**UNIT 7  FUNDAMENTAL CATEGORIES, FACET ANALYSIS AND FACET SEQUENCE**

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**7.0 OBJECTIVES**

This Unit introduces to you the concept of fundamental categories and acquaints with the techniques associated with facet analysis and facet sequence. A knowledge of these concepts and techniques and their application in library classification is essential for the efficient and effective functioning of an information professional. After reading this Unit, you will be able to:

- get a clear understanding of the postulate of fundamental categories;
- obtain an insight into and familiarity with the five fundamental categories: Personality, Matter, Energy, Space and Time;
- understand the concepts and techniques of facet analysis and facet sequence and their application to the classification of documents in a library; and
- exemplify the application of facet analysis and sequencing of facets in Colon Classification, Dewey Decimal Classification and Universal Decimal Classification schemes.

**7.1 INTRODUCTION**

While in Block I of this Course you have been made familiar with elements of library classification - basic terminology and historic perspectives; and the need and purpose of library classification-, in Block 2 you have been exposed to the General Theory of Library Classification and how Dewey Decimal Classification, Universal Decimal Classification, and Colon Classification map out subjects. This Block 3 introduces you to the various approaches to library classification.

In Unit 6 of this Block 3, the postulational and systems approaches to library classification have been explained in detail. These approaches offer a systematic methodology for the
intellectual organisation of knowledge and serve as a set of useful guidelines for application in practical classification.

After explaining the postulate of fundamental categories, this Unit explains Ranganathan's Fundamental Categories - Personality[P], Matter[M], Energy[E], Space[S] and Time[T]. Each one of the fundamental categories is explained with examples.

The classification of documents in a library involves an analysis of the contents of documents into their respective facets. Ranganathan's Fundamental Categories can, thereafter, be applied to fit them into framework to work out their respective class numbers. This method of facet analysis, using Ranganathan's Fundamental Categories, is illustrated with examples in this Unit.

In addition, facet sequence(s) adopted by Colon Classification, Dewey Decimal Classification and Universal Decimal Classification schemes have been described in detail.

### 7.2 FUNDAMENTAL CATEGORIES

In mapping the universe of subjects, different systems of classification have adopted different methods and approaches. Ranganathan adopted a systematic procedure based on certain assumptions which we have called Postulates. The process of division that Ranganathan followed recognises that every subject has a basic facet, i.e., the first context-specifying facet and represented by the concept/term called basic subject (BS), to which one or more isolate ideas may be attached. He postulated these fundamental ideas by the term 'Fundamental Categories'. By going to a dictionary and finding out the meaning of each of the two component terms 'Fundamental' and 'Category' and then combining the meanings, one cannot understand what the Fundamental Categories (FC) are. The word-group forming the term FC is an unbreakable one and can be defined by enumeration only.

#### 7.2.1 Postulate of Fundamental Categories

According to this postulate "There are five and only five fundamental categories - viz., Time, Space, Energy, Matter and Personality." Explaining these, Ranganathan emphasises that these terms and the ideas denoted by them belong strictly to the context of the discipline concerned. Their significance, in our context, can be seen only in the context of the discipline concerned. This set of FC is, for brevity, denoted by the initionym PMEST.

After identifying basic subjects, the analysis of isolate ideas going with basic classes has also to be done in a systematic and logical way to produce the desired result. An examination of subjects will reveal that every subject has its different aspects and together all these present a coherent account of the subject. For example, consider the following six terms in the subject of chemistry:

1. alcohol  
2. liquid  
3. Volatility  
4. combustion  
5. analysis  
6. burette

1. Substance  
2. State  
3. Property  
4. Reaction  
5. Operation  
6. Device for

It can be seen that each of the isolate terms in the left column belongs to a corresponding category in the right column. Here, substance means all substances and state mean all states. It, therefore, follows that each of the above terms is a category of ideas and can be regarded as a facet of the subject chemistry. Indeed we can discern this type of organisation of ideas in any subject. Table 1 illustrates this. This table lists some basic subjects and the type of facets that go with each of them respectively.

While designing Colon Classification, Ranganathan discerned that although different subjects have facets special to them, there is an underlying unity of ideas when these facets are examined in depth. In each one of the subjects, there is a core set of ideas that are central to every aspect of the study of that subject. This underlying of ideas led Ranganathan to postulate the Fundamental Categories.
Table 1: Matrix of Basic Subjects and Their Corresponding Facets

<table>
<thead>
<tr>
<th>Basic Subject</th>
<th>Facets</th>
<th>Type of Library</th>
<th>Library Type of Materials</th>
<th>Activity</th>
<th>City</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library Science (Research Library)</td>
<td>1</td>
<td>Materials (Documents)</td>
<td>Activity (Classification)</td>
<td>City (Delhi)</td>
<td>(1997)</td>
<td></td>
</tr>
<tr>
<td>Chemistry</td>
<td>Substance (alcohol liquid)</td>
<td>Property (Volutility)</td>
<td>Reaction (Combustion)</td>
<td>Analysis (Operation)</td>
<td>Device (Burette)</td>
<td></td>
</tr>
<tr>
<td>Botany</td>
<td>Natural of Plants (Flowering plant)</td>
<td>Property (Colour, morpholgy)</td>
<td>Structural</td>
<td>Country (India)</td>
<td>Year (1986)</td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>Crops (Rice)</td>
<td>Property (protein content)</td>
<td>Operation (Harvesting)</td>
<td>Machinery (Tractor)</td>
<td>Country (Burma)</td>
<td>Year (1985)</td>
</tr>
<tr>
<td>Medicine</td>
<td>Organs (Lungs)</td>
<td>Structural (Anatomy)</td>
<td>Disease (Cancer)</td>
<td>Treatment (Oral)</td>
<td>Drug (Streptomycin)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>F.ducand (Children)</td>
<td>Subjects (Maths)</td>
<td>Teaching (Question-Answer)</td>
<td>Equipment (Slide, Projector)</td>
<td>City (Delhi)</td>
<td>Year (1987)</td>
</tr>
<tr>
<td>History</td>
<td>Community (Indians)</td>
<td>Activities (Freedom Struggle)</td>
<td>Period (1910-1947)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sociology</td>
<td>Social Groups (Labour Class)</td>
<td>Activities (Marriage)</td>
<td>Welfare (Flood Relief)</td>
<td>Country (Pakistan)</td>
<td>Year (1987)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Words given under each facet in brackets are isolates of the respective facets.

7.2.2 Five Fundamental Categories

There are five and only five Fundamental Categories.

These are:

Personality [P]
Matter [M]
Energy [E]
Space [S]
Time [T]

Let us loop at Table 1-again in the light of the five Fundamental Categories. Each of the facets, going with the basic subjects, can be regarded as a manifestation of one or the other of the five Fundamental Categories. Figure 1 graphically represents this idea. PME are the categories that operate in a space-time configurations.
Self Check Exercise

1) Identify the different facets in library science and fit them into the framework of the five Fundamental Categories with an example.

**Note:**

i) Write your answer in the space given below

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

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For example let us consider a wooden table in relation to the basic subject furniture manufacture. Here, "table" with its distinct shape, volume, utility, etc., is the core idea and is central to every other idea that goes with it. Hence, it is to be regarded as a member of the facet furniture, which in turn can be regarded as P. The wood, that has gone into the making of the table can be regarded as the manifestation of M. The processes and activities that are necessary to get the finished product could be regarded as the manifestation of E. That the table is in the premises of IGNOU in Delhi represents the concept space and therefore facet S and it is, there in 1997 which represents the facet T. Although this, example is an over-simplification of the method of analysis, it explains the basic ideas of Fundamental Categories fairly clearly. Let us now try to get a formal explanation of Fundamental Categories (FCS).

Self Check Exercise

2) Identify the five Fundamental categories in “Furniture Manufacture”.

**Note:**

i) Write your answer in the space given below

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

The FC "Time" gives the least difficulty in identification. It is used in accordance with what we commonly understand by the term. The usual Time isolate ideas such as millennium, century, decade, year and so on are its manifestations. Time isolates of another kind - such as, day and night, seasons such as summer and winter, and time with meteorological quality such as wet, dry, snowy, stormy, etc., are also taken as a manifestation of the FC "Time". Some examples of titles presenting the Time element are given below:

- Superconductivity in 1997
- Winter sowing of wheat
- Night journey by trains
- Technological advances in the 20th century
- Study of astronomy through the millennia

In classification schemes like CC, UDC, etc., time schedules are listed separately as "Time Isolates" or "Chronological divisions" or "Featured Time Isolates" these common isolates occur in many subjects.

Space

The FC "Space" comes next to "Time". Normally, there is no difficulty in its identification and is represented in most schemes of classification. It is in accordance with what is commonly understood by the term. It includes geographical isolate ideas like continents, countries, states, districts, taluks, cities, towns, villages; water formation and physiographical isolate ideas such as oceans and seas, deserts, prairie, rain-forest, plateau, mountain, rivers, canals; climatological zones, tropics; areas occupied by population clusters, such as city, town, etc. All these are taken to be a manifestation of the FC "Space".

The following are examples of titles wherein Space Isolates are present.

- Textile industry in Canada
- Mountain ranges of India
- Airconditioning in the tropics
- Public library services in village
- Political conflicts relating to the Indian Ocean
- The Ganga cleaning project

From the above, it is clear that the manifestation of FCs Time and Space can be easily understood and present no difficulty, generally, in their identification. In many cases, they can be identified from the titles of documents themselves.

Energy

The manifestations of Energy are generally actions. They connote dynamic actions, such as, "doing", "changing" "evaluating" "determining", "forecasting", "analysis", etc. The action may be among and by all kinds of entities - inanimate, animate, conceptual, intellectual, and intuitive. The identification of the FC "Energy" is a little more difficult than that of "Time" or "Space". As matter of fact, the distinction between the manifestation of "Energy" isolate and "Matter Property" isolate poses problems mainly due to action-associated ideas. It has been found that two groups of attributes can be deemed to be manifestations of Matter (Property). They are:

Isolate idea denoting a "static" attribute that is an action-associated attribute doing some characteristic function-general or specific-or a behaviour of an entity or a system. For example, "Function", "Physiology" and "Control". On this basis an isolate idea such as "Control" occurs as a facet in the subject "Management" because, it denotes a function of management. But, on the other hand, the isolate idea "Control" occurring as a facet in the subject of "Control of the diseases of the human body" is deemed to be a manifestation of Energy. Here 'Control' does not denote a function of anyone deemed to be a dynamic attribute of the core entity. Thus, it is not a manifestation of Matter.

The following are examples of Energy Isolates:

- Preparation Focusing Separation
- Generation Reflection Diagnosis
- Operating Scattering Extraction
Examples of titles carrying Energy Isolates are:

- Preparation of sulphuric acid
- Generation of knowledge in R&D laboratories
- Operating diesel engines
- Scattering of lights
- Warming of seafood
- Estimation of Chlorine in water for drinking

**Self Check Exercise**

3) Explain the Fundamental Category “Energy” with an example.

**Note:**

i) Write your answer in the space given below

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

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**Matter**

The identification of the FC "Matter", is more difficult than even "Energy", Its manifestations are taken to be of two kinds - Matter-Material and Matter-Property. Viewed from the angle of Classification, Matter-Material ranges from chemical elements or raw materials from one end to finished products at the other end. There is a series of intermediate stages, connecting these two ends. For example, cotton is a raw material in the context of garment manufacture which is a finished product. Cotton fabric is at the intermediate stage. Cotton, however, is the ultimate crop product in the context of agriculture.

According to Ranganathan's school of thought, properties of things, persons, etc., are also deemed to be manifestations of Matter. Isolates such as variance, intensity, wave length, height, weight, volume, etc., are regarded as manifestations of Matter.

Here, are some examples of titles displaying Matter Isolates.

- Density of solid
- Ink quality in printing
- Rubber quality in the manufacturing of mattresses
- Electric current resistance of superconductors

**Self Check Exercise**

4) Explain the FC “Matter” with an example.

**Note:**

i) Write your answer in the space given below

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

The Fundamental Category "Personality" presents the greatest difficulty in identification. It is too elusive. Therefore, Ranganathan had suggested adopting the Method of Residues for identifying Personality Isolate in the facet analysis of a Compound Subject. If a certain manifestation is easily determined not to be one of "Time", "Space", "Energy", or "Matter", it is deemed to be a manifestation of the FC "Personality". This is so, as according to the Postulate of FCs, there are five and only five FCs. The application of this method of residues, however, is not infallible. But experience will lead to the establishment of reflex action in recognising this FC manifesting in any isolate idea.

Nevertheless, later developments have suggested that it is helpful to recognise the manifestations of FC "Personality" first and then the manifestation of the other FCs. Experience in the design of depth schedules suggests that it is possible to identify a core concept in compound subjects going with a basic subject, such as "human mind" in psychology, "human body" in medicine, etc. Such a core concept is deemed to be a manifestation of FC "Personality". The attributes of such a core concept can be several. A concept helps to determine the pattern of sequence of concepts. It helps in determining the relative degree of affinity of subjects going with different basic subjects. Greater weightage will have to be given in relation to the affinities among core concepts. The core concepts in their role as manifestations of the FC "Personality" act as leading parts of the system. Thus, to search for this leading part core concept should be the best method of recognising the manifestation of the FC "Personality".

In other words, "Personality" is a central part of the whole subject, encompassing a range of related ideas. Crops in agriculture, natural groups of plants in botany, animals in zoology, the Community of people in history, substances in chemistry, and social groups in sociology are some of the best examples to understand and comprehend the FC Personality.

Examples of tides displaying Personality Isolates are:
- Quantitative analysis of Organic Compounds
- Economics of Steel Industry
- Cotton bleaching in hydrogen peroxide
- History of Indian people
- Cancer of Lung
- Study of anger in Women
- Sugarcane yield in Uttar Pradesh

7.3 FACET ANALYSIS

7.3.1 Subject Analysis Using Facet Analysis

A facet is an aspect of a subject. Facet analysis means an analysis of a subject into its aspects obtained on the basis of a systematic application of a set of characteristics. Facet analysis of a subject results in the formation of groups of classes. Let us illustrate this with an example: In analysing the subject "Toy Manufacture", we can discern that "Toys", being the ultimate...
product manufactured, is one of its facets; the "Materials" used in the making of toys is another facet and the "Process of manufacturing toys" is yet another facet. Thus, the Toys facet will contain a number of groups and subgroups; similar is the case with the "Material" facet and "Process" facet. The chart given here will further clarify this:

![Chart: Toy Manufacture]

In the above chart, we have divided "Toys" into a number of subgroups on the basis of the application of a set of characteristics; similarly "Materials" used in the making of "Toys" have been divided to produce a number of subgroups and so also the "Process" of manufacture of "Toys" has been divided to result in a number of subgroups. Each of these subgroups could be further divided to form sub-subgroups till a point is reached when no more division would be possible. These subgroups and the sub-subgroups as well as the members of each one of these groups are all arranged systematically in a helpful order and displayed in a classification schedule which serves as a tool for classification.

It is clear from the above example that all subjects can be broken up into their facets applying appropriate characteristics for the purpose of division. We should also note that facet analysis is independent of any system of classification. The purpose of such division of subjects into their facets is to obtain a helpful order in classifying documents on the basis of their subject contents for organising them on library shelves, in catalogues and in bibliographies and such
other tools of storage and retrieval of information. Thus, facet analysis, according to Ranganathan, is "Analysis of a subject into facets according to the postulates and principles stated for the purpose". In the words of Palmer and Wells it "...means the analysis of a specific subject into facets produced by the application of characteristics".

The earlier schemes of classification were enumerative in nature and the entire universe of subjects was systematically divided into classes and sub-classes and resulted in readymade class numbers. In contrast, Ranganathan adopted the faceted approach wherein, instead of enumerating all subjects of past, present and anticipatable future, it would be better to enumerate the basic concepts or elements or descriptors. At the time of classification of documents depending on the subject concerned - simple, compound, complex - the concepts/descriptors can be analysed and then synthesised in an appropriate manner resulting in class numbers representing the subject(s) discussed in the documents. While the facet analysis approach is adopted by the classificationist in designing classification schemes, the classifier adopts it for classifying document.

Let us now see the application of facet analysis in Colon Classification (CC), Dewey Decimal Classification (DDC), and Universal Decimal Classification (UDC) schemes. You are advised to refer to Block 4 of this Course for a detailed study of these systems of classification.

7.3.2 Colon Classification and Facet Analysis

Among the systems of library classification, it is in Colon Classification that we see the explicit application of facet analysis in full measure. Ranganathan developed his postulate of Fundamental Categories from the rigorous analysis of subjects into their facets. In fact, in the first three editions of Colon Classification, the Fundamental Categories of PMEST had not featured. Table-I Matrix of Basic Subjects and their corresponding facets given in 7.2.1 of this Unit illustrates the analysis of subjects into their facets. After carefully studying the kinds of facets in different subjects, Ranganathan was able to establish that they could be accommodated in Five Fundamental Categories, despite their apparent surface differences. In subsequent editions of CC, the Postulate of Fundamental Categories has been used to design schedules for every, basic subject. CC is regarded as a Freely Faceted Classification System because it is the nature of subjects that determines their facets which are fitted into the framework of postulates and not based on any predetermined facet structure. The enumeration of isolates for each class, the common isolates, the space and time isolates, the language isolates, etc., - all these have emerged using the Principle of Facet Analysis.

Applying the postulate of Fundamental Categories of Ranganathan to the subject 'Toy Manufacture' we may regard

Toys as a manifestation of Personality
Materials as a manifestation of Matter
Manufacture as a manifestation of Energy
Space and Time can be added when warranted

If the title "Treatment of Lung Disease in India in 1997", is analysed, it results in the following facets:

| Basic Subject | Medicine |
| Personality   | Lung     |
| Matter        | Disease  |
| Energy        | Treatment|
| Space         | India    |
| Time          | 1997     |

Self Check Exercise

6) List the uses and advantages of applying the technique of facet analysis for the subjects.

Note:  
  i) Write your answer in the space given below  
  ii) Check your answer with the answers given at the end of this Unit.
7.3.3 Dewey Decimal Classification and Facet Analysis

In Dewey Decimal Classification, there is clear indication of the implicit use of Facet Analysis for the design of the classification system. In the Editor's Introduction to the 19th edition of DDC, it is stated, "In all classes (002-029, 069, 079.1-.9, 090, 100-700, 900), unless a different sequence is prescribed, arrangement is first by most specific discipline and most specific subject under it, then by area of specification, then by time specification if the schedules permit then by form of presentation. For example, a work on the Native snakes of Texas is classified as follows:

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Science</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zoology</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Cold-blooded Vertebrates</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Reptiles</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Snakes</td>
<td>6</td>
</tr>
<tr>
<td>Area</td>
<td>(Sign of Geographic concept to follow)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>North America</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>South Central U.S.</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Texas</td>
<td>4</td>
</tr>
</tbody>
</table>

Thus, 597.960 976 4

Works of Shakespeare is classified as follows:

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Literature</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>English</td>
<td>2</td>
</tr>
<tr>
<td>Form</td>
<td>Drama</td>
<td>2</td>
</tr>
<tr>
<td>Period</td>
<td>Elizabethan period 1558-1625</td>
<td>3</td>
</tr>
<tr>
<td>Works</td>
<td>Shakespeare's Works</td>
<td>3</td>
</tr>
</tbody>
</table>

Thus, 822.33

In the first example given above, the facets that divide the work Native snakes of Texas, are "Discipline", Zoology is one of the divisions of this facet; "Subject" representing a natural group of animals, snakes being a member of this facet, "Area" is the Space Facet, Texas being a member of this facet. In the second example, the facets are "Discipline" "Language", "Form", "Period" and "Works". Although DDC does not indicate explicity the method of facet analysis in the schedules, it should be clear from these two examples that the method of facet analysis has been the basis of its design. It should be noted that DDC does not enumerate in its schedules "Facet Isolates" as is done by CC, but display combinations of "Facet Isolates" representing a compound subject. The standard subdivisions, the area table, the time schedules applicable to certain subjects, etc., are given separately which can he added to any class when needed.

In addition, throughout its Schedules, DDC had given copious notes to divide a particular class by a set of divisions given elsewhere in its schedule, indicating thereby that the principle of facet analysis could be applied to any subject when required. For example: (All these examples will have to be studied with DDC Schedules)

1) Jews in India

This is analysed into the following facets: Social Stratification (305.6), Religious Groups, Jews. Under Social Stratification by Religious groups (305.6); the following note is given. Add to Base number 305.6 the numbers following 2 in "Persons" notation 21-29 from Table 7.

The number for Jews in Table 7 is 296. The final class number is 305.696

2) Migration of Birds

This is analysed into the following facets: Bird, Migration

Under a note given at 598.21-.28 (General Principles) at Birds, the instructions are given
to "Add to base number 598.2 the numbers following 591 in 591.1-591.8" and the number for migration is 591.525. The final class number is 598.252.

3) Sacred places of Jainism
   This is analysed into the following facets: Jainism, Sacred places.
   The Note given at 294.41-.48 "Add to base number 294.4 the numbers following 291 in 291.1-291.8" and the number for sacred places is 291.35. The final class number is 294.435.
   These are examples where there is a clear indication of facet analysis and synthesis.

Self Check Exercise
7) State in five lines the provision for using the facet analysis technique in DDC Note: i) Write your answer in the space given below
   ii) Check your answer with the answers given at the end of this Unit.

7.3.4 Universal Decimal Classification and Facet Analysis

The Universal Decimal Classification (UDC) has adopted the basic structure of DDC but has developed on its own philosophy, policies and principles. The facet structure of UDC is much more explicit than it is in DDC. Some of its faceted features are given below:

i) Common auxiliaries of Place, Race and Nationality, Time, Points of View, etc.;
ii) Facet indicators Colon (: ) Square Buckets() Double Colon (::) to 'combine two or more facets;
iii) Special auxiliaries to introduce facets peculiar to a given basic class with specific facet indicative;
iv) Availability of a facet division for application to any class which warrants such division. This is somewhat similar to the provisions in DDC.

Some examples of the application of Common auxiliaries and Special auxiliaries are given below (The words in bold face represent the respective common auxiliary):

Common Auxiliaries: Coal mining in India. The sociological
Place, Race & Nationality importance of kinship among the Jews.
Time Superconductivity Research in the 10s.
Points of View Nuclear reactors for power production from the environment point of view.

Special Auxiliaries Reciprocating valve gear Electric switch mechanisms Sodium chloride.

Special facet indicators are used.

These examples should be studied with the UDC Schedules.

Self Check Exercise
8) State the faceted features of UDC. Note: i) Write your answer in the space given below
   ii) Check your answer with the answers given at the end of this Unit.
7.4 FACET SEQUENCE

We have so far been discussing an analysis of subjects into their facets. But the purpose of such analysis is to synthesise the facets in a chosen order to be helpful for document storage and retrieval. So the end objective of analysis is to establish an order of synthesis of the facets. Without this rigorous analysis, it would be difficult to establish a rational order of synthesis. Indeed facet analysis and facet synthesis are the two sides of the same coin, the one has no purpose without the other.

The question now arises is what should be the sequence of facets? Is there any single order by which the sequence of facets could be established which is most helpful for the purpose of document storage and retrieval?

In the example "Toy Manufacture", we identified three facets, viz., Toys (A), Materials (B) and Process (C). The following are the six ways of arranging these three facets:

i) Toys, Materials, Process ABC
ii) Toys, Process, Materials ACB
iii) Materials, Toys, Process BAC
iv) Materials, Process, Toys BCA
v) Process, Toys, Materials CAB
vi) Process, Materials, Toys CBA

If there are only two facets, there are two ways of arranging them viz., AB or BA. If there are three facets, as we have seen above, there are six ways of arranging them. If there are four facets, there are 24 ways of arranging them. If there are five facets, there are 120 ways of arranging them. Obviously we have to choose only one among the various choices available, as we cannot have all of them. How to choose one order among the many is the question.

We shall study in the succeeding section how this problem is handled in CC, DDC and UDC.

7.41 Facet Sequence in Colon Classification

After determining the various facets curing in a Compound Subject, one should arrange them in a helpful sequence. For this purpose, Ranganathan enunciated five postulates. These are:

i) Postulate of First Facet
ii) Postulate of Concreteness
iii) Postulate of Facet Sequence within a Round
iv) Postulate of Facet Sequence with the Last Round
v) Postulate of Level and Level-Cluster

We shall examine them one by one in the above order.

i) Postulate of First Facet

In a compound subject, the basic facet should be the first facet. As stated in Unit 6, every compound subject should have a Basic Facet and one or more Isolate Facets. To achieve helpfulness requires that all compound subjects going with a basic facet should be arranged together. Hence, the basic facet should be given the first position among the facets of a compound subject.

For example: Treatment of Lung Cancer. In this example, the basic facet is implicit, i.e., Medicine. The other isolate facets of the compound subjects are:
As per the above mentioned postulate, the sequence of facets should be:
Medicine [BF], Lung [P], Cancer [M], Treatment [E]

At this juncture, it may be worthwhile mentioning that the indication of the basic facet in the title of document may be either explicit or implicit or absent. In the absence of any indication, the information professional would do well to read the contents page and/or the whole document.

ii) Postulate of Concreteness

The postulate is stated thus:

The Five Fundamental Categories fall into the following sequence, when analysed according to their decreasing concreteness: P,M,E,S,T.

This sequence of the FCs according to their relative concreteness conforms to the approach of the majority of readers.

Consider the following titles:

a) Library Science in the 1980s: BS (Basic Subject) and T (Time) are specified.
b) Library Science in India in the 1980s: BS, T, and S (Space) are specified.
c) Classification in India in the 1980s: BS, T, S, E (Energy) are specified.
d) Classification of microforms in India in the 1980s: BS, T, S, E and M (Matter) are specified.
e) Classification of microforms in special libraries in India in the 1980s: BS, T, S, E, (Personality), M, E, S and T are specified.

In the above titles, you can see a clear indication that the different aspects discussed move from the general to the specific. All aspects of library science in the 1980s are discussed in item (a). Item (e) however, discusses a very specific area, viz., Classification of microforms in special libraries in India in the 1980s. In other words, as we run down from (a) to (e), the contents are becoming increasingly concrete and move in the ascending order of concreteness. This is obtained by fixing a sequence an the Fundamental Categories which is in decreasing concreteness if we move from P to T, or in increasing concreteness if we move from T to P. The intellectual organisation of subjects would command this arrangement of moving from the general to the specific and would be acceptable to the majority of users.

iii) Postulate of Facet Sequence within a Round

In any Round of facets of a compound subject in which each or any of the Fundamental Categories - Personality, Matter, Energy - occur only once, their sequence should be: Personality Facet, Matter Facet, and Energy Facet.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Facet Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Prevention of Diseases in Rice Plant</td>
<td>Agriculture [BF], Rice Plant [IP], Disease [114], Prevention [1E]</td>
</tr>
<tr>
<td>2) Treatment of Lung Cancer</td>
<td>Medicine [BF], Lung [IP], Cancer [1M1], Treatment [1E]</td>
</tr>
</tbody>
</table>

iv) Postulate of Facet Sequence within the Last Round

In the last Round of facets of a compound subject, in which each of the Fundamental Categories other than Energy may occur and occurs only once, the sequence of the facets should be Personality Facet, Matter Facet, Space Facet, Time Facet.

The above postulate implies that there can be more than one Round. The question then is - what is a Round? In order to explain the manifestation of Fundamental Categories more than once in the form of facets, Ranganathan formulated the Postulates of "Rounds and Levels".

According to the Postulate of Round, "The FC Energy may manifest itself in one and the same
subject more than once. The first manifestation is taken to end Round I of the
manifestation of the three FCs Personality, Matter and Energy. The second
manifestation is taken to end Round 2, and so on."
Similarly, the FCs Personality and Matter may get manifested itself in Round I and
Round 2 and so on.
Depending on the Round to which they belong, Personality and Matter are
represented as [1P], [2P], [IM], [2M], etc.
However, in regard to the FCs "Space and Time", they manifest themselves only in
the last of the Rounds in a subject.
Example: Assessment of ultra-violet treatment of bone cancer in Karnataka in'1997
An analysis of the title using the Postulate of Basic Facet, Fundamental Categories,
Rounds, etc., gives rise to the following facet sequence:
Medicine [BF]; Bone [1P]; Cancer-[ IM];- Treatment [IE];'Ultra-violet Ray [2P];
Assessment [2E]; Karnataka [S]; 1997 .[T].
Note: While the FC "Personality" occurs twice as [1P] and [2P], "Matter" occurs as [IM],
and "Energy" twice as [IE] and [2E], "Space" and "Time" occur once as [S] and
[T]. It may be observed that [S] and [T] occur only in the last Round of the
compound subject. At this juncture, it may be appropriate to mention that with the
introduction of the concept of spectator in the General Theory of Classification,
speciation of the FC "Energy" was allowed. This has resulted generally, in the
elimination of the concept of Rounds as far as the FCs "Personality and Matter" were
concerned. Consequently; [2P], [2N ~, [3P], [3M] and so on have become speciators
to the FC "Energy" depending on whether it is [1E],[2E], etc. However, in some
special cases they may occur. For example, the concept of "side effects" of treatment
may occur as [2M].

v) Postulate of Level
This postulate states that "Any of the Fundamental Categories 'Personality' and
'Matter' may manifest itself more than once in one and the same Round within a
subject; and similarly with "Space" "Time"-in the last Round. This first, manifestation
of the FC within a round is known as Level 1 and a similar second manifestation
within a Round as Level 2".
Postulate of Level-Cluster
This postulate is stated thus:
Facets of different levels of the same Fundamental Category within a Round of facets
in a compound subject should be kept together.
   a)   Consider the following titles:
b)   Criticism of Shakespeare's Hamlet.
c)   Hindu law of property.
d)   Diseases of leaves of flowering plants and their treatment by chemical spray.
e)   Quality of cotton fabrics for designing shirts.
In the above examples, we can see a cluster of isolates that can be deemed as
manifestations of the FC Personality. In the first title, English, Drama, Shakespeare
and Hamlet are deemed to be manifestations of Ps and criticism is an energy isolate.
The sequencing of the personality isolates is to be on the basis of Wall-Picture
Principle. The sequence of facets, according to the Wall-Picture principle would be
language, farm, author and work. In the second example, Hindu law is followed by
property, both being Ps. In the third example, the sequence of the FC' Personality in
the first round would be flowering plants and then leaves. In the fourth example, the
terms quality and cotton fabrics can be regarded as manifestations of M and the
sequence would be cotton fabrics preceding quality. "Classification of documents
according to their contents should be done with the help of facet analysis and
synthesis,. One must bear in mind that we must be sensitive to the postulates and-
principles that would help us in arriving at a sequence of helpful and logical teams,
for storage and retrieval". It must be remembered that the FCs will operate only after
the basic class is identified. All facet termins will follow the basic class in their
respective order of arrangement
Sample Exercises in Facet Analysis and Sequencing

Following are some examples in facet analysis and sequencing. Each title is analysed, the terms representing the subject content are derived and then are ordered according to the postulates and principles discussed above.

1) Criticism of Shakespeare's Drama:
   Literature, English, Drama, Shakespeare, Hamlet, Criticism
   Literature    BS
   English       [IP1]
   Drama         [1P2]
   Shakespeare   [IP3]
   Hamlet        [IN]
   Criticism     [E]

2) Hindu law of property:
   Law, Hindu, Property
   Law           BS
   Hindu         [1PI]
   Property      [1P2]

3) Diseases of leaves of flowering plants and their treatment by chemical spray:
   Botany, Flowering plants, Leaves Diseases, Treatment
   Botany        BS
   Flowering Plants  [IP1]
   Leaves        [1P2]
   Diseases      [1MPI]
   Treatment     [1E]

Self Check Exercise

9) List the postulates of facet sequence of Ranganathan with their definition.

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

7.4.2 Facet Sequence in Dewey Decimal Classification

As has been mentioned earlier in this Unit, DDC does not specify any facet sequence in its schedules of compound subjects, although it uses implicitly the principle of facet analysis. But, extensive rules have been provided throughout its schedule for classifying documents, which demand a treatment of using facet analysis and synthesis. Let us see how this is done.

Agriculture and Related Technologies have been divided first by crop production, then by plant injuries, diseases, pests and then by individual crops as given below:

630 Agriculture and related technologies
631 Crops and their production
632 Plant injuries, diseases, pests
633 Field crops
634 Orchards, fruits, forestry
635 Garden crops
Now, a document on **Harvesting of Peaches** could either be classed in 631.55 giving preference to Harvesting or under 634.25, giving preference to Peaches. But the specific subject of the document requires a combination of the two, viz., the particular crop and harvesting. Rules given under 634.25 (Add as instructed under 633-635) precisely indicate that the two facets could be combined, drawing the subdivisions of 631 representing harvesting to arrive at 634.255 which stands for Harvesting of Peaches. In this way, throughout the schedule, rules have been provided to combine facets directly without any connecting symbol or with a connecting symbol of Zero (0). But the citation order is set by the system and is not necessarily based on any stated principle.

In addition to the set of rules prescribed at various places in the Schedules, DDC suggests a Citation Order Formula when no rule has been provided. The facets and the sequence or citation order suggested are given below:

- Things
- Kinds of things
- Parts of things

Materials from which the Things, Kinds and Parts are made, Properties of the Things, Kinds, Parts, Materials Processes within the Things, Kinds, Parts, Materials Operations upon the Things, Kinds, Parts or Materials Agents performing such Operations. This is given as Rule 4 under 8.55 Citation Order in the Editor's Introduction on page 57 (DDC 19th ed. Volume 1, Introduction, Table). The rule says: "Apply the Citation Order Formula which will generally prove to be reasonable and helpful.

### 7.4.3 Facet Sequence in Universal Decimal Classification

We have stated in Section 7.3.4 of this Unit that UDC has many more facet features than DDC. Although there is no specific citation order or facet sequence given in UDC, either in its introduction or anywhere in the Schedules of classes, a Citation Order has keen recommended by Jack Mills in his Guide to Universal Decimal Classification which is as given below:

- Things, Kinds, Parts; Materials:
- Properties;
- Processes;
- Operations;
- Agent.

The Common and Special Auxiliaries with their specific facet indicators provide full scope to apply facet synthesis wherever necessary.

Particularly the relation signs Colon (:), the Square Brackets [ ] and the Double Colon (::) facilitate combination of facets: For example, for classifying a document "Virus diseases and indoor plants", the schedule provides separate places for "virus diseases" and "indoor plants", as 635.91 and 632.38. But they can be combined by the relation sign colon (:) to get a class number as 635.91:632.38. This can be reversed as 632.38:635.91, making "virus diseases" the first facet and "indoor plants" the second, if a library prefers this sequence. But if a Double Colon (::) is used for the combination, the reversing device would not be allowed.

Square Brackets [ ] as a facet combinator is used to indicate a particular chosen order of facets. For example: Indoor animones (animones are a kind of indoor plants) get the class number 635.91:582.675.1(582.675.1 standing for animones), But if a library wants to gather everything on particular plants together, under the general heading, "Horticulture", it might change the above number to 635.91 [582.675.1] to make the main facet the individual plant (in this case Animones) with "indoor" as a secondary facet.

This principle is known as Flexibility in facet citation. This is acclaimed as a strength but it could also be viewed as an undesirable feature if libraries using UDC chase different facet sequences.

The Special Auxiliaries also give scope for facet combinations. There are three types of special auxiliaries which are using facet indicators (Hyphen (-) Point Zero (.0) and the Apostrophe O. The Hyphen and Point Zero are used to introduce a facet peculiar to a given basic class.
Examples: 62-31 Reciprocating valve gear parts
820-31 English novels
621.3.066 Electrical switch mechanism
66.066 Clarification, etc., Chemical Engineering

The apostrophe is at present used with a rather different meaning in chemistry and similar subjects where it is used to indicate synthesis of material elements as well as notational.

Examples: 546.33 Sodium
546.13 Chlorine
546.33' 13 Sodium Chloride

7.5 SOME GENERAL OBSERVATIONS

We can discern from the above study on facet analysis, and facet sequence that Colon Classification is backed by a theoretical basis for fixing the facet structure of its schedules. While this theoretical basis may be subjected to criticism (as it has been), it is essential to have a theoretical basis without which the order of arrangement of classes would suffer. Framing ad hoc rules for using facet analysis and synthesis, both DDC and UDC are not able to get a most desirable filiatory sequence of classes. The policy of DDC, while recognising its weak structure, is not to introduce any basic structural changes which might endanger its use by several thousands of libraries throughout the world, but meet the problem by providing rules for facet analysis wherever necessary. UDC, having a greater facility for facet analysis and synthesis, suffers from its adaptation of DDC's structure which restricts its scope of the use of the facet principles of analysis and synthesis. In recent times there developed a generation gap among the three classification systems. With DDC or UDC, it is not possible to make any drastic change to meet the expanding demands of bibliographic classification. Future classification systems would benefit from Ranganathan's contribution to theoretical foundation to library and bibliographic classification.

Self Check Exercise

10) Explain in five lines the use of double colon(::)in UDC..

Note:  
i) Write your answer in the space given below

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

7.6 SUMMARY

This Unit has

i) described briefly Ranganathan's Five Fundamental Categories with examples;
ii) defined and explained the concepts and techniques of facet analysis and facet sequence and their application in the classification of document in a library; and
iii) explained the postulates and principles of facet sequence and their application in CC, DDC and UDC.

7.7 ANSWERS TO SELF CHECK EXERCISES

1) The facets in library science are:
   Library Scienc - Basic Subject
In furniture manufacture:
Furniture is a manifestation of Personality
Material used is a manifestation of Matter
Carpentering is a manifestation of Energy
Delhi is a manifestation of Space
1997 is a manifestation of Time

Energy represents any kind of action, mental or physical and actives all other entities. Learning and Teaching are manifestations of Energy in education.

Matter is commonly understood as a manifestation of material, substance, commodity, etc. Ranganathan recognises two types of matter; a) Matter-Material (MM) and b) Matter-Property. For example: Plastics (MM) for manufacturing kitchen utensils; Volatility (MP) of alcohol.

Personality is the central core of a subject. All other aspects of the subject are related to this central core. Crop in agriculture, social groups of persons in sociology, substance in chemistry are examples of Personality.

The use and advantage of the technique of facet analysis are:

- It is a fundamental and primary step of subject analysis, prior to classifying a document on a specific subject.
- It helps in structuring the subjects for the design of a classification system.
- It is of invaluable help in subject indexing, query analysis of readers and in literature search.

The provision for facet analysis in classifying documents by DDC has been on the basis of a set of rules in general and also specially at many places in the schedules. Extensive rules have been given to divide a particular specific subject further by adding divisions given elsewhere in the schedule. The Standard Subdivisions, Area Table, Period Divisions are the other devices that help facet analysis.

The faceted structures of UDC are:
Common Auxiliaries of Place, Race and Nationality, Time, Points of View, Facet Indicators, viz., Colon (: ) Square Brackets [ ] and Double Colon (:: ) to combine two or more facets. Special Auxiliaries introduce facets peculiar to a basic class with specific facet indicators. Indication of applying a facet division to any class which warrants such division.

The three postulates of facet sequence of Ranganathan are:

i) Postulate of Concreteness: The five Fundamental Categories fall into the following sequence when arranged according to their decreasing concreteness as PMEST.

ii) Postulate of Round: If the Fundamental Category Energy manifests itself more than once in one and the same specific subject, the sequence of the two Energy isolates is fixed on a general principle of the Wall-Picture Principle.

iii) Postulate of Level: Any of the Fundamental Categories Personality and Matter may manifest itself among the facets of a specific subject more than once in any one and the same Round. The cluster of isolates should be arranged by the Wall-Picture Principle.

In UDC, the facet relation sign ( ) is used when a reversal of two facets is not required. The use of colon (: ) which connects two facet isolates, provides for the reversal of the order of the facets. But the double colon does not permit the reversal technique.

7.8 KEY WORDS

Auxiliary : Additional, Supplementary
Basic Subject: Generally means conventional subjects. It is a postulate in Colon Classification; basic subject, basic class, basic facet are used synonymously.

Citation Order: The order of sequencing facets of a subject (synonymous with facet sequence and facet synthesis).

Classificationist: One who designs a scheme for classification of subjects.

Contents Analysis: Analysing subject contents of documents from subject statements from which the different facets of the subject may be identified.

Facet: A group of isolates obtained on the application of a characteristic; for example, sulphur is an isolate of the substance facet in chemistry.

Facet Analysis: Analysing subject contents of documents into their facets.

Facet Indicator: A symbol connecting two facets. Also known as connecting symbol.

Helpful Order: A logical arrangement of subjects, their facets and isolates which help the arrangement and display of documents on shelves in libraries.

Isolate: A single idea that can go with any basic subject. Example: Rice Crop is a facet in agriculture.

Matrix: A rectangular arrangement of ideas into rows and columns. In Table 1 the Facet are numbered in a row and the corresponding facets of subjects are in a column.

Schedules of Classification: Lists of basic classes, their facets, isolates, etc., arranged systematically using a symbol.

Standard Subdivisions: A table of notations in Dewey Decimal Classification designing certain frequently recurring forms or methods of treatment applicable to any subject or discipline. May be added to any number in the schedules, if required.

7.9 REFERENCES AND FURTHER READING


