THE COMPUTERIZATION FACILITIES FOR TECHNICAL LITERATURE

आपो हिष्टा मयोभुवः

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PREFACE

The great speed at which the science and Technology is advancing makes it imperative to resort to computerized information dissemination to serve the professional community in an effective way. Library is the repository of all such information that needed to be disseminated. As such, Library users needed to be provided with an attractive, less time consuming, informative procedures to search a book.

With these objectives in view, the institute started working on computerizing the different books available in its library. After a survey of existing softwares available and their uses in various nearby libraries, the institute opted for the implementation of CDS/ISIS software developed by UNESCO. 10 number of databases have been prepared for accommodating various hydrologic themes. Sample outputs in different user-oriented formats are given herewith. It is aimed to publish the total list of the books available in the library as a complete output of the program near future. This report entitled " The computerization facilities for Technical Literature" is a part of work programs of the **Hydrological Information System Division,** of the Institute for the year 1994-95. This study was carried out by **Dr.(Mrs.) Drama Devi Mehta**, P.R.A., under the guidance of Mr. A.K.Bhar, Divisional Head of the division.

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CONTENTS

ABSTRACT

Various library transaction mainly - 1) Processing- Management system, 2) Extent of databases activities for bibliographic/Non bibliographic information storage and 3) Retrieval and various services are provided by different softwares in different ways. National Information System for Science and Technology and Institute of Scientific Information Organizations are making concerted efforts at national level in stimulating interest in the development of standard codes for practice in the domain of information technology and its applications in information work. The CD - ROM technology has given new dimensions to information storage and retrieval process. Many databases are now available in compact disk editions. A survey for softwares being used by various organizations in and around Roorkee has been made for comparing their relative performances and selecting the best one as per need in an Indian library dealing with mostly technical publications. Finally the software CDS/ISIS has been used for computerization of technical literature in the library of National Institute of Hydrology.

CDS/ISIS is a menu driven generalized system, which is designed for storage and retrieval informations about non-numerical databases. It is capable to handle an unlimited databases with different data elements. Description about Users services is given in this manual while a brief description about System services of CDS/ISIS is given in Appendix 'A'. There are 10 databases proposed for N.I.H. Library for different technical fields. **Each database has same Field Definition Table, Worksheet, Field Select Table and output format**. Therefore it is possible to prepare a single database 'BOOK' for all the technical books in N.I.H. library by merging all above databases of different fields. The exchanging/merging of data is also possible in any database.

LIST OF DATABASES IN N.I.H. LIBRARY

The library of N.I.H. has a large number of books in different fields. So, it is proposed to have different varieties of such databases keeping in view the various disciplines the institute is working and likely to be working in future and various aspects of library managements.

The proposed databases are in two groups:

GROUP 'A'

a) **For Technical Books:**

Tech. Fields	Code(s)
1. Flood studies+ Lake Hyd.	FLOOD
2. Surface water hydrology + Drainage and Irrigation +	SWH
3. Ground water hydrology	GWH
4. Water resources system	WRS
5. Nuclear hydrology	NUCHYD
6. Mountain and Snow hydrology	MOUNT
7. Environmental hydrology + Climatology + Drought Hyd.	ENVHYD
8. Remote sensing	REMOTS
9. Computer + mathematics	COMPT
10. Water Quality	WATQUA

A database 'BOOK' is also completed with combining all technical literature existing in N.I.H. Library. It is a combination of all databases given above.

GROUP 'B'

b) Journals, Reports and other Information:

1. Finance and Admn.

2. Lib Science

3. Photography

4. Hindi literature

5. W.M.O. Publications

6. C.S.U. Publication

7. H.E.C. Publication

8. I.I.A.S.A. Publication

9. Journals

10. Indian standard

11. Manuals

12. Micro-fitche

13. Reports

14. Maps and Toposheets

15. Handbooks and Tables

16. Abstracts (Journals)

For Technical books all above mentioned databases have been prepared and most of the entries have been completed. Each database has same FDT, Worksheet, FST with same output format. This software is also available at VAX-Station in N.I.H. for networking facilities. The databases for group 'B' can be prepare in future with all entries with material existing in the N.I.H. library.

1.0   INTRODUCTION

Technical literature does not exist in isolation. The diversification and expansion of research and business activities have lead to the information explosion, which in turn has increased the significance of information as an essential input in many activities. So, now-a-days libraries in India are increasingly using computers and related technology to improve the efficiency and effectiveness of their information services. This in turn has simulating interest of databases records among libraries. Some agencies are using CD-ROM technology(1).

Research and development in science and technology is taking place in such a speed that various bibliographical information systems are finding it increasingly difficult to keep track of the literature produced to disseminate the results of such Research and development efforts. Only in the field of Science and Technology about 60,000 Journals(2) are being published all over the world. Such an exponential growth in literature in the twentieth century is supplemented by the change in the nature of its use. Users now need pin-pointed information on a specific field at a quickest possible time(3).

The automation has been started in 1940's with the semi mechanical machine as "card punching machine". Then till 1980's it occupies the new dimensions and since than it is rapidly increasing day by day. Now there are many national and international softwares floated by various agencies all over India. The various agencies are trying to establish the standard softwares which may be used for networking. The networking of various libraries is possible if the data elements of the

1

`databases are same. Consequently efforts are being made by all concern to increase cooperation, coordination and promotion of compatibility among systems and services across institutional, regional, national and international border.

2.0 OBJECTIVES

Lancaster(4) has summarized the main objectives of mechanization as to:

1)   improve productivity

2)   reduce staff

3)   improve control

4)   reduce error

5)   improve speed

6)   increase range and depth of service

7)   facilitate cooperation

8)   reduce unit cost of operation

Beside these, automation helps in avoiding duplication of work of different places. The users even can get the information about the book of any particular field sitting at a location away from the library. The library processing can also be computerized. Finally the networking with other libraries at national and international level is the main objective of these attempt(5,6).

3.0 SELECTION OF THE SOFTWARE

The software can be selected by two ways:
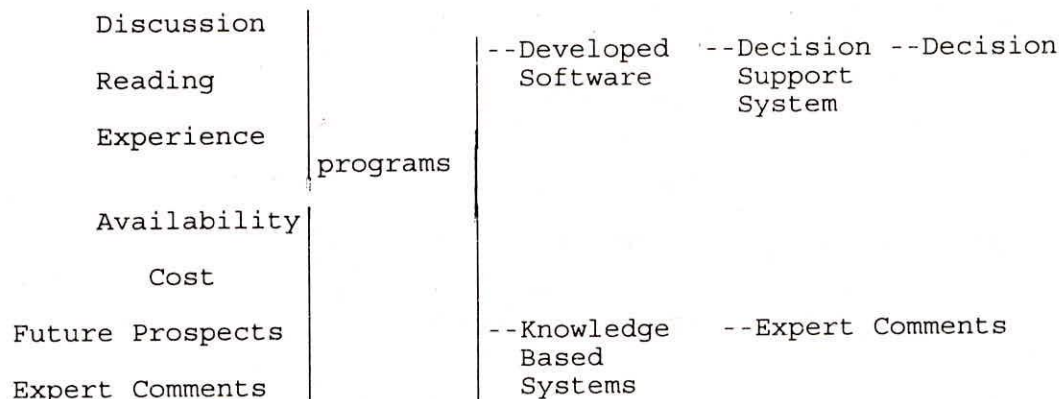
1) By Expert System and its Related Factors:

The available information and the expert knowledge, are considered as major resources of an organization which have to be managed and utilized effectively.

2

The most developed and widespread decision- oriented information system are the decision support systems, which extend the ability of the computer system to support human decision making process by providing decision models. This has resulted in an intensive effort of the software industry to develop a wide range of decision modelling software, which are now being extensively used by organizations for forecasting, growth analysis trend projecting planning etc.

The evolution of expert system and its interrelation with other related factors has been represented in the form of a flow chart.

EVOLUTION OF EXPERT SYSTEM AND ITS RELATED FACTORS

```
Discussion
                            |--Developed    ·--Decision  --Decision
Reading                     |  Software        Support
                            |                  System
Experience         |
                   |programs|
Availability|               |
                            |
Cost                        |
Future Prospects   |        |--Knowledge    --Expert Comments
                            |  Based
Expert Comments    |        |  Systems
```

The decision of expert system after considering all available softwares and its related factors was to use CDS/ISIS to meet library requirements at National Institute of Hydrology.

2) By reviewing the systems at nearby Institutes:

A survey of softwares being used by the various organizations in and around Roorkee has been made for comparing their relative performances and selecting the best one as per the need in N.I.H. library. Appendix B shows the list of softwares used by different institutions in this region.

3

After having a look on the list given in Appendix 'B' and with the recommendations of the expert system, the software CDS/ISIS developed by UNESCO and distributed by NISSAT(7) has been selected for use at N.I.H. library computerization.

The main reasons of opting this program are as follows:

1. Suited to library requirements
2. Regular Training facilities available at a nearby locations.
3. Available free of cost
4. Favorable opinions expressed by professional colleagues
5. Regular updating
6. Satisfactory performance in other organizations
7. Performs all library operations
8. Convincing demonstration at some conference, etc.
9. User friendly
10. Future networking possibilities.
11. Convenient for database creation
12. Easily adaptable for local needs.

4.0   NEED FOR STANDARDIZATION

The databases in each software have a number of anomalies in their creation and use. Despite a number of limitations, the databases play a vital role in development of our country by fulfilling information needs of users at local as well as national level. If the records have the same **'Format'** and **'Structure'** than the records on a similar subject by different institutions can be exchange/merging from databases. standardized format of a database is not only useful for identification of original documents but also helpful for users to 'judge' the immediate relevance of document from its bibliographic description. The different national and international agencies have been developed various formats (8 to 15).

4

The merging/exchanging of records among databases developed by different institutions on specific subjects may bring forth the emergence of comprehensive and useful databases in India. These databases, then, may provide useful services to the users at national level. Due to this reason the standardization is very needful to develop a national and international communication format.

5.0 HOW TO OPERATE CDS/ISIS

5.1 Brief discussion :

CDS/ISIS is a menu driven generalized information storage and retrieval system designed specifically for the computerized management of structured non-numerical databases. It is able to manipulate an unlimited number of databases each of which may consist of completely different data elements. It also has the facility of accepting intercept program written in **CDS/ISIS Pascal.** This package is very much user's friendly but it is less suitable for library transaction(16).

5.2 How It Help in Library:

As the Libraries have a lot of books and all the information about each book is required at a time, this package meets this requirement conveniently. Number of databases have been prepared keeping in view all the needs of library management and Users. This software has been implemented on **P.C. AT-286** and tested. The Field Definition Table (FDT) provides information on the contents of the master records in a given database. The data elements in all databases are same in **FDT** with same tag number. A sample format of the FDT file has been given below:

```
****************************************************************

Field Definition Table                    Data Base: GWH


---------------------------------------------------------------
?   Tag      Name           Len  Typ  Rep  Delimiters/Pattern
---------------------------------------------------------------

-   10       CN              25   X
-   20       BN              20   X
-   30       ACN             20   X
-   40       AUTHOR/EDITOR  150   X    R
-   50       TITLE          200   X    R
-   60       EDITION         10   X
-   70       PLACE           20   X
-   90       PUBLISHER       50   X
-  100       YEAR             4   X
-  110       VOLUME          10   X
-  125       PAGES           10   X
-  130       SERIES         150   X
-  140       EDITOR          50   X
-  150       TYPES           25   X
-  160       KEYWORD(1)     400   X
-  170       KEYWORD(2)     250   X
---------------------------------------------------------------


A- Insert(after)     B- Insert(before)     C- Change Line
D- Delete line       P- Previous page      N- Next page
T- Top               X- Exit               Y- Next line

****************************************************************
```

The FDT is used to control the creation of data entry worksheet for the database and to validate the concepts of fields and it is created or modified by means of the ISISDEF services, using the CDS/ISIS line editor. After feeding FDT , A worksheet defined according to the space for data elements and format can be defined according to the need. The output formats for all databases are given according to the requirements of Users and library management. The worksheet editor is used to create and/or modify the layout of data entry worksheet and system worksheets. The listing of worksheet and output format of the database G.W.H. are given here for users convenience.

WORKSHEET FOR DATABASE 'GWH'

```
CN--------------------------- BN----------------------------------
ACN -----------------------------------
AUTHOR/EDITOR ------------------------------------------------------
-------------------------------------------------------------------
------------------------------------------
TITLE -------------------------------------------------------------
------------------------------------------
PUBLISHER ---------------------------------PLACE ------------------
EDITION ----------------- YEAR------------- VOLUME ------------
PAGES ---------------
SERIES -----------------------------------------------------------
EDITOR -----------------------------------------------------------
KEYWORD(1) --------------------------------------------------------
-----------------------------------------------------------------
---KEYWORD(2) ----------------------------------------------------
------------------TYPES ------------------------------------
```

```
M- Modify      R- Right just  S- Shift      D- Delete   C- Center
A- Add field   Y- Next        X- Exit       <TAB>- Previous
```

FORMAT OF OUTPUT:

****

```
Data Base Code: GWH                    FORMAT NAME: GWH
------------------------------------------------------------------
C10,'MFN:',MFN(4)/ C10,'CN: ',V10,' BN: ',V20/ C10,'ACN: ', V30/
C10,'AUTHOR:  ', V40(9,9)  /  C10,'TITLE:    ', V50(9,9)/
C10,'PUBLISHER: ',V90(9,9),'PLACE:' V70(9,9)/C10,'Ed.:',mdu,
v60,'YEAR: ', V100,' Vol.: ',v110,' Pages: ', v125/#c10,'Key 1:
', v160(9,9)/ #c10,'Key2: ',v170(9,9)/ #c10, 'Types: ',v150/
c10,v130(9,9)/ c10,v140(9,9)/##
```

****

The modification in FDT will modify the FST (inverted file) and worksheet automatically. The format of the databases can also be changed according to the users requirements.

5.3 Getting In:

The Users can enter in CDS/ISIS with the command:

           C:>CD LIB

and   **C:\LIB>ISIS**

"LIB is the directory in which the software CDS/ISIS is loaded and ISIS.EXE is the execution file of this package."

The menu chart will be on the screen as

```
********************************************************************

------------------- MICRO CDS/ISIS - VERSION 2.32 ---------------

********************************************************************


                    C -   Change data base
                    L -   Change Dialogue Language


                    E -   ISISENT - Data Entry Services
                    S -   ISISRET - Information Retrieval Services
                    P -   ISISPRT - Sorting and Printing Services
                    I -   ISISINV - Inverted File Services
                    D -   ISISDEF - Data Base Definition Services
                    M -   ISISXCH - Master File Services
                    U -   ISISUTL - System Utility Services
                    A -   ISISPAS - Advanced Programming Services

                    X -   Exit ( to MSDOS)

                                     ?

********************************************************************
```

Its total facilities are provided through a set of 8 major services, classified into two broad categories:

1) First four facilities are for User services - operating on existing databases.

2) Last four facilities are for System services - To create or modify the databases.

The status information is displayed as soon as a database is selected.

5.4 Data Entry Services:

The ISISENT services provide all functions related to edit the records. For getting this service give

E <ENTER>

The database will be asked. After getting the code of the database, a menu chart will appear on the screen as -

```
**********************************************************************

Service ISISENT          Data Base Services          Menu EXE1


                 L - Change Dialogue Language
                 W - Select Another Worksheet
                 N - Create New Records
                 E - Edit Record (or range)
                 R - Edit Last Search Results
                 D - Define Default Values
                 P - Recall Last Record Modified
                 C - Clear Default Values
                 X - End Data Entry

                             ?

**********************************************************************
```

Data entry is done through data entry worksheet. Each field of the worksheet is entered or modified by means of the field editor. New entries of the books are also possible by users just by pressing 'N' for new entry. In this prepared worksheet (as given in back) the users can fill the information according to its data elements.

5.5 Information Retrieval Services:

The ISISRET Services provide all functions related to information retrieval. Now for getting sorting and retrieval information give

S <ENTER>

The database will be asked, Type code of the database in which users want to work. Again a menu chart will appear on the screen as -

L - Change Dialogue Language
B - Browse Master File
T - Display Terms Dictionary
S - Search Formulation
D - Display Search Results
F - Change Display Format
R - Recall Query Formulations
G - Execute Previous Search
P - Save Search Results
X - Exit

?

****

The Option 'B' for browse master file display a section of master file starting from a given MFN.

Now for browsing information about a book, press

B < ENTER>

It will ask the browsing number (from which users want to watch the output) e.g. by giving **no. 1** it will show output from first entry to last entry or by giving **no. 20 to 30**, it will show output from 20th entry to 30th entry. The output on the screen will be as **OUTPUT NO. 1**

**Database - Ground Water Hydrology
Output with full given Format**

MFN: 0001
CN: 556.3.626 BN: N84
ACN: 2979
Author: Joseph Rosenshein and Gordon D.Bennett
Title: Ground Water Hydraulics
Publisher: American Geophysical Union, Place: U.S.A.
Ed.: I Year: 1984 Vol.: I Pages:

Key 1: John Ferrris Symposium in 1981 spring annual meeting in Baltimore.

Key 2: Papers on Aquifer Hydraulics, Heat Transport and Modelling.

Types: Proceedings.
Water Resources Monograph Series 9.

MFN: 0002
CN: 556.38.001 BN: N81
ACN: H-387

------- will continue upto last entry.

```
*********************************************************************
```

5.6 Browsing by changing the format:

The records are displayed using the currently selected display format (option F). This display may be interrupted as option D. Again there is a very good facility to see the piece information by changing the format (by pressing F, it will ask new format then by pressing <F6> the old format will disappear and the new format can be written). As soon as the users will exit from the software , the new format will be replaced by old format. If someone want to preserve this new format then by pressing <F8> it can be stored permanently. Now after changing the format the browsing information will now come with new format.

eg. 1. Change format by V50/V40/##,

The browsing information will be only with Title followed by the author's name of the book according to its Tag number given in FDT file. The output with the change format is as **OUTPUT NO. 2**

Database - Ground Water Hydrology
Piece Information about Title and Author

MFN: 0001
Title: Ground Water Hydraulics
Author: Joseph Rosenshein and Gordon D.Bennett

MFN: 0002
Title: Ground Water Resources Investigation and Development
Author: S.Mandel and Z.L.Shiftan

MFN: 0003
Title: Ground Water Pollution
Author: Jean J.Fried

MFN: 0004
Title: Experience in operation of Hydrosystems,
Author: T.E.Unny and Edward A.McBean

MFN: 0005
Title: Ground Water Management
Author: American Society of Civil Engineers

MFN: 0006
Title: Detection, Control and Renovation of contaminated ground
       water
Author: Norbert Dee, William F.McTernan and Edward Kaplan

----- will continue upto last entry.

eg. 2. Changing format by V50/V160/V170/##

V50 gives the information about Title, v160 and v170 will inform about **Keyword 1 and Keyword 2**. The sign / is for next line

The output with this format is as **OUTPUT NO. 3**.

Database - Ground Water Hydrology
Piece Information about Title and Keyword(s)

MFN: 0001
Title: Ground Water Hydraulics
Key 1: John Ferris Symposium in 1981 spring annual meeting in Baltimore
Key 2: Papers on aquifer hydraulics, Heat transport and modelling

MFN: 0002
Title: Ground Water Resources Investigation and Development
Key 1: Aquifer types and ground water environment, Map and sections, Geophysical methods, Drilling for exploration and water supply, Pumping tests, water level, Spring flow, Geochemical methods, Environmental isotope techniques, Delineation of ground water system, Ground water balance, Methodology of G.W. investigations.
Key 2:

MFN: 0003
Title: Ground Water Pollution
Key 1: Ground water pollution, Theory of dispersion in porous media, The experimental determination of pollution parameters, mathematical models, case histories, Point dilution theory, Numerical analysis.
Key 2:

MFN: 0004
Title: Experience in operation of Hydrosystems
Key 1: This book is one of the two proceedings books of the international symposium on real time operation of hydrosystems held in waterloo, Canada, 1981
Key 2: Sections are : Models for large scale systems, Planning for operation of systems, Real time water management practice, Worth of data in operational practice.

MFN: 0005
Title: American Society of Civil Engineers
Key 1: Manual & Reports on Engineering Practice - No. 40
Key 2: Surface & subsurface exploration, Capability of extraction & recharge, Aquifer b. conditions, Models, Management Plans.

MFN: 0006
Title: Detection, Control & Renovation of Contaminated G.W.
Key 1: G.W. Contamination, Monitoring & Detection, Control of contamination.
Key 2: Renovation contamination G.W.

---- will continue upto last entry.

eg.3. Changing format by V40/V50/V150/##

When V40 gives the author of the book and V50 and V150 tells us
about the Title and Type of the book. The output with this format
is as **OUTPUT NO. 4.**

Database - Ground Water Hydrology
Piece Information about Author, Title and Types

MFN: 0001
Title: Ground Water Hydraulics
Author: Joseph Rosenshein and Gordon D.Bennett
Types: Proceedings

MFN: 0002
Title: Ground Water Resources Investigation and Development
Author: S.Mandel and Z.L.Shiftan
Types: Text Book

MFN: 0003
Title: Ground Water Pollution
Author: Jean J.Fried
Types: Text Book

MFN: 0004
Title: Experience in operation of Hydrosystems
Author: T.E.Unny and Edward A.McBean
Types: Proceedings

MFN: 0005
Title: Ground Water Management
Author: American Society of Civil Engineers
Types: Manual and Report

MFN: 0006
Title: Detection, Control and Renovation of contaminated G.W..
Author: Norbert Dee, William F.McTernan and Edward Kaplan
Types: Proceedings

MFN: 0007
Title: Ground Water Pollution
Author: Institute of Geology and Mines of Spain
Types: Report

MFN: 0008
Title: Polluted G.W.: A review of the significant literature
Author: David Keith Todd and Daniel E.Orren McNulty
Types: Text Book

MFN: 0009
Title: Case studies in G.W. resources evaluation
Author: J.W.Lloyd
Types: Case studies,/GWH/

MFN: 0010
Title: Numerical Modelling of G.W. basins.
Author: J.Boonstra & N.A.de Ridder
Types: A users-oriented manual
                .... will continue upto last entry.

5.7 Sorting and Printing Services:

The ISISPRT services allow to print the output of a given query and/or to print a selected records. Whole databases or a specific range of records can be defined by the lowest and highest MFN to be printed in the MFN limits fields of the print worksheet. The titles of the printouts could be defined according to the contents.

The same procedure follow in printing matter. In the main menu 'P <ENTER>' is for printing and then it will show the menu for printing as -

```
*******************************************************************

Service ISISPRT        Sorting & Printing Services      Menu EXPRT


                L  -  Change Dialogue Language
                S  -  User Print Worksheet
                P  -  System Print Worksheet
                X  -  Exit

                              ?


*******************************************************************
```

Now again the key P is for system printing. The printing sheet will comeover the screen and will ask about the different formats for printing matter with the specific database name. The format of printing sheet is as follows:

Database name GWH   MFN Limits 1/32000   Save File Name

First Title   ---

Second Title   ---

Third Title   ---

Print Format   ---

Line Width 70 -   Number of Columns 1   Column width 70

Lines/Page 60   First Page Number 1   EOC Tolerance 3

Data Indention 0   Sort ?   Sort Worksheet name ------

                                    Print File name ----------

Any number of records can be printed by giving the first and last number in MFN Limits first no. /last no.. The line and column width given in this printing sheet are default values but the users can change these values according to their requirements. For full printing with the given format of the database just type the format's name of the present database with the sign @ in column 'Print Format'. In these databases , the format's name for each database is the same as its database's CODES. All three titles can specify the nature of the output. Any save or sort files can be printed. Here The print file name is specifying the printer connection with P.C., in these P.C.'s it is generally LPT1.

5.8 Printing by Changing the format:

The users can get the printing with piece information by giving their own formats like:

i) V50/V40//

ii) V50/V160/V170//

iii) V50/V40/v150//   etc.

Now the output will be only with the above given formats in the form of pieces. But the number with V must be the Tag number defined in the Field Definition Table.

The outputs by changing the formats in printing are same as given in Output No. 2, 3 and 4. The number of entries in different outputs can be changed by defining the MFN number in the printing sheet. It also has many other facilities, which the users can read in its manual kept in the Library. In Keywords 1 and 2, It has been tried to cover all the contents of the books while in 'Types' the type of the book is given eg. either it is Text book or Proceedings or Databook or Handbook. The users can make a save files in Browsing with changed formats and for selected MFN numbers. Similarly the sort files can be prepared.

5.9   Search by Dictionary:

One FST file for each database defines the contents of the corresponding inverted file. The elements built by this FST file once stored in the inverted file, constitute the Dictionary of searchable terms for the database.

In the first menu of this package by pressing **'S'** for information and retrieval services it gives another chart of menu (as given at page no. 10), where it has a term **'T'** for term dictionary. This dictionary contain all author's name, Titles and types of the books in each database in alphabetical order as these tag numbers are given in its FST File.

The command T <enter> will ask the alphabet from which the user want to start the dictionary, by giving simple return it will show from very start i.e. with numbers then it will show with first alphabet 'a'. But the users can start it by their own requirements eg. as the user want to search any book with title Ground water then just type 'Gr' then the dictionary will start from 'Gr'. A sample listing of database 'GWH' for term dictionary Starting with 'Gr' is given herewith.

```
******************************************************************
Dictionary List                          Database Name GWH
******************************************************************

- Ground Water Engineering        - Ground Water Quality and
- Ground Water Handbook           - Ground Water Quality pra
- Ground Water Hydraulics         - Ground water resources
- Ground Water Hydrology          - Ground water storage and
- Ground Water Hydrology and HYD  - Ground Water studies: an
- Ground Water in Varahamihira's  - Ground Water: A Selected
- Ground water in water resources - Groundwater
- Ground water Managements        - Groundwater and seepage
- Ground water Manual             - Groundwater as a geomor
- Ground Water Mechanics          - Groundwater Contamination
-
-
-
******************************************************************
```

16

From this list of the dictionary the users can select the desired entries by pressing 'S' on those entries. After selecting the entries give 'X' for exit from select mode. Now by pressing enter it will show you the status of your all selecting books and then by pressing 'D' (For Display) it will display all the information according to the MFN No. entries.

(i) Authorwise Search: As the user select the author's name - D.Ouazar+C.A.Brebbia in dictionary then the display on the screen will be as **OUTPUT NO. 5**

<div align="center">

Selected Information by Term Dictionary
Authorwise selection
</div>

MFN: 0027
CN: 556.18.518 BN: 084C
ACN: 4180
Author: D.Ouazar & C.A.Brebbia
Title: Computer methods & water resources: Ground Water & Aquifer modelling
Publisher: Computational Mechanics Publications, Boston
Place: Southampton Boston
Ed. I Year: 1988 Vol.: 1 Pages:

Key 1: Vol.1 has two sections, sec.1 - Aquifer simulation,
       sec 2: Groundwater Modelling.

Key 2: Natural resources: water management applications of computer systems, Numerical modelling, solute transport, Multi-aquifer system, Multi layered aquifer models, Finite element model, Parameter identification.
Types: Proceedings,/GWH/
Proceedings of Ist International Conference, Morocco 1988, (divided into six volumes.)

MFN: 0028
CN: 556.18.518 BN: 084C
ACN: 4181
Author: D.Quazar, C.A.Brebbia & H.Barthet
Title: Computational Methods & water resources: Computational Hydraulics
Publisher: Computational Mechanics Publications, Boston
Place: Southampton Boston
Ed.: I   Year: 1988 Vol.: 2 Pages:

Key 1: This Vol. has four sections, Sec. 1: Hydraulic System, Sec. 2: Fluid Transients, Sec. 3: Flood Routing & Dam breaking, Sec. 4: Marine Hydraulics,

Key 2:   Flow in networks involve the use of complex computational procedures. Hydraulic systems for pipe or channel network.

------ will continue with other entries of the selected author.

(ii) Subjectwise Search: If the selection has been made by subject ' Artificial Ground Water Recharge' then it will select all books of same title in this database and then it will appear on the screen as **OUTPUT NO. 6**

Selected Information by the Term Dictionary
Subjectwise selection has been made

MFN: 0158
CN: 556.332.63 BN: N83:1
ACN: 2363
AUTHOR: L.Huisman & T.N.Olsthoorn
Title: Artificial Groundwater Recharge
Publisher: Pitman Publishing Inc.
Place: Massachusetts
Ed.: I, Year: 1983, Vol.: I, Pages:

Key 1: Artificial recharge , Environmental impacts, Mathematics of groundwater flow - Influence of vertical flow components & temperature & anisotropy, Variation in Detention time, Storage of water, Changes in water quality.

Key 2: Hydraulics of induced recharge, Artificial recharge by well injection, Functions & correction factors for unsteady flow of G.W.Bassel Functions, Intrusion control, Underground waste disposal. Types: Text book,/GWH/

MFN: 0219
CN: 556.33.63 BN: N82.1
ACN: 2568
Author: Deutscher Verband fur Wasserwietschaft and Kulturbau E.V. (German Association for water Resources and Land Improvement)
Title: Artificial Ground Water Recharge
Publisher: Verlag Paul Parey, Hamburg/Berlin
Place: Germany
Ed.: I, YEAR: 1982, Vol.: I, Pages:

Key 1: Regional aspects of artificial groundwater recharge, Artificial groundwater recharge in water resources management.

Key 2: Different papers by different authors, DVWK Series has bulletin No. 6,7,10,11,12,13 & 14, Bulletin 11 to 14   are in Volumes I to IV.
TYPES: Bulletin,/GWH/.
SERIES: DVWK Bulletin 11.

---- will continue with other entries of this selected field.

Also the users can save their own save/sort files for printing with change formats by pressing 'P' in ISISRET services for the different fields and authors.

5.10 The list of Databases with their codes:

DATABASES	CODE(S)
1. Flood studies + Lake Hyd.	FLOOD
2. Surface water hydrology + Drainage and Irrigation +	SWH
3. Ground water hydrology	GWH
4. Water resources system	WRS
5. Nuclear hydrology	NUCHYD
6. Mountain and Snow hydrology	MOUNT
7. Environmental hydrology + Climatology + Drought Hyd.	ENVHYD
8. Remote sensing	REMOTS
9. Computer + mathematics	COMPT
10. Water Quality	WATQUA

5.11 Single Database 'BOOK':

A single database 'BOOK' has been prepared by combining all the above databases. This database has most of the Technical books in each discipline existing in N.I.H. Library. This database is good only for high power machine because there its retrieval time will be less. The users can search any book without entering in any other database/s.

6.0 OUTPUTS

The outputs from all databases have been compiled in a separate booklet " Contents of Technical books of N.I.H. Library" because it is a bulky matter. Some sample outputs from a selected database "G.W.H." have been given with full formats and Some outputs with different formats according to the list. The output cover all technical books of different fields available in the N.I.H. Library at present. A database 'BOOK' has been completed by collecting all the entries of all databases. This database is useful at higher version machines but at low power machines it is not so.

7.0 CONCLUSIONS

Library is inseparable part of any institution and University now-a-days. Information and their dissemination are the backbone in modern day developmental activity. A library in an institution and cannot function effectively if it exist in isolation without any interaction and information exchange from other libraries. If the data elements of all databases are created by using standardized exchanging format, the merging/exchanging of records among databases is possible. This database could be available for publication in one library or the publications of other libraries could be merged through networking. In keeping the view of advantages and disadvantages of CDS/ISIS, the N.I.H. has decided to adopt this package. In this software , the data entries of any database can easily be transfered to any other software if the 'structure' and 'format' are same in both. The software is User friendly and is flexible enough to be linked with any other suitable program having same format for the purpose of linking and transferring databases. Also CDS/ISIS allows the users to build and manage structured non-numerical databases, it does more than just text processing.

REFERENCES

(1)   Taneja, S.K. (1991) CD-ROM in S and T libraries with sprcial reference to India, ILA Bulletin, Vol. xxv11, No. 3

(2) Vishwanathan, T. (1992) Development of scientific collections in India. Paper presented at the 58th IFLA general conference, New Delhi, p.5

(3)   Burton, P. 1987 Microcomputer applications in academic libraries, LA; London, p-114-19

(4)   Lancaster, F.W. (1977) Measurement and evaluation of library services, Information Resources, Washington, p.273

(5)   Hood, H.A. (1988) Disk and Dat: Recent developments in legal databases and emerging information technology in the United States, J. Lib. and Inf. Sci. , 13(1), p.51-66

(6)   Mahakuteshwar, H.Y., (1988) Optical storage devices and their impact on libraries and information retrieval systems, Annuals of library science and documentation., 35(3), 105, 110

(7)   NISSAT, (1992) CDS/ISIS users in India (updating book till 1993) P.88

(8)   Library of Congress; Automated systems office, " MARC format for bibliographic data", Washington, D.C.: LC.

(9)   International Standards Organization (ISO) , (1991) "Documentation: Format for bibliographic interchange on magnetic tape (ISO: 2709-1981)" 2nd edition, Geneva: ISO.

(10)   IFLA: (1971)International standard bibliographic description (for single volume and multivolume monographic publications. London: IFLA committee on catalouging

(11)   IFLA (1977) Working group on content designators, "UNIMARC: Universal MARC format". 2nd revised ed. , IFLA International office for UBC, London.

(12)   UNISIST/ICSU-AB working group on bibliographic description. " UNISIST reference manual for machine readable bibliographic description", 1974, UNESCO, Paris.

(13)   CCF: The Common Communication Format"   (1988) Ed. by Peter Simmons and Alan Hopkinson. Paris: General Information programs on UNISIST, UNESCO, Paris.

(14)   American Standards National Institute (ANSI), (1979) " American national standard format for bibliographic information interchange on magnetic tape, (ANSI: Z 39.2-1979)", New York

(15)   BIS: Bureau of Indian Standard, (1985), IS: 11370

(16)   Hariharan A. and Rajashekhar, T.B., Survey of the usage of micro-CDS/ISIS in library and information centers in India. (Experts from project work done as a part of INSDOC course in associationship in information science). p.4

Appendix - 'A'

INTRODUCTION OF CDS/ISIS SOFTWARE

Mini-Micro CDS/ISIS version 2.3 (new version 3.0 is also available) developed by UNESCO is being distributed by NISSAT in India. A seizable number of libraries in India have already acquired the package. Also, the number of libraries acquiring the package every year is increasing in order.

One of the major advantage offered by the generalized design of the system is that CDS/ISIS is able to manipulate an unlimited number of databases each of which may consist of completely different data elements. Also CDS/ISIS allows the users to build and manage structured non-numerical databases. It does more than just text processing.

The major innovations introduced in this version are given below:

1) All programs (ISIS, ISISNV, ISISDEF, ISISPRT, ISISUTL and ISISXCH) are now integrated into a single program and accessible from a main menu. Menu jump keys are provided to directly select the most frequently needed functions. Always the status information is displayed as soon as a database is selected.

2) A database may contain over 16,000,000 records.

3) Data integrity has been improved by flushing all master file buffers after writing or updating each record.

4) System menus and worksheets, message files and database files may reside in different directories and/or drives; this feature gives the possibility to optimize the distribution of files on the machine.

5) It has a new and powerful feature " formatting languages". The maximum size of a display format is 4000 characters.

6) Menu and submenu options identifiers may be customized to match the requirements of each language.

7) Sort sequences (for printed outputs) may be changed according to the particular requirements of each language.

SYSTEM FUNCTIONS

The major functions provided by CDS/ISIS are ;

1) Define databases containing the required data elements.

2) Enter new records into a given database.

3) Modify or delete existing records.

4) Automatically build and maintain fast access files for each database in order to maximize retrieval speed.

5) Retrieve records by their contents, through a sophisticated search language.

6) Display the records in any sequence desired.

7) Print partial or full catalogues and/or indexes.

8) Develop specialized applications using the CDS/ISIS integrated programming facility. These facilities are provided through a set of eight major services, which are classified in two categories : User services, operating on existing databases, and System services , designed for the database administrator to create new databases and perform various system tasks. User services only require a basic operational knowledge of CDS/ISIS, whereas system services assume an in-depth technical knowledge of all system components, up to familiarity with computer programming.

The four user services provide the following function:

1) ISISENT : data entry and record editing

2) ISISRET : information retrieval

3) ISISPRT : production of printed output such as catalogues and indexes

4) ISISINV : inverted file maintenance and utility functions.

The four system services provide for :

1) ISISDEF : defining of new databases and/or modification of existing database definitions.

2) ISISUTL : miscellaneous system utility functions

3) ISISXCH : facilities for interchanging data with other system and master file utility functions.

4) ISISPAS : advanced programming facilities, which allow the users to develop their own application programs and integrate them with CDS/ISIS.

DATABASE STRUCTURE

Although a CDS/ISIS database appear as a single file of information, in actual fact it consists of a number of logically related but physically distinct computer files. A CDS/ISIS database definition consist of the following components, each stored in a separate file:

1) FIELD DEFINITION TABLE (FDT) : The FDT defines the fields and their characteristics which may be present in the records of the database.

2) DATA ENTRY WORKSHEET(S) : One or more screen layout used to create and/or update the master records of the database. The CDS/ISIS provides a specially designed editor to create these worksheets.

3) DISPLAY FORMAT : Display format define precise formatting requirements for either on-line display of records during searching or for the generation of printed output products such as catalogues and indexes. The CDS/ISIS provides a powerful and comprehensive formatting language which allows to display the contents of record in any desired way.

4) FIELD SELECT TABLE (FST) : One FST defines the field of the database to be made searchable through the inverted file.

Additional FST's define the most frequently used sorting requirements for the data base.

MASTER FILE : The master file contains all the records of a given data base, each record consisting of a set of variable length field. Each records is identified by a unique number, automatically assigned by CDS/ISIS when it is created, called the master file number or MFN. Users may create, modify or delete Master file records by means of the data entry facilities of the ISISENT services.

SYSTEM RESTRICTIONS

The following restrictions are currently in effect :

1) Maximum number of databases ... Unlimited

2) Maximum number of records in a database ... 16 millions

3) Maximum record size ... 8000 characters

4) Maximum number of fields (defined in FDT) ... 200
   (Excluding repetitions of repeatable fields)

5) Maximum number of FST lines ... 200

6) Maximum field size ... 8000 characters

7) Maximum number of fields in worksheet pages ... 19

8) Maximum number of pages in a worksheet ... 20

9) Maximum size of a display format ...4000 characters.

10) Maximum number of stopwords ... 799

FIELD DEFINITION TABLE (FDT)

The FDT provides information on the contents of the master records in a given data base. In particular it defines the various fields which may be present and a number of parameters for each field.

The FDT is used to control the creation of data entry worksheet for the database and to validate the contents of fields, and it

is created or modified by means of the ISISDEF services, using the CDS/ISIS line editor. A sample listing of FDT file for database "GWH" has been given in Text.

Each line of the FDT defines one field of the master file record and contain 6 parameters: The field tag, name, length, type, repeatability and delimiters or patterns.

A data element, as it name implies , is an elementary piece of information. The first step in designing the database should be a careful and comprehensive analysis of the data elements required. Items normally eligible to be selected as data elements would be those that must be able to be processes individually. Data elements may be stored in fields or subfields. A field is identified by a numeric tag and is defined in the FDT of the data base. CDS/ISIS know tag as the name of the field. Each time CDS/ISIS required the tag of the field where the data element is stored to perform an operation on a particular data element. e.g. in the FDT given above, the title is assigned with tag 50. For displaying the contents of the title field, ask CDS/ISIS to display V50 (which is a formatting command to display a field). CDS/ISIS normally treats the contents of a field as a continuous string of characters and as a single entity. The field could be subdivided into subfields. In this case the field contains more than one data element, each being stored in a different subfields. Unlike fields, subfields are not identified by a tag but by a subfield delimiter. A subfield delimiter is a 2-character code preceding and identifying a variable length subfield within a field. It consists of the character ^ followed by an alphabetic or numeric character, eg. ^a.

Although the FDT may be modified after it is created by using the ISISDEF services, but certain changes could adversely affect

repercussions, especially when records have been already entered in the corresponding database. Whenever the FDT will modify, the CDS/ISIS will perform a consistency check of the worksheet defined for the database and will automatically modify them under certain conditions.

WORKSHEET OF DATABASE

Data entry worksheet is used to enter and modify database records and are therefore associated with the corresponding database. These worksheets are created and edited using ISISDEF services. Each field has two components:

1) File name: which is a label descriptive of the contents of the field. e.g. Title could be the field name of the field containing the title of a book.

2) Field value: Field value is the actual data to be processed. It may change any time by the terminal operator. Some default values can also pre-defined at the time of creating the worksheet. A sample worksheet'listing for present database "GWH" is given in the Text.

FIELD SELECT TABLE

A field select table (FST) defines criteria for extracting one or more elements from a master file record. Depending on the context in which an FST is being used, these elements may then be used to create inverted file entries for the record from which they were extracted, for sorting record in the desired sequence before producing a printed report, or to reformat records during an import or export operation.

FST's are created or modified by means of the ISISDEF services using the CDS/ISIS line editor. A sample FST listing as displayed by line editor for the present database "GWH" is given in the

Text. An FST file consist one or more lines each defining three parameters:

1) A field identifier (column labeled ID): It is a number (in the range 1-32767) which is assigned to each element created during the indexing step. The meaning of the field identifier depends on the purpose the FST is being used for, Inverted file FST, sorting FST and reformatting FST .

2) An indexing technique (column labeled IT): An indexing technique specifies a particular processing to be performed on the data produced by the format in order to identify the specific elements to be created. There are five indexing techniques which can be used. They are given in a numeric code from 0 to 4.

3) A data extraction format (coded using the CDS/ISIS formatting language): This is coded using the CDS/ISIS formatting language because the data produced by this format is not meant to be displayed, but further processed. The concept of line width may be relevant to a particular indexing technique applied to the output produced by the format. In this case CDS/ISIS will guarantee that line will only be created in response to explicit new line commands specified in the format.

On the other hand, the **MODE** selected to output certain fields may be instrumental to the correct functioning of a particular indexing techniques. As a general rule, upper case translation should not be used but lower case modes such as mpl, mhl or mdl should be used.

Whenever CDS/ISIS is requested to extract elements using on FST, it will read the relevant master file records and carry out, for each record and for each FST entry , the following process:

1) execute the format to extract from the record the corresponding data;

2)   apply the specified indexing technique to the data produced by the format; and

3)   assign to each element thus produced the specified field identifier.

The process described above is strictly mechanical and is performed exactly as described. There is no transmission of knowledge between one step to the next, only of data, although all steps co-operate in achieving the desired results.

DATA ENTRY

Data entry is done through data entry worksheet, which have been previously defined by means of worksheet editor. As mentioned earlier, CDS/ISIS uses two types of worksheets:

i)   Data entry worksheet :   which are used to collect the data to be stored in the master file and

ii)   System worksheet :   which are used to collect the parameters required to perform a particular task, such as a print run. System worksheet may only have one page, whereas data entry worksheets may extend over several pages.

Each field of the worksheet is entered or modified by means of the field editor. But, in addition, CDS/ISIS also provides full screen editing facilities such as moving from field to field in a page, or switching back and forth between pages.

INVERTED FILE

One FST file for each database defines the contents of the corresponding inverted file. The elements built by this FST file once stored in the inverted file, constitute the dictionary of searchable terms for the data base.

The dictionary alone, however, is not sufficient to provide a complete retrieval mechanism, as each term must be linked to all the database records in which it occurs in the database.

Furthermore in order to support some advanced search language facilities, such as proximity search operators, each posting contains not only the MFN of the record, but also additional information concerning the location of the term in the record from which it was extracted. A posting has four components:

1)   The **MFN** of the record containing the term ; assigns the component automatically.

2)   The **field identifier** to be used during searching when an operand qualifier is specified.

3)   The **occurrence number** required to implement field level search operators on repeatable fields.

4)   The term **sequence number** required to implement proximity search operators.

SEARCH LANGUAGES

The search language of CDS/ISIS is based on Boolean algebra, which provides a convenient way of expressing logical operations between classes. Each search term associated with a given record, in fact, can be viewed as representing the class of all those records associated with that term. Thus by expressing logical operations between search terms users can define precisely the class of records to be retrieved in response to user's needs.

The key to efficient and effective searching is a thorough knowledge of the search terms usable for a given data base. It is important, therefore the user must be familiar with the dictionary of search terms available for the data base. The option 'T'of the ISISRET services allow the user not only to display the dictionary but also to build the required search by

selecting terms directly on the screen. Also the most efficient way to carry out a search with CDS/ISIS is through the inverted file. It is only possible when the search requirement are within the scope of the dictionary of search terms defined for a given data base. For other cases CDS/ISIS provides an alternate search methods, called free text searching which allow the users any search requirement independently from the contents of the inverted file.

Two or more search terms can be combined in a search expression by using search operators, which indicate the intended relationship between the terms. The three basic operators are OR, AND and NOT. Where logical OR is the class union operator, logical AND is the class intersection operator and the logical NOT is the class exclusion operator. It is also true that , unlike the logical OR and the logical AND, the logical NOT operation does not give the same results if the two operands are inverted. Thus , A^B is not the same as B^A (except in the particular case in which A and B represent the same class, in which case the result is the empty class).

The basic building block of a search formulation is a search expression. Each time by selecting option **S** in the ISISRET services menu xXGEN, a new search expression will create.

In response to a search expression CDS/ISIS will:

1)   assign a unique number, called the set number, to the search expression just entered (provided it contains no syntactical error)

2)   display the number of postings for each term in the expression, for each sub expression and for the whole expression. There are no set rules for formulating a search. It could be developed as complex search expressions by their own experiences. Free text searching allows to specify search requirements on

fields which have not been inverted and/or to specify conditions.
A free text search is entered by selecting option **S** of the
ISISRET services. In order to distinguish it from a normal search
expression, it must be preceded by a question mark, as follows:

? Boolean expression or

? # n Boolean expression.

where ? identifies as a free text search.

In response to a free text search, CDS/ISIS will compute the
Boolean expression for each Master file record and build a hit
list containing the records satisfying the specified conditions.
For example

?   V160 : ''HYDROLOGY' would retrieve all records containing
'HYDROLOGY' in field 160.

and   ? V40/V150   would retrieve all records about the author and
keywords in the entire field with the desired format.

INFORMATION RETRIEVAL SERVICES.

The ISISRET services provide all functions related to information
retrieval. These allow, in particular to display the dictionary
of search terms and use it as a help in formulating the query
(Option 'T'), submit search expressions (option S) and display
the corresponding results (option D) , as well as save search
results for subsequent printing (option P).

The **option B** for browse master file display a section of master
file starting from a given MFN. The records are displayed using
the currently selected display format **(option F)**. This display
may be interrupted as explained under **option D.**

The **option D** for display search results displays the records
retrieved by the last search expression which is submitted.

A massage will display if no search expression have yet been
created or if the last search retrieved no records. The key **X**

will interrupt the display and return to the menu.

If the users want to display records retrieved by other than last search expression. They must first make that expression the current one by using the **option S**. For example, if after submitting five search expressions the user want to display the result of the second, select the **option S** and submit the followings:

2

This will create a new hit list, the sixth, equal to the two, which they may then display. By selecting the key **F** for change display format the users can supply their own format or modify the current one. By pressing key <F6> the old format will be clear and the users can write the new one, these changes will be temporary and only last until the users will exit from the program or they will select the another format. The field editor function key <F8> allows to the users for permanently save the changes which they made.

Other options allow you to display selected sections of the master file (option B), re-execute and/or edit a previously submitted search expression, possibly to a different database (option G), review the list of search expressions you have submitted (option R), and select a suitable display format (option F). Option 'T' for **Display term dictionary** display the terms dictionary according to the data elements defined in the FST File on the screen and allow users to select the required terms for searching. One or more characters may be select by pressing the key 'S'. In response to the selection CDS/ISIS will display upto 36 terms. A line of asterisks (*) indicates the end of the dictionary. A Sample listing of database "GWH" for term dictionary is given in the Text.

Appendix - 'B'

Software Used By Different Institutes for Non-numerical Data Processing.

	Name of the Institute	Software used
1.	Wadia Instt.of Himalayan Geology Dehradun	CDS/ISIS
2.	Indian Instt. of Remote Sensing. Dehradun	-do-
3.	Wild Life Instt. of India. Dehradun	LYBSYS
4.	Indian Institute of Petroleum Dehradun	CDS/ISIS
5.	Oil and Natural Gas Commission Dehradun	ONGC package in COBOL and Partially using CDS/ISIS
6.	C.B.R.I., Roorkee.	Partially using CDS/ISIS
7.	University of Roorkee, Roorkee	CD-ROM
8.	Central Water Commission, Delhi	CDS/ISIS
9.	Bharat Heavy Electrical Ltd. HARDWAR	Partially CDS/ISIS
10.	UNESCO, New Delhi	CDS/ISIS
11.	Tata Energy Research Institute New Delhi	- do-
12.	India Today, New Delhi	- do-
13.	Indian Institute of Technology New Delhi	- do-

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DIRECTOR         :        S   M   SETH

DIVISIONAL HEAD  :        A   K   BHAR



              STUDY   GROUP
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           RAMA DEVI MEHTA
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