

TKM COLLEGE OF ENGINEERING LIBRARY AUTOMATION SYSTEM

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The TKMCE Library Automation System aims at providing a comprehensive computerized solution to the needs of the library routines such as data entry, circulation control, catalogue access, etc. The system provides an overall view of the above said functions and the package is user-friendly and menu driven. Special efforts have been made during the design and development stage to ensure data integrity and security. This package facilitates fast retrieval of information and error free statistics. This project was done at the TKM College of Engineering, Kollam, Kerala, using Visual Basic 6.0 as front end and MS Access 7.0 as back end under Windows 98 environment.

INTRODUCTION

Library automation in simple terms is the application of computers and utilization of computer based products and services for carrying out different library operations and functions.

Automation implies a higher degree of mechanization where routine and repetitive tasks or operations are to be performed by machines with little or no intervention by human beings. The lesser the degree of human intervention, the greater the degree of automation.

The characteristics of a computer system that are particularly significant for libraries are the following:

- It can store large quantities of information. For instance, an entire library's catalogue can be stored on one or more magnetic discs on a computer.
- It can process information rapidly and accurately. For instance, a computer can be used to manipulate bibliographic

data to produce catalogue cards, sorted list of books, etc.

- Information stored in the computer system can be searched and retrieved rapidly.
- Information stored in the computer can be edited and modified easily.
- Information stored in the computer system can be communicated at high speed over telecommunication lines to remote locations connected to the computer.

OBJECTIVE OF THE SYSTEM

The main objective of the TKMCE Library Automation System is to provide better services at minimum cost, effort and time. It aims at eliminating manual labour in repetitive and routine activities.

TKM COLLEGE OF ENGINEERING

The TKM College of Engineering needs no introduction to the academic community. Dr. Rajendra Prasad, the first President of India, laid the foundation stone on February 3, 1956 and Prof. Humayun Kabir, Union Minister for Scientific Research and Cultural Affairs inaugurated the College on July 3, 1958.

The college started with 120 students and 6 faculty members offering courses in Civil, Mechanical and Electrical Engineering. This was truly a humble beginning, but the years that followed were of unprecedented growth and achievements. Now the college offers eight undergraduate programs viz., Architecture, Civil, Mechanical, Electrical & Electronics, Electronics & Communication, Production,

Chemical and Computer Science Engineering. The college also offers four post-graduate programs viz., M.Tech in Civil and Mechanical Engineering, MBA and MCA. The student strength has grown to more than 2000 and faculty strength has increased to 200 supported by 250 non-teaching staff. The growth of the college has been nothing short of phenomenal.

The TKMCE library in a huge and elegantly designed building, houses a vast collection of over 50,000 books and subscribes to more than 100 technical journals. The library has a good collection of bound volumes of technical journals. The library also has a full-fledged reprographic centre and its own book binding section. The library has Internet facilities too.

System analysis is the process of gathering and interpreting facts and diagnosing problems and using the information to recommend the improvements in the system. A system study was carried out at TKMCE LIBRARY and necessary information was gathered.

METHODOLOGY

The various methods adopted for the investigation include discussion with staff members, reviewing the organisation's requirements, onsite observations, etc. The present library being a manual system, the discussion with the staff members was of immense help in formulating a clear picture of the present system.

EXISTING SYSTEM

The following activities are carried out in the library.

- a. Acquisition and accessioning: This is the process of acquiring books to the library on request from the heads of departments and members. Books ordered and acquired newly by the library have to be registered and an accession number in chronological order is given to each book that is acquired.
- b. Membership: Library membership is of two categories –staff and students. Each

member details include his name, address, number of books he can borrow, etc.

- c. Circulation control: This section attends to the charging (issuing), discharging (returning) and renewing of books.
- d. Search and Query: Here users query is answered regarding the availability of books by consulting card catalogue kept in the library.
- e. Periodical section: This section takes care of the various technical and non-technical periodicals received in the library. This section arranges sending of reminders for non-receipt of periodicals.

DRAWBACKS OF EXISTING SYSTEM

Since all activities mentioned are done manually it is time consuming and highly prone to human errors. Most of the library activities are routine and repetitive in nature. Under many conditions same information may have to be repeated. This can lead to differences in the same information at different places due to human errors.

The drawbacks can be overcome by computerisation. Almost all the above drawbacks can be removed to a great extent, if not completely, through computerisation, hence, it is essential to

- Minimise the human efforts
- Reduce errors drastically
- Speed up processes
- Remove redundant data
- Improve efficiency, and
- Optimise man power

PROPOSED SYSTEM

The proposed automation system is developed in Visual Basic 6.0 on Windows –98 platform. MS access 7.0 is used as back end. The aim of the proposed system is to overcome the shortcomings of the existing system.

In order to fulfil the new requirements, a database has to be designed. The system will

be protected from unauthorised manipulation by providing passwords. Since combo boxes are used for certain fields it is very easy for the data entry operator to select options. The system can provide answers to different queries based on author, title, publisher, subject, series, etc. Various reports based on the database can be generated as and when required. Above all the system is highly user friendly.

FEASIBILITY STUDY

A feasibility study from various angles was carried out as described below:

Technical feasibility

All the methods and equipments used in the system are available at TKMCE LIBRARY such as windows 98, VB 6.0, MS Access 7.0 and the hardware required for this system making it technically feasible.

Economic feasibility

The proposed system is not expensive since all the requirements are available at this library and moreover the institution has a group of experts who can under take this task without much difficulty.

Social feasibility

The system will enhance the efficiency of the present system. Using this system the library can provide better services to its users. The varying information needs of the user community can be met with the proposed system.

SYSTEM DESIGN

System design is a solution of "how to" approach the creation of a new system. This phase is composed of several steps and it provides the procedural details necessary for implementing the system recommended in the feasibility study. Emphasis is on translating the performance requirements into design specifications. Design goes through logical and physical stages of development. Logical design reviews the present input and output specifications. The physical design maps out

the details of the physical system and plans the system implementation. All available modern facilities have been incorporated in the new system to make the system more user friendly and interactive to every one with minimum training.

Input Design

Input design is the basic thing to be considered in the system design. Here interfaces are designed according to the user needs. Forms are the tools available in Visual Basic for creating input screen for the data entry purpose. Various forms are designed separately for various applications.

In such an interface, the user is keying data by filling the blank space on the screen. Each field on the screen has a tab order and by pressing the tab key or by using the arrow keys one can move from one field to another within the form.

Each data entry form has its own set of command buttons provided by the software. These command buttons are used for adding or clearing the records. Validations are done for each and every data being entered. Whenever the user types erroneous data, appropriate error messages are displayed and the user can move on to the next field only after correcting the errors.

Output Design

Computer outputs are the most important and direct source of information to the user. An efficient output design would improve the system relationship with the user and it provides the required information.

The output from the system can be displayed or hard copied. Hard copy is preferred because it can be used by the administrative unit and can become a document for further references. Careful considerations have been given in designing the search outputs. We can search the database on the basis of author, title, subject, series and publisher.

It is also possible to generate Index cards (catalogue cards) by using catalogue option and print catalogue cards by specifying the range of accession numbers and generate reports based on total book count and total member count.

Code Design

A code is an ordered collection of symbols designed for unique identification of an entity or an attribute. The purpose of using code is as follows.

- To achieve unique identification
- To be used instead of name
- To specify an object's physical and performance characteristics
- To give operational characteristics
- To achieve secrecy and confidentiality

Process Design

It gives insight into the way in which processing is done in the system by using menus and the application is completely event-driven. The menus consist of all the required events, which provide needed information. Menus and sub menus are user-friendly and they are activated according to the functional process.

Main menu consists of:

- Data entry
- Modifications
- Circulation
- Cataloguing
- Search
- Reports
- Journals
- Exit

When each menu is activated, the corresponding submenus or command is executed. Each one has the following submenus.

DATA ENTRY

Accession Register
Membership
—Staff
—Student

MODIFICATION

Accession Register
Staff
Student

CIRCULATION

Issue
Return
Renewal
Reservation
Fine

SEARCH

Author
Title
Subject
Series
Publisher

JOURNALS

Accession
Reminders

REPORTS

Members count
Book count

NORMALISATION

The process of normalisation is concerned with the transformation of the conceptual scheme into a computer representable form. This form is called data base schema. The application of normalisation to a conceptual schema does not result in any loss of information. The scheme arrived at captures in it the sum total of all the information contained in the conceptual schema. Normalisation results in the elimination of certain undesirable properties in the representation of the conceptual schema. These are called the update, deletion and insertion anomalies.

STRUCTURE OF DATA BASE

The structure of the database is as below:

Table Structure of Accession Register

Field name	Type	Size
Accession_No	Long	4
Author1	Text	50
Author2	Text	50
Author3	Text	50
Title	Text	100
Publisher	Text	50
Pub_Place	Text	20
Subject	Text	50
Volume	Text	15
Edition	Text	20
Cost	Text	10
ISBN	Text	15
Year_publctn	Integer	2
Pages	Integer	2
Series	Text	50
Status	Text	5
Entrydate	Date/Time	8
Comments	Text	100
Current_Status	Text	15

Table Structure of Staff

Field Name	Type	Size
Member_number	Integer	2
Issuedate	Date/Time	8
Name	Text	50
Designation	Text	50
Department	Text	50
Permanent_address	Text	50
Books_Issued	Integer	2

Table Structure of Student

Field Name	Type	Size
Member_number	Text	10
Name	Text	50
Branch	Text	15
Class	Text	10
Permanent_address	Text	50
Roll_No	Integer	2
Issue_date	Date/Time	8
Validity	Date/Time	8
Books_Issued	Integer	2
Student_status	Text	10

Table Structure of Issue

Field Name	Type	Size
Member_number	Text	10
Accession_No	Long	4
Issuedate	Date/Time	8
Duedate	Date/Time	8

Table Structure of Return

Field Name	Type	Size
Accession_No	Long	4
Returndate	Date/Time	8
Member_No	Text	10
Fine_calculation	Currency	8

DEVELOPMENT

The system is developed by using various tools provided by Visual Basic and MS Access. The opening screen asks for password and after the verification it displays the main menu. The pull down menu system provides DATA ENTRY/MODIFICATION/CIRCULATION/SEARCH/REPORTS/EXIT options. Selection of any of this option displays sub menus if any. If DATA ENTRY – ACCESSION REGISTER option is selected, the form for Accession Register is displayed. In search option search results are printed according to the choice of the user.

SYSTEM IMPLEMENTATION

The system is implemented with sample data collected from TKMCE Library. Using the data collected, the different options were tested and errors were corrected. The result was as per the expectation of the users.

SYSTEM TESTING

System testing is important for the success of any software systems. System testing makes the logical conclusion that if all the modules are correct, the goal will be achieved. Some of the methods for system testing are given below:

Unit testing

In unit testing, each window is tested separately, this is made possible by giving dummy data and hence all the windows on a single module are tested independently before integration.

Integration testing

The relationship between different modules is checked in this testing for the overall performance of the system. If the integration

test is found to be satisfactory, there is no need of unit testing.

Acceptance testing

In this phase the system is to run with live data by the actual user to test the proper functioning of the system. Here the system is run parallel with the existing system.

Online response

Online system must have a response time that will not cause hardship to the user.

Volume testing

In this test several test records are input as would normally be included in the database to verify the hardware and software function correctly.

Recovery and security

A forced system failure is induced to test back up recovery procedure for file integrity and inaccurate data are entered to see how the system responds in terms of error detection and protection.

Usability and documentation

The usability test verifies the user-friendly nature of the system. This relates to normal operating

and error handling procedures. Proper documentation has been provided for future reference.

SCOPE FOR FURTHER ENHANCEMENT

The system was developed keeping in mind the present requirements. But it is easy to make modification if new requirements arise. Maintenance activities involve making enhancements to software products, adapting products to new environment and rectifying problems. The library may change its organisation and policy and in such cases it is easy to make the required changes in the system and efforts have been taken to make the system as simple as possible.

CONCLUSION

It is obvious that computerisation of an information system would minimise the extent of human effort in the processing of information. In fact, large amount of data can be processed by the computerised systems very quickly and in an efficient manner. The present system – TKMCE Library Automation System has all the advantages of the computerised information system. A low cost in-house library automation system has been developed.