as tool for dealing with such practical day-by-day economic, social and administrative affairs of the community as the keeping of accounts, the issuing of receipts, the recording contracts of sale and exchange, and the making of final wills and testaments. Suffice it that the basic techniques of writing on clay, which handled commercial and related transactions adequately, in time, became sufficiently flexible to express and record a variety of complicated historical and literary compositions. The library as an indispensable agency of civilized society became inevitable, whenever and wherever records of whatever sort, were inscribed on clay tablets, for with the first written works came the need for a place to keep them so that they could be protected and preserved; so that they could be used when needed; and so that they could be handled on. Here, then, in basic economic and social needs both individuals and the community are the beginnings of the story of libraries and librarians.

Since recorded communications and their collection, organization, preservation, and utilization are so significant in the story of civilization, it is readily understandable why cultural historians have not contributed more to library history than occasional brief descriptions, chance reference to names and places, and meager discussions of contributions and services.

The story of the library has been told often, either wholly or in part, and with each telling certain facts of significance and importance become more clear:

1. Libraries are essential ingredients of a civilized society;

2. They come into being to meet certain recognized needs, and these needs determine their forms, purposes, functions, programmes, and services;
3. Certain conditions - economic, technological, scientific, geographical, cultural, or social, encourage their development, and when such conditions do not prevail, libraries decline and may disappear.

By 2700 BC, the Sumerians had established temple, private, and government libraries in which their various writings could be preserved and used.

Much of our knowledge of Babylonian civilization comes from the tablets of the Library of Borisppa, which were copied and then preserved in the library of King Ashurbanipal of Assyria.

Our knowledge of Egyptian libraries is scant, but there are references to temple libraries and records of library, which belonged to Khufu, a monarch of 4th Dynasty, and an other to Khafre, the builder of the second pyramid.

The libraries of ancient Greece and Rome are the world's major libraries. When we trace history of libraries it is incomplete if we don't mention these libraries.

The middle ages saw learning moved to the East. When Constantinople was founded in 330 A.D, Constantine took steps to establish a library in his new capital on the Bosphorus, but it was an apparently not a very large collection. He seemed to be more concerned with the formation of a fine library for his new great church than with an imperial library. At Damascus, the first center of the Muslims world, Umayyad dynasty established a royal library during the 17th century. The great period of Muslim learning came during the time of Abbasid rule, or Caliphs. Haroon and Mamoon were the great admirers of libraries, as such they established learning centers of high standard. Muslims libraries in Spain and later in India are other examples.

The library was created to meet certain social necessities, and that its development is closely related not only to intellectuals history but also to change in the organizational structure and the value system of its supporting culture, should be apparent from even a cursory reading of the record. The school and academic libraries of today, can trace their linkage back to the training of the priesthood's in pre-Christian eras, and the medieval universities profoundly influenced them.

The mid 19th century leaders of the movement of the public libraries were well aware that they were implementing one the largest changes in the human adventure—the attempt to qualify an entire population to participate in the control of political and economic system in which they lived. It is axiomatic that the library as social instrumentality is as it has always been, conditioned and shaped by the social milieu within which it functions.

For centuries libraries have been the traditional institutions in charge of acquiring and storing recorded information for those who wish to use it. In the past they served mainly the scholarly and educated and had no great problems in delivering satisfactory service, but this century has witnessed major sociological changes and greater advances in education, research, science, and technology than in any previous period in history.

Computers and associated technologies are becoming increasingly important to both types of institutions i.e. libraries and non-libraries. In libraries the use of these technologies is labeled library automation; in non-library agencies information retrieval. Neither term is precise or discrete, but the distinction is made to provide a convenient division of responsibilities for discussion.

Library automation is generic term often used in discussing the uses of computer and related equipment to help libraries handle and manage the physical materials that comprise library collections. Although the books are still the main stays, the collection represents a wide variety of recorded information, print and non-print, available in today's libraries. Library automation is concerned with using existing electronic data processing equipment to assist in handling and controlling these print and non-print material as physical entities.

A library's ability to meet user needs and the extent to which a collection is used are measures of success and satisfaction. To meet these needs each library develops its own set of routines for getting the work done. These are categorized as following:

1. Selection and acquisition of materials
2. Preparation, storage, and maintenance of each item; and bibliographic control
3. Use of material by dissemination and service
4. Management/administration serves as the umbrella to control and coordinate the three categories and to provide general services.

Library automation and information retrieval involve some tasks that are similar and overlapping, but at present their operational procedures have been integrated. Most agencies involved directly in the production of information retrieval products are not attached to libraries. The notable is National Library of Medicine, which produced Index Medicus.

Technological developments have played a marvelous part in updating information processing. Computers, communication technologies and other electronic devices have made information handling easier. Large databases are being handled with Internet and such other networks have made responsibilities of the librarians entirely complex. These factors have advanced the cause of information science. A council of former USSR states, "information science is a discipline belonging to social science, which studies the structure and general characteristics of scientific information and also general law governing all scientific communication processes". Perhaps in its grouping information science will identify some of the problems and their solutions, which can improve the quality of library service.

The impact of new information technologies has changed the complexion of libraries. Resultantly basic four types of library systems have emerged: polymedia libraries, electronic libraries, digital libraries, and virtual libraries.

OBJECTIVES

After studying this unit the students will be able to

1. define and trace history of library science;
2. familiarize themselves with the development of library science
3. elaborate concept of different types of library systems

COMPULSORY READINGS

1. Encyclopedia of Library and Information Science. New York: Marcel Dekkar, 1997, vol. 59(22). pp. 145-49.
2. Shera, Jesse H. Introduction to library science. Littleton, Col.: Libraries Unlimited, 1976. pp: 13-40, 81-105.

SELF-ASSESSMENT QUESTIONS

1. was Ashurbanipal. Describe his contribution in history of library science.

2. information science belong to social science; if yes, why.
3. What is a virtual library? How is it different from traditional library containing books, periodicals and audiovisual material?

ACTIVITIES

1. Read an article on electronic library and explain the concept of electronic library in your own words.
2. Select any article on digital library and review the same giving your viewpoint about the future of this type of library in Pakistan.

UNIT-2

INFORMATION SCIENCE EVOLUTION

INTRODUCTION

It is difficult to place an exact date to the beginning of Information Science. However, it is as old as man and civilization. When the Garden of Eden, the first man and woman, Adam(a.s) and Eve(a.s) were created by the Lord, and when commandment not to eat the fruit of the tree out of bounds, called the forbidden fruit, was violated. Adam(a.s) and Eve(a.s), who were till then absolutely impervious to their sexes, and other emotions were electrified, and first sin was committed. One may cite that this great fact may be called the first and foremost information. The information science field is the product of convergence of disparate disciplines and activities. Some of these are: library science, computer science, communication science, behavioral science, documentation of research and development, abstracting, indexing, video and optical science. However, it is difficult to pinpoint the relative contributions of each one of these seminal components to the growth and development of information science.

With the historic perspective let us try to understand as to what constitutes Information Science.

Information Science is an applied science directed towards the development of Information Systems that augment human functions and facilitate the generation, use and transfer of knowledge directed towards solving problems and making decisions.

Some people wrongly regard Information Science as computers added to library procedures, especially to information storage and retrieval. Automata theory, as applied in the subsystems, forms only one component of the information system. Often, Information Science is regarded as the scientific study of the communication of information in society, communication forms but one subsystem of information system.

The following problems can be identified in Information Science:

- terminological problems;
- information systems;
- interdisciplinary nature;
- distinction between library and information science; and
- education and training for information professionals.

The fundamental reason to the failure of developing a theoretical foundation of information science is the lack of common or shared approach and understanding of the use of terminology. Definitions are practical instruments because they facilitate essential distinction between objects, process and concepts so necessary to professionalism.

The inherent reason for failure to reconcile the problem in usage of terminology is the choice of the name "information" and "information science" for the field that grew out of documentation movement of the 1950s and early 1960s.

Library Science is concerned with the logistics and management of documents. Information Science is concerned with the content of these documents and the work tasks of users including problem solving and decision-making.

Librarian has been concerned with the acquisition, storage, maintenance and loan of documents including the technical aspects of acquisition, processing of documents, library buildings, shelving of documents, issuing, monitoring loan records and the prevention of theft. Shera considers that if the function of the library is to promote the interaction of human minds through the medium of graphic records, it is axiomatic that the intellectual content of graphic records, rather than the records themselves as artifacts, must be known and understood by the librarian. This concern of librarians with the contents of documents is mostly, however, only for the purposes of classification and indexing.

The management aspects of librarianship have traditionally been concerned with the personnel of libraries and with maintaining good working relations. The modern concepts of management also cover financial aspects and the monitoring of services.

Although information science is concerned primarily with the relationship between content of document and the work tasks of users, this does not imply only satisfaction of users, which is an extension, though perhaps more active, of traditional librarianship. The library is the laboratory of the information scientist. The emphasis on problem solving and decision-making involves skills and activities that are not usually part of the equipment of librarians.

Information specialist should ask a good many more questions than the librarian playing a passive role of receiving requests for information, providing documents and sometimes information and leaving the matter at this level. The information presented must not make the user happy, it should rather make him successful.

Most information services retrieve only bibliographical references. Hillman refers to a much more advanced type of information retrieval as second generation, and it aims to retrieve textual passages and numerical data. Expert systems are an important development of this field.

Information scientists are educators, and teach users how to solve problems and retrieve information. By skillfully submitting relevant information to the user, the information scientist is changing the cognitive operations of the user. There is more than enough information in the world to solve social, scientific and technical problems. The information specialist must just bring it together at the right time for the right people and the right problems.

OBJECTIVES

After studying this unit the students will be able to

1. Define information science and know its history.
2. Describe development of information science.

COMPULSORY READINGS

1. Encyclopedia of Library and Information Science. New York: Marcel Dekker, 1995. Vol.56(19), pp. 137-170.
2. Problems of Information Science. New Delhi: New Age International, 1996. pp.6-18, 26-29.

SELF ASSESSMENT QUESTIONS

1. Is information science an offshoot of library science? Explain.
2. When was the information science evolved and why? Describe the reason.
3. Is it true that simple application of computers in libraries is information science?

ACTIVITY

Read an article from a concerned encyclopedia on 'Information Science' and interpret the same in your own words.

UNIT-3

RELATIONSHIP OF LIBRARY SCIENCE WITH INFORMATION SCIENCE

INTRODUCTION

Unit 2 has provided an overview of information science evolution. Seemingly Information Science is an off shoot of Library Science. Though it is a young discipline yet it gained unimaginable popularity in the recent past. It is now being treated as integral part of library science and the new nomenclature has emerged as Library and Information Sciences. Most of the Library Schools in Pakistan have opted the new nomenclature.

The earliest formal use of the term information science dates back to 1958 when the Institute of Information Scientists (IIS) was formed in the United Kingdom. According to its founder, Jason Farradane, the use of the term information scientist may have intended to differentiate information scientists from laboratory scientist, since the main concern of the members was with the management of scientific and technological information. By calling themselves information scientists the members of IIS obviously wanted to stress the importance of the scientific information and the processes of involved in handling scientific communication, whereby their work was continuation of previous theoretical and empirical attempts to address problems of organization, growth and dissemination of recorded knowledge carried out prior to the world war II.

Notwithstanding an identical processing of documents and information and a similar use of information technology (IT), a division of perspectives between the two groups has continued to exist during the postwar period in many countries. An effect of this divergence can be observed in the alternative name of the discipline: library and information science. The library community of library science itself has in additions been seen as scientific alternative to information. Library science is simply information science and research applied to that particular locality that is called a library; the division is quite artificial and unproductive.

A core distinction from other fields is that information science is the one discipline that actually studies large text entities and other media-borne message containing preserved knowledge with more interest in solving theoretical and practical problems of both its organization and its representation in systems for later retrieval and use on demand than in the technology itself — the latter being the means to the former.

Library and information science consider communication of, mainly recorded, information, between human generators and human users. It aims at conceptualizing and understanding information environments, information needs

of, and seeking, individuals and groups, and the organization of information resources for facilitating access to desired information. Systems of organizing information include e.g. libraries, information services and databases.

Library Science is concerned with the logistics and management of documents. Information Science is concerned with the content of these documents and the work tasks of users including problem solving and decision-making.

Librarian has been concerned with the acquisition, storage, maintenance and loan of documents including the technical aspects of acquisition, processing of documents, library buildings, shelving of documents, issuing, monitoring loan records and the prevention of theft. Shera considers that if the function of the library is to promote the interaction of human minds through the medium of graphic records, it is axiomatic that the intellectual content of graphic records, rather than the records themselves as artifacts, must be known and understood by the librarian. This concern of librarians with the contents of documents is mostly, however, only for the purposes of classification and indexing.

The management aspects of librarianship have traditionally been concerned with the personnel of libraries and with maintaining good working relations. The modern concepts of management also cover financial aspects and the monitoring of services.

Although information science is concerned primarily with the relationship between content of document and the work tasks of users, this does not imply only satisfaction of users, which is an extension, though perhaps more active, of traditional librarianship. The library is the laboratory of the information scientist. The emphasis on problem solving and decision-making involves skills and activities that are not usually part of the equipment of librarians.

OBJECTIVE

After studying this unit the students will be able to identify the difference between library and information science.

COMPULSORY READINGS

1. Bajpai, S.K. Modern information retrieval. New Delhi: Ess Ess Publications, 1999. ppl08-139, 152-165.
2. Encyclopedia of Library and Information Science. New York: Marcel Dekker, 1995. Vol. 56(19).pp.137-170.

SELF-ASSESSMENT QUESTIONS

1. Does information science deal with the management of documents? If not, why?
2. Describe that information science is part of library science.
3. Who was Farradane? What is his contribution in information science?

ACTIVITY

Read the article from the Encyclopedia of Library and Information Science and describe the difference between library and information science you understand.

UNIT-4**COMPUTER HARDWARE, SOFTWARE,
LAN & WAN**

INTRODUCTION

A personal computer (PC) is small enough to be placed on a desk and does not take space more than a standard typewriter. A PC usually consists of a System Unit, Keyboard and a Monitor. A printer is added most of the time specially when intended for business use. A PC is very powerful tool capable of performing calculations at a amazingly high speed, but the benefits to be gained from its use depend upon the skill and experience of the people who direct and control the uses to which it is put.

The student should not be confused with the term microcomputer. It is PC consisting of central processing unit (CPU) and number of peripheral units. These when concocted together are known as computer system. The modern microcomputer systems have five basic components.

1. Input Unit
2. Mass Storage Devices
3. Central Processing Unit (CPU)
4. Memory or Primary Storage Unit
5. Output Unit

1. Input Unit

Programme and data must be sent to a computer for subsequent processing. The process of sending information to computer is called input. The devices that perform input are called input unit. Information is fed into the computer through any of several different sources. Most of these are as under:

1. Keyboard
2. Mouse and Track Ball
3. Graphic tablet
4. Light Pen
5. Joystick
6. Graphic Scanners or Optical Character Reader
7. Microphone

2. Mass Storage Devices

Mass Storage devices store programme and data permanently, usually on some magnetic medium. The programmes and data are retrieved as and when required. The mass storage devices commonly used with personal computer are:

1. Disk Drive, this includes Floppy diskette Drive, Hard Disc, CD-ROM Drive
2. Cassette Tape and Tape Backup Unit
3. CD-ROM & DVD

3. Central Processing Unit (CPU)

The central processing unit of a microcomputer is also called a microprocessor. The microprocessor has some functions. These are described as below.

CPU is the part of a computer where arithmetic and logical operations are performed, and instructions are decoded and executed; this part is called arithmetic logic unit (ALU). A control unit is also included which directs all operations performed in the CPU. Different types of registers and data buses are also incorporated for storage of data and communication inside respectively. Modern microprocessors also have built-in Memory Management Unit (MMU) and/or math coprocessor. In fact the CPU controls the overall operations of a computer.

4. Memory Or Primary Storage Unit

The memory is the space within a computer where information is stored as some unique combination of zeros and ones, while being actively worked on. Now a days semiconductor memories are being used in computer with advantage of their speed and compactness. However these memory chips may loose the data stored when the computer is turned off. Such memories consist of integrated circuits etched onto silicon chips. Computer memory can be divided into two major types:

1. Read Only Memory (ROM)

ROM has four types with respects to methods used for programming and/or erasing the memory chips, i.e. ROM, PROM, EPROM, EEPROM

2. *Random Access Memory (RAM)*

There are two types of RAM with respect to the method of retaining the data:

1. Static RAM
2. Dynamic RAM.

There are other kinds of RAMs that student may have their information from the study material.

5. *Output Unit*

The information sent out by the computer, as result of its processing, is called output. The output consists of intermediate or final results, which are returned to memory or an output device. The output can be displayed on monitor, printed on a paper, stored on magnetic disks or in the form of synthesized voice. A brief list of microcomputer output devices are:

1. Monitor
2. Printer
3. Plotter
4. Modem/Fax
5. Voice Synthesizer

The students may study detail of computer working from study material.

WHAT IS SOFTWARE?

Just like putting fuel in a car to make it move down the road gets you where you want to go, getting software up and running on your PC gets you places you want to go. What is software? It is computer programmes, procedures, commands, and associated documentation concerned with the operation of a data processing system. For a computer to perform operations as desired by the user, there has to be a set of instructions that must be given to computer to follow. A computer programme is a set of instruction that are executed by a computer to do something useful. The computer will perform various operations depending upon the instructions contained in a programme. Computer programmes are also termed as software. Software can be classified into the following classes with regard to their use.

Types of Software

1. Disk Operating System (DOS)
2. Utilities
3. Application Software

LAN & WAN

The student should be well familiar with the term network before taking up the work on Local Area Network (LAN) and Wide Area Network (WAN). A network can be defined as any system composed of one or more computers or terminals. Most networks are composed of multiple terminals and possibly multiple computers, to enable the network to function efficiently. To understand in simple words, the network is linking of two or more computers together with the help of cables, telephone lines etc.

As far as structure of networks is concerned it has following main types;

1. Star Network
2. Mesh Network
3. Ring Network
4. Hierarchical Network

The *star structure* is the most common for connecting a number of terminals to a central computer. Generally, the purpose of such a connection is to provide communication between the terminals and the computer. Terminal to terminal communication can also be established via the computer, in which case the computer acts as a switch. In a star network, there is exactly one path between any two points that may be connected.

A *mesh network* may connect several computers or terminals over more than one path. If a path fails, a second path becomes available to provide connections among other computers or terminals. The number of paths among the nodes is a design parameter that is carefully engineered to provide good service.

A *ring network* connection provides exactly two paths from any node to any other node. A failure of more than one node in the ring splits the ring into disjointed parts that cannot communicate with one another.

A *hierarchical structure* includes a combination of one or more of the previous three configurations in a multi-level arrangement. Grouping into two, the

first level connects groups of terminals in various locations to their central site computers. In the second level, computers are connecting with one another via a mesh network.

Now it would be easy to understand what are LAN and WAN

Networks can be divided into two categories, local area network (LAN) and wide area network (WAN) based on the physical distance between the computers and terminals.

A local area network interconnects a large number of computers, terminals and peripheral devices within about 1km of each other. Local area networks normally operate within a limited geographical area such as an office building or a university campus. Usually coaxial cable is used and the transmission speed is very high. The main purpose of local area network is to allow the computers and terminals to communicate with each other and to share expensive peripheral devices, such as, high-speed line printers, plotters and magnetic disks holding large databases.

A wide area network interconnects widely separated computers and terminals together. This type of communication system may be developed to operate nationwide or worldwide. The transmission media used are normally public systems such as telephone lines, microwave and satellite links.

Wide area network allows its users to conveniently share programmes, data, documents and ideas. People at different sites can easily collaborate on projects such as the development of software or writing reports, article or books. Electronic mail, which can be delivered in a fraction of a minute, also plays an important role in bringing widely separated users into close contact. In fact, the network can end the tyranny of geography

OBJECTIVES

After studying this unit the students will be able to

1. Understand hardware and software concepts of computer,
2. Define and identify the terms: local area network and wide area network

COMPULSORY READINGS

1. Abdullah, Ahsan. Internet and Pakistan. 2nd e.d. [n.p], [n.p], 1996. pp.1-11.

- 2 Sulehri, Mahmood Anmad. Computeres: an introduction to personal computers Lahore- Ferozsons, 1995. pp.65-87,131-37

SUGGESTED READING

Saffadi, William. Introduction to automation for librarians. 4th ed. Chicago: ALA, 1999. pp.3-81

SELF-ASSESSMENT QUESTIONS

1. What are the different kinds of networks formed while connecting many computers with each other?
2. What do you mean by application software?
3. Differentiate between LAN and WAN..
4. How is a mesh network different from the ring network?

ACTIVITY

Visit any organization having computer networks nearby your resident. Study the installation of LAN and describe its credits as compared to the working of single PC.

UNIT-5

FUNDAMENTALS OF COMPUTERIZED INFORMATION STORAGE

INTRODUCTION

A library stores large amounts of information; for example, a library's catalogue may comprise billions and trillions characters; and its books, more than 100 millions and trillions characters. The tools for retrieval include the library's catalog, subject classification (for example, Dewey Decimal Classification), ordered arrangement of books on the shelf, and bibliographies and indexes for subject areas covered by the collection. Each of these tools can be both computerized and manual (non-computerized).

The Purpose of Storing Data is Retrieval.

Information is always stored so that it is retrieved when needed. Thus it is very important that information be stored in a way that when needed be economically retrieved. While storing information its processing and retrieval has to be kept in mind. For example when a decision is made to acquire a book by a library its bibliographic information is prepared in accordance with the laid down standards. So that its output/bibliographic information be multiply used, e.g., for placing order, for cataloguing and classification, for reference service or for any other purpose. Preparing database is the best way to store a document or piece of information. The information once stored in computer need not to be repeatedly input. That is why the importance of computerized storage needs careful consideration. If you see large databases and critically analyze their storage you would certainly feel that these are stored according to a prescribed standard. Storage standards have been developed to exercise online access to different databases.

Virtually all academic libraries and some public libraries now have computer-based online public access catalogues that provide users with retrieval capabilities; they have computer-based shelf lists that identify where books are stored, they provide access to a wide range of computer-based reference retrieval services.

Computer methods for information storage and retrieval have been developed to accommodate dramatic growth both in the amount of information and in the needs to provide access to it, and to do so with economic efficiency. In 1987, worldwide publication of new books and new editions of books was over 600,000 titles, triple that of 1957. This trend is exhibited not only for books but also for science and technology journals, government reports and documents, and data describing operations within companies. Recent estimates, one being that by the 1990s more than 50% of the U.S. work force was engaged in information

work; similar estimates apply in other countries of the world. For that many persons to have ready access to information has required the development of cost-effective systems. Fortunately, the "information technologies" -computers, related forms and data storage and display, and telecommunication- have provided the means for meeting those needs.

Steps in Storage

1. Selecting and acquiring the source data
2. Establishing a vocabulary of terms for describing them
3. Assigning terms to each specific data item
4. Arranging assigned terms in formats to create records
5. Establishing an organization of these records into files
6. Creating means for access to the records by various criteria.

Though retrieval of data is discussed in another unit yet to have a clear idea of steps involved in retrieval of information are outlined here.

1. Expressing requests by using terms from the vocabulary
2. Searching the file and matching requests with stored records
3. Retrieving and presenting the results.

Types of Systems

Information storage and retrieval systems can be grouped into five types: database, reference, document, text, and image. For each, computer systems have been developed that provide rapid access to large amounts of information stored on computer-processible media, with easy communication between the system and its user. In the majority of cases, however, these systems must still rely on human skills to acquire the source documents, to analyze and classify their contents, and to formulate requests for information. Following are the types of systems:

1. Database Systems

The most fundamental system is the database system, since all others are simply special cases of it, differing in the kinds of data and complexity of processing but partaking of the same components.

2. *Reference Retrieval Systems*

A reference retrieval system is a database system storing references to documents. Data will include terms descriptive of content, on which retrieval will be based; abstracts may be included, providing a more detailed description of content and the potential for retrieval based on words in the abstract. Records identify where a source document can then be found by a retrieval system for delivery to the requester.

3. *Document Retrieval Systems*

A document retrieval system combines a reference database system with the ability to retrieve desired document pages, as text or as images, and to print or display them. The storage medium may be printed pages, photographic film, optical disks, or magnetic tapes or disks.

4. *Text Retrieval Systems*

The fact that computers can process text as well as store and retrieve it provides another dimension of retrieval capability. In principle, it should be possible to use the text as the basis for the retrieval process in addition to or even instead of an associated reference retrieval system. This is an integral part of several "full-text retrieval" services in fields such as law.

5. *Image Retrieval Systems*

There are dramatic parallels between text and digitized images in that a computer can process as well as store and retrieve the images. In principle, it should be possible to use images as the basis for the retrieval process. There are already counterparts of word processing for the creation of image files and for applications of digitized image processing in virtually every commercial enterprise, academic discipline, and creative activity—from the storage of business documents to radiology to computer-aided design and manufacturing to cartooning.

OBJECTIVES

After studying this unit the students will be able to

1. define and understand the concept of computerized information storage in computers
2. describe the steps of storage and different types of computerized storage systems.

COMPULSORY READINGS

1. Flynn, Roger R. An introduction to information science. New York: Marcel Dekker, 1987. pp. 247-311.
2. The Encyclopedia Americana. Danbury: Grolier Incorporated, 1998. vol. 15 pp. 161-165.

SELF-ASSESSMENT QUESTION

1. Discuss various systems of computerized information storage.
2. Explain the term vocabulary. Describe some reference books specifically meant for vocabulary terms.

ACTIVITY

Use the computer loaded with some databases and look for information of your choice noting the way as how the information has been stored.

UNIT-6

INFORMATION RETRIEVAL AND DISSEMINATION

INTRODUCTION

This unit is partial introduction to the Library Automation offered as full-fledged course in the 2nd semester. That being advanced it is therefore seemed logical that before you step to the advanced course you should first be introduced with the overview of that course.

Information retrieval is a generic term that covers a broad range of activities more concerned with the analysis and dissemination of the contents of parts (i.e. articles in journals) than with whole document. It involves use of the computer in abstracting, indexing extracting, content analysis, SDL, current awareness and retrospective searching, and related activities that help to make the information available to users.

Library automation and information retrieval involve some tasks that are similar and overlapping, but at present their operational procedures have been integrated.

Remember that the purpose of storing data is retrieval; i.e. we anticipate that the data will need to be retrieved at some future date. Such future needs may be predictable and periodic, in which case standard programming approaches to data processing are applicable (e.g., the development of software to do pay roll, yearly financial reports, and inventories). These uses fall in the category of data manipulation. Other future needs are less predictable and require data or information on demand. We would look at two types of query systems that have been developed to produce information demand: bibliographic information retrieval systems and data base management systems (DBMSs).

Both types of systems interact with databases, but the type of data held in the databases varies: Bibliographic information retrieval systems provide access to journals, literature and research reports. They are analogous to online libraries. The user of the system describes a topic of interest; say articles on the use of light wave technology, medicine, and the attempts to produce documents on the subject. The documents are often described by index terms, i.e., descriptors of "key words," and the user of the system must phrase his or her requests in the language of the system. Questions of relevance arise in that some retrieved documents are judged to about the topic of interest, and are called hits, which others are judged to be either peripheral to those interests or not relevant all, and are called "noise". Systems are judged in terms of relevance of the output and its completeness (in terms of number of documents returned).

Several query languages are examined in order to show the common features of such query languages.

DBMSs are treated from the user's point of view. The use of DBMS is addressed in two stages, corresponding to the data description language (DDL) and data manipulation languages (DML).

When we retrieve information it means that it has to be disseminated. Otherwise there is no sense of retrieving it. Dissemination of information means the distribution, or sending, of information whether specifically requested or not, to members of an organization by a librarian or information officer. The means normally used include news bulletins, abstracts, individual memoranda or letters, and personal interview or telephone calls, but may also include notes accompanying article, memoranda, cuttings or reports and the underlining of sentences or marking of paragraphs in it. SDI is also included in dissemination of information, but it is the service for selected people. For the purpose of this unit dissemination means dissemination of computerized information.

OBJECTIVES

After studying this unit the students will be to understand and describe computerized information retrieval and its dissemination.

COMPULSORY READINGS

1. The Encyclopedia Americana. Danbury: Grolier Incorporated, 1998. vol.15 PP. 161-165
2. Rowley, J. The electronic Library. London: LA, 1998. pp. 157-178.

SELF-ASSESSMENT QUESTIONS

1. What DBMS and DML stand for? Explain these terms.
2. Explain the term 'noise'.
3. How the systems are judged?
4. What is query language, explain.

ACTIVITIES

1. Have a computer access and search for on line databases of ERIC.

2. Feed a CD-ROM in the computer and search for some databases of your interest.

UNIT-7

USING COMPUTER SPREAD SHEETS AND GRAPHICS

INTRODUCTION

1. Spreadsheets and Their Use

The main purpose of using spreadsheet programme is the maintenance of record of accounts of different types. Worksheet programme is intensively applied in business organizations. Its use in libraries is also of the same nature. Spreadsheet programmes have made micros popular in the business world. On the screen the electronic spreadsheet looks like a worksheet that you can tailor to the needs of your business. After you define the relationships between the various rows and columns, and give it preliminary data, the programme fills in the rest of the numbers for you. Because electronics spreadsheets can recalculate equations so quickly, they let you see the effect of changed costs or sales figures at the touch of a key.

When the reading material is acquired the payment record of accounts is kept in libraries. It is at that time this software is used. This programme has its relationship with graphics. Many of the presentation graphics programmes now also include a spreadsheet making it easier to enter figures that drive the content of graphs and charts. Harvard Graphics include a small spreadsheet specifically for this purpose. Microsoft's global coverage of all applications in their office suite includes a graphing components that makes it possible to literally cut figures right out of Excel and create a chart or graph for use in Word document.

2. Graphics and Their Use

Graphics programmes can display business data in easy-to-read charts and graphs, while artists, designers, engineers, and computer hobbyist use more sophisticated packages to create and manipulate images. Some graphics systems may require additional hardware—a joystick or a graphics table for input and colour display to see the results of your work. If you want your output in colour on paper, you will need either a printer with coloured ribbons or a plotter.

Pictures charts, freehand graphics, special fonts and photographs are really graphics, elements that the computer recognizes as a series of bits instead of a figure as letter or number. A graphic is generally composed of a series of pixels of dots that when taken together create an entire image. The use of graphics on the computer actually began when desktop publishing first began to catch on as an application area, because users needed to be able to place text and graphics on the same page, all from their desktop. Now you are no longer had to take a newsletter into a special printer and have it done-you could do it yourself! A graphic

programme is any software application that can edit, create, and save a bitmapped graphics image. With many of these applications, if you can view the graphic on-screen, you can print it.

3. How Computer Graphics are used?

When you create a document you use boldfaced, italicized, and even underlined text to accentuate points you want to make. It is really the same idea with graphics-you use them to accentuate and clarify your ideas. Graphics are everywhere; in the newspapers, magazines, movies, and on TV. In the world of computers and PCs, graphics are used for communicating complex concepts in a simple manner-making them easier to understand. How do you get started with graphics software? And what are the minimum hardware requirements? It all depends on what you want to accomplish. Take a look at a PC and peripherals that are needed for creating great graphics. To create and use graphics, you will need a PC with the following:

- A graphic programme you are interested in using and learning more about
- An operating system compatible with the graphics software you want to use. Window95 is especially good for this area.
- A PC based on the Intel Pentium/133 Mhz processor or better
- At least 16MB of RAM
- 1.2GB hard disk drive or large
- SVGA monitor and graphics adapter card
- Keyboard, mouse or additional data input devices
- Printer capable of producing graphics (optional)
- Clipart image (optional)

4. Learning to use Graphics

Graphic convey meanings and are quickly comprehended-so they are valuable to know how to create and use. Let us take a look at the skills you need be going in graphics:

- Get familiar with your presentation graphics programme. An excellent one to learn in Microsoft's PowerPoint, since you can construct entire presentation and the graphics included on each slide

- Learn how to start the presentation graphics programme of your choice. In the case of PowerPoint this is as simple as double clicking on its icon.
- Work with your mouse until you are comfortable with how to move it around the screen.
- Learn to save your graphics before trying to create an entire presentation. It's a good idea to save periodically as you work through your presentations.
- Use the command in the presentation graphics programmes to import images and graphics in a variety of formats. Knowing how to do this will increase the versatility of your slide.
- Learn how to use the free hand graphics features so you become good at sketching images directly onto your computer's screen.

OBJECTIVES

After studying this unit the students will be able to

1. Explain and use computer spreadsheets
2. Describe usefulness of graphics and their application in daily life

COMPULSORY READINGS

1. Columbus, Louis. Learn computers in a day. New Delhi: BPB Publications, 1997, pp.37-49
2. Haider, Sajjad. Fundamentals of computer, Islamabad: National Book Foundation, 1995, pp 120-129.

SELF-ASSESSMENT QUESTIONS

1. Define computer spreadsheets. Where these can be used in libraries?
2. What is the purpose of graphics? What accessories are needed with PC to generate graphics?
3. Explain the difference between graphics and spreadsheets.

ACTIVITIES

1. Prepare a pie chart showing literacy rate of Pakistan in 1999.
2. Using appropriate software prepare a spread sheet to show that there are 2012 students admitted in CT, 23512 students in PTC, 400 students in B.Ed., 450 in M.Ed. and 50 in MPhil, and they have paid Rs. 12000, 25000, 6500, 8890, and 11000 respectively as tuition fee.

UNIT-8

DATA COMMUNICATION, ON-LINE SEARCHING AND CD-ROM

INTRODUCTION

1. Data Communication

The recent merger of telecommunications and computers is a significant technological event. As a result we are able to transport the computer's power from special computer rooms to remote locations. Most of the minicomputers and mainframes sold or leased have communications capabilities. The data processing and communication industries have become closely integrated, bring computing power to all parts of the business and commercial world. A data communication system has some components, which are as under:

- i. Terminals
- ii. Modems
- iii. Computer System

The term terminal refers to a device that can input data to, and receive data from, the computer. A modem (derived from "Modulate-DEModulate") is an electrical device that accepts a digital signal and converts it to an analog signal or can accept analog signal and converts it to a digital signal. The computer system is the function of any data communication network, of course, to place data in the computer system for processing or to transmit processed data from the computer to users located at site remote from the computer. Any data communication, which takes place with a computer system, will be under the control of a programme stored in the main memory of the computer system. It is this programme, which processes data received over the network and sends messages back to the terminals in the network. This programme also has the responsibility for controlling the network, establishing contact with the terminals and handling any line errors which may occur.

The mode of transmission used the type of terminals used in the data communications network and the speed at which the data must be transmitted. There are three modes of transmission.

- i. Simplex
- ii. Half-duplex
- iii. Full Duplex

Data is transmitted from a terminal to computer system or from the computer system to terminal over communication line (also called communication

channel or communication media). The communication media includes the following types:

- i. Standard telephone lines.
- ii. Coaxial cables
- iii. Microwave transmission
- iv. Satellite communications
- v. Fiber optics

2. On-line Searching

In the early 1970's the computing industry began to shift its emphasis from offline, batch-oriented data processing to the development of online systems that process requests for information entered at remote terminals in time-sharing environment. As with offline search system, a requester's information requirements are delineated and a search strategy, consisting of commands and search terms, is formulated. But rather than being batched for later input, the search strategy is entered at an online terminals, and an immediate indication of the number of presumably relevant citations is obtained. Online searching has become so popular that there emerged a market to provide services. These are called vendors of online search services like DIALOG. Large databases have been established which are marketing their products online like ERIC. Pakistan is lagging far behind in this area.

3. CD-ROM

The term CD-ROM is abbreviation of compact disk read only memory. CD-ROM is a shiny plate made of plastic. A CD is a fairly simple piece of plastic about 1.2mm thick. It consists of mostly a moulded piece of clear polycarbonate plastic. During manufacturing this plastic is impressed with microscopic bumps.

CD-ROMs cannot be used to rewrite information as can be done on floppy disk. This is because each disc is made by burning sequence of tiny holes into the reflective base material of blank master disc, which is then made into a mould. These moulds are mounted on a stamp press, heated and plastic injected into them to make the copied CDs. The CD can store up to 74 minutes of music. The total amount of digital data that can be stored on a disc is 783,216,000 bytes i.e. about 2,50000 pages. In other words it can handle up to 670MB of data. There are single, dual, quad, 6X, X speed CD-ROMs that make it possible to view movie clips on your computer's screen just as if you were watching TV or movies.

ROMs use light to read the contents of the disk. These are becoming increasingly popular for distributing information, games and programmes. Speeds of CD-ROMs are in 'time', which really refers to their sampling rate.

Because CD-ROMs can hold enormous data, the libraries and information centres use this medium to keep and use them as book and journal. Now thousands of dictionaries and encyclopedias are available in CD form.

There are four general uses of the CD-ROM media in library and information science:

- Reliable mass storage of both the most frequently needed and less frequently needed book material and archives
- Rapidly-accessible storage of most time consuming material
- Extremely long -term storage of archives and book material, and
- Minimum space storage of vast amount of information.

A CD-ROM player is used to retrieve information from the CD-ROM. Optical disk is little bit different from CD-ROMs. It has the capability to both read and write data to the disk. Now it is in common use in our daily lives.

OBJECTIVES

After studying this unit the students will be able to

1. Describe data communication
2. Understand and explain the concept of online and offline searching
3. Use CD-ROM and its capability in information storage and searching

COMPULSORY READINGS

1. Heder, Sajjad. Fundamentals of computer. Islamabad: National Book Foundation, 1995. pp. 120-125.
2. Rowley, J. The electronic Library. London: LA, 1998, pp. 203-230, 236-259.
3. Saffady, William. Introduction to automation for librarians. 4th ed. Chicago: ALA, 1999. pp.259-64

SELF-ASSESSMENT QUESTIONS

1. What is the storage capacity of CD-ROM? Is it online searching medium, describe.
2. Define optical disk. How it is different from floppy disk.

ACTIVITIES

1. Feed a CD-ROM containing bibliographic database in a computer and take out a print out of one page bibliography on any topic of your interest.
2. Use a computer having Internet connection and ask any expert to guide you how to have access of online data.

UNIT-9

INTERNET AND E-MAIL

INTRODUCTION

INTERNET AND ITS ORIGIN

The beginning of the Internet was the creation of the ARPANET, an experimental network sponsored by the U.S. Department of Defense Advanced Research Projects Agency. The ARPANET was a network connecting university, military and defense contractors and it was established to aid researchers in the process of sharing information and to study how communications could be maintained in the event of a nuclear attack.

Other experimental networks using packet radio satellite were connected with the ARPANET by using an inter network technology. At first this interconnection of experimental networks was called DARPA Internet, but later the name was shortened to just 'the Internet'.

In 1986 the U.S. National Science Foundation created a network called NSFnet that interconnected many smaller networks of researchers. At first NSFnet tried to use the ARPANET for communications, but this strategy failed because of bureaucracy and staffing problems. In response, NSF decided to build its own network, based on ARPANET technology. NSFnet slowly began to connect more and more computers located at research institutions, universities and colleges, government departments and research oriented private industry, and it began to replace the ARPANET for research networking. An important aspect of NSF's networking efforts is that it allowed every one to access the network. Currently, the Internet is a vast network of networks that physically interconnects thousands of networks worldwide. It has evolved from an experimental network, to a research-oriented network, and now to an open, global network that provides access to thousands of diverse information resources and services.

ORGANIZATION

There is no single authority figure responsible for the Internet. As a whole, it is rather a conglomeration of thousands of separately administered networks. Networks get together and decide how to connect themselves together and fund these interconnections. The 'common language' on the Internet that allows computers to communicate, is TCP/IP, which stands for Transmission Control Protocol/Internet Protocol. Any computer with this protocol is capable of connecting to the Internet. The Internet also provides gateways to other, non TCP/IP networks, such as BITNET, UUCP and FIDOnet.

BASIC SERVICES

The Internet offers three kinds of basic services. The first is electronic mail, the second is remote login, also known as Telnet, and third is file transfer. Electronic mail is the most elementary service and it is also the service that is most common across all networks connected to the Internet. It is used for personal communication, sending a message from one person to another or to a whole group of people, but it can also be used for other kinds of communication.

With electronic mail you can join electronic mailing lists, which are group discussions or interest groups. A mailing list is a list of e-mail address of people interested in a certain subject. When your e-mail address has been added to a mailing list, you will automatically receive all contributions of other list members in your mailbox. Any message you send to the e-mail list address will be distributed to every member of that list.

Another possibility of electronic mail is receiving electronic journals and newsletters. Electronic journals and newsletters number in the hundreds on the Internet and are devoted to a large variety of topics. Electronic journals exist in different formats. One alternative is the electronic version of an existing print journal, with the difference that the electronic version is usually in ASCII. Some journals will send you the articles irregularly, as soon as the authors have written them, instead of sending the journal in full issues. Others will alert you with a table of contents, and explain how can you obtain the individual articles.

The second service on the Internet is remote login, which allows you to connect to a remote computer with your local computer as a terminal. The name of the Protocol that enables remote login is Telnet, which is also the command on many systems to allow you to login to other computers. With the Telnet command the user can use whatever services are provided on the remote computer. This could be, for example, an on line public access catalogue, a commercial database host like DIALOG (for which you will of course require an account) or a campus wide information system.

The third service on the Internet is file transfer, which is a possibility to transfer files from one computer to another. A file can be documents, graphics, software, spreadsheets, or even sounds. The protocol for transferring files on the Internet is called File Transfer Protocol (FTP) and on many systems, the actual programme that you will use is called FTP, which stands for the transfer programme. Files that are publicly available can be transferred via anonymous FTP. The process involves three steps. First you connect to a remote computer

where the desired file is stored. Once you have access to a remote computer, you examine its directories, and locate a specific file. Then you transfer the files to your own computer.

NAVIGATION TOOLS

Next to these three basic services, some navigation tools are available, which enable to locate useful information on the Internet. These navigation tools are Archie, WAIS, Gopher and www.

Archie is an on line directory service for anonymous FTP sites and other information resources. It was developed to solve the problem of finding information, which is stored in the many public access archives on the network. The way it works is simple. The Archie system, maintains a database of all the names of files stored at known public archive sites. A user can search this database by using a client programme, by remotely logging in to an Archie server computer, or by sending e-mail to the server. In this way you will be able to locate files by name.

WAIS stands for Wide Area Information Servers and it allows you to search for information in databases located on server computers. The idea of WAIS is to let the user search for a combination of words by sending search strings to the appropriate WAIS server machines. Each of these servers offers one or more collections of documents available for the search routine. Sources that contain the specified words are flagged, and the information is returned in hierarchical order based on the frequency of each word and the distance between the words in the document. The documents your search flags can be requested from the server, and the server will send them to you.

Gopher is menu-based system, which automatically makes use of FTP and Telnet to find information. Developed at the University of Minnesota, it offers a menu of resources that are available to you

World Wide Web or **WWW** is a system, which provides simple access to a variety of Internet resources, like Gopher, but through a hypertext interface. Dial-up access is almost as good as having your own connection, and it is considerably easier to set up. Your computer does not actually become part of the Internet; it is just accessing a service computer that is permanently connected to the network. Many organizations provide this kind of service. Since you are sharing the connection with others, the cost of these services is greatly improved.

INTERNET CONNECTIONS

There are different ways of connecting to the Internet, with different grades of service: dedicated Internet access, dial-up access, and access via other networks.

E-MAIL

The term **E-Mail** has become so common that every computer literate understands the concept. But it is a new term for those who don't have access to computer or they are computer illiterate. For the students of library and information it is essential to learn the technique and use the Internet in libraries as it has become part and parcel of information science. The term e-mail is derived from the word mail being commonly used with relation to post offices. E is abbreviation of the word 'electronic' and when combined with Mail the term becomes E-Mail. It can only be utilized when there is network of computers. Like post offices deliver letters to individuals, similarly every person or organization has to have mail box address called E-Mail address. E-Mail is a facility to electronically transfer messages from one computer to another. The two computers can be in the same room or on different subcontinents. E-Mail can be found on most networks. But the information exchanged is usually text based. The most E-Mail packages include the capacity to attach files containing graphics, pictures etc.

You should be eager to know as how does E-mail work. In many ways electronic mail works like paper mail sent through the postal service. The principle behind both postal mail and e-mail is called store and forward. Your message does not travel all the way from your mailbox to the recipient's mailbox in one long jump; instead, there is system for sending mail from place to place in shorter hops.

The principle of electronic mail is that computer users swap message from their own personal computers via a large central computer, the e-mail host computer. An e-mail system can be restricted to one organization, which means that you can only send message within that organization, but the system can also be connected to national and international computer networks. In this case the sender and the receiver of an e-mail system can be in the same building as well as thousands of miles away from each other.

An e-mail host computer is operated by a body, which runs the e-mail system. Any organization or individual wishing to use e-mail must first join an e-mail system. Each member of an e-mail system is assigned a mailbox on the

central e-mail host computer, with unique name or identification code and a password to prevent an unauthorized access to a mailbox. With their identification code and password users have access to the host computer. They can look in their own mailbox to see if any message have arrived and they can post messages in the mailbox of other users. If different e-mail systems are inter linker, it is also possible to post messages in the mailboxes of users on other e-mail systems.

Members of an e-mail system can connect up with the central host computer via an ordinary telephone line. The sender and the receiver are never in direct contact with each other on an e-mail system and e-mail user never receives calls. E-mail users always have to dial in to the central host computer themselves, whether it is to check their mailbox or to send messages. For this reason e-mail user does not have to be continuously connected to the system 'in case someone calls'.

All that is normally needed to use e-mail is a computer, a modem, communication software package and access to phone line for a short period each day.

In theory it is possible to use most types of personal computer to send and receive e-mail. Subscribers do not need to have 'compatible' machines to swap mail since all messages are sent via the central host computer. The limiting factor is whether an acceptable communications software package is available for the computer in question.

OBJECTIVES

After studying this unit the students will be able to

1. Understand the nature of E-mail and its capability of quick communication;
2. Learn the process of E-mail and its application in the filed of library and information science.

COMPULSORY READINGS

1. Abdullah, Ahsan. Internet and Pakistan. 2nd. ed. [n.p], 1996. pp.81-125.
2. DeFaber, Jolanda. Electronic mail... Den Haag: Socrates, 1994. pp.7-14

3. Rowley, J. The electronic Library. London: LA, 1998, pp. 181-201.

SELF-ASSESSMENT QUESTIONS

1. What is e-mail? How is it different from the mail you receive through a post-man, explain.
2. Is it necessary to have the e-mail address of your friend if you intend to e-mail him? Why?

ACTIVITIES

1. E-mail department of library and information of AIOU. Give a message that you are facing some problems in solving the first assignment of this course. Take the print out of the message and show it to some of your tutor or friend.
2. Use a computer having Internet connection. Browse some library and information science departments and show hard copy of your exercise to your teacher.