UNIT 14  SUBJECT CATALOGUING - PROBLEMS

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14.0  OBJECTIVES
As we are already aware, one of the approach by which users access a catalogue or
search for information is by subject. In this context subject cataloguing assumes a
great importance. In this unit, we discuss various aspects of subject cataloguing.
After reading this Unit, you will be able to:
•  explain the concept of subject cataloguing;
•  distinguish it from author/title cataloguing;
•  analyse various problems associated with subject cataloguing and arrive at
  appropriate solutions;
•  describe different methods (approaches) of subject cataloguing;
•  and suggest appropriate method of subject cataloguing for your library.

14.1  INTRODUCTION
The primary function of any library is to make available the information it possesses
(documentary as well as other types), to the users on their request.
To fulfil this objective, each library maintains a properly organised catalogue. The
catalogue is to be constructed on sound principles. By studying Units 1-4 of Course
BLIS 04, namely ‘Purpose
and Types of Library Catalogue', you are in a position to construct a suitable catalogue to meet the needs of your library.

For a person in need of information on a specific topic (i.e. specific subject), the library catalogue has to provide the facility of subject approach to library contents. If this facility is provided in the catalogue, the library user, on his own, will be able to find the items which are available in the library on a given subject as well as items related to the subject of his interest.

During the process of cataloguing, the cataloguer must take into account the dual manifestation of the items added to the library collection. That is to say, that these items are both intellectual as well as physical entities. In descriptive cataloguing, the physical description pertains to the physical entity (document), while subject catalogue provides access to the intellectual content of the entity. In practical terms, subject catalogue is designed to provide subject access to the library contents.

Inquirers, who need information on a certain subject will approach the catalogue with some questions formulated with their own terminology. These terms must be translated into the pre-determined access categories of the cataloguing. Certainly, such communication between the inquirer and the catalogue usually takes place with the assistance of the librarian.

There are different ways of providing subject approach to library materials. One of the methods involves the arrangement of library materials using a classification scheme. This results in a systematic arrangement of materials according to their subject content. The second, and the most commonly used method, is indexing the library materials through the use of a list of subject-headings or controlled vocabulary. This method also provides access to the intellectual content of a library. Classification provides a logical or methodical approach to the arrangement of documentary materials, whereas subject cataloguing provides mainly the alphabetic approach to the concepts discussed in these materials. These two methods offer two alternative modes of access to a library collection. The concept of subject cataloguing, the ways and means by which it differs from other aspects of cataloguing and the techniques available for this purpose as well as the problems confronted in subject cataloguing are discussed in this unit.

### 14.2 SUBJECT CATALOGUING

You will recall from your study of Block I of this course, that a library catalogue constitutes a complete record of the library's collection of documents. Also, you have learnt that the essential functions of a catalogue and the principles upon which it is constructed are not affected by the physical form. Even so, the card catalogue has become by far the most popular form of a library catalogue.

In the card catalogue, it is possible for a document to have a number of representations, though practical considerations limit this number. Each document representation (substitute) is in the form of a catalogue card, known as an entry. Each entry indicates some characteristics of the document, such as authorship or subject content. In other words, multiple access points are provided for a document in a catalogue. The entries that indicate the inclusion of documents in classes defined by subject content are known as 'subject entries'. The process of preparing subject entries for documents and organising them for subsequent retrieval is known as Subject Cataloguing.

#### 14.2.1 Meaning and Purpose

Since an entry in the catalogue serves as a document substitute, it is necessary to provide relevant information for individualising it so that the document can be retrieved or located from amongst the others belonging to the same subject category. This job is usually accomplished with the help of a call number assigned to the document. In addition to entries for individual documents, the catalogue also contains directions which refer the searcher from one heading to another heading under which potentially relevant information in the form of document entries can be found. Such entries in the catalogue are known as references. These references also help the searcher in locating information about the related subjects to the subjects of his interest.

"The assigning of headings and references, with retrieval of documents through the medium of a catalogue, in response to request for information on specific subjects is generally defined as subject cataloguing". Subject cataloguing forms an integral part of the total process. Therefore, there is little need to emphasise on the important role of subject cataloguing in libraries. The potential use of library materials cannot be exploited without it, especially in large libraries.
Also, the vast increase in the number of documents in every sphere of human activity, clubbed with the increased complexity of the pattern of knowledge, calls for a foolproof method of access to records on any subject. Thus, subject cataloguing is concerned with *subject description of documents*.

### 14.2.2 Objectives of Subject Cataloguing

All forms of subject catalogues have a two-fold objective: first to enable an enquirer to identify documents on a given subject and second, to make known the presence of material on allied or related subjects. Shera and Egan (1956) summarise the objectives of subject cataloguing as follows:

- To provide access by subject to all relevant material;
- To provide subject access to materials through all suitable principles of subject organisation such as matter and applications;
- To bring together references to materials, which treat substantially the same subject regardless of differences among groups of subject specialists, and/or from the changing nature of the concepts with the discipline itself,
- To show such affiliations among subject fields, which may depend upon use or application of knowledge;
- To provide entry through any vocabulary common to a considerable group of users, specialists or laymen;
- To provide formal description of the subject content of any bibliographic unit in the most precise, or specific terms possible: whether the description is in the form of a class, number or symbol; and
- To provide means to the users to make a selection from among all terms in any particular category, according to any chosen set of criteria such as, most thorough, most recent, etc.

With the above objectives, the techniques developed and designed to meet the requirements of subject cataloguing are discussed in the following sections of this Unit.

**Self Check Exercises**

1) Explain briefly (in not more than 10 lines) the concept of subject cataloguing.

**Note:**

i) Write your answers in the space given below.

ii) Check your answers with the answers given at the end of this Unit.
14.3 SUBJECT APPROACHES

Most of the users approach information sources not with names of who might have been responsible for their creation, but with a question that requires an answer on a or a topic for study. Users seek documents or information on a particular subject. In order to make provision for this common approach, it is necessary to arrange documents on the shelf and entries in catalogues in such a way that items on a specific subject can be retrieved.

In other words, it may be said that subject approach is very important in the access to and exploitation of documents in a library. Before we actually discuss the methods developed by librarians and information workers to meet this requirement, let us consider the question *What is a subject?* While talking about a subject we normally refer to a given area of knowledge, or the contents of a document of a given scope. A subject may be defined by:

- an area of interest,
- an area in which an individual researcher or professional works,
- an area in which an individual writes, and
- an area of knowledge being studied:

Let us consider a well-known area such as Physics. To understand this subject, let us first ask a student studying this subject, as to what constitutes this subject. Also, let us find out the definition of physics from a few dictionaries and encyclopaedias. We may come across different definitions and different boundaries for this subject area alone. We may also find that different users and separate pieces of literature hold different perspectives on one subject. The points of divergence in perspective can be categorised into two types:

- different labels (names) that are used for a subject, and
- different concepts about scope and associations with other subjects that are evident.

Essentially, these factors form the basis of problems in identifying a satisfactory subject approach and the need to have a vast array of tools to explain the subject approach to knowledge. It is possible and convenient to select a particular view point on the scope, associations and labels for subjects which coincides with the way in which subjects are handled in the literature. In libraries, most devices for the organisation of knowledge concern themselves primarily with organising documents, based on literary warrant. This approach is known as pragmatic approach. The main limitation of the approach is the time and collection dependency of the resulting tool. There is an alternative method for the design of subject retrieval devices, and that is to build schemes, which depend upon theoretical views about the nature and structure of knowledge. This theoretical approach is important in determining the nature of subject devices required for the organisation of knowledge. A subject device normally seeks to fulfil two functions:

- To show what a library or information centre has on a particular subject; and
- To show what a library or information centre has on related subjects.

Different devices for the organisation of knowledge place different emphasis based on the relative importance of these two functions. However, the two functions are inter-dependent and neither can be excluded without impairing the effectiveness of the other. A user who starts a search with a specific subject in mind may, in fact, be seeking a specific subject which does not quite match his requirements. For example, a user might start looking for "growing of tomatoes". A document on 'vegetable gardening' may contain equally valuable information on 'growing tomatoes' but generally he will not try to notice it because he believes that the more specific subject - 'growing tomatoes,' will not be covered in the document 'vegetable growing'. Later, on examining the document, he may discover that the information, he is looking for, is available in the document on 'vegetable growing'. Thus, broader subjects may help the user even with a specific search.

Classification schemes as well as alphabetical indexing systems attempt to fulfil both the basic functions mentioned earlier. The distinction arises from different emphasis. Classification schemes specialise in showing network of subjects and displaying relationships between subjects while alphabetical indexing systems specialise in establishing specific labels for subjects and providing direct access to individual subjects. Also, it may be stated here that author and title catalogues enable the user to locate documents of which the user knows either the name of the author or title of the documents, while subject catalogues enable him to find out documents of his interest even without knowing any of these items of information.
The subject approach may be totally alphabetical or it might be classified supported by alphabetical indexes.

**Self Check Exercises**

2) Explain briefly (in 5 to 6 lines) what constitutes a subject.

**Note:**

i) Write your answers in the space given below.

ii) Check your answers with the answers given at the end of this Unit.

14.3.1 Alphabetical Subject Approach

There are different means of providing alphabetical subject approach to documents and information. But, all these methods are confronted with some common problems. These problems are mainly concerned with the label (name) that is given to a subject in an alphabetical subject catalogue. Therefore, the basic problem pertains to the naming of a subject. It is generally agreed that a user-oriented approach should be followed in subject catalogues in naming the subjects. In order to achieve this objective, the various approaches of different users must be taken into consideration. If a subject has more than one name, a library catalogue must bring all material on that subject together (within the limitations of the scope of the collection) under those names. Specific problems encountered in this connection are:

a) Synonyms, b) homographs, c) singular and plural forms, d) multiword concepts, and e) complex subjects.

It is rather important to understand as to how the above mentioned aspects present problems to the subject cataloguer. First of all, let us briefly discuss about them.

a) *Synonyms* are terms with the same or similar meanings. Such terms are present in every subject. Near synonyms are most common. True synonyms which mean exactly the same thing and which are used precisely in the same context, are rather unusual. However, even near synonyms are regarded as equivalent for some purposes. Some situations in which synonyms arise are:

i) In case of some subjects which have one stem and several derivatives. For example: steriliser, sterilising, sterilised, or computing, computed, computation. Sometimes, it is acceptable to treat such words as equivalent to one another, and at other times it is important to differentiate between them.

ii) Some of the subjects might have both common and technical names, and these must be recognised for the purpose of subject cataloguing so that depending upon the clientele for whom the catalogue is meant, these are reflected in the catalogue. Examples are ‘Sodium Chloride’ and ‘Salt’, ‘radish’ and ‘raphanus sativus’, etc.

iii) Use patterns of terms also present problems to the cataloguer. The cataloguer should try to keep pace with changes in normal usage.

iv) Some concepts are defined differently in different versions of one language. American and English are examples of such differences in usage for example, lift and elevator. In all such cases, the user should be guided from the heading that is not chosen to the one that is chosen (preferred) in the catalogue.

The merging of synonyms carries implications for the effectiveness of a library catalogue as a retrieval tool.

c) *Homographs* means words which have the same spelling but different meanings. In normal language usage, the meaning of such homonyms is established by the context in which the term is used. But, in a catalogue the term is used as heading and therefore, it will be difficult to establish the interpretation to be placed on the homograph. In such cases,
c) **Use of Plural and Singular forms:** Generally, the plural and singular forms of the same noun are regarded as an equivalent, but there are some situations, when it is necessary to treat them distinct. In case, only one form of heading is permitted in the catalogue, then it is common practice to adopt the plural form. However, specific rules are provided for the usage of singular or plural form.

d) **Multi-word Concept:** Some subjects cannot adequately be described by one word, and require two or more words to specify them fully. Examples are: Information Retrieval, Country Walks, Underwater Colour Photography, etc: In such cases, no matter which word (in the term) is used as the main approach point in the catalogue, the user might choose to seek the subject under the second or third word (in the multiterm) first. Therefore, it is advantageous to provide access via all significant words in a multi-word concept. In a multi-word concept, sometimes the terms are presented in direct order; at other times, the inversion of terms is also resorted to, for example, Military Hospitals can find a direct entry in a catalogue which treats Military Hospitals as a unitary concept or it may be found in the inverted form as Hospitals, Military. Sometimes inversion may lead to grouping of like subjects. For example, inversion to Hospitals, Military will cause this heading to be filed along other headings starting with the word Hospitals. The primary disadvantage of inversion method is that the user of the catalogue might not be in a position to predict the terms of a multi-word concept that may be inverted. Also, the word order in a multi-word concept may also create some problems of uncertainty to the users.

e) **Complex Subjects:** Complex subject contains more than one unit concept in them and a number of terms may be used to fully describe these concepts. Each of these concepts might form a potential search key in a catalogue. With complex subjects, citation order becomes important. By citation 'History of Science' is not the same as 'Science of History'. The same—two terms 'History' and Science' serve to describe two subjects and it is only the order in which they are cited that determines the meaning; in the natural language, the connecting word 'is/are' distinguishes statements of the two subjects. The occurrence of a variety of concepts in the statement of one subject area is referred to as syntactic relationship. The syntactic relationships and the ways they can be handled are the distinguishing features between pre-coordinate and post-coordinate indexing systems.

### Self Check Exercises
3) List the problems encountered in alphabetical subject approach.
4) Explain with an example how a complex subject is handled in alphabetical subject approach.

**Note:**
1. Write your answers in the space given below.
2. Check your answers with the answers given at the end of this Unit.

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14.3.2 Display of Subject Relationships

The vital problem concerned with the alphabetical subject approach is the naming (labeling) of subjects. However, any tool such as the library catalogue used for the organisation of knowledge, must also take into account the different relationships existing between the subjects. There are two main categories of relationships between subjects. These are known as the syntactic relationships and semantic relationships.

For example, in a topic such as 'Sugar and Health', the concept 'Sugar' and 'Health' are drawn together in a specific context. Obviously any of these concepts may also be present in other contexts, where the existence of relationships defined for the purpose may be irrelevant. On the other hand, semantic relationships show aspects of genus-species relationships and are expected to reflect widely accepted subject relations. Entries should be made in the catalogue for linking such related subjects. This is normally achieved by means of references and other devices such as, alternative entries. These are some of the significant issues which cause problems in subject cataloguing and the cataloguer must take these into account and try to provide suitable solutions by which these problems might be minimised, if not totally eliminated.

14.4 ALPHABETICAL INDEXING LANGUAGES

In this section let us look at the concept of indexing language, its categories and functional use. Let us begin with the meaning of 'indexing language'. It is the language used to describe a subject or other aspects of information in an index or in a library catalogue. The generally accepted difference between a library catalogue and an index is that an index entry merely locates a subject or a concept, whereas a catalogue entry includes some descriptive specification of a document containing the subject. But the line of demarcation is not, in practice, hard and fast. The indexing language can be an alphabetical language or may be a classification scheme. But, our emphasis would be on alphabetical indexing languages. There are three main categories of indexing languages. They are: a) natural indexing languages; b) free indexing languages; and c) controlled indexing languages.

14.4.1 Natural Indexing Language

One of the greatest hurdles in discussing natural indexing language is that it is not easy to identify or know as to what exactly constitutes a natural indexing language. We do not generally come across lists of natural indexing languages. Obviously, a natural indexing language is the language of the documents that are indexed or catalogued for a library. Hence, it could be static as long as the document collection remains static. As soon as a new batch of documents is added to the library, the terms of the indexing language are changed to accommodate the new terms contained in the new set of documents. Each system will have a different indexing language even if the documents cover the same subject area. Also, since the indexing language is derived from the documents, added to the library or input into the system of different records, even if they represent the same documents, they generate a different indexing language. These variations affect the consistency associated with the library catalogue and so, present many problems. Most of the natural indexing languages are based upon the language of title, abstract and other text of documents.

There is a debate going on as to the effective use of natural languages for indexing and subject cataloguing purposes. One school of thought believes that full exploitation of the opportunities offered by computer systems could only be done taking recourse to natural indexing language, whereas the other school holds the view that controlled indexing language is the only proper way to index documents. However, it may be mentioned that controlled indexing language is extremely time consuming, costly and uneconomic. One of the applications of natural language indexing is the production of indexes based on words in titles of documents such as, Key Word In Context (KWIC) indexes.

14.4.2 Free Indexing Language

It is the nature of free indexing that any word or term that suits the subject may be assigned as a subject heading in catalogue or as an indexing term. The terms may be human assigned or computer assigned although free language indexing is commonly used in the computer produced subject catalogues or indexes. The computer generates the list, by indexing under every word which is provided, unless if is instructed not to do so.
14.4.3 Controlled Indexing Language

In the foregoing paragraphs we have discussed the concept of an indexing language as also, the categories into which it falls. In the process, we have learnt the meaning of natural indexing and free indexing languages. Let us now learn some facts regarding controlled indexing languages and their use in subject cataloguing and indexing.

Control is necessary in respect of terms used as subject identifiers in a catalogue or index, because of the variety of natural languages. Such control may involve barring of certain terms from use as headings or access points in a library catalogue or an index. The term which are to be used are specified and the synonyms recognised and as far as possible are eliminated. Preferred word forms are noted. The list of terms, thus, prepared constitutes what is called controlled indexing language. One of the methods by which such a language is formed, is to list or store the acceptable terms in a vocabulary. Such lists contain specific decisions relating to the preferred words, and also decisions regarding the form of words to be used; for example, singular or plural, nouns or adjectives. There are mainly two types of controlled indexing languages in verbal plane. They are: subject heading lists and thesauri. These two types of controlled indexing languages have the following functions:

i) to control the terminology used in subject catalogues and indexes; and

ii) to control the display of relationships in catalogues and indexes.

Subject heading lists are lists of index terms normally arranged in alphabetical order, which can be used to determine the terms to be used in a catalogue for describing subjects (i.e., as subject headings) by cataloguers. These lists attempt to solve some of the problems concerning alphabetical subject approach. They serve as guides to the cataloguer and aid him in the task of subject cataloguing. The basic functions of a subject headings list may be stated in the following terms:

i) The list records terms which shall be used in a catalogue or database, and also indicates the form in which they shall be shown. It acts as an authority list for index terms and their form.

ii) The list makes recommendations about the use of references for the display of relationships in a catalogue in order to guide the users to distinguish associated terms.

'Sear's List of Subject Headings' and 'Library of Congress List of Subject Headings' are examples of popular list of subject headings. These two lists have been the basis for discussion in respect of alphabetical subject catalogues or in other words, for the theory and practice of subject cataloguing. We shall be learning more about these two lists in Unit 15 of this course.

It was mentioned earlier that controlled indexing languages are of two types. In the foregoing paragraphs we have discussed one of these two types namely 'Subject Headings'. Let us now try to understand the second type namely 'Thesauri'.

Thesauri

The dictionary meaning of the word 'thesaurus' is "a collection of words put in groups together according to likenesses in their meaning rather than an alphabetical list." However, in library and information science parlance the word thesaurus means an authoritative list showing terms which may and sometimes may not be used in a catalogue or index to describe concepts. Technically, a 'thesaurus' could be defined as "a compilation of words and phrases showing synonymous, hierarchical, and other relationships and dependencies, the function of which is to provide a standard vocabulary for information storage and retrieval systems". In a thesaurus, each term is usually given together with terms; which are related to it in a number of ways. The primary purpose of thesaurus is to exert terminology control in choosing proper headings in subject cataloguing and indexing. This concept is being extensively used since the 1950s in many information retrieval systems and a variety of bibliographical tools. A number of standards have come into existence to provide guidance in the construction of thesauri. 'Root Thesaurus' published by the British Standards Institution is one of the best models. Apart from this, there are a number of thesauri such as TEST (Thesaurus of Engineering, Scientific and Technical Terms), and others concerned with INIS, INSPEC, AGRIS, etc., which are being used in information storage and retrieval systems. We shall be learning more about the 'thesaurus' in Unit 15.
Self Check Exercises

5) What you understand by an ‘Indexing Language’?

6) Mention the different categories of Indexing Languages indicating the situations when they could be used with advantage. Give your answer in about fifteen lines.

Note: i) Write your answers in the space given below.
ii) Check your answers with the answers given at the end of this Unit.

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14.5 INDEXING SYSTEMS

The preparation of a series of entries for inclusion in a subject catalogue or in a printed index is known as indexing. An entry is a basic unit of a subject catalogue or an index. It consists of (a) a means of identifying an item in, or a concept derived from the collection (i.e. the documents of a particular library), and (b) a means of locating the item or material relating to the concept. Indexing is a technique for providing service operation and an index or a subject catalogue is a tool. It is a means to an end, never an end in itself. In other words, it is a communication link between a collection (of a library) and those who intend to obtain some information from it.

The process of indexing calls for sensitivity to users’ approaches, intuition to select appropriate terms and skill to identify the terms and their relationship, on the part of the indexer. The indexing process also requires the creation and recognition of pattern and rule conscientious and adherence to them, as also accuracy and precision. In other words, the process involves the application of a model indexing system.

14.5.1 Definition of an Indexing System

Let us now look at some of the definitions available in the literature of Library and Information Science. One such definition states that "an indexing system is a set of prescribed procedures for organising the contents of records of knowledge or documents for the purposes of retrieval and dissemination." Another definition reads that "an indexing system is the means whereby an indexing language can be applied to make an index." It appears that both these definitions have common roots. The only difference is that the first definition is somewhat broader in scope. It may be stated that the need for an indexing system stems out of the work of devising index headings. These index headings mainly relate to documents dealing with compound or multi subjects although, elementary one-concept subjects are not excluded from the purview of an indexing system. For convenience, indexing systems could be divided into two basic groups: the pre-coordinate systems and post-coordinate systems. On the basis of experience, it may be stated that not every index necessarily exhibits all the features of either of these two types of indexing - systems, both types of indexing systems. However, this division is useful in understanding these two categories of indexing systems. A brief description of the pre-coordinate as well as post-coordinate indexing systems is provided in the following sections.
14.5.2 Pre-Coordinate Indexing Systems

Pre-coordinate indexing systems are conventional systems mostly found in printed indexes. In this type of system, a document is represented in the index by a heading or headings comprising of a chain or string of terms. These terms taken together are expected to define the subject content of the document. The leading term determines the position of the entry in the catalogue or index, while the other (qualifying) terms are subordinated to it. Let us consider the title of a document "Use of Computers in Library and Information Activities". It might be represented by headings such as:

- LIBRARY ACTIVITIES : Use of Computers
- COMPUTERS : Use in Library Activities

Since the coordination of terms in the index description is decided before any particular request is made, the index is known as pre-coordinate index. One of the characteristics associated with a pre-coordinate index is that the headings in the index are relatively specific compared to one-concept headings such as LIBRARIES or COMPUTERS. Pre-coordinate indexes are mostly prevalent as printed-indexes. For example, the indexes to abstracting and indexing journals, national bibliographies and subject indexes to library catalogues apply principles of pre-coordinate indexing in varying measures. Such indexes are compiled both manually as well as with the help of a computer.

Two aspects are of great significance in relation to pre-coordinate indexes. The first aspect concerns the consistent description of subjects. In case of subject headings describing many concepts, consistency should be introduced into the terms used to represent individual concepts that constitute the multiple-concept heading. Also, the order in which the individual terms representing the unit concepts of a multiple-concept stated must be consistent. Some basic principles have to be evolved and followed regarding an acceptable citation order of the terms. There must be a theoretical basis by which consistent citation orders could be achieved. Use of such theoretical principles may result in the derivation of a structured system of headings with consistent citation order between similar, yet distinct subjects. The citation order is less likely to be overlooked if some rationale determines such citation order which is to be followed.

The second significant aspect that requires the attention of subject cataloguers or indexers, is the need to provide access for those users who approach the subject under consideration from one of the secondary concepts. Since only one term can appear in the primary position in the prescribed citation order, the preferred citation order should be the one, which caters to a majority of users. In this context, it may be stated that the same citation order, however well founded it is, will not prove suitable to every searcher. To obviate this problem, references or added entries should be provided in the catalogue or index. At least, one added entry is usually provided for each of the secondary concepts contained in the preferred citation order. Generally, there is some pattern by which such references could be generated to an acceptable level:

Both these aspects arise because of the fact that pre-coordinate indexing systems are basically one-place-systems. That is to say, that these systems normally provide one main entry for each document and are mostly suitable for catalogues and bibliographies. These are very helpful to the searcher since a number of searches can be conducted simultaneously by-tracing entries under similar headings. Pre-coordinate systems find their application in printed indexes and library catalogues.

In summary, it may be stated that in all pre-coordinate indexes, the subject description is composed of a set of terms, which constitutes a summarisation of the subject. Also, the assumption is that subject description reflects the most likely way in which the information concerned will be asked for. Thus, when a user asks for information on a particular compound (multi-concept) subject, the combination of the concepts involved will be easily matched in the index against an entry for the same combination. Because this method of indexing coordinates the elements of compound subjects before any particular request is placed for information on that particular compound subject, it is known as pre-coordinate indexing.

14.5.3 Post-Coordinate Indexing Systems

These systems are also called coordinate indexing systems. As in the pre-coordinate systems, the starting point, here too, is the identification of multi-concept subjects and their compound concepts from the documents to be indexed. Once the multi-concept subject is analysed into its elementary compound concepts, entries are prepared under terms, which represent elementary concepts. In
other words, by this method only simple subject concepts are indexed. These concepts are not coordinated at the time of preparation of catalogue or index. Since the coordination of concepts does not take place till such a request is made by user for information about a particular compound subject, this method of indexing is called post-coordinate or sometimes simply, coordinate indexing. In its early stages, post-coordinate indexing employed subject concepts as they were expressed in the document for index description of the document. Although, indexing can thus be done in 'natural language' (i.e., by using significant words taken directly from the document) but in many cases, post-coordinate indexing language employees terms which mostly represent isolate concepts and are not in the form of compound subject headings. For example, if we have a document dealing with the compound subject "Computer Cataloguing in Libraries", the subject analysis of the document may consist of three simple concepts namely,

COMPUTERS  
CATALOGUING  
LIBRARIES

The document is indexed under each of these simple concepts and index entries are prepared. Thus, the compound subject of the document receives an index description consisting of their concepts entered individually in the index. If a user is interested only in documents dealing with the compound subject then he has to coordinate all these terms at the search stage and retrieve the documents dealing with the compound subject. This is accomplished by retrieving documents containing common document numbers under individual component concepts. Let us, consider another document representing the subject 'Torsion in the Reinforced Concrete in Service Cores in Tall Buildings'. This multi-concept subject may be analysed into the following unit or elementary concepts:

Torsion  
Reinforced Concrete  
Service Cores  
Tall Buildings

If it is intended to prepare post-coordinate index for this example, we may have to prepare entries under the following index headings:

Buildings, Tall  
Concrete, Reinforced  
Service Cores  
Torsion

Self Check Exercises

7) Explain in about fifteen lines what you understand by ‘Indexing System’.
8) Bring out in about 15 to 20 lines the essential differences between Pre and Post-Coordinate Indexing Systems.

Note:  
i) Write your answers in the space given below.
ii) Check your answers with the answers given at the end of this Unit.

14.6 ONLINE PUBLIC ACCESS CATALOGUE (OPAC)

By late 1970s, libraries began to use computers for cataloguing purpose and the idea of making the catalogue of a library available to its users online began to be accepted and has been implemented in a number of libraries. This computerised online catalogue, which can be searched by the users directly for the retrieval of records without the assistance of a trained intermediary is commonly known as Online Public Access Catalogue ((PAC).

14.6.1 MARC and the Subject Approach

The concept of MARC (Machine Readable Catalogue) has brought in a new era in the field of library and information services. MARC stimulated the development of library automation and information networks.

the evaluation of MARC - I format. The idea behind MARC - II was to develop one common format structure capable of containing bibliographic information for all forms of documents. Not all the information in the MARC record is relevant to the subject of a document, but certain fields are likely to be more productive than others in providing a range of subject descriptions. Some fields are related specifically to notation/class number derived from different schemes of library classification, such as those of LCC, UDC, DDC and NLM; and others are related to alphabetical subject headings, such as those drawn from LCSH, PRECIS, and other alphabetical systems.

14.6.2 Subject Access to OPAC

The typical OPAC interaction process requires the matching or crude translation of user vocabulary to system vocabulary. It became apparent that the amount of subject information included in standard MARC records is not adequate to meet the users' subject approach to the OPAC. Online capabilities offer many possibilities for improved subject access. Two important search devices used in OPACs are discussed below:

**Boolean Search**

Boolean search is the process of searching where the search terms are combined through Boolean Operators (AND, OR, NOT)

a) **Logical Product AND**: Here two or more terms are combined by logical "AND" in order to formulate the search statement. If we formulate the search statement as A and B, we require that matching for both A and B in the index record to take place. Thus, a search for 'Electronic Scanner' seeks to formulate the search statement as 'Electronic AND Scanner'.

b) **Logical Sum 'OR'**: Here two or more terms are combined by logical 'OR'. Thus, a search for 'Electronic Scanner' or 'Electronic Searcher' seeks to formulate the search statement as 'Electronic AND (Scanner OR Searcher)'.

c) **Logical Difference 'NOT'**: Here, terms are combined by logical 'NOT'. If we formulate the search statement as A NOT B, we require that, for matching, A must be present in the index, record but B must be absent. Thus a search statement '(Automation AND Library) NOT Circulation' will retrieve all index records concerning 'Library automation' except 'Circulation'.

In this connection, it is to be noted that different OPACs have their own symbols used to indicate the Boolean operators (AND, OR, NOT) while formulating the search statement. The Boolean search method is also explained in BLIS - 06 and BLIS - 07 courses.

**Truncation**

It is not necessary to specify complete words. The system may allow for 'term truncation', where a fragment can be specified and the computer will pick up any term containing that fragment. This device is also known as 'Word fragment search'. Fragments may be truncated at either or both ends or at the middle. As for example:

<table>
<thead>
<tr>
<th>Type of Truncation</th>
<th>Term</th>
<th>Words captured by term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right truncation</td>
<td>LIBR *</td>
<td>Library, Librarians, etc.</td>
</tr>
<tr>
<td>Left truncation</td>
<td>*OLOGY</td>
<td>Zoology, Geology, etc.</td>
</tr>
<tr>
<td>Infix truncation</td>
<td>P*DIATRICS</td>
<td>Pediatrics, Paediatrics</td>
</tr>
<tr>
<td>Right-left truncation</td>
<td>*Electric *</td>
<td>Electricity, Electric conductivity, Hydroelectricity, etc.</td>
</tr>
</tbody>
</table>

The sign '*' is used to indicate truncation. The sign may vary from one system to another system.

14.6.3 Aids to Searching

Subject searching in OPAC creates certain problems for the users. Several OPACs have been developed to ease vocabulary selection and aid in searching. When the user is having trouble in finding the correct controlled vocabulary term to use for searching, a in resulting display of records with the message that the retrieved records have the subject words in their titles and their headings' will be useful in the search. Subject headings on the records help to find controlled vocabulary for the desired topic. Thus, OPACs offer the opportunity in guiding the users from natural language terms in titles to the controlled vocabulary used in subject headings.
Self Check Exercises

9) Explain what you understand by OPAC?

10) Formulate the search statements using Boolean Operators for the following subjects:
   i) Bibliography on Library Automation excluding circulation
   ii) Use of Multimedia in Teaching
   iii) Classification and Indexing of Film Materials
   iv) Standards for Indexing, classification, and abstracting

11) Formulate an expression to retrieve all index records containing any of the words 'excess', 'excessive', or 'excessively' in titles or descriptors.

Note: i) Write your answers in the space given below.
   ii) Check your answers with the answers given at the end of this Unit.

14.7 SUMMARY

In this Unit, we have explained the concept of subject cataloguing, its purpose and functions. Subject approach to library materials which is necessary for the effective exploitation of library resources is discussed.

The meaning of indexing languages, their categories and the important role they play in the effective implementation of subject cataloguing have also been discussed. The process of indexing, and how it helps subject cataloguing has been explained. The major types of indexing systems namely pre-coordinate and post-coordinate have been considered in the context of subject cataloguing. The unit also mentions some of the problems confronted by subject cataloguers and the ways and means of overcoming them. The essential features of OPAL along with its search devices are briefly explained in this Unit.

14.8 ANSWERS TO SELF CHECK EXERCISES

1) Library catalogue constitutes an important record of collection of documents in any library. Each entry in the catalogue indicates some characteristics of documents such as authorship or subject content. The entries that indicate inclusion of documents in class, defined by subject contents, are known as subject entries. The process of preparing subject entries' for documents and organising them for subsequent retrieval is known as subject cataloguing. This task is accomplished by assigning subject headings and references, which facilitate retrieval of documents through the medium of a catalogue, in response to requests by users in a specific subject. Subject cataloguing is very important for the optimum exploitation of library materials.

2) While discussing about a subject, we generally refer to a given area of knowledge, or the contents of a source of information of a given scope. A subject might be defined by:
   - an area of interest,
   - an area in which individual researcher or professional works, and
   - an area of knowledge which is studied.

3) The problems encountered in alphabetical subject approach are those that relate to the handling of:
   a) synonyms
   b) homographs
   c) plural and singular forms;
   d) multiworded concepts
   e) complex subjects.

4) Complex subjects are those that have more than one concept to describe their subject contents. A citation order is necessary to be prescribed to fix the order of the unit concepts, which would indicate their contextual meanings. For example: 'Teaching techniques in Chemistry', the unit concepts are 'Teaching techniques' and 'Chemistry', indicating that teaching methods are discussed in the context of Teaching Chemistry. The citation order in this example is 'Teaching Techniques, Chemistry', in the subject of Education.
1) An indexing language is a set of terms (vocabulary) and devices for handling the relationships between subjects or terms in a system for providing index descriptions. Indexing languages are also known as retrieval languages. The basic functions associated with indexing languages are:
   i) To control the terminology used in indexes and catalogues.
   ii) To control the display of relationships between the concepts in indexes.

There are two types of indexing languages, namely subject headings list and thesauri. Both these types perform the basic functions mentioned above.

6) Indexing languages may be grouped into three categories. They are:
   i) Controlled indexing language
   ii) Free indexing language
   iii) Natural indexing language

Controlled indexing languages are subject headings lists such as Sear's List of Subject Headings, Library of Congress List of Subject Headings and thesauri such as, TEST, INIS Thesaurus and INSPEC Thesaurus.

Free indexing language cannot as easily be delineated as a controlled indexing language. It is in the nature of a free indexing language that any word or term that suits the subject may be assigned as an indexing term. The terms may be computer or human assigned although free indexing language is commonly used in computer-based systems. All the above mentioned types of indexing languages are possibilities for index construction. While subject heading lists are commonly used in library catalogues, thesaurus and other type of languages are preferred in computer-based information retrieval systems.

7) The creation of a series of entries for inclusion in a catalogue or index is an indexing process. This process involves the use of a system known as indexing system. An indexing system is a set of prescribed procedure for organising the contents of records of knowledge or documents for the purpose of retrieval and dissemination. It is a means whereby a specially designed (indexing) language is applied for the compilation of an index. Most of the work on indexing systems stems out of the need to devise index headings which aid in the retrieval of compound or multi-concept subjects. Indexing systems can be divided into two groups namely a) pre-coordinate indexing systems, and b) post-coordinate indexing systems. The main purpose of indexing systems is to make information retrieval an easier operation.

8) Indexing systems are broadly categorised into two groups. They are 'Pre-coordinate indexing systems' and 'Post-coordinate indexing systems'. In pre-coordinate indexing system, a document is represented in the index by a heading or headings consisting of a number of terms. The leading term determines the position of the entry and qualifying terms are subordinated to it in the arrangement. Since the coordination of index terms in the index description is decided by the indexer at the input stage, before any particular request is made, the index is termed a pre-coordinate index. The two important factors that distinguish pre-coordinate indexes are: a) a pre-determined citation to express the terms, and b) provision of additional entries for approaches besides the leading term.

Post-coordinate indexing systems also start from the identification of multi-concept subjects and analysis of such subjects into their component single concepts. But the indexing is confined to single concepts. In other words, these concepts are not coordinated to form a compound subject until the search stage. In fact, the coordination of single concepts to form a compound subject takes place only at the stage of output from the system. As the combination of terms are done only at the search stage, this system is known as post-coordinate indexing system. Because the coordination of single concepts to form a multi-concept subject does not take place until a request is made by the user for information about a particular compound subject, this indexing method is called posts-coordinate indexing.

9) Most library catalogue research in 1970s was directed towards the development of online catalogues, as they are now commonly called OPACs (Online Public Access Catalogues). When a library's users can retrieve catalogue records directly from computer database, the library is said to have an OPAC. An OPAC is based on MARC records and is accessible by means of access points or search keys from users workplace in an interactive mode through a computer terminal. Another form of OPAC is CD-ROM catalogue, accessed
through stand-alone microcomputers. The amount of subject information included in the MARC records may not become adequate to satisfy the users' subject approach. Online capabilities offer many possibilities for improved access: Keyword searching, selective search combinations through Boolean operators (AND, OR, NOT), truncation, and guiding users form natural language terms in titles, to the controlled vocabulary terms used in subject headings.

10) i) (Bibliography AND Library Automation) NOT Circulation
   ii) Multimedia AND Teaching
   iii) (Classification OR Indexing) AND Films
   iv) (Classification OR Indexing OR Abstracting) AND Standard.

11) excess*

14.9 KEY WORDS

Alphabetical Subject Approach : There are different methods of providing subject approach to information contained in documents. One of them is known as alphabetical subject approach. As per this approach, items of information are first grouped under their specific subjects and then arranged according to alphabetical order so that specific subjects can be retrieved easily.

Boolean Search : A process of searching the machine-readable collection of bibliographic data by applying the Boolean operators 'AND', 'OR', 'NOT'.

Index : A tool that exhibits the analyzed contents of a bibliographic entity or group of such entries, arranged in a systematic way, so that retrieval of specific items of information could be done easily.

Indexing : Indexing is the process whereby indexes and associated tools for the organization of knowledge are generated. Indexing can be done both manually as well as with the help of a computer. Subject indexing comprises three stages: familiarisation with subject, analysis and assigning of terms to represent concepts using an indexing language.

Indexing Language : It is a set of items (vocabulary) and devices for handling the relationships between them in a system for providing index descriptions. Indexing language is also referred to as a retrieval language.

MARC (Machine-Readable Cataloguing) : A system in which cataloguing records are prepared in a format that enables the computer to recognize the data elements and manipulate them for various purposes.

OPAC (Online Public Access) : An online catalogue based on MARC records accessible in an interactive mode.

Post-coordinate Indexing System : An indexing system, in which the grouping of a large number of entries is done under simple concepts in such a way that the user can combine them to locate material on compound subjects in which he is interested.

Pre-coordinate Indexing System : An indexing system, in which a combination of subject terms is accomplished at the time of preparing the index itself for use in the retrieval of information pertaining to complex concepts.

Semantic Relationship : Semantic generally means the study of meanings of words. But the context of subject indexing, semantic
relationships are relationships between the subjects, which are stable, and reflect the consensus of opinion concerning the connections/relations between the subjects. For example, the component of the building is roof and not vice versa. Physics is a branch of science, etc. and not the reverse.

### Subject Approach
Users often approach information sources with a question that requires an answer or a topic for study. In other words, they seek documents or information concerned with a particular subject. This method of seeking information by users, is known as subject approach to information. In order to make provision for this common approach, it is necessary to arrange documents and document surrogates, in library catalogues, indexes, etc. in such way that items of specific subjects can be retrieved.

### Surrogate
Generally the word means a substitute or representation. A document surrogate means a representation of the document such as author, subject, etc. The term is used in the context of information retrieval.

### Syntactic Relationship
Syntactic relationships arise from the context of subjects in specific documents. They are less permanent compared to semantic relationships. For an indexer, it is necessary to distinguish between these two types of relationships and to provide suitable mechanism in indexes to take care of them.

### Thesaurus
It is a compilation of words and phrases showing synonyms, hierarchical and other relationships and dependencies, the function of which is to provide a standard vocabulary for information storage and retrieval systems. The object of the thesaurus is to exert terminology control in indexing and to aid in searching by alerting the searcher to the index terms that have been applied.

### Truncation
A device for searching through a fragment of the search term so that it can match related terms starting with the same terms.

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### 14.10 REFERENCES AND FURTHER READING