SYSTEM DESIGN FOR AUTOMATION OF LIBRARIES

System can be defined as an assemblage or combination of things or parts forming a complex whole. It is something consisting of a set of first or infinite entities among which a set of relation is specified so that deductions are possible from some relations to the other or from the relations among the entities to the behaviour or history of the system. So system is an entity, conceptual or physical, which consists of inter-related, interacting or interdependent parts with common purpose or objectives. Library is a very good example of a system. It comprises of several subsystems which are linked together with the objectives of providing effective and efficient information service to its users. The basic subsystems of library are administration and planning, acquisition, serial control, technical processing, maintenance, conservation, reprography, publication, reference and documentation and circulation. Technical processing may contain next level of subsystems like cataloguing, classification, labeling etc. Thus any particular entity or process is a system in itself, it is subsystem in relation to its upper proximity and suprasystem for its subordinate systems in the hierarchical order of divisions.

System development is a structured process of analysing the ways in which things are done and designing and implementing new and better methods. Usually a computer based system is being created for improving the efficiency and effectiveness in a modern service library. The main phases of system development may fall into three groups. Groups one is system analysis which includes problem identification, feasibility study and detailed analysis phases. Group two is system
design and programming which include the system design and system building phases. Group three is system’s implantation.

In producing a system design the following consideration must be borne in mind –

(i) Features of a successful system.
(ii) Users’ friendliness
(iii) Feasibility
(iv) Maintainability
(v) System security

The specific functions to be carried out during the system design process are: data definition, specifications of system logic, design of system modules, detailed definition of interfaces, design of input and output, specifications of control procedures, development of test requirements and preparation of correction plans.

The steps of system design are as follows –

**Step – 1 – Establish the need for automation**

**Step – 2 – Analyse the existing system** – This step is concerned with analysis of system with a view to make them more effective either by modification or by substantial redesign. The activities under this step involves –

a) Gathering information on the existing system by observation, interviewing, questionnaires and document sampling.

b) Structuring of gathered information into input, processes, files and output.

c) Representation of information flow among these items using tools such as flow charts, data flow diagrams, and system outline charts.
d) Representation of processes involving multiple decisions using flow charts, structured English and decision tables.

**Step -3 Define system requirements** – Requirements may be stated as, general requirements, scope of operations, function at requirements, human factor requirements, volume to be handled and management data requirements.

**Step – 4 - System Design** – This involves:

- Hardware specifications
- Software specifications
- Program design inputs like flow charts, data formats and file structures.
- Operational procedures
- Personnel and cost factors
- Design alternatives.

**Step – 5 – Implementation** – This includes system development, testing and modifications and installation.

**Step – 6- Documentation, training and maintenance**

However, under present circumstances the major criteria are considerations of Hardware software and humanware in system design and therefore this study concentration on these aspect to analyse the systems used in libraries.

**3.1 – System Selection**: General guidelines for selecting a system are –

a) Select products that have a fairly large user community for this will ensure good vendor supports.
b) Be careful about products offering unique features to ensure that these features do not isolate that product to a narrow portion of the market.

c) Be careful of a product that is too early or two late in the technology life cycle.

d) The criteria for selecting or otherwise of a system should be decided by the customer/user of the system.

e) Statements in the proposal must be taken as contractual.

f) Take money back guarantee from the supplier about the functioning of system as per the specifications.

g) Select out of those systems only which are installed and working on existing customers’ sites.

Some specific steps involved in system selection may be summarised as follows –

a) Analysis of needs and current operations

b) Preparations of specifications.

c) Request for proposal should include description of application area, system configuration, expected performance, evaluation criteria, cost limits and payment terms, site preparation requirements and training required etc.

e) Identification of probable suppliers and soliciting bids.

f) Evaluation of proposals and selection of supplier.

g) Negotiations with supplier and signing contract.

h) Site preparations.

i) Installation of system

j) System start up

k) Acceptance test

l) Final acceptance and authorisation of final payment.
3.1.1. *Criteria for Hardware Selection*:

A suitable computer hardware is very important for proper functioning of the system and sufficient care must be taken in its selection. Some important points are summarised below –

a) Computer configuration – This includes I/O devices, file structure and size, transactions, application characteristics and interfaces with other systems.

b) Word length and execution speed of CPU.

c) Memory capacity.

d) Disk Storage – Hard disk, floppy disk.

e) Tape storage

f) Terminals – Number, display colour, max. operational distance from main system.

g) Printers – Type, speed and width of page.

h) Operational System – No. of users, single / multi tasking etc.

i) Utilities – Sort / Merge, Text editing, File back up, Programme debugging etc.

j) File management.

k) Data base management system.

l) Programming languages.

m) Installation / Maintenance.

n) Documentation / Training.

3.1.2. *Software Packages Selection* – The criteria for selecting appropriate software are illustrated, very briefly, as follow –

a) Overall suitability – Meets the expressed specifications, configuration, cost, adaptability, bibliographic data handling and staff requirements.
b) Hardware considerations – compatibility main memory, processing speed, peripherals,

c) Software considerations – These include –

   i) Operational System compatibility.
   ii) Programming languages.
   iii) Single / multi user.
   iv) Portability.
   v) Source code available.
   vi) User friendliness.
   vii) Compatibility with International Bibliographic standards.
   viii) Response time.
   ix) Handling of required character sets.
   x) Connection to external systems for data exchange.
   xi) Numerical data handling.
   xii) Data base creation facilities
   xiii) Modification facilities
   xiv) File building facilities
   xv) Indexing facilities
   xvi) Thesaurus maintenance.
   xvii) Authority files.
   xviii) Single inverted file / separate files.
   xix) Inversion of fields.
   xx) Search features.
   xxi) System output
   xxii) Security
   xxiii) Installation / maintenance.
3.2 System Design for Library Operations

The library operations include various housekeeping routines viz acquisition, circulation, serial control, cataloguing etc. and Information Storage and Retrieval system. System design for each of these operations is suggested below –

3.2.1. Automated Acquisition Control System:

An automated acquisition system is expected to perform certain managerial functions in addition to certain clerical functions, such as pre-order searching, creating purchase orders etc. An ideal system, which may be best suited for large library system like that of IITs may be designed to respond to regular order, blanket order, exchanges etc. It may also be designed to handle regular receipts, non-receipts, out-of-print documents with wrong billing, unwanted documents with right billing, and so on. The typical functions of this system are –

(i) Pre – order searching to check duplicate orders.

(ii) Creating purchase orders:

(iii) Receiving materials:
    a) Request for invoice, if needed.
    b) Sending order letters (if necessary, alongwith cheques/draft).

(iv) Claim (for damaged materials) and / or cancellation notices.

(v) Providing information on orders outstanding and sometimes work-in-progress.

    a) Sending cheques / drafts (as and when necessary).
    b) Completion of accession list.
    c) Announcement of latest documents received.
    d) Completion of cataloguing.
Also whenever there is a delay in supply the system must prepare a reminder note and when books are received in must handle the various associated accounting procedures. In the system, given below, the bibliographical data in the order record can be amended to produce a catalogue card, update the accession list and produce automatically machine readable book card for computerised circulation system as part of the order system.

In addition to these, list of orders (by order number, by author, by title etc.) and various reports of statistical analysis may also be derived from the system. Besides these, provisions can also be made in the system to perform such functions as —

a) To hold orders until funds become available.

b) To re-order from a second vendor if the first fails to supply the documents; and

c) To compute vendor’s performance measure e.g. Average supply time and average discount given etc.

**Data Files:**

The following factors are to be considered in advance while designing an automated acquisition system —

a) The files to be maintained.

b) Data elements in the records of each file.

c) Record format and media of the file.

d) Modes of operation (batch processing or on-line).

In a total on-line system, the acquisition librarian can access the files at any time from his/her desk itself. In a batch – processing system, the files are not directly
accessible but the printed lists are used. To perform the above mentioned functions
in a typical system atleast the following files have to be maintained in a machine
readable form –

1) Order file
2) Accession file
3) Fund file

But in order to have a smooth functioning of system it is being suggested to have
the following files –

1) Purchase order file
2) Approval file
3) Author index file to purchase order file.
4) Control file.
5) Currency file.
6) Designation and Division file.
7) Find file.
8) Subject file.
9) Supplier file.
10) Text file.
11) Title index file to purchase order file.
12) Accession file.
13) Author index and title index files to accession file.

In a batch processing system the above files may be maintained on magnetic tapes
and in an on-line system it is necessary to maintain them on disks. The purchase
order file contains minimum information, required to process an order, related to
document and the accession file contains complete information regarding the
documents which are available in the library.
In order to have as many data elements as possible in order, a field cum variable field format similar to the MARC format, may be adopted. A record may consist of following three –

a) Leader
b) Directory
c) Variable data fields.

Leader – Each record may begin with a 24 character leader. It contains the structure of record and a few data elements. The data elements in the leader are required primarily to process the record. The data elements in the leader are shown in the following tables –

**TABLE - 3.1**

*Data Elements in Leader for the Order Record*

<table>
<thead>
<tr>
<th>Character Position</th>
<th>Length</th>
<th>Name and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>5</td>
<td>Record length (No. of characters in the order records).</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>Status code (0=New record; 1 = Replacement; 2 = Order cancelled; 3 = Deleted) After receiving document the record status may be changed to deleted.</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Type of document (M = Monograph; S = Serial; R = Report; P = Patent; N = Non-book materials; 0 = Others etc.).</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>Mode of acquisition (P = Purchase ; S = subscription; E = Exchange etc).</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>Reminders ( 0 = Not sent ; 1 = sent).</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Record Level code ( 0 Minimum information i.e. only ISBN;</td>
</tr>
<tr>
<td>Character Position</td>
<td>Length</td>
<td>Name and Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>0-4</td>
<td>5</td>
<td>Record lent.</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>Status code (0 = New record; 1 = Record corrected; 2 = missing document; 3 = Weeded out).</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Type of document (M = Monograph; S = Serial; R = Report; P = Patent; N = Non-book materials; O = Others etc.).</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>Mode of acquisition (P = Purchase; S = subscription; E = Exchange; C = Complimentary copy).</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>Location of document (0 = In the main library; A - Z = code of branch libraries).</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Blank character (for local use).</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>Length of the field indicator (Indicator associated with each variable usually it is 2).</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>Sub field indicator length.</td>
</tr>
<tr>
<td>12-16</td>
<td>5</td>
<td>Base address of the data.</td>
</tr>
<tr>
<td>17-23</td>
<td>7</td>
<td>May be used to suit the local needs.</td>
</tr>
</tbody>
</table>

**TABLE - 3.2**

*Data Elements in Leader for the Accession Record*
Directory – It is an index to the location of the variable fields within a record. It is made up of a series of fixed length fields consisting of tags and the starting character position of the field. The directory begins immediately after the leader and end always with a field terminator. The number of entries in the directory depends on the number of variable data field in the record.

**TABLE - 3.3**

*Data Elements in Directory for Order and Accession Records*

<table>
<thead>
<tr>
<th>Character Position</th>
<th>Length</th>
<th>Name and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>3</td>
<td>Tag (A 3 character number that identifies a variable field).</td>
</tr>
<tr>
<td>3-6</td>
<td>4</td>
<td>Starting character position (A 4 character number which identifies the position of the field in record of the first character of a field relative to the base address of the data.</td>
</tr>
</tbody>
</table>

Note – In MARC format, it is also suggested to store the size of each field alongwith its tag and starting character position.

**Variable Data fields –**

The variable data fields consist of a series of variables (data elements). Each of these fields may begin with the field or subfield indicators. The various data elements for an order file/or and accession for an accession file are given in the following table –
### TABLE - 3.4

**Data Elements (Variables) for Order/Accession Record**

<table>
<thead>
<tr>
<th>SN</th>
<th>Tag</th>
<th>Field Indicator</th>
<th>Name and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>001</td>
<td>@a</td>
<td>ISSN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@b</td>
<td>ISBN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@c</td>
<td>CODEN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@d</td>
<td>LC Card number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@e</td>
<td>Any other information</td>
</tr>
<tr>
<td>2</td>
<td>002</td>
<td>@a</td>
<td>Accession Number</td>
</tr>
<tr>
<td>3</td>
<td>003</td>
<td>@a</td>
<td>Title Associated with:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@b</td>
<td>Analytic (an article)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@c</td>
<td>Monograph</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Collection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Persons Associated with</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Author/Collaborator etc.):</td>
</tr>
<tr>
<td>4</td>
<td>004</td>
<td>@a</td>
<td>Analytic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@b</td>
<td>Monograph.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@c</td>
<td>Collection.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Affiliation</td>
</tr>
<tr>
<td>5</td>
<td>005</td>
<td>@a</td>
<td>Analytic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@b</td>
<td>Monograph.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@c</td>
<td>Collection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Corporate body associated with</td>
</tr>
<tr>
<td>6</td>
<td>006</td>
<td>@a</td>
<td>Analytic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@b</td>
<td>Monograph</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@c</td>
<td>Collection</td>
</tr>
<tr>
<td>7</td>
<td>007</td>
<td>@a</td>
<td>Edition</td>
</tr>
<tr>
<td>---</td>
<td>-----</td>
<td>----</td>
<td>--------</td>
</tr>
<tr>
<td>8</td>
<td>008</td>
<td>@a</td>
<td>Volume Number</td>
</tr>
<tr>
<td>9</td>
<td>009</td>
<td>@a</td>
<td>Part Number</td>
</tr>
<tr>
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<td>010</td>
<td>@a</td>
<td>Issue Number</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Date</td>
</tr>
<tr>
<td>11</td>
<td>011</td>
<td>@a</td>
<td>Date of publication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@b</td>
<td>Other than date of publication</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Language</td>
</tr>
<tr>
<td>12</td>
<td>012</td>
<td>@a</td>
<td>Of the text</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@b</td>
<td>Of the summaries</td>
</tr>
<tr>
<td>13</td>
<td>013</td>
<td>@a</td>
<td>Name of publisher</td>
</tr>
<tr>
<td>14</td>
<td>014</td>
<td>@a</td>
<td>Place of publication</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Collection</td>
</tr>
<tr>
<td>15</td>
<td>015</td>
<td>@a</td>
<td>Analytic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@b</td>
<td>Monograph</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@c</td>
<td>Collection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Additional data elements for description of conference documents</td>
</tr>
<tr>
<td>16</td>
<td>016</td>
<td>@a</td>
<td>Name of Meeting</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(i.e. Conference/Seminar/Congress etc).</td>
</tr>
<tr>
<td>17</td>
<td>017</td>
<td>@a</td>
<td>Location of the meeting.</td>
</tr>
<tr>
<td>18</td>
<td>018</td>
<td>@a</td>
<td>Date of meeting.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Additional Data elements for description of patent documents</td>
</tr>
<tr>
<td>19</td>
<td>019</td>
<td>@a</td>
<td>Identification of patent document.</td>
</tr>
<tr>
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<td>020</td>
<td>@a</td>
<td>Persons associated with patent.</td>
</tr>
<tr>
<td>21</td>
<td>021</td>
<td>@a</td>
<td>Corporate body associated with patent.</td>
</tr>
<tr>
<td>22</td>
<td>022</td>
<td>@a</td>
<td>Domestic filing data of document</td>
</tr>
<tr>
<td>23</td>
<td>023</td>
<td>@a</td>
<td>Convention priority data of patent.</td>
</tr>
<tr>
<td>24</td>
<td>024</td>
<td>@a</td>
<td>Reference to legally related domestic patent.</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>Additional Data Elements for description of Reports.</td>
</tr>
<tr>
<td>25</td>
<td>025</td>
<td>@a</td>
<td>Report Number</td>
</tr>
<tr>
<td>26</td>
<td>026</td>
<td>@a</td>
<td>Name of the performing organisation.</td>
</tr>
<tr>
<td>27</td>
<td>027</td>
<td>@a</td>
<td>Contract / Grant number.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Additional Data elements for description of Theses and Dissertations.</td>
</tr>
<tr>
<td>28</td>
<td>028</td>
<td>@a</td>
<td>University / Other educational institution</td>
</tr>
<tr>
<td>29</td>
<td>029</td>
<td>@a</td>
<td>Type of degree</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Note</td>
</tr>
<tr>
<td>30</td>
<td>030</td>
<td>@a</td>
<td>Summary only note]</td>
</tr>
<tr>
<td></td>
<td>@b</td>
<td>Bibliography note.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>@c</td>
<td>Abstracts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>@d</td>
<td>Ancillary data.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Subject Code</td>
</tr>
<tr>
<td>31</td>
<td>031</td>
<td>@a</td>
<td>Broad subject of ordering code</td>
</tr>
<tr>
<td></td>
<td>@b</td>
<td>UDC Number</td>
<td></td>
</tr>
<tr>
<td></td>
<td>@c</td>
<td>CC Number</td>
<td></td>
</tr>
<tr>
<td></td>
<td>@d</td>
<td>Other classification number</td>
<td></td>
</tr>
<tr>
<td></td>
<td>@e</td>
<td>Controlled index term</td>
<td></td>
</tr>
<tr>
<td></td>
<td>@f</td>
<td>Uncontrolled index term.</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>032</td>
<td>@a</td>
<td>Name of the currency.</td>
</tr>
<tr>
<td>33</td>
<td>033</td>
<td>@a</td>
<td>Cost / Subscription</td>
</tr>
<tr>
<td>34</td>
<td>034</td>
<td>@a</td>
<td>Handling charges</td>
</tr>
<tr>
<td>35</td>
<td>035</td>
<td>@a</td>
<td>Exchange rate (For Rs. 100)</td>
</tr>
<tr>
<td>36</td>
<td>036</td>
<td>@a</td>
<td>Invoice number</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td>37</td>
<td>037</td>
<td>@a</td>
<td>Invoice date.</td>
</tr>
<tr>
<td>38</td>
<td>038</td>
<td></td>
<td>Invoice Amount</td>
</tr>
<tr>
<td>39</td>
<td>039</td>
<td></td>
<td>Name of the bank.</td>
</tr>
<tr>
<td>40</td>
<td>040</td>
<td></td>
<td>Cheque / Draft number.</td>
</tr>
<tr>
<td>41</td>
<td>041</td>
<td></td>
<td>Date of cheque / Draft.</td>
</tr>
<tr>
<td>42</td>
<td>042</td>
<td></td>
<td>Binding Charges (in Rupees).</td>
</tr>
<tr>
<td>43</td>
<td>043</td>
<td>@a</td>
<td>Vendors information</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@b</td>
<td>Vendor's Name</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@c</td>
<td>Person/ Corporate body with whom the document is exchanged.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Person/Corporate body who has gifted the document.</td>
</tr>
<tr>
<td>44</td>
<td>044</td>
<td>@I</td>
<td>Address (I = 0,1,2,........9)</td>
</tr>
<tr>
<td>45</td>
<td>045</td>
<td>@a</td>
<td>City</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@b</td>
<td>Pin Code</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@c</td>
<td>Country</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dates Related to Order</td>
</tr>
<tr>
<td>46</td>
<td>046</td>
<td>@a</td>
<td>Record created / Purchase order sent.</td>
</tr>
<tr>
<td>47</td>
<td>047</td>
<td>@a</td>
<td>Date when the document is received.</td>
</tr>
<tr>
<td>48</td>
<td>048</td>
<td>@a</td>
<td>Date when the document is claimed for a defective copy.</td>
</tr>
<tr>
<td>49</td>
<td>049</td>
<td>@a</td>
<td>Date when the claimed copy is received.</td>
</tr>
<tr>
<td>50</td>
<td>050</td>
<td>@a</td>
<td>Date when the order is cancelled.</td>
</tr>
<tr>
<td>51</td>
<td>051</td>
<td>@a</td>
<td>Date of sending the last reminder</td>
</tr>
<tr>
<td>52</td>
<td>052</td>
<td>@a</td>
<td>Date of approval of the document</td>
</tr>
<tr>
<td>53</td>
<td>053</td>
<td>@a</td>
<td>Expected arrival date.</td>
</tr>
<tr>
<td>54</td>
<td>054</td>
<td>@a</td>
<td>Purchase order number</td>
</tr>
<tr>
<td>55</td>
<td>055</td>
<td>@a</td>
<td>Quantity ordered (No. of copies).</td>
</tr>
<tr>
<td>56</td>
<td>056</td>
<td>@a</td>
<td>Missing issue / document information</td>
</tr>
<tr>
<td>----</td>
<td>-----</td>
<td>----</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>57</td>
<td>057</td>
<td>@a</td>
<td>Country of publication.</td>
</tr>
<tr>
<td>58</td>
<td>058</td>
<td>@a</td>
<td>Title of serial.</td>
</tr>
<tr>
<td>59</td>
<td>059</td>
<td>@a</td>
<td>Series designation</td>
</tr>
</tbody>
</table>

Note – Serial nos. 1($a$-$e$), 10, and 56 are relevant only to the acquisition of periodical / serial publications.

**Fund File**

The fund file may contain –

(i) Total amount available for the year (Local and foreign currency).

(ii) Amount to be spent for different types of documents (viz – Monographs, Journals, Magazines, Reports etc).

(iii) Amount to be spent for different subjects (viz. – Physics, Chemistry, Mechanical Engineering, Civil Engineering etc.).

(iv) Amount spent in the previous month of the current year as suggested in (ii) and (iii).

Steps involved in the Design and Development of Acquisition System – The following steps are involved:

Step A – First a worksheet has to be designed and the necessary information required for an order has to be written in the worksheet. A sample worksheet is given below –
### TABLE - 3.5

**Worksheet**

<table>
<thead>
<tr>
<th>044</th>
<th>Order date</th>
<th>054</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>ISBN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>004</td>
<td>Author</td>
<td></td>
<td></td>
</tr>
<tr>
<td>003</td>
<td>Title</td>
<td></td>
<td></td>
</tr>
<tr>
<td>013</td>
<td>Name of the Publisher</td>
<td>033</td>
<td>Year</td>
</tr>
<tr>
<td>033</td>
<td>Price</td>
<td></td>
<td></td>
</tr>
<tr>
<td>034</td>
<td>Vendor’s Name and Address.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Type of Document**  S/M/P/R/N/O

**Step B** – Key in the data from the worksheet to the **In – Process file**. This file contains the minimum required data elements to create an order file. Each record in the In-Process file consists of one data element and its tag. For example:

**For Title** –

003 $a  Advanced cataloguing Practice.

**For Author** –

004 $a  Gautam, J.N. and Singh, Niranjan.

---

The last character in each of the order must be a special character, so that one can easily identify the end of the data elements. If the tag is 000, it can be treated as the end of a bibliographical record if the tag is 999 it can be treated as the end of the file (in the In – process file).

Step C – Processing the In – process file to create an order file. For each block (consisting of information regarding order for a document) of information an order record has to be created, to be stored in the order file. As and when the order is created an order letter may be printed. After receiving the invoice, the order file may have to be processed again to print an order letter. This letter may be sent to the vendor alongwith the cheque/draft, if necessary.

Step D – Processing the order file

(i) Send reminders
(ii) Send claim notices for replacement of defective copies; and
(iii) Update the accession record in the accession file etc.

Step E – Preparation of –

(i) Catalogue cards ;
(ii) Book cards; and
(iii) Due date slips, etc.

Step F – Processing the order file and fund file (once in a quarter or 6-9 months, to obtain financial statements and also to evaluate vendor’s performance etc.)
3.2.2. Automated Serial Control System

Automation of serial control system helps to handle processing of serials more easily, quickly and economically. Automated serial control systems are usually designed and developed independently from book order system because of the very nature of serials. The serials are to be subscribed regularly as well their cataloguing data, holding in particular, undergoes changes very frequently. The simplest type of serial control system is the straight listing of information regarding each title. In such a system the information is key-punched and then the printed lists are obtained by title, subject or any other sequence. Multiple copies of the library holding can be produced easily and made available to users of library even at remote points. On a micro computer the arrival file and holding file may be maintained on floppy disks and appropriately used.

Functions of a Serial Control System

Before going into the details of the system it will be appropriate to look into its general objectives which are to handle serials and maintain holding list. To achieve these objectives the system must perform the following functions –

A) Inputting serial data.
B) Ordering new serials
C) Renewal of presently subscribed serials.
D) Cancellation of presently subscribed serials, if needed.
E) Accessioning of individual issues as and when received.
F) Sending reminders, if necessary.
G) Claiming the issues, if necessary (such as replacement copy for soiled or defective issues).
H) Selective follow up of missing issues.
I) Preparation of lists like –
   i) List of serials received during a specified period.
   ii) List of serials cancelled during a specified period.
   iii) List of holdings with their status i.e. on shelf, on binding, on circulation etc.

J) Keeping tract of the amount spend on serials’ subscription, serials’ binding etc.

K) Estimate cost of budget for the next academic / and financial year.

L) Binding cost.

The number of above mentioned functions may differ on the basis of local needs.

**Data Files**

To perform the above mentioned functions it is advised to maintain the following files –
   i) Periodical main file.
   ii) Publisher/ Agent file.
   iii) Country/Currency file
   iv) Fund file
   v) Payment file
   vi) New arrival file
   vii) Holding file.

The number of above files may differ depending upon the type of operating system, but atleast the following three files have to be maintained on disk –
   i) Order file
   ii) Holding file
   iii) Fund file.
In order to have as many data elements as possible in the order and holding files the following format, very similar to that of MARC may be adopted:

**TABLE - 3.6**

*Data Elements in the Leader for Order file in Serial Control System*

<table>
<thead>
<tr>
<th>Character Position</th>
<th>Name of Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>Record length</td>
<td>0 = New record; 1 = Request for replacement of a defective copy; 2 = order cancelled; 3 = Deleted.</td>
</tr>
<tr>
<td>6</td>
<td>Type of document</td>
<td>S = Serial; O = Others, etc.</td>
</tr>
<tr>
<td>7</td>
<td>Frequency of the serial</td>
<td>W = Weekly; F = Fortnightly; M = Monthly; 2 = Once in two months; Q = Quarterly; 4 = Once in 4 months; H = Half yearly; Y = Yearly; I = Irregular</td>
</tr>
<tr>
<td>8</td>
<td>Type of Journal</td>
<td>P = Primary; S = Secondary; T = Territory, M = Magazines etc.</td>
</tr>
<tr>
<td>9</td>
<td>Order for</td>
<td>0 = For new journal; 1 = For renewal 2 = For back volumes.</td>
</tr>
<tr>
<td>10</td>
<td>Records level</td>
<td>0 = Record contains the minimum information; 1 = Partial information; 2 = Complete information (0 level is effective only in an on-line system).</td>
</tr>
<tr>
<td>11</td>
<td>Length of the Field</td>
<td>Either 0, 1, or 2.</td>
</tr>
<tr>
<td>indicator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Character Position</td>
<td>Name and Description</td>
<td>Remarks</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>0-4</td>
<td>Record length</td>
<td>-</td>
</tr>
<tr>
<td>5-9</td>
<td>Accession Number</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Mode of acquisition</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>Frequency of the journal</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>Type of journal</td>
<td>-</td>
</tr>
<tr>
<td>13</td>
<td>Foreign / Indian Publication</td>
<td>I = Indian; 0 = Foreign</td>
</tr>
<tr>
<td>14</td>
<td>Bound / Unbound volumes</td>
<td>B = Bound; U = Unbound</td>
</tr>
<tr>
<td>15</td>
<td>Complete / Incomplete</td>
<td>C = Complete; I = Incomplete</td>
</tr>
<tr>
<td>16</td>
<td>Location in the library</td>
<td>-</td>
</tr>
<tr>
<td>17-21</td>
<td>Base address for data</td>
<td>-</td>
</tr>
<tr>
<td>22-23</td>
<td>Used for local purposes</td>
<td>-</td>
</tr>
</tbody>
</table>

**TABLE – 3.7**

*Data Elements in the Leader for Holding File*

**Steps in Design and Development of System**
The following steps are involved in designing and developing the system for serial control—

Step 1 – A worksheet has to be designed in following manner—

**TABLE - 3.8**

*Worksheet for Creating the In – Process File*

<table>
<thead>
<tr>
<th>Tag</th>
<th>Name and Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>058</td>
<td>Title of the serial</td>
<td></td>
</tr>
<tr>
<td>013</td>
<td>Name of the publisher</td>
<td></td>
</tr>
<tr>
<td>014</td>
<td>Place of publication</td>
<td></td>
</tr>
<tr>
<td>043</td>
<td>Name and address of Vendor / Donor / Exchange</td>
<td></td>
</tr>
<tr>
<td>011</td>
<td>Year of publication</td>
<td></td>
</tr>
<tr>
<td>008</td>
<td>Volume number</td>
<td>Part / Issue</td>
</tr>
<tr>
<td></td>
<td>Order for New subscription/Renewal/Back Volumes. Mode of Acquisition</td>
<td>E/S</td>
</tr>
<tr>
<td></td>
<td>Frequency of the journal</td>
<td>W/F/M/2/Q/4/H/Y/I</td>
</tr>
<tr>
<td></td>
<td>Type of journal</td>
<td>P/S/T/M</td>
</tr>
<tr>
<td>001</td>
<td>ISSN</td>
<td>(046) Order date</td>
</tr>
<tr>
<td>033</td>
<td>Expected arrival date.</td>
<td></td>
</tr>
</tbody>
</table>

Step 2 – Key in the data from worksheet to in – process file (a temporary file). The file contains order data. Each record in the In-process file consists of one data element and its tag. Further in the In-process file the records may be conveniently grouped and each group may be called as a block of information. A block may then be divided into two sub-blocks. The first sub-block for the minimum required
data elements and the second sub-block for the issue numbers and their expected dates of arrival.

Step 3 – An order file is created: This means processing the In-process file to prepare order records. For each record in the 2nd sub-block an order record is created along with the information available in the 1st Sub-block. That record is then written into the order file. If there are 12 issues for a given volume 12 order records are created one for each issue with its arrival date.

As and when the block of information in the In-process file is processed, an order letter (requesting for invoice) is printed. After receiving the invoice, the order file may be processed along with the financial information, to print an order letter. This letter may be sent to the vendor/publisher along with the cheque/Draft.

Step 4 – Processing the order file depending on the requirements for –
   a) Sending reminders
   b) Sending claim notices
   c) Preparing holding file, etc.

Step 5 – Processing the holding file to:
   a) get catalogue cards; book cards, due date slips etc.
   b) complete and update the holding record; and
   c) get the binding statements.

Step 6 – Processing fund file as well as order file to obtain financial statements:

When program has to be developed in-house/locally separate programs have to be written for each step 1 to 6.
3.2.3. *Automated Circulation Control System* –

Circulation, as a library function, is very specific, definable and similar to common business activities such as material handling and inventory control. Circulation control is mainly concerned with the functions of keeping track of documents taken out of the library by the users i.e. of charging, discharging, overdue control, reserves and associated file maintenance activities. It is, therefore, quite amenable for automation. Any circulation system must contain information on document, borrower and time of return.

Functions – Any circulation control system should be capable of performing the following functions –

i) Creation, updation and deletion of members.

ii) Keeping track of loan details.

iii) Validation of members, at the time of loans.

iv) Reservation of issued documents.

v) Renewal of loans.

vi) Calculation of fines.

vii) Generation of reminder notices.

viii) Generation of statistical reports.

ix) Provision of reporting the location of a document and/or number of documents borrowed by a member.

To perform the above functions in addition to charging and discharging, circulation systems are designed to record and manipulate the following three kinds of information:
A) Information about the borrower (Name, address, telephone number, Identification number, category etc).

B) Information about the document (call. no., Identification no., normally bar code, author, title, date of publication etc).

C) Information about the transaction (such as due date or date of loan, in some cases the time of loan).

**System Design and Development**

This involves identification of various files, sequence of operation on them i.e. modules, reports alongwith their periodicity, software and hardware requirements.

Data Files – For an on-line automated circulation control system the desired files and their data elements may be as follows –

**TABLE - 3.91**

*Description of files of circulation control with data elements*

<table>
<thead>
<tr>
<th>SN</th>
<th>Name of File</th>
<th>Data Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>User File</td>
<td>a) User identification Number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Name and address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) Telephone number, if any.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d) Category, (Student / Faculty / Staff etc).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>e) Subject interest</td>
</tr>
<tr>
<td></td>
<td></td>
<td>f) Delinquency (O may be used for this).</td>
</tr>
<tr>
<td>2</td>
<td>Document file</td>
<td>a) Document Identification Number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Call Number</td>
</tr>
<tr>
<td>3. Transaction (Absence)</td>
<td>File</td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) User Identification Number</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) Document Identification Number (Call no. or Accession no.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) Author</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d) Title</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e) Year of Publication</td>
<td></td>
</tr>
<tr>
<td></td>
<td>f) Date of transaction or Due date</td>
<td></td>
</tr>
<tr>
<td></td>
<td>g) Kind of transaction (Charging, discharging etc.).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>h) Location of the transaction (Main Library/branch library etc.).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Transaction (Inventory)</th>
<th>File</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a) User Identification Number</td>
</tr>
<tr>
<td></td>
<td>b) Document Identification Number</td>
</tr>
<tr>
<td></td>
<td>c) Date of transaction or Due date</td>
</tr>
<tr>
<td></td>
<td>d) Kind of transaction.</td>
</tr>
<tr>
<td></td>
<td>e) Location of the transaction.</td>
</tr>
</tbody>
</table>

| 5. Request file | |
|-----------------| a) User Identification Number |
|                 | b) Document Identification Number |
|                 | c) Data when the book is reserved. |
Methods of Inputting Identification Numbers

The simplicity of an automated circulation system depends upon how best the document and identification numbers are recorded at the circulation desk at the time of charging/discharging a document. The identification numbers can be assigned as follows-

Document Identification Number – The minimum required data identifying a document are:

- Document Identification Number (12 Characters)
- Author (15 Characters)
- Edition number, if any (2 Characters)
- Volume number, if any (2 Characters)
- Year of publication (4 Characters)
- Name of publisher (10 Characters)
- Place of Publisher (10 Characters)

The basic problem is with document identification number. It can be any of the following–

a) Call Number
b) Accession Number
c) ISBN
d) Any other Serial Number than Accession Number.
e) Any other code.

In most of the system studied bar-coded labels are used for identification of documents.
User Identification Number – This can be any of the following –
   a) Roll Number or Register Number assigned by the library or parent body.
   b) Social Security or Insurance Number.
   c) Name.

In case of Academic libraries like IITs Register Number is considered to be best suited for UIN.

Modules – In order to perform the functions of an automated circulation control system it must have the following modules –
   a) Member Create
   b) Member Update
   c) Issue
   d) Return
   e) Renewal
   f) Reservation
   g) Reminder
   h) Query
   i) Official job execution
   j) Alert
   k) Statistics.

Software:

The libraries may go for a readily available program – package or may develop its own program. COBOL, BASIC, PASCAL or PROLOG. Language or dBase III package can be used to develop the software package. Since dBase III provide easy modification of records, sorting / Indexing, generating reports and screen design it may be suggested to develop the software programs using dBase III
package. PRO LOG being the first practical logic programming language is considered to be most suited to develop a program.

**PROLOG** – Programs in PROLOG are treated as data in a database. One of the unique properties of PROLOG programs is their conciseness. It is common for a conventional program to require five to ten times more source code than the corresponding PROLOG.

The features of PROLOG are –

1. Both programs and data are represented through clauses.
2. General pattern matching is available through unification.
3. An automated influence mechanism with back tracking is provided.
4. A non-deterministic style of programming is possible.
5. Use of recursive programs and structures can provide simplicity.
6. Many PROLOG programs are invertible.
7. Both declarative and procedural semantics.
8. The ability to intersperse metalevel code with object level code.
9. PROLOG can deal with large database.
10. PROLOG allows straightforward knowledge modifications by producing more modular systems.

A few of the important practical advantages of using PROLOG are –

(i) The declarative nature of PROLOG programs and their conciseness, result is less time required for software development and improved productivity.

(ii) The declarative style of programming language is very natural, making the task of programming easier.
(iii) Because programming in PROLOG is closer to writing a specification, it is easier to address the issues of correctness and verifications in PROLOG than in any conventional language. In addition, task of debugging is easier.

(iv) PROLOG based systems can include features such as natural language interface and graphics.

3.2.4. Automated Cataloguing System

Due to lack of telecommunication facilities on an economical basis and non-availability of national bibliographies in a machine readable form in our country, the libraries in India have developed their own automated cataloguing system instead of developing such a system on a national level. Such a system can easily be developed as a by-product of a book-ordering system. The main activities of a cataloging system is the production of catalogue cards. In a computerised cataloguing system we can also produce, as a by-product of it, spine label, pockets and book cards for use in circulation system. Also it provides most economically cataloguing information to the branch libraries.

Procedures involved in cataloguing are:

a) Preparing worksheet.

b) Generating machine readable records consisting of appropriate tags, these records can directly be stored on tapes or disk through terminals.

c) Verification of the machine readable catalogue records and finally generation of computer readable catalogue. It is usually on tape and key to the record is preferably through the call number.

d) Generation of added entries (such as author entry, title entry, series entry etc). These entries can be stored in an “Inverted file”. In this file, the records consists of data elements and the link to the main record in the CORC; the data element may be either author or title or any other item which is in the main entry.

e) Generation of indexes and cross-reference entries. Records of the index files can be merged appropriately into the inverted file and the records of cross reference files can also be merged appropriately in the CORC (Computer Readable catalogue). To generate indexes and cross reference entries it is essential to maintain a subject authority file.

f) Printing the records in card form, book form or in machine readable form.

System Design and Development

To keep pace with the international standards as well to have links to national and international networks a system design on MARC pattern is suggested. The basic machine readable catalogue record consists of the leader, the Record Directory, the control fields and the variable fields.

The control field consists of both variable control number and variable fixed fields. The leader is fixed in length for all records contains 24 characters. It is a set of fields describing the general structure of the individual entry. The Record Directory is an index to the location of the control and variable fields in the record.
It consists of a series of fixed length entries, one for each variable field in the record. An entry in the Record Directory contains the identification tag, the length and starting character position in the record of each of the variable fields. The Record Directory will end with a field – terminator code. Since the number of variable fields in a record can vary, the total length of the Record Directory is also variable. Variable fields are made up of variable length alphanumeric data. All fields end with a field terminator code except the last variable field in a logical record which replaces the field terminator with an end of record code. Each variable field is identified by a three character numeric tag in the Record Directory. Tags may be repeated, as required, in a logical record. However, tags associated with the control fields will not be repeated in a logical record.

A detailed outline of data elements of Leader, Record Directory, Control fields and variable fields is as follows –

**TABLE - 3.92**

*Data Elements in Leader of Automated Cataloguing*

<table>
<thead>
<tr>
<th>Element No.</th>
<th>Name of the Data Element</th>
<th>No. of Characters</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Logical Record Length (0-4)</td>
<td>5</td>
<td>The total no. of characters in the logical record including itself. The no. is right justified with leading zeros.</td>
</tr>
<tr>
<td>2</td>
<td>Record Status (5)</td>
<td>1</td>
<td>n=New record; c = corrected/revised record; d=deleted records</td>
</tr>
<tr>
<td>3</td>
<td>Type of Record (6)</td>
<td>1</td>
<td>a= Language material printed etc.;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------</td>
<td>---</td>
<td>-----------------------------------------------------------------</td>
</tr>
<tr>
<td>4.</td>
<td>Bibliographic level</td>
<td>1</td>
<td>m = monograph; a = Analytical; and c = Collections etc.</td>
</tr>
<tr>
<td></td>
<td>(7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Blank Characters</td>
<td>2</td>
<td>For local purposes.</td>
</tr>
<tr>
<td></td>
<td>(8-9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Indicator Count</td>
<td>1</td>
<td>Each variable field begins with two characters called indicator</td>
</tr>
<tr>
<td></td>
<td>(10)</td>
<td></td>
<td>which provide certain descriptive information about the data</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>which follows. For monographs all variable fields must be</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>incriminated by 2 to reach the subfield code for the first data</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>element in the field.</td>
</tr>
<tr>
<td>7.</td>
<td>Subfield code count</td>
<td>1</td>
<td>Each data element with a variable field is identified by a two</td>
</tr>
<tr>
<td></td>
<td>(11)</td>
<td></td>
<td>character subfield code made up of a delimiter and a lower case</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>alphabetic character.</td>
</tr>
<tr>
<td>8.</td>
<td>Base address of data</td>
<td>5</td>
<td>A number which is the starting character position of the first</td>
</tr>
<tr>
<td></td>
<td>(12-16)</td>
<td></td>
<td>control field i.e. equal to the length of Leader and the Record</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>directory. The starting character position for each field entered</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>in the record is relative to the first character of the first</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>control field.</td>
</tr>
<tr>
<td>9.</td>
<td>Blank Characters</td>
<td>7</td>
<td>For local use.</td>
</tr>
<tr>
<td></td>
<td>(17-23)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### TABLE - 3.93

*Data Elements in the Record Directory*

<table>
<thead>
<tr>
<th>Element No.</th>
<th>Name of the Data Element</th>
<th>Number of Characters</th>
<th>Character position in the Directory</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tag</td>
<td>3</td>
<td>0-2</td>
</tr>
<tr>
<td>2</td>
<td>Field length</td>
<td>4</td>
<td>3-6</td>
</tr>
<tr>
<td>3</td>
<td>Starting Character Position</td>
<td>5</td>
<td>7-11</td>
</tr>
</tbody>
</table>

### TABLE - 3.94

*Control Field Description*

<table>
<thead>
<tr>
<th>Tag</th>
<th>Name</th>
<th>Data Elements</th>
<th>No. of Characters</th>
<th>Character position in the field</th>
</tr>
</thead>
</table>
| 001 | Card Number (Control No.) | 1. Alphabetic prefix  
2. Year  
3. Number  
4. Supplement  
5. Suffix | 3  
4  
6  
1  
Variable | 0-2  
3-6  
7-12  
13  
14 |
| 008 | Fixed length data elements | 1. Data entered on file  
2. Type of publication data code  
3. Date 1  
4. Date 2  
5. Country of publication code | 6  
1  
4  
3  
4 | 0-5  
6  
7-10  
11-14  
15-17  
18-21 |
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6.</td>
<td>Illustration code</td>
<td>1</td>
</tr>
<tr>
<td>7.</td>
<td>Intellectual level code</td>
<td>4</td>
</tr>
<tr>
<td>8.</td>
<td>Form of reproduction code</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>9.</td>
<td>Form of content codes</td>
<td>1</td>
</tr>
<tr>
<td>10.</td>
<td>Govt. publication indicator</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>11.</td>
<td>Conference/meeting indicator</td>
<td>1</td>
</tr>
<tr>
<td>12.</td>
<td>Festschrift indicator</td>
<td>1</td>
</tr>
<tr>
<td>13.</td>
<td>Index indicator</td>
<td>3</td>
</tr>
<tr>
<td>14.</td>
<td>Main entry in body of entry indicator</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>15.</td>
<td>Fiction indicator</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Biography code</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Language code</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Modified record indicator</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>Cataloguing service code.</td>
<td></td>
</tr>
<tr>
<td>Tag</td>
<td>Data</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>-------------------------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Control Number</strong></td>
<td></td>
</tr>
<tr>
<td>010</td>
<td>Card Number</td>
<td></td>
</tr>
<tr>
<td>011</td>
<td>Linking Card Number.</td>
<td></td>
</tr>
<tr>
<td>015</td>
<td>National bibliography number</td>
<td></td>
</tr>
<tr>
<td>016</td>
<td>Linking NBN.</td>
<td></td>
</tr>
<tr>
<td>020</td>
<td>Stand Book Number</td>
<td></td>
</tr>
<tr>
<td>025</td>
<td>Overseas Acquisition Number</td>
<td></td>
</tr>
<tr>
<td>026</td>
<td>Linking OAN</td>
<td></td>
</tr>
<tr>
<td>035</td>
<td>Local System Number (LSN)</td>
<td></td>
</tr>
<tr>
<td>036</td>
<td>Linking LSN</td>
<td></td>
</tr>
<tr>
<td>040</td>
<td>Cataloging service.</td>
<td></td>
</tr>
<tr>
<td>041</td>
<td>Language</td>
<td></td>
</tr>
<tr>
<td>042</td>
<td>Search Code</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Knowledge Number</strong></td>
<td></td>
</tr>
<tr>
<td>050</td>
<td>Call Number</td>
<td></td>
</tr>
<tr>
<td>051</td>
<td>Copy Statement</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Main Entry</strong></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>Personal name</td>
<td></td>
</tr>
<tr>
<td>110</td>
<td>Corporate name</td>
<td></td>
</tr>
<tr>
<td>111</td>
<td>Conference / Meeting</td>
<td></td>
</tr>
<tr>
<td>130</td>
<td>Uniform title handling</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Supplied Titles</strong></td>
<td></td>
</tr>
<tr>
<td>240</td>
<td>Uniform title</td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>--------------</td>
<td></td>
</tr>
<tr>
<td>241</td>
<td>Romanized title</td>
<td></td>
</tr>
<tr>
<td>242</td>
<td>Translated title</td>
<td></td>
</tr>
<tr>
<td>Title Paragraph</td>
<td></td>
<td></td>
</tr>
<tr>
<td>245</td>
<td>Title</td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>Edition Statement</td>
<td></td>
</tr>
<tr>
<td>260</td>
<td>Imprint</td>
<td></td>
</tr>
<tr>
<td>Collation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>Collation</td>
<td></td>
</tr>
<tr>
<td>350</td>
<td>Bibliographic Price</td>
<td></td>
</tr>
<tr>
<td>360</td>
<td>Converted Price</td>
<td></td>
</tr>
<tr>
<td>Series notes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>Personal Name – Title (Traced Name)</td>
<td></td>
</tr>
<tr>
<td>410</td>
<td>Corporate Name – Title (Traced Name)</td>
<td></td>
</tr>
<tr>
<td>440</td>
<td>Title (Traced Name)</td>
<td></td>
</tr>
<tr>
<td>490</td>
<td>Series untraced or traced differently</td>
<td></td>
</tr>
<tr>
<td>Bibliographical Notes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>General Notes</td>
<td></td>
</tr>
<tr>
<td>501</td>
<td>“Bound with” Notes</td>
<td></td>
</tr>
<tr>
<td>502</td>
<td>Dissertation Notes</td>
<td></td>
</tr>
<tr>
<td>503</td>
<td>Bibliographical history Notes</td>
<td></td>
</tr>
<tr>
<td>504</td>
<td>Bibliography Note</td>
<td></td>
</tr>
<tr>
<td>505</td>
<td>“Limited Use” Note</td>
<td></td>
</tr>
<tr>
<td>506</td>
<td>Abstract or Annotation</td>
<td></td>
</tr>
<tr>
<td>Subject Added Entries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>Personal Name</td>
<td></td>
</tr>
<tr>
<td>610</td>
<td>Corporate Name (Excluding political jurisdiction alone)</td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>611</td>
<td>Conference / meeting</td>
<td></td>
</tr>
<tr>
<td>630</td>
<td>Uniform title heading</td>
<td></td>
</tr>
<tr>
<td>650</td>
<td>Topical</td>
<td></td>
</tr>
<tr>
<td>651</td>
<td>Geographic Name</td>
<td></td>
</tr>
<tr>
<td>652</td>
<td>Political jurisdiction alone or with subject subdivisions.</td>
<td></td>
</tr>
<tr>
<td>690</td>
<td>Local Subject Heading System.</td>
<td></td>
</tr>
<tr>
<td>700</td>
<td>Personal Name</td>
<td></td>
</tr>
<tr>
<td>710</td>
<td>Corporate Name</td>
<td></td>
</tr>
<tr>
<td>711</td>
<td>Conference / Meeting</td>
<td></td>
</tr>
<tr>
<td>730</td>
<td>Uniform Title heading</td>
<td></td>
</tr>
<tr>
<td>740</td>
<td>Title traced differently</td>
<td></td>
</tr>
<tr>
<td>750</td>
<td>Name not capable of authorship.</td>
<td></td>
</tr>
<tr>
<td>800</td>
<td>Personal Name – Title</td>
<td></td>
</tr>
<tr>
<td>810</td>
<td>Corporate Name – Title</td>
<td></td>
</tr>
<tr>
<td>811</td>
<td>Conference / Meeting Title</td>
<td></td>
</tr>
<tr>
<td>840</td>
<td>Title</td>
<td></td>
</tr>
</tbody>
</table>

### 3.2.5. Automated Information Retrieval System

A typical Information Retrieval System consists of –

a) Database Maintenance:
   
   Creation of the database
Updating (deleting/inserting/modifying the record).

b) Query Analysis:
   - Receiving the queries.
   - Analysing and structuring the queries appropriately.
   - Matching the queries with the entries in the database.

c) Information Dissemination Output:
   - Provide the retrieved information to the users.


In Library and Information field our concern mostly is with bibliographical database and their operations. Hence our IRS may safely be called Bibliographical Information Retrieval System (BIRS). A BIRS is defined a set of rules and procedures operated by human beings and/or computers for performing some or all of the following operations:

i) Classification and / or Indexing – Constructing representations of documents eg. Preparing main entries, cross – reference entries, added entries including subject index and then arranging the entries in a helpful sequence.

ii) Search formulation (of users’ query).

iii) Searching (Matching documents against users’ query).

iv) Retrieving (Printing)

v) Feedback (Modifying any or all of the above steps on the basis of evaluation by users).

vi) Indexing language construction.
Design and Development of BIRS

The major steps involved in design and development of a database for BIRS are –

a) Filling up of worksheets in a standardised manner (for worksheets design INIS, or AGRIS formats and for tags and sub-field indicators MARC may be adopted). Vocabulary control devices have also to be maintained for assigning descriptions to documents.
b) Transfer the information. A good input design has to be prepared at this stage.
c) Creating machine readable records.

The software to be developed consists of programs for the following purposes –

A) To create a database:

Input – Bibliographical information along with appropriate tags and subfield codes on tape or on disk.

Output – Machine – readable database including the inverted files.

B) To update the Database:

Input – Bibliographical database to be updated (same a in A)

Output – Updated Database (updating may involve inserting a record/deleting a record/correcting or modifying a record.

Flow chart for updating the Database Encl. – 2

C) To Search the Database:
Integrated View of BIRS

Flowchart-1
Flowchart for Creating a Database

1. Flowchart for Creating a Database

2. Flowchart for Updating the Database
3. Flowchart for Searching the Database
Input – Query through terminals. A query may consist of either a single data elements or a combination of data elements.

Output – Retrieved information as print-outs or display on terminals.

Modes of Operations in BIRS / Flowchart for Searching the Database

The BIRS may be operated entirely either on batch mode or on-line mode or on a combination of both. Choosing a batch or on-line system is an important decision in design. In a batch system queries are grouped together and entered and are processed sequentially. In an on-line system each entry is entered from a terminal and is processed individually.

The advantage of using a system that is partly on-line and partly batch is that queries may be validated by the computer and any error corrected immediately by the operator, there are fewer possibilities of error when the data is entered at the terminals. Depending upon the availability of hardware, a typical BIRS can adopt different modes of operations. Which are as follows –

<table>
<thead>
<tr>
<th>SN</th>
<th>Function</th>
<th>System</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Data entry</td>
<td>On-line</td>
</tr>
<tr>
<td>2.</td>
<td>Data update</td>
<td>Batch</td>
</tr>
<tr>
<td>3.</td>
<td>Retrospective Searching</td>
<td>Batch</td>
</tr>
<tr>
<td>4.</td>
<td>Large scale printing in retrospective searching</td>
<td>Batch</td>
</tr>
<tr>
<td>5.</td>
<td>Current awareness searching</td>
<td>On-line</td>
</tr>
<tr>
<td>6.</td>
<td>Index production</td>
<td>Batch</td>
</tr>
</tbody>
</table>
**Data Entry** – The data entry is an important component involved in design and development of BIRS. The purpose of data entry may be to:

a) Create a new database.
b) Insert a record in the existing database.
c) Delete a record in the existing database.
d) Modify the existing record in a database.

In order, to have an effective system for data entry a good worksheet for in putting the data designed. The software may be designed in such a way that the worksheet may be displayed on the screen. This makes keying in of data much simple. In CDS/ISIS while defining the database the user defines the worksheets which are displayed as and when the data are entered. In entering the data related to subject heading, often called descriptors, we may use a standard list of terms. This may be a simple list of terms used in a particular subject or it may be based on a scheme of classification or a thesaurus. A vocabulary control device most commonly used is thesaurus. It is a structured controlled vocabulary which links one term to its associated terms:

a) Broader term (Less specific in the subject).
b) Narrower term (More specific in the subject).
c) Related term at a similar level in subject mostly with a common broader term.
d) Homonymous Term (Same term used to describe different subjects).
e) Synonymous Term (Different terms used to describe a single subject or concept).

Out of the above the BT, NT and RT are most commonly used.
4. Flowchart of Data Entry in Batch Mode
5. **Flowchart of data entry in On-line mode**
Query Analysis and Searching

A query to a BIRS is a sequence of search statements. In batch system the query may consist of only a single statement. In interactive systems a query can consist of a sequence of statements. Most often, a query will be an expression consisting of data elements, attributes that specify the fields within which the terms are to be searched 95 Boolean operators.

A description of a query in a suitable form for input to a search program is called User’s Interest Profile. The rules for formulation of interest profiles should be simple to be easily understood by the user, but they should also allow a proper representation of his/her search requirements.

Once a query is structured, the next process is ‘matching’. It may be for the purpose of ‘Retrospective searching’ or for current Awareness Searching’ or for ‘Selective Dissemination of Information’ (SDI). The users interest profile is matched against the secondary information database/bibliographical database. If the user wishes to have a ‘retrospective search’ the query has to be matched with all the secondary information, and for ‘current awareness search the query has to be matched with recently (since the last current awareness search was made) acquired documents only.

The steps involved in search process may be shown by the following flow charts – Information Dissemination (Output)

The output from an BIRS serves a number of purposes:

a) Informing users about recent information / documents of a potential interest to them (SDI Service).
6. Flowchart of Searching in a Batch mode
7. Flowchart of Searching in an On-line mode
b) Providing a list of all recent additions to all the users irrespective of whether or not the user is interested in the documents listed (CAS).

c) Maintaining one or more separate catalogue/s.

d) Generating and maintaining various indexes (Author, Titles Subject etc.) to the library collection.

e) Producing bibliographical publications for local use.

f) Producing bibliographies (on demand) on various subjects depending on special projects.

The output media may be –

i) Computer terminal output.

ii) Computer printed listings.

iii) Library catalogue cards.

iv) Microforms (Microfilm, Microfiche etc).

The process of producing various outputs of a search consists of several tasks such as –

a) Creation of entries necessary for each selected record.

b) Organizing the entries in a specified order.

c) Performing detailed formatting such as pagination, emboldening, keywords, handling over flow from one index card to another etc.

d) Formatting the printed list, the screen etc.

3.2.6. Design of Key – Word Indexing using CDS/ISIS

CDS/ISIS offers total flexibility in handling bibliographical information. The features to be highlighted are :-
VARIABLE FIELD :- This feature help in handling lengthy fields like title, conference name, series, etc. where these length can not be well predicted.

REPEATABLE FIELD : This is most useful feature for handling bibliographical information. Fields like author, report number, subject descriptor keyword, and series, which can have different value for a single record can be handled with ease. Multiple value of a field are delimited with a ‘%’ sign, during data entry. The contents of these repeatable fields if selected for indexing, are given individual access points in the index. For Information Retrieval, ISIS offers features like the formation of a set, of the posting of an index term, and allows to define a boolean relation between the different sets in the form of search query. But for printing indexes for publications, like reading lists, literature surveys, current additions list and printed catalogues, one has to depends upon the uniterm index which it produces. This leads to the loss of context in which a keyword has been used, in relation to other keywords. Generic terms like design research, analysis, fabrication etc. do not mean anything unless one examine the main entry. This leads to the prohibitive use of such terms, thus sacrificing a lot of qualitative value of the index.

A utility program has been developed to generate a permuted keyword index. Pascal language is used. It can be used to generate permuted index for repeatable fields like keywords, authors and report numbers.

PROBLEM DEFINITION :- CDS/ISIS offers ‘Uniterm Index’ only through its standard system worksheet by choosing the ‘*’ format. The index does not preserve the context in which a particular term is used. For example, if there are three subject terms say A,B and C used as descriptors for one document, the index, no doubt compact, resembles the following :
A 1
B 1
C 1

As a alternative, one can print the lead term and beneath that the full string as a KWAC index entry. This can be done by giving the tag for the keywords, without repeatability along with the ‘m f n’, instead of the ‘*’ format while sorting on the keywords alone. Each index entry in two lined and the lead term is repeated in the next line. For example, the index will resemble the following :-

A

A, B, C 1
B
A, B, C 1
C
A, B, C 1

OBJECTIVE :- The objective of this utility program is to format all the keyword terms in one line string along with the reference to the main entry. Then the keyword terms in the string have to be permuted in a cyclic order in one direction to provide on access from each one of the term. Finally, all these strings have to be sorted alphabetically in the form of an index.
The gives rise to one line index entries while avoiding repetition and ensuring a saving of space. The entries will resemble the following:

```
A,  B,  C  1
B,  C,  A  1
C,  A,  B  1
```

As main entry will have different number of index term (i.e. one record may have two keywords, while another may have 5 keywords), the program should be able to handle different cases.

**SYSTEM DESIGN AND METHODOLOGY:** When one is producing a list of bibliographical records, the main entries are generally sorted on call number, broad subject heading or category no., or by author, title etc. As the records are to be sorted on any one of the above mentioned fields, it is advisable to transfer them into a ‘TEMP’ database, having the same structure of the regular database. This will help, to give a running serial number to the main part, starting from 001.

The different steps involved in producing the ‘Permuted Index’ are as follows:

**STEP 1 – CREATE ‘TEMP’ DATABASE:** From the regular database, creat the ‘TEMP’ data base by doing the following:

- Copy the following files using DOS copy command

  `XXXXXX. FDT  to  TEMP.FDT`
  `XXXXXX. FST  to  TEMP.FST`
  `?XXXXX. FMT  to  ?TEMP.FMT`
(Required format for the main part)

XXXXXX. PFT to TEMP.PFT

- Re-initialise the ‘TEMP’ database.
- Edit the TEMP.FDT using the ‘N’ option. (No document Mode) using Wordstar.
- Change the information to ‘TEMP’ in the first three lines for default values

\[
\begin{align*}
W & : \quad \text{TEMP} \\
F & : \quad \text{TEMP} \\
S & : \quad \text{TEMP}
\end{align*}
\]

These are the default names of the worksheet, print format, and field selection table for database ‘TEMP’. Save the file. This will ensure that the ‘TEMP’ database has the same structure of the regular database in use.

STEP-2 CREAT ‘SORT’ DATABASE :- Create another database with the name of ‘SORT’, having one field with Tag = 10. Name of the field = Keyword string, Length = 500, Type of character = X;

STEP 3 – CREAT A HIT FILE :- Create a ‘Hit file’ by sorting on the desired field from the regular database. Make a search for the required records on the regular database and save the search. Go to ‘Print Worksheet’. Use the file name, else use the range of MFN. You may choose the default format, however we do not have an intention to print the record. Choose ‘Y’ option for sorting and enter ‘NULL’ as the print file name. In the ‘Sort Worksheet’, sort on the field, according to which the main part will be arranged, The procedure will generate a
' XXXXX. HIT' file;

Step 4 – EXPORT USING THE HIT FILE :- Use ‘Export Worksheet’ and enter ‘Y’ option for ‘Hit file’ to export the required records into a ‘MST.ISO’ file and then import by loading into the temporary database say ‘TEMP’;

STEP 5 – RUN THE PROGRAM :- Run the program ‘PERKEY’. The program ask two inputs. One, the name of the temporary database say ‘TEMP’, and two. The tag of the field on which the index to be generated, say ‘620’ for keywords. The name of the database for sorting i.e. ‘SORT’, is default and is a must.

The program first generates a text file ‘Keyword.txt’ which contains a list of strings which are permuted in a cyclic manner. Then, it reads each line from the text file, and creates one record in the ‘SORT’ database.

STEP 6 – SORT AND PRINT FROM ‘SORT’ DATABASE :-

Use the ‘SORT’ database, and print the keyword string, V10 Sort on the same field with no. of headings = 0, 90 characters width, 55 lines per page. ‘N’ for no page breaks and page numbers.

STEP 7 – EDIT USING WORDSTAR :- Edit and print the index using Wordstar. Use the dot command ‘CWI’ to compress the text sideways. Set the right margin at 100th column and align the record numbers indicating the reference to the main entry at column no. 90. Print the index in draft mode.

NOTE :- For future use, reinitialise both the database ‘TEMP’ and ‘SORT’ before executing the above mentioned steps.
COMPILING THE PROGRAM: Use Wordstar and choose the ‘N’ option (Non-document mode) from the main menu. Enter ‘PERKEY.PAS’ as the file name. Type the program and save it.

Note the following important points.

- Do not enter the line number.
- Do not use the ‘Tab Key’; the compiler does not accept the tabulation character (ASCII Codes) use spaces instead.
- After ‘;’, which is the end of statement, ensure that a carriage return is given by pressing the ‘Enter Key’, without any space.
- Do not enter a ‘;’ before the part of the statement ‘Else’ (See line no. 36 and 43).
- Assign statement.

- If you are using version 2.3, use the following syntax Assign (‘OUT’, ‘NULL’); (see line no. 71):
- If you are using version 2.32, use as shown in the program listing, i.e. Assign (‘OUT’, ‘’);
- The same applies for Assign (‘INP’); statement (see line no. 85).

- You may not enter the text within the braces, which are comments (see line no. 2, 24, 30, 54).

Choose the ‘A’ options from CDS/ISIS main menu and then the ‘C’ option to compile the program. Enter the file name as ‘PERKEY’ without any extension. If there are no compilation errors, be assured that the program will run smoothly.
PROGRAM LISTING :-

PROGRAM PERKEY
NAME OF THE PROGRAM ; PERKEY
PAS
PURPOSE : TO GENERATE A PER
MUTED KEY WORD INDEX

DEVELOPED BY : Apurba Kanjilal
Library and Documentation Facility
ISRO, SHAR Centre
Sriharikota – 524124
DATE OF LAST UPDATE : 22.04.1992)

Var
dbname, str, gstr : STRING ;
tag, r min, r max, mfn, fl, n, x, y, z : REAL;

PROCEDURE DB' OPEN;

Begin
Clear
Box (5,10, 5, 60, 2):
Cursor (7, 15);
Write ('Enter Database Named :');
Readln (dbname);
Open (dbname);
End;
PROCEDURE GETTAG;

Begin
  Clear
  Box (5,10,5,60,2);
  Cursor (7,15);
  Write ('Enter Tag Number (Ex. 620) : ');
  Readln (tag);
End;

PROCEDURE GENKEY;

Begin
  mfn := Record (r min);
  n := Nocc (tag);
  x := O;

  Repeat [String]
    x := x + 1;
    y := 0;
    z := x;
    str := " ";
    gstr := " ";
    Repeat (Sub - String)
      y := y + 1;
      Str := Field (Field.n (tag, z));
If (z + 1) > n then
Begin
\[ Z := (n - (n - 1)) ; \]
End
Else
Begin
\[ Z := z + 1 ; \]
End ;
If y = 1 then
Begin
\[ gstr := str ; \]
End
Else
Begin
\[ gstr := gstr \ ' \ ' \ 1 \ str ; \]
End
Untill y = n;
\[ gstr := gstr \ ' \ ' \ 1 \ Encint (rmin, 1) ; \]
Writeln (Out, gstr);
Untill x = n;
End;
Begin (Main program begin here)
DBOPEN ;
GETTAG;
Assign ('OUT','KEYWORD. TXT');
R MAX := maxmfn;
R max := (r max - 1);
R min := 0;
Clear;
Box (8,20,5,37,2);
Clear box (8,20,5,37,2);
Attr (‘ ‘, 2, 10, 22, 32);
Write (’PLEASE WAIT! Generating STRING’);
Repeat
  r min := r max + 1;
  GENKEY;
Until rmin = r max;
Assign (‘OUT’);
Open (‘SORT’);
Assign (‘INP’, ‘KEYWORD.TXT’);
Clear;
Box (8,20,5,37,2);
Clear box (8,20,5,37,2);
Attr (‘ ‘, 2, 10, 22, 32);
Write (’PLEASE WAIT! Generating SORT DB’);
Repeat
  Readln (inp, str);
  mfn := NEWREC;
  fl := Fldadd (10, 1, str);
  Update
Until EOF(INP);
Assign (‘INP’, ‘ ’);
Clear;
(Box (8,20,5,40,2);
Clear box(8,20,5,40,2);
Attr ( ‘ ‘, 2, 10, 22, 36);
Write (‘use sort database’ sort on field V10’);
END.


3.2.7 Design Of A Bibliographic Database (Based on CCF) using Micro – CDS/ISIS.

A text / information retrieval system is designed to store a variety of textual and/or bibliographic information which can be accessed by one or more terms or keywords and the retrieved data can be displayed in a user-defined format. Two major characteristic features of text / bibliographic information systems are – they are designed to handle a number of fields most of which are unstructured, and they provide a wide range of retrieval facilities.

The term library automation generally encompasses two major categories to tasks performed in libraries viz. Information retrieval services and house keeping operations.

However, a text or bibliographic database is a key to both the information retrieval services and housekeeping operations in libraries. For example, library personnel and end-users will have to consult the bibliographic database for locating a
particular document in the collection, for conducting a retrospective search, or to locate the recent additions to the library’s collection. Similarly, the bibliographic database, being a key to the holding of the library, needs to be consulted for various house – keeping operations like circulation control or acquisition. Therefore libraries should pay much attention to this key-the bibliographic database.

Much attention to be paid towards the design aspects in order to make one library’s bibliographic database accessible to others for the purpose of resource sharing. Recently a number of measures have been taken up in India to promote resource sharing through national network (e.g., INFLIBNET) as well as regional library networks (e.g. BONET, CALIBNET, DELNET, MALIBNET, etc.). In order to achieve success toward the end of effective resource sharing, a standard framework for designing the bibliographic database is absolutely necessary. Some library networks have proposed to use the CCF (the Common Communication Format) as the standard format for holding bibliographic records, while others proposed to adopt other formats. However, experience shows that adopting the CCF as it is may not serve the desired purpose – in some cases use of all the fields proposed in the CCF makes the database too bulky; some of the fields will never be or will seldom be used. On the other hand, using the CCF strictly, librarians may find it difficult to perform some tasks with the database; some new fields may need to be added for the purpose. In other words, manipulation of data for different purposes may not be so easy in all cases using the CCF as it is.

Considering these points, measures have already been taken in other parts of the globe to adopt a database format with necessary modifications to the CCF – some fields proposed in the CCF have been discarded while some new fields have been added keeping the practical requirements in view. Outcome of one such attempt is the IDIN manual for the creation and management of a bibliographic database.
using Micro-ISIS. The preparation of the IDIN manual has been sponsored by the OECD (Organisation of the Economic Cooperation and Development). Publication of the IDIN manual was influenced by another such attempt made earlier by the IDRC which gave rise to a publication called 'Manual for the preparation of records in the development of information systems.' The structure of the IDIN bibliographic database has been created for use on a micro computer using Micro-ISIS and includes guidelines for the form and contents of data according to AACR-2. It has been exchange and resource sharing among participating libraries. Mrs. Anne Di Lauro, the author of the IDIN manual, adopted the CCF fields which she found necessary and also added some fields on her own. Thus the fields defined for the IDIN bibliographic database include:

1. All the mandatory CCF fields;
2. Many of the optional CCF fields; and
3. Fields not included in the CCF but considered useful for describing non-conventional material and for in house operations.

Hence a format for designing bibliographic database using Micro-CDS/ISIS is being proposed. The bibliographic database is assumed to contain book materials – books, monographs, reports, theses etc., but no serials, because it is believed that a different format for serials database might be more useful and the matter will be treated separately. The design of a bibliographic database may be useful to libraries going for automation using Micro-CDS/ISIS, and also will facilitate data exchange among libraries.

Although the basic framework for the database resembles the format proposed in the CCF, some modifications have been made. These modifications are not exactly like those proposed in the IDIN manual; rather they were made keeping the Indian library situation in view. Thus the proposed design of the database covers –
- Almost all the mandatory fields in the CCF,
- Some of the optional fields, and
- Some newly added fields which have been considered necessary.

The fields chosen for the database are mentioned in the following section. It is believed that standard bibliographic fields proposed in the CCF might not need elaborate explanation as such. However, detailed explanations have been provided with necessary illustrations, for those fields which have been added to the mandatory CCF fields. The justifications in favour of the newly added fields have been given by way of typical examples which shows the necessary measures that should be taken for a particular kind of information retrieval operation, for example providing access to a given article in a composite book through its author's name or title. In addition, typical measures to be taken to solve some particular problems in an information retrieval environment, like generation of author index, keyword index, etc., generation of added entries showing the role played by each author (joint author, editor, translator etc.), generation of a classified catalogue arranged under subject heading, etc., have been described. The proposed design of a database facilitate various information retrieval operations in libraries. The display format has been designed such that data can be displayed according to AACR-2, as far as practicable. Modifications in the display format, according to user's choice, can be made with very little effort. A model for bibliographical databases with a view to facilitate sharing of resources among Indian libraries in order to provide better information retrieval services to the users community, is being proposed here.
TABLE - 3.96

Field Definition Table (FDT)

<table>
<thead>
<tr>
<th>Tag</th>
<th>Field Name</th>
<th>Length</th>
<th>Type</th>
<th>Rep</th>
<th>Subfield</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Record Identifier</td>
<td>15</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Bibliographic level</td>
<td>5</td>
<td>X</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Source of Record</td>
<td>25</td>
<td>X</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Completeness</td>
<td>5</td>
<td>X</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Date entered</td>
<td>15</td>
<td>X</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Language/Script</td>
<td>20</td>
<td>X</td>
<td>R</td>
<td>A</td>
</tr>
<tr>
<td>40</td>
<td>Lang/Script of Item</td>
<td>20</td>
<td>X</td>
<td>R</td>
<td>AB</td>
</tr>
<tr>
<td>50</td>
<td>Physical Medium</td>
<td>5</td>
<td>X</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>Type of Material</td>
<td>5</td>
<td>X</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>ISBN</td>
<td>50</td>
<td>X</td>
<td>R</td>
<td>ABC</td>
</tr>
<tr>
<td>120</td>
<td>Document No.</td>
<td>100</td>
<td>X</td>
<td>R</td>
<td>AB</td>
</tr>
<tr>
<td>200</td>
<td>Title/Statement</td>
<td>300</td>
<td>X</td>
<td>R</td>
<td>MABL</td>
</tr>
<tr>
<td>210</td>
<td>Parallel Title</td>
<td>200</td>
<td>X</td>
<td>R</td>
<td>ABL</td>
</tr>
<tr>
<td>240</td>
<td>Uniform Title</td>
<td>150</td>
<td>X</td>
<td>R</td>
<td>ACF</td>
</tr>
<tr>
<td>260</td>
<td>Edition Statement</td>
<td>80</td>
<td>X</td>
<td></td>
<td>AB</td>
</tr>
<tr>
<td>300</td>
<td>Personal Author</td>
<td>100</td>
<td>X</td>
<td>R</td>
<td>MA</td>
</tr>
<tr>
<td>301</td>
<td>Collaborators</td>
<td>150</td>
<td>X</td>
<td>R</td>
<td>CETX</td>
</tr>
<tr>
<td>310</td>
<td>Corporate Body</td>
<td>150</td>
<td>X</td>
<td>R</td>
<td>ABDE</td>
</tr>
<tr>
<td>320</td>
<td>Name of Meeting</td>
<td>150</td>
<td>X</td>
<td>R</td>
<td>AGIJ</td>
</tr>
<tr>
<td>400</td>
<td>Place/Publisher</td>
<td>150</td>
<td>X</td>
<td>R</td>
<td>AB</td>
</tr>
<tr>
<td>440</td>
<td>Publ Date</td>
<td>20</td>
<td>X</td>
<td>R</td>
<td>B</td>
</tr>
<tr>
<td>460</td>
<td>Collation</td>
<td>100</td>
<td>X</td>
<td></td>
<td>ABCD</td>
</tr>
</tbody>
</table>
Explanation relating to the fields shown in the FDT :-

1. Record Identifier :- This field holds data which uniquely identifies a given record. Individual libraries creating the records may devise their own coding system for this purpose, e.g., 10051 which may indicate a given record bearing number 10051 in the database of a given library.

2. Bibliographic Level :- This field holds data relating to the nature of document being recorded. Five unique codes have been adopted which may be used in the subfield ‘a’ to denote the nature of the record, e.g.,

s = serial  
m = monograph  
c = multi volume monograph  
a = component part  
e = made-up collection
This has many uses, for example, a library may want to know how many monographs or multi-volume monograph it has in its record collection. Similarly, by looking at a given record one can determine its nature, for example, in case of a composite document that is a document having a collection of papers written by different authors, fields ‘015’ and subfield ‘a’ will contain the code ‘e’, i.e., ‘ae’, by which the user can understand that it has some component parts details of which are provided in the contents note. Similarly, for a multi-volume monograph, the code ‘c’ will indicate that the user may look for the component parts in a subsequent field called ‘part statement’.

3. Source of Record :- This field is quite useful for the purpose of resource sharing. If a library down loads data from another source, than this field will indicate that source, participating libraries may devise their own source codes.

4. Completeness of Record :- This field shows how for a given record is complete; two codes have been chosen where code ‘B’ indicates that the record contains data relating to all the mandating fields proposed in the CCF, while code ‘C’ indicates that all mandatory fields are not present in the given record.

5. Data Entered on File :- This field shows the date on which a given record is created. Subfield ‘a’ has been chosen which allows entry of date in the format ‘yyyyymmdd’.

6. Language and Script of Record and Item :- Two different fields have been chosen to denote the language and script of an item. If an item is written in a language which differs from the language in which the record is created, the field ‘031’ is to be used. For example, if a book is written in Bengali and its record is created in English that field ‘031’ will contain an entry ‘ a eng’.
Field ‘040’ is used for a slightly different purpose there are two subfields which are to be used when the language of an item and the script used to write that item differs; when both are same use of subfield ‘a’ will serve the purpose. For example, if the language of a book in English and it is written (for obvious reasons) in Roman script, field ‘040’ will have an entry ‘A a eng’; if on the other hand, the language of a book is Hindi and it is converted in Roman script, the entry will be ‘A a hinAbaa’ (‘aa stands for Roman script in the CCF).

7. Physical Medium :- This field is particularly useful to libraries which handle multi-media documents like paper, film, braille, magnetic, laser/optical and others. Different code is used to indicate the nature of the document, for example,

010 = Paper
020 = Film
030 = Braille
040 = Magnetic
050 = Laser / Optical
060 = Other

Use of this field will facilitate identification of different kind of items and their total numbers in library’s collection.

8. Type of Material :- This field denotes the nature of the material being handled, and several options are available. The code used (given in the CCF) for this field helps library to identify, for example, how many theses, reports, patents, etc, are there in the collection.

9. ISBN :- Three subfields have been chosen where
a indicates the ISBN noted on the book
b indicates the invalid ISBN
c indicates qualification, if any.

This field has been made repeatable keeping in view that a given book may have more than one ISBN-One for paper back, one for hard bound, and so on.

10. Document Number :- This field holds data relating to the number which uniquely identifies a document, for example, standard number, patent number, etc. Two subfields proposed in the CCF have been chosen where

a indicates document identification number, and
b indicates type of document, for example, Indian standard, US patent etc.

Thus this field allows one to conduct searches by the name of a given standard, patent, technical report, etc., and its number, for example, ‘ISO 2709’, ‘IS 4001’, etc.

11. Title and Statement of Responsibility :- This field holds data relating to the title of a document and statement of responsibility. Two important points need to be mentioned about this field. According to AACR-2, title and statement of responsibility area has a typical format; while names of authors, when used as heading, appear in the format ‘forename follows by surname’, they appear in a different form, ‘forename followed by surname’ in the statement of responsibility area. In addition, display of data in the statement of responsibility area sometimes becomes complex, particularly so when more than one persons are responsible for a given publication. Hence, for proper display of data according to AACR-2, it is proposed that while entering data in
this field, the pattern in which they appear on the title page should be followed.

Four subfields have been suggested for this field, viz.

m = when title is used as main heading
a = when title is not used as main heading
b = statement of responsibility
l = language of title

Subfield ‘m’ and ‘a’ have some special significance. For proper display and/or printing of data in the AACR-2 format, the system should be able to determine automatically when the title is to be used as main heading and when not, because a separate rule is there in the AACR-2 for the purpose of data identification. Besides the system should be able to identify when title is used as the main heading and when author is used as main heading (see also section 15). The subfield ‘m’ and ‘a’ serve this purpose. In a classified list of documents, prepared for the Current Awareness Service, say, entries under main heading are considered only. In that case the system should be able to determine automatically when title has been used as a main heading. Again, for proper display, it is proposed that when title is used as main heading, the first word in the title should be entered in uppercase. Examples illustrating how the use of subfields ‘m’ and ‘a’ facilitates data display appear in Annexures I and III. This is an addition to the format proposed in CCF, because CCF does not, as such, provide any such facility and hence it becomes difficult for the system to determine automatically when main entry will be under title.

12. Parallel Title :- This field holds data when an item has a parallel title and three subfields have been proposed, viz.

a = if title is available in other language
b = statement of responsibility associated with the parallel title.
l = language of parallel title

Example illustrating parallel title appears in Annexures I and III.

13. Uniform Title :- Three subfields have been chosen for this field which are –

a = uniform title
b = name of part (s)
f = version

Example showing uniform title appears in Annexures I and III.

14. Edition Statement :- Two subfields have been chosen, viz.

a = edition
b = editor (when responsible for the particular edition).

This field has been made repeatable keeping in view that a given document may have more than one edition statements associated with it.

15. Personal Author :- There are two subfields which indicate when an author should appear as main heading and when not. The subfields are –

m = when author is used as main heading
a = when author is not used as main heading
This arrangement serves two purposes. First it enable the system to know whether the author of a given item should appear in the main heading and thus it can display the entries accordingly. Second, when an item has more than one authors, the system by looking at the subfields can determine when the qualifier it. author is to be written against the author’s name while generating added entries. This facility is not available in the CCF, as such and therefore it is an extension. Examples illustrating the utility of the subfields appear in Annexures I, III and IV.

16. Collaborators :- As mentioned in section 11, this design allows to enter statement of responsibility relating to a given work along with its title in field ‘200’. It also allows to enter names of collaborators, if any, in its normal form, i.e., ‘forename followed by surname’, without any preceding subfield delimiter. A question may then by raised how would one find a document if he only knows the name of a collaborator, say name of compiler, translator, or editor? Again how would the system generate added entries under these collaborator names? CCF proposes the use of a subfield ‘f’ under field ‘300’ to denote the role of an author. However, this causes data redundancy to some extent, because one has to enter the role of each and every author, that is, one has to use two subfields simultaneously – subfield ‘a’ for author’s name and subfield ‘f’ to denote the role played by that author. In order to simplify the process, a new field (not proposed in the CCF) has been added. Field ‘301’ holds data relating to the names of collaborators in four subfields, viz.

c = compiler’s name.
e = editor’s name

t = translator’s name

x = others
Thus any name(s) occurring under subfield ‘c’ will indicate that the contributor is a compiler; similarly subfield ‘e’ denotes editor, ‘t’ denotes translator, etc. For other contributors subfield ‘x’ has been proposed; however, new subfields may be added, if necessary. It is proposed that data should be entered here in the format – ‘surname followed by forename: use of this field helps in –

- searching by collaborator’s name;
- generating added entries under collaborators;
- pointing out the role of the collaborators, e.g., ed., comp., tran., etc.

Examples illustrating collaborators appear in Annexure V and VI.

17. Corporate Body :- It is felt that the following four subfield can accommodate the data elements which are necessary to denote corporate bodies.

   a = main body
   b = sub - body
   d = city / address
   e = country

Example relating to corporate body appears in Annexures 1 and III.

18. Name of Meeting :- This field is used when a item is recorded under the name of a conference, seminar, workshop, meeting, etc. Four subfields have been chosen, viz.

   a = name of meeting
   g = location
i = date of meeting
j = number of meeting

Thus depending on the way the database is indexed, one can search information relating to a seminar by its name, by name and number for example 'Informatics 8', by name and location and/or date, and so on.

19. Publication Details :- Two separate fields have been chosen for this purpose where '400' holds data relating to place of publication (subfield 'a') and name of publisher (subfield 'b') while field '440' holds data relating to the year of publication in subfield 'b' which, according to the CCF, can hold date in the free form.

20. Physical Description :- The collation statement is entered in this field. It has been taken as it is in the CCF. Each item of information is entered in a different subfield like

a = number of pieces or pagination
b = other descriptive details
c = dimension
d = accompanying materials

21. Price and Binding :- This field holds data relating to the price and binding details of an item in two subfields, viz.

a = price
b = binding
This field has been made repeatable because sometimes a book shows different prices for different bindings, for example one price tag for the paper back and another price tag for hard bound.

22. Series Statement :- Data relating to a series can be help in three subfields, viz.

a = series name  
b = statement of responsibility  
c = part statement

Other subfields in the CCF are not felt necessary.

23. PART STATEMENT :- This field hold data when a multivolume book is entered. Thus from this field one can get brief information about the different parts of a multi-volume book. This field has been made repeatable because a given book may have more than one volume or parts. Four subfields have been chosen to hold data relating to each part, e.g.,

a = volume/part number  
b = pagination defining a part  
c = title and credibility  
e = year

Subfields ‘a’ and ‘b’ have been taken as it is in the CCF; subfield ‘c’ has been modified and subfield ‘e’ has been added keeping specific requirements in view. It may be noted that a given part of a multi-volume work is treated as a specific entity and therefore separate entry for each component part may be prepared. This will serve two purposes. First, this will allows users to search by any key like author, title word, keyword, accession number, etc., of the main document as well
as those of each component part. Thus when the sought key will belong to the host or the main document, the display will not only show the main document but it will also show brief detail of each component part. Similarly, when the search key is related to any component part, the display will show details of the component volume and its note section will also provide brief information about the host document. Thus both way relationship (vertical and horizontal) can be represented.

The second advantage of creating separate entry for each component part is that separate catalogue entries and author indexes can be generated thereby showing information about the component parts as well the host document.

24. Notes :- Two different fields have been chosen the hold data relating to notes – field ‘500’ to hold general notes and field ‘530’ to hold field about contents.

CCF proposed a subfield ‘A’ for the field ‘500’. However, it is felt that no subfield is required general notes can be entered according to the user’s choice.

Field ‘530’ has been chosen keeping particularly composite documents in view. While recording a composite book, i.e., a book having a number of articles written by various authors or a seminar or conference volume etc., the library may want the record information relating to each article. CCF proposes only one subfield, for the field ‘530’; but is felt that this serves only a limited purpose. Hence, three subfields have been proposed for the field '530' viz.

\[\begin{align*}
a &= \text{title} \\
b &= \text{credibility} \\
c &= \text{pages}
\end{align*}\]

Each of these three subfields has been made repeatable to hold data for all the component articles/papers in a composite document.
Thus users can search for a given article in a composite document in two ways:

(1) by approaching through keys like name of editor, title, etc. of the host document, display of which will show all the component articles appearing in the contents notes (for example see Annexure 1);

(2) by approaching through title words or by the first author name (actually truncating after the first author’s name) a can display the record.

The present design does not make any provision to conduct a search through the second and subsequent author’s name component articles. One has to make a minor modification in the design to achieve this target – a separate repeatable field is to be created which will hold names of all the authors appearing in all the component articles in a composite document.

25. Call Number :- Three subfields have been chosen to hold data relating to call number, viz.

a = notation, i.e., class number
b = classification scheme
c = author mark

The subfield ‘c’ has been added to serve a specific purpose. A clever approach to generating inverted index with allow users to search document by their call numbers which are a combination of class numbers and author marks. Thus the document can be searched by class numbers as well as by call numbers.

26. Sort Code and Subject Heading :- Two new fields viz. ‘611’ and ‘612’ have been added for data relating to ‘sort code’ and ‘subject heading’ for two specific reasons. Generation of a classified list of documents is a very common
function in libraries. However, experience in CDS/ISIS shows that if document records are sorted on the basis of their class numbers, the resulting list does not always conform to the strict classified order proposed in the code followed (UDC, say). This happens because within the computer system items are sorted according to their ASC II codes which differ from the (sort) order proposed in the classification schemes. This can be avoided if a sort code list is generated for use in the library and depending on the class number of the document being recorded, the appropriate sort code from the list is entered in the ‘sort code’ field. This will facilitate proper sorting of document records in classified order.

A library may again require to sort the document records in its collection in a classified order but at the same time they may want to display them under subject headings so as to make the list more intelligible to general users. The problem here is-if the document records are sorted simply by their subject headings, related items will disperse owing to their alphabetical values. For example, item on ‘Networking’ will be placed under ‘N’, while ‘LAN’ will be placed under ‘L’ and those on ‘WAN’ will go under ‘W’. The present design proposes a method by which two fields, viz ‘sort code’ and ‘subject heading’ will be used in conjunction to sort the document records in a classified order while they will be displayed under subject headings; thus related items will appear together under an appropriate subject heading. Examples illustrating this appear in Annexure II.

27. Descriptors :- This field allows to enter assigned descriptors to the document records. For obvious reasons it has been made repeatable in the CCF; two subfields have also been provided. However, for simplification the present design does not propose the use of any subfield; instead it proposes that each descriptor should be enclosed in angular brackets for extraction of data elements for the purpose of database indexing.
28. Accession Number: This is also an added field (i.e., not proposed in CCF). This field has been made repeatable keeping a particular requirement in view. For example, in case of multi-volume book, there will be one entry for host document, and each separate volume/part, being a separate entity, will have different accession numbers. All these accession numbers may be entered in field '900'. One may however, argue that with this measure we may loose one unique advantage—if each record would have only one accession number, simply by looking at the MFN we could say how many records have been created; but this is not possible if some records contain more than one accession numbers. This issue has been considered and it is proposed that a simple measure by sorting and printing will enable us not only to know how many document records have been entered into the database, but we may also be able to print the accession numbers of those documents. However, as mentioned in section 23, separate entry for each component of a multi-volume document is to be made.

LIBRARY OPERATIONS: A number of library operations can be performed with the proposed design. First and foremost is the resource sharing. This is possible provided all the participating libraries adopt this design format with as little modification a possible. In addition to the sharing of resources, the present design will help each library to perform a number of operations, each being performed automatically by the CDS/ISIS software. Some of the most common library operations which can be performed with the proposed design are mentioned in the following subsections.

1. Information Retrieval Operations: Micro-CDS/ISIS, being specifically designed for the purpose, allows one to perform almost all kinds of information retrieval operations in libraries. It may be noted that the present design does not propose to use abstract field in the database, because normal catalogue-
based information retrieval operations in libraries do not require abstract field; moreover, addition to abstract field for each document in libraries will make the database to bulky. However, it may add ‘abstract’ field to the database, if so desired

The present design will enable libraries to conduct searchers on any of the following keys:

- author’s name-personal as well as corporate;
- name of joint authors and collaborators;
- name of author of an article in a composite document, or a multi-volume document;
- name of a meeting/seminar/conference, etc. as well as name of a report and its number, patent and its number, standard and its number, and so on;
- title of a document – a monograph, a multi-volume book a seminar or report, etc., as well as uniform and parallel title;
- type of material like theses, report, film, etc;
- keywords, class numbers and call numbers, etc.

Key values for each of these fields can be used as search either alone or in combination with other terms using Boolean operators. The powerful search system of CDS/ISIS will retrieve the necessary documents by approaching through any access key and the retrieved records can be displayed in AACR-2 format. The display and printing of records in appropriate AACR-2 format is possible by a display format designed for the purpose. Searches by the author name and/or title of the component articles in composite documents or multi-volume works retrieve and display the records showing the sought document along with the host document.
2. Printed Catalogues :- Libraries may often require to generate printed catalogues of different kinds. For example, they may want to produce a complete catalogue of documents arranged alphabetically showing main as well as added entries; or they may want to produce the same for a particular kind of document like theses, reports etc. The present design enable printing of such catalogues in AACR-2 format where main entries can be generated under personal author, corporate author, title, uniform title, name of meeting/conference, etc. as appropriate, for each given document according to AACR-2. Measures have been taken to facilitate generation of such printed catalogues simply by calling a print format designed for the purpose. The catalogue entries also show the role of authors like it. auth., tran., ed., comp., etc. as the case may be Annexure I, IV, V and VI present examples of such catalogue entries. It may be noted that the documents recorded in the database were hypothetical and therefore users are advised not to take any field value in its literal meaning.

The present design also enables libraries to generate printed classified catalogue where documents may be arranged alphabetically under major class headings. Annexure II presents examples of classified catalogue entries.

3. Indexes :- Libraries may often wants to produce printed indexes under author, subject, keywords, etc. Annexures VII and VIII illustrate such indexes. Measure suggested in section 24 will enable libraries to generate index entries under names of each author of the component articles, thereby displaying both the article sought and host document. Similarly, measures suggested in section 23 will enable libraries to generate index entries under name of each author of the component parts of a multi-volume document, thereby displaying both the part/volume sought and the host document.
4. Accession List: Libraries may want to maintain a hard copy of the accession list where document record will be arranged according to accession numbers and will be display in full according to AACR-2. Annexure II displays an accession list:

The above discussion justify that the proposed design of the bibliographic database will enable Indian libraries in participating in networks for the purpose of resource sharing as well as for performing a number of information retrieval activities. Necessary extensions to the CCF have been made in order to achieve better performance, while some of the CCF fields have been discarded in order to maintain simplicity. The proposed design is expected to serve the purpose of all kinds of Indian libraries. However, owing to the specific nature, some library may want to make some changes in the design, such changes will not clash with the proposed design as long as same field tags are not used for an entirely different purpose; rather libraries may add new fields in order to achieve better performance, though such extensions should be made carefully. The present design has been formulated to creat a general framework where most Indian libraries can be accommodated to achieve an optimum level of performance and standardization.
ANNEXURE – I

SAMPLE CATALOGUE ENTRIES


   New holy Bible containing old testament/translated by

   205 p. : 24 cm.
   Bible is translated into Hindi
   ISBN 00-3733-98. 220,52
   Acc no. 14567.

Carlson Verne

   Professional lighting handbook/verne carlson and Sylvia. .
Carlson ; with a forward by David Quadid. – Boston : Focal Press, 1986
   xxi. 242p. : ill., tabs; 21 cm. – (Popular photography Series, no. 2: V1
Wilson)
   ISBN O – 53476-526-4
   ACC NO. 16699. 771.44 (02)

DECISION maker’s guide to videotext and teletext/comp. by

   V, 91 p. : ill.; 30 cm.
   ISBN 0 – 82514-287-9
   ACC NO. 16873 681.32 : 621.39 (036)

INFORMATION retrieval research/edited by RN Oddy.

   SE Robertson, CJ Van Rijsbergen and PW Williams – London :
   Butter worths 1981.
Contents:

Brooks BC. Information technology and the science of informations.
Salton G and WU Harry. A term weighting model based on utility theory.
Shank RC. Kolodner JL and Dejong G. Conceptual
Information retrieval.
ACC NO. 52967 029.54

Nisevich, N1


265 P. : ILL. : 22 CM.
Contains English abstract
Contains bibliographies
ISBN 0 – 14624-510-2 616.9-053.2
ACC NO. 27481


Public Libraries and Museums : a bill to place the public library service provided by local authorities in England and Wales under the superintendence of the Minister of Education .......... / Presented by Sir Edward Boyle : supported by Quinti Mogg.......... (et al.)… - (HC.) Bill. (1963-64)67

ACC NO. 23456 340
UNIVERSAL decimal classification – Internation Medium
BS 1000 M, Part 1
English Text
ISBN 0-59413-158-4
ACC NO. 16670; 16671 025.45

WORKSHOP on Management of Information Services (1983 May 9-21; Arusha : Tanzania)
Management of information services : report/edited by Lutz Hutttemann. –
Bonn :
(s.n.), 1983.
i. 94 p.; 21 cm.
Contains 15 refs
ISBN 089345-256-2 002 : 65.01 (082.2)
ACC NO. 16947.
ANNEXURE – II

CLASSIFIED CATALOGUE
(arranged under subject heading)

DOCUMENTATION

WORKSHOP on Management of Information Services (1983) May 9-21; Anisha: Tanzania)

  Management of Information services : reports/edited by Lutz Hutteman –
  Bonn : (s.n.). 1983.

II,94p.; 21 cm.
Contains 15 refs.
ISBN 0-89345-256-2 002 : 65.01(082.2)
ACC NO. 16497

LIBRARIANSHIP


  Brooks BC, Information technology and the science of information Salton G and
  Wu Harry, A term weighting model based on utility theory.

Shank RC. Kolodner JL and Dejong G, Conceptual information retrieval
ISBN 0-408-10775-8
ACC NO. 52967. 029.54
UNIVERSAL desimal classification – International Medium – London:

British Standard Institution, 2 pts.
BS 1000 M, Part 1
English Text
ISBN O – 59413 – 158-4
ACC NO. 16670; 16671 025.45

RELIGION


New holy Bible containing Ols Testament / translated by James Maffat. –
205. : 24 cm.
Bible is translated into Hindi
ISBN 00-3733-948
ACC NO. 14567 220.52

SOCIAL SCIENCES

Untied Kingdom. Parliament. House of Commons

Public Libraries and Museums: a bill to place the public library service
provided by local authorities in England and Wales under the superintendence of

ACC NO. 1234.

PATHOLOGY

Niserich, N1

Infektsionnuie bolezni U deteri/by N1 Nishevich and VF Uchalkin = infectious disease in children / translated by M1 Michurin – Moscow :

296 p. : ill.; 22 cm.
Contains English abstract
Contains bibliographies 616.9-053.2
ACC NO. 27481.

COMPUTER AND DATA PROCESSING MACHINE

V, 91P. : ill. : 30 cm.
ACC NO. 16873. 681.32 : 621.39 (0.36)
PHOTOGRAPHY

Carlson, Verne


ISBN 0-53476-525-4
ACC NO. 16699 771.44 (02)
ANNEXURE III

ACCESSION LIST

(1234)

United Kingdom. Parliament. House of commons

Public Libraries and Museums : a bill to place the public library service provided by local authorities to England and Wales under the superintendence of the Minister of Education.…. / Presented by Sir Edward Boyle; supported by Quants Hogg.…. (et al.) – London : H.M.S.O., 1964.
(14567)


205 p.; 24 cm.

BIBLE IS TRANSLATED IN HINDI

ISBN 00-3733-948 220.52
(16670)

UNIVERSAL DECIMAL CLASSIFICATION – INTERNATIONAL MEDIUM ED. – LONDON :
BRITISH STANDARD INSTITUTION, 2 PTS.
PT. 1 : SYSTEMATIC TABLES. – 1985. – XIII, 494P.

ENGLISH TEXT

ISBN 0-59413-154-4 025.45

CARLSON VERNE (16699)
PROFESSIONAL LIGHTING HANDBOOK/VERNE CARLSON AND SYLVIA CARLSON:

XXI, 242 P. : ILL., TABS; 21 CM., - (POPULAR PHOTOGRAPHY SERIES, NO. 2 "VI
WILSON

ISBN 0-53476 – 526-4


Workshop on Management of Information Services (1983 May 9-21;
Arisha : Tanzania)

Management of Information Services : Report/Edited By Lutz Huttemann.
– Bonn (S.N.), 1983.
II, 94P.; 21 CM.
Contains 15 Refs.

NISEVICH N1

InfeKsionnuie Bolezni Detel/N1 Nishevich and Vf Uchalkin = Infectious
Disease in Children/Translated by M1 Michurin. – Oscow "Meditsina, 1985.
296p.; ILL; 22 CM.

CONTAINS ENGLISH ABSTRACT
CONTAIN BIBLIOGRAPHIES

ISBN 0-16424-510-2 616.9-053.2

(52967)


CONTENTS:

BROOKS BC, INFORMATION TECHNOLOGY AND THE SCIENCE OF INFORMATION
SALTON G AND WU KARRY, A TERM WEIGHTING MODEL BASED ON UTILITY THEORY
SANK RC, KOLONER JL AND DEJONG G. CONCEPTUAL

INFORMATION RETRIEVAL.

ISBN 0-408-10775-8 029.54

ANNEXURE IV

SAMPLE ADDED ENTRIES
(UNDER JOINT AUTHOR)
CARLSON SYLVIA. JT. AUTH.

CARLSON VERNE
PROFESSIONAL LIGHTING HANDBOOK/VERNE CARLSON AND SYLVIA CARLSON:
WITH A FARWARD BY DAVID QUAID. — BOSLAN : FOCAL PRESS, 1985. XXI, 242P. :
ILL.; 22 CM. — (POPULAR PHOTOGRAPHY SERIES. NO. 2: V1 WILSON)

ISBN 0-53476 — 526-4
ACC NO. 16699 771.44 (02)

UCHALKIN VF. FT. AUTHOR

NISHEVICH N1

INFEKTSIONNUIE BOLEZNI U DETEI/BY N1 NISEVICH AND VF UCHALKIN =
INFECTION DISEASE IN CHILDREN/TRANSLATED BY M1 MICHURIN. — MASCOW :

296P. : ILL.; 22 CM.

CONTAINS ENGLISH ABSTRACT
CONTAIN BIBLIOGRAPHIES.

ISBN 0-14624-510-2 616.9-053.2
ACC NO. 27481.

ANNEXURE V
SAMPLE ADDED ENTRIES

(UNDER EDITORS

HUTTEMANN LUTZ, ED.)
WORKSHOP ON MANAGEMENT OF INFORMATION SERVICES (1983) MAY 9-21 :
ARUSHA : TANZANIA

MANAGEMENT OF INFORMATION SERVICES : REPORT / EDITED BY LUTZ
HUTTEMANN. – BONN : (S.N.), 1983.
II, 94 P.; 21 CM.
CONTAINS 15 REFS
ACC NO. 16947. 002.65.011 (082.2)

ODDY RN, ED.

INFORMATION RETRIEVAL RESEARCH/EDITED BY RN ODDY, SE ROBERTSON, CJ VAN
CONTENTS :
BROOKS BC, INFORMATION TECHNOLOGY AND THE SCIENCE OF INFORMATION.
   SALTON G AND WU HARRY, A TERM WEIGHTING MODEL BASED ON UTILITY
   THEORY. SANK RC KOLODNER JL AND DEJONG G, CONCEAUL INFORMATION
   RETRIEVAL
   ACC NO. 52967. 029.54

ROBERTSON SE, ED.

INFORMATION RETRIEVAL RESEARCH/EDITED BY RN ODDY, SE ROBERTSON. CJ VAN

CONTENTS :
BROOKS BC, INFORMATION TECHNOLOGY AND THE SCIENCE OF INFORMATION.
   SALTON G AND WU HARRY, A TERM WEIGHTING MODEL BASED ON UTILITY
THEORY. SHANK RC KOLODNER JL AND DEJONG G, CONCEPTUAL
INFORMATION RETRIEVAL.
ISBN 0-408-10775-8
ACC NO. 52967. 029.54

VAN RIJSBERGEN CJ, ED.

INFORMATION RETRIEVAL RESEARCH/EDITED BY RN ODDY, SE ROBERTSON,
CJ VAN RIJSBERGEN AND PW WILLIAMS – LONDON: BUTTER WORTHS & CO.,
1981.

CONTENTS:
BROOKS BC, INFORMATION TECHNOLOGY AND THE SCIENCE OF
INFORMATION. SALTON G AND WU HARRY, A TERM WEIGHTING MODEL
BASED ON UTILITY THEORY. SHANK RC KOLODNER JL AND EJONG G,
CONCEPTUAL INFORMATION RETRIEVAL.
ISBN 0-408-10775-8 029.54
ACC NO. 52967.

WILLIAMS PW, ED.

INFORMATION RETRIEVAL RESEARCH/EDITED BY RN ODDY, SE ROBERTSON, CJ VAN
RIJSBERGEN AND PW WILLIAMS – LONDON:

BUTTERWORTHS & CO., 1981.

CONTENTS:
BROOKS BC, Information technology and the science of information. Salton G and
Wu Harry, A term weighting model based on utility theory. Shank RC, Kolodner
JL and Dejong G, Conceptual information retrieval.
ISBN 0-408-10.775-8
ANNEXURE VI
SAMPLE ADDED ENTRIES
(Under Translators

Moffat. James, tran.


New holy Bible containing Old Testament / translated by James Moffat. – London

205 p. ; 24 cm.
Bible is translated into Hindi
ISBN 00-3733-948
ACC NO. 14567.

ANNEXURE VII

SAMPLE AUTHOR INDEX

Abraham, CE
16873

Bible
14567

Boyle Edward
1234

Oddy, RN
52967

Quid David
16699

Robertson SE
52967
ANNEXURE VIII
Simple Keyword Index

Bible 14567
Photography : Lighting 16699
Bill, Museum 1234
Professional lighting 16699
Bill, Public Library 1234
Public library : England 1234
Children, Infectious disease 27481
Public library : Wales 1234
Classification, decimal 16670, 16671
Religion 14567
Information Science 52967
Teletext 16873
Information Service: management 16947
Theology 14567
Information Technology 52967
UDC 16670, 16671
Management : Information service Universal decimal classification