AUTOMATED LIBRARY CIRCULATION SYSTEM

A CASE STUDY OF ISA KAITA LIBRARY
KADUNA POLYTECHNIC

BY

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PGD/MCS/2001/1080

Being Project Submitted to the Department of Mathematics
and Computer Science
School of Science and Science Education (SSCE)
Federal University of Technology
Minna

In Partial Fulfillment for the Award of Post Graduate
Diploma in Computer Science

NOVEMBER2003

CERTIFICATION

This project has been examined and found to be acceptable in partial fulfillment of the requirement for the PGD (Computer Science), of the Federal University of Technology, Minna.

DR. N. I. AKINWANDE — DATE
[Project Supervisor]

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EXTERNAL EXAMINER — DATE

DEDICATION

To all my family members.

ACKNOWLEDGEMENT

The execution of a project of this nature and scope obviously demands the co-operation of many individuals or bodies as such therefore, first and foremost my grateful to Almighty Allah who in His infinite power saw me through successfully in completing this research project.

Secondly, thanks to Alhaji Aliyu Guragi who is my Head of Department for selecting me to attend the computer course. I am also indebted to Dr. N. 1. Akinwande, the project supervisor who left no stone unturned in reading and guiding me to write every aspect of the project.

Generally, my sincere thanks to all those who assisted in one way or the other in seeing the completion of this project a success.

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1.0 BACKGROUND OF THE STUDY

1.1 OBJECTIVES OF THE STUDY

The study aims to achieve the following objectives:

1. To automate the library circulation system.
2. To create data bank to be able to provide for proper enquiry when the need arises.
3. To reduce time waste when searching for a particular book.
4. To improve the security of records.
5. To improve on the management of information.

1.2 INTRODUCTION

The library is the nerve centre of educational institutions, especially the likes of Universities, Polytechnics, Colleges of education etc. It is also a crucial centre in the educational development of man at any level and more particularly so in any academic pursuit. Time is invaluable in any research; hence it is pertinent for one to know how to find out what he wants in the library quickly and easily too.

The development of the library and information services is on a rapid movement becoming more and more complex. The output of information, which has reached an exponential rate, needs to be properly organised for use of students, scholars and researchers in various areas of knowledge. No matter how minute one's area of study of research might be it is impossible to cover any sizeable amount of published works in that area not to talk of covering all.

To this end, if the student as well as the researcher will learn a few basic, common library practices, he will save time and avoid much frustration. On the whole, automation of the processes involved in a library will make things very easy. Especially the librarian will be relieved of the Herculean tasks, as records of users will be properly maintained.

1.3 GENESIS OF THE LIBRARY

The origin of libraries and library services in Kaduna Polytechnic can be traced to various dates as reflected in the origin of the former three autonomous institutions that make up the Polytechnic, while the library collection of the College of Science and Technology (CST)

was built out of the collection of the former Kaduna Technical College in 1968.

College of Administrative and Business Studies (CABS) library developed out of the collection of the Staff Development Centre and the College of Environmental Studies (CES) library was an offshoot of the former Northern Nigeria Survey Unit. About the same time, the fourth library was established at the By-Pass campus to service the two departments moved there from CABS. Originally, each campus library was under the control of a Director of each campus. However, the administration of these unit libraries had to be centralised in 1981, in order to ensure uniformity, better performance and development of the institution. Before the centralisation exercise, each unit library has a separate committee, which was responsible for the development of the library under it. But with the inception of the centralisation, the unit library committees were abolished and replaced with a wider and representative committee, which was empowered to cater for the interest of all the unit libraries.

The major objective of the library is to provide the much needed materials to support not only instruction in all the subject areas

taught in the Polytechnic, but also support research carried out by staff and others from without. To this end, the libraries in conjunction with staff members have endeavoured to acquire these materials on a rather continuous basis.

1.4 ANALYSIS OF THE EXISTING SYSTEM.

The overall purpose of systems investigation is to determine whether the current system is satisfying the goals and objectives of the organisation. It consists of the descriptions of activities and processes, with examples of the forms used.

1.4.1 ORGANISATION UNDER INVESTIGATION

The organisation under investigation is Kaduna Polytechnic Library Complex, which has the following sub-divisions or sections:

1. Circulation
2. Serials
3. Newspaper
4. Cataloguing and Classification
5. Acquisition

6. Science and Technology
7. Humanities
8. Bindery
9. Reference
10. Media
11. Reserve
12. Administration

1.4.2 DESCRIPTION OF THE SYSTEM

The basic purpose of circulating a book from a library is to enable the reader to make greater use of it and be able to read it conveniently whenever and wherever it suits him. The activities of the system under investigation are summarised as follows:

1.4.2.1 COLLECTION OF CHARGING DATA

This concerns the capture of data to make a circulation or transaction record for each book that is borrowed from the library. The four categories of data in a transaction record are:

1. Book Information (Data type one)

a). Book number (call or accession number)

b). Author /Title

c). Class mark or other subject identifier

Accession No: ----------

Author: ----------

Title: ----------

Class No: ----------

Due for Return Borrowers' Name

Fig. 1.1 Book Card

2. Reader Information (Data type two)

a). Identification number (registration or file number)

b). Name, addresses etc.

KADUNA POLYTECHNIC
LIBRARY COMPLEX.
BORROWERS' TICKET

Unit Library: _

Name: _

(Surname)

KPT No: _

Dept: _

Course / Rank: _

Duration: _

Signature: _

Ticket No: _

Fig. 1.2 Borrowers' Ticket

3. Loan Information (Data type three)

(a) Date of issue, date for return or period of loan

(b) Category of loan (four weeks for staff, two weeks for students)

This book is due for return on or before the

last date shown below

Fig. 1.3 Date Due Label

Note: Category of loan in 3b above

4. Additional Information (Data type four)

(a) Reservations (other readers waiting to borrow the book when it is returned)

(b) Recalls (records of recall, overdue, and other letters sent to borrowers)

RESERVED BOOK

Name: ___

Class: ___

CSTNo: _

Date: _____

Fig. 1.4 Reserve Card

ISA KAITA LIBRARY

KADUNA POLYTECHNIC

Date: _

Name: __

Per. No.jReg. No: _

Department: _

RECALL OFLIBRARYBOOK(5)

Our record shows that you have the following book(s) that are overdue for renewal or return to the library.

SINO.	AUTHOR	TITLE	ACe. NO.	DATE

Note: Any overdue book attracts a fine of N1.00 per book per day.

Fig. 1.5 Recall Notice Form

NOTE: Additional information that is (data type four) is not strictly required in the charging operation but can conveniently be discussed in conjunction with it because it completes the list of types of input data required by the system.

1.4.2.2 THE DISCHARGING PROCESS

This concerns the return of book to the library except when a reader wants to renew a book, that is return it and immediately borrow it again. Three items of information are required for a discharge transaction record:

a. Book number

b. Author / Title

c. Class mark

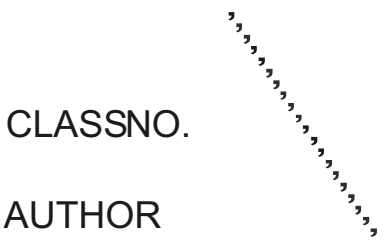

Fig. 1.6 Book Pocket

1.4.2.3 STATISTICAL INFORMATION

This concerns the compilation of statistics based on the books that are borrowed and returned and on the readers that registered and typically include the following:

a. Book loaned

b. Book returned

c. Registered users

MONTHLY STATISTICS

Loaned:	Category	Number
	Staff	
	Student	
	Total	
Returned:	Category	Number
	Staff	
	Student	
	Total	
Registered:	Category	Number
	Staff	
	Student	
	Total	

Fig. 1.7 Monthly Statistics

1.4.3 PROBLEMAREAS

The analysis of current operations and formulating a concept of what is desired in a new system are closely intertwined. As the current organisation and procedures are examined, it will become obvious which tasks are most in need of stream lining or classifying.

It is important to distinguish between problem areas that can be addressed directly by automation and those that might simply be a

result of inefficiencies in organisation or ambiguities in procedure under the current system.

The problems of the existing system can therefore, be summarised as follows:

1. Backlogs: If backlogs are increasing and not of a temporary or seasonal nature they are indication of a system's inefficiency or simply unable to handle the volume of work being placed on it.
2. Filing: Filing of paper forms and records is common to manual systems. If there is a filing backlog, it indicates an imbalance in the allocation of resources.
3. Control over records and items being handled: This is an essential part of analysing current operations, for example in circulation, can over due materials be easily identified?
4. Statistical information: Circulation statistics are examples of compilations that provide valuable management information if used effectively. Compilation of statistics under a manual system is often too tlrne-consumlnq.
5. Financial loss: Items that are charged out and never returned cause unnecessary expenditures.

6. Patron service: There is no response from users when an over due notice is sent to them and the renewal of library cards also not easily feasible.

1.5 PROPOSED AUTOMATED SYSTEM

The proposed system will be supplied with name, address and other information about the reader or user. The data collected are then entered into the computer through the keyboard after the validation of data that is error free.

If a wrong data about the circulation process is entered, the computer will produce wrong output. This type of error can be corrected by debugging the input data for a better output. When accurate data are supplied, the automated system has the advantage of flexibility, reliability, simplicity and standardisation over the existing method.

The following pre-conditions are essential for the current system:

1. The use of password to prevent unauthorised interference;
2. The system's ability to serve the same purpose if adopted by another library;

3. The system's ability to provide a means of deleting records;
4. The system's ability to provide a means of updating files or changing of data;
5. The system's ability to accept borrowers' information;
6. The system's ability to accept book information;
7. The system's ability to accept loan information and
8. Statistical information.

1.6 REASONSFORAUTOMATION

New ways of presenting and managing information will be required, and these will be the key areas:

1. Improved efficiency.
2. Better information for decisions.
3. New services.
4. More control over staff.

1.7 SCOPEAND LIMITATION OF THE NEW SYSTEM

The write up for the new system does not cover all the activities of the library, but only limited to the circulation process of the Readers'

Service section. It is hoped that the limitation will make the conduct of the research more effective by revealing concrete information that can assist the library in its automation effort.

1.8 OPERATIONAL DEFINITION OF TERMS

The definitions of terms are given by the writer to ease the understanding of readers of this research work.

Accession Number: A number allocated to an accession on arrival in the repository to identify it for control purposes.

Circulation: The total number of books issued from a library in a given period.

Class Number: One or more characters showing the class to which a book belongs in the scheme of classification in use.

Data Type: A fundamental term in data processing, which is a unit of data which can assume certain values and on which certain operations can be performed.

Mapping:	The relationship between a given logical structure and its physical representation.
Memory:	A device or a functional unit in a computer for storing or holding data.
Processor:	A device or system capable of performing operations upon data.
Specification:	The detailed information necessary to describe a task.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 INTRODUCTION

As there are many writers on the subject matter of automated library circulation systems, so also their works are in existence. Based on this therefore, a review of the related literature, which has an impact on the area under research, was conducted within available bibliographical sources.

The bulk of the research contained in this chapter comes from the sources written basically from Britain and America, while a few are locally sourced.

2.2 THE CIRCULATION / ISSUE SYSTEM

The implementation of automated circulation systems started in the sixties. Early examples in the United Kingdom were West Sussex in the public library sector, Southampton University amongst academic libraries and the Atomic Weapons Research Establishment in the special library sector. Now, many academic libraries in Polytechnics

and Universities have such systems and many others are in the process of converting (Rowley, 1985).

Williams-Osula (1999) highlighted on the case for automation of the whole or part of the procedure cannot be overemphasised, if libraries are to be saved the harrowing experience of losing their books/materials to dubious and/or anti-social users.

Many libraries in the developed world have implemented automated library issue systems. Provided an historical survey of the progress of automation from 1966 to the present day (Foster, 1988).

In a report on the scope of computer systems in the planned British library Line (1972) listed a number of criteria for the development of such systems. Two reasons quoted which are well suited to all types of library are:

1. To provide a better service at lesser or no great a lost.
2. To give added benefits at lesser cost.

Kimber (1968) opines "any circulation system, automated or other wise must be closely keyed to the needs of the individual library for it to be fully satisfactory." It is necessary first of all to examine what

these different needs are, and then to discuss the ways in which they are met by computer-aided systems.

Automated library issue systems no doubt facilitate library control work. They equally give the library image of modernity. These not withstanding there has to be a genuine need for replacing the manual issue system. Therefore, any library that contemplates, automation should carry out a needs analysis. And where there is the need, it has to be affordable (Ozowa, 1990).

Bahr (1979) reported various trends related to automated circulation systems at the end of the 1970s and these included:

a. The trend away from punched book cards and embossed borrower identity cards to on-line mini automated systems continues to accelerate.

b. The low cost of microprocessors is stimulating the development and marketing of off-line circulation systems for small libraries.

c. Flexible system design, which maximises the library's options, is emphasised in the newer systems.

d. Many libraries are making circulation control the hub of automated processes and are using the circulation terminals to interact with other databases.

e. Most users have not had sufficient time to exploit all the potential of their circulation control systems.

f. A trend for libraries to use packaged systems rather than develop their own software for circulation control.

Several reasons have necessitated the automation of circulation control sub-systems in Nigerian University libraries. These include shortage of staff, slowness of the manual system in retrieving or knowing the status of a document, difficulty in ascertaining a person's loan status, increase in library patronage etc. (Zakari, 1987). According to the words of Reynolds (1985) '"the primary focus of circulation control is on that part of the collection that is readily accessibleto the public and from which materials may be borrowed." There are several aspects to handling circulation transactions, and an automated system should be able to allow for all the following functions:

a. Checkout of materials to patrons (charging) .

b. Renewal of loans.

c. Returns of materials from patrons (discharging).

d. Placement of holds on materials charged out.

e. Identification of overdue materials.

f. Issuing of recalls for materials on loan.

g. Reserve collection circulation.

h. Handling of fines payment and accounting.

i. Preparation of off-line notices.

j. Statistical compilation and generation of reports.

Another assertion by Olanlokun (1993) on the charging systems states, "In libraries which have automated their operations, the borrowing system is faster than where the manual system is used." By this, it is also possible to get a list of patrons with overdue books and the dates with minimum effort using the computer.

Talking of technology in general, Menkes (1988) opines, "If used properly technology liberates you, thus enabling you to give an even better personal service."

CHAPTER THREE

3.0 SYSTEMS ANALYSIS AND DESIGN

3.1 PROBLEM DEFINITION

This is the first step in system analysis. The system analyst is charged by the management of an organisation to assess the nature of the problem, the possible cause(s) and proffer an effective solution.

Problems encountered in the existing system are basically on library books circulation processes that involve high number of readers who are engaged in borrowing books from the library. The librarian is in charge of keeping records of all books borrowed, returned, registered readers and daily records of books consulted.

Therefore, the manual system of running the library is very tedious and time-consuming; as such the problems are thus summarised:

1. Lack of accurate record documentation.
2. Lack of efficient patron service.
3. Inadequate security of files.
4. Lack of accommodation of large number of users.

5. Lack of accurate, current information to management to enhance decision-making.

3.2 SYSTEMS OVERVIEW

A system is a group of components, consisting of sub-systems or procedures that works in a coordinated fashion to achieve some objectives.

3.3 SYSTEM ANALYSIS

This involves the process of studying the network of interactions within an organisation with a view to assisting in the development of new or improved methods of performing the necessary work. In other words, it is a process of appraising the existing system in order to see if there is need to implement a new system or to improve on the existing system or even discard the system (i.e. the new one) and allow the existing one to continue.

System analysis involves the following basic steps:

1. Problem definition: (see section 3.1 above)
2. Data collection and analysis:

This activity as the name suggests is concerned with data collection and analysis that is, the system analyst will collect relevant data to the problem, analyse it and find lasting solution to the problem. These are the major tools for data collection:

a. System interview

b. Standard flow chart

c. Decision table

d. Questionnaire

Note: For the purpose of this study a system interview was conducted.

3. Analysis of system's alternative:

This is a process of giving people a choice among several alternatives. It is pertinent to consider the merits and demerits of several alternatives before selecting anyone as the best.

4. Determination of feasibility:

The purpose of feasibility study is to investigate the present system, evaluate the possible application of a revised or new system. After this, a system is selected tentatively, its cost and

effectiveness evaluated (see section 3.4) as well as its impact on existing personnel before it is finally determined if a new or retrained personnel is needed for the system. It is necessary to conduct series of tests about each of the alternative systems to establish clearly the benefits and liabilities. Usually the following conditions are stated:

1. Ability to meet systems' needs.
2. Impact on the organisation.
3. Workability.
4. Resources required / provided.

5. Prototype system development:

This involves developing a model for the proposed system. Prototyping is used at two different stages in the system process:

a. The proposed solution may be so novel such that its workability is in doubt; hence the need for a pilot system development.

b. It is equally used during system implementation to

minimise its impact on the organisation. The pilot approach enables the organisation to test the new system and make required modifications without disturbing the normal daily activities of the firm.

3.4 COST-BENEFIT ANALYSIS

A cost-benefit analysis is necessary to determine economic feasibility. The primary objective of cost-benefit analysis is to find out whether it is economically worthwhile to invest in the project. If the reasons on investment are good, then the project is considered feasible.

3.5 PERFORMING COST ANALYSIS

An assessment of current operating costs is extremely important in the analysis period. The following simple cost analysis techniques will be reviewed here:

3.5.1 UNIT COST

Regardless of whether a library is considering book purchases, processing costs, or circulation transactions, everything should be

able to be broken down into unit costs (sometimes called per-unit costs).

These are determined by putting the cost in the numerator and the number of units in the denominator. For example, suppose we spent NSOOO:OOto receive 100 diskettes.

Solution:

NSOOO.00/100 = NSO.OOper diskette

This is the basic approach to calculate the average per-unit cost of any number of aspects of a given system.

3.5.2 COST EFFECTIVENESS RATIO

A basic cost effectiveness measure can be accomplished by putting the money in the denominator and the number of units in the numerator. For example, if we processed 500 books for Nl000:00 we calculate a cost effectiveness ratio in this way.

Solution:

500/ Nl000.00 = .5

If it had cost us more to process these books, the ratio will change. For example, if the cost was N1200:00, the ratio would be .42. It can be seen that the more cost effective a process is, the higher the ratio (number) will be.

3.5.3 TIME EXPENDITURE

To find the time spent for given operations, for example, if it takes 6 minutes to check out 15 books to a user the per-unit time is:

Solution:

6 minutes/If books = .4 minutes

(24 seconds per book)

The time effectiveness ratio is:

Solution:

15 books/6 minute = 2.5

The less time it takes to check out books, the higher that number will become.

f

3.5.4 OEPRECIATION CHART

Vendors make use of the concept of depreciation, and therefore, it should be introduced. Depreciation is determined by first estimating what the value of equipment will be at the end of its projected life span. For example, a vendor may provide information indicating that the CRT terminals it now sells for N10, 000:00 will each be worth N2000:00 in five years. The annual depreciation is calculated in this formula:

$$\text{Annual Depreciation} = \frac{\text{Purchase Price} - \text{Projected Salvage Value}}{\text{Life Span in Years}}$$

In the example:

$$\text{Annual Depreciation} = \frac{10{,}000{:}00 - 2.\ 000{:}00}{5}$$

$$= \text{N1,600:00}$$

The value of the equipment each year of its projected life span is depicted in table below.

Year	Value at beginning of ylear	Annual depreciation	Value at end of ear
1	10000:00	1 600:00	8400:00
2	8400:00	1 600:00	6800:00
3	6800:00	1 600:00	5200:00
4	5200:00	1 600:00	3600:00
5	3600:00	1 600:00	2000:00

Table 3.1 CRT depreciation chart

3.5.5 COST ESTIMATE BASED ON RESEARCH

The following prices emerged during the data collection and analysis stage based on estimation depicted in table below:

ITEM	DESCRIPTION	QTY	AMOUNT (N)
A	Hardware requirement		
1	Pentium III - 933 Intel MM & fan processor server	1	38,250:00
2	Work station	1	95,625:00
B	Other hardware accessories		
1	Hard disk drive 30.0 GB	1	10,000:00
2	Mother board	1	11,500:00
3	Floppy disk drive 3.5" (1.44MB)	1	1,000:00
4	56x CD ROM	1	3,500:00
5	15" PTX CRT	1	18,000:00
6	ATX full tower chassis	1	6,875:00
7	600 watts speakers (pair)	1	9,375:00
8	UPS (Sun-PAC (1KVA)	1	33,750:00

9	Hewlett Packard LaserJet printer 110DA	1	68,750:00
10	APC Surge Arrest	1	11,250:00
11	Multimedia key board	1	1,000:00
12	Mouse & pad set	1	500:00
C	Software requirement: price + installation	_	350,000:00
		Total	659,375:00

Table 3.2 Cost estimates

3.6 SYSTEM DESIGN

This is the development of the actual mechanics for a workable system. At this stage, the analyst focuses attention on the ways and manner in which jobs will be processed on the system. Specifications are developed for the system's inputs, outputs and information base. The product of the design phase is a set of operating procedures, computer programmes and hardware specifications. Programme development comes in after having developed the system on paper (system flowchart), but this depends on the type of programming language, as some may not require flowchart for example the Visual

Basic programming language. The programmer then takes over to develop the main topic needed to actualise the proposed system.

The programmer develops programme flowchart where necessary, decides on the choice of programming language followed by the actual coding and testing of the programme.

3.7 DESIGN METHODS

To design a system, there are a lot of methods that can be adopted. They include:

1. Expediency method:

This is an ad-hoc method whereby new designs are made to correct some changes in a segment of a system, with no consideration for how it will relate to the whole system.

This method is fast but dangerous. Fast because faulty segments can be redesigned and corrected quickly but dangerous because it does not take into cognisance the other components of the system.

2. Top-down method:

This is a modular design whereby the analyst breaks down the whole system into smaller units (modules) and starts the design from top downward. This method often results to comprehensive solutions. It considers the requirements of the information system as a whole followed by the operations of the various modules. The method is less expensive and maximises the productivity of the entire system.

3. Bottom-up method:

This method is equally modular but concentrates on the operations of the various modules. The various modules or sub-systems are designed and subsequently integrated to achieve the overall objectives of the information system. That is, the analyst starts with a small unit of the system down the hierarchy and work-up, modifying and controlling other modules to facilitate the attainment of the overall objectives of the system.

4. Eclectic method:

This is a combined method whereby the best parts of the other methods are put together with a view to minimising the disadvantages, associated with each of them.

3.8 SYSTEM IMPLEMENTATION AND CONVERSION

Putting a new system in operation is usually a very complicated process due to the fact that the old system is still in use. In some cases, implementation involves entirely new equipment; that is, changing from a manual system to an automated one or just a change in capacity of the machine.

A good planning can be a decisive factor determining the ultimate success or failure of system implementation. Generally, effective planning considerations include:

1. Assignment of system personnel.
2. Training of user personnel.
3. Structuring the user relationship.
4. Preparing for new equipment.
   - Deciding the hardware
   - Deciding the software
   - Site preparation
5. Testing the system.
6. Final documentation of the system.

3.9 CONVERSION

The method of changing from one system to another, especially a new one, is known as conversion. There are several commonly used methods of changing from the old system to the new. These methods are:

1. Parallel Method:

This involves simultaneous operation of both the old and the new system until the new system is certified efficient.

2. Dual Method:

This method involves gradual phasing out of the old system for a new one. Hence it is called "gradual change method" or "phasing method."

3. Inventory Method:

This is called "Cold Turkey," "Direct" or "Crash" method. It requires one-time conversion from old to new. This approach is carried out on non-business days (weekends).

4. Pilot Method:

This method involves implementing a small portion of the new system either in parallel or dual method, while a major portion is processedon the old system.

3.10 SYSTEM EVALUATION/FOLLOW UP

This is a very vital aspect of the total system process and is closely related to the process of system implementation. It is not just enough for the analyst to change to the new system, make a few evaluations and leave. This is a post-installation process whereby the analyst examines the performance of the system, compares his findings with the initial expectations, and makes recommendations based on them.

3.11 SPECIFICATIONS

This is the application area that will be used in the main menu programme with the following options:

1. Reserved Books
2. Book List
3. Borrowers'List

4. Transaction

5. Reader Information

6. Borrower Registration

7. Report

8. Exit

3.11.1 FILE SPECIFICATION

File is the collection of records treated as a unit. Examples of files are the master file, transaction file, sort file, back-up file etc. But for the purpose of this study, transaction file will be used for the following:

1. Book List

2. Borrower Registration

3. Reserved Books

4. Transaction Form (Loan)

3.11.2 FIELD SPECIFICATION

Field is a unit of information or data item that can be numeric or character in nature.

BOOKLIST FILE	BORROWER REGISTRATION FILE
Field Name	Field Name

Accession No.	Registration No.
Author	Name
Title	Category
Class mark	Department
	Class/Rank
	Duration (Session)
	Date
RESERVEDBOOKSFILE	TRANSACTIONFORM(LOAN)
Field Name	Field Name
S/ No.	Registration No.
Author	Title
Title	Accession No.
Accession No.	Author
Date	Date Issued
	Date Returned
	Fine

3.11.3 OUTPUT SPECIFICATION

This involves the process of obtaining result from an input data and depends on how an individual wants his/her output to look like. The output has the following conditions to fulfill:

1. Who will use the report?
2. What is the proposed use of the report?
3. What is the volume of the output?
4. How often is the output needed?

DESIGNOF SCREENS

ISA KAllA LIBRARY, KADUNA POLYTECHNIC
BOOK LIST

Acc. No.	Author	Title	Classmark	Our.
Xxxxxxx	xxxxx	xxxxx	xxxxxxxxx	xxxxx
Xxxxxxx	xxxxx	xxxxx	xxxxxxxxx	xxxxx

Table 3.3 Screen for book list

ISA KAITA LIBRARY, KADUNA POLYTECHNIC
BORROWERS' LIST

Reg. No.	Name	Title	Ace. No.	Author	Issd	Retd	Fine
Xxxxxxx	xxxxx	xxxxx	xxxxxx	xxxxx	xxxx	xxxx	xxxx
Xxxxxxx	xxxxx	xxxxx	xxxxxx	xxxxx	xxxx	xxxx	xxxx

Table 3.4 Screen for borrower List

ISA KAITA LIBRARY, KADUNA POLYTECHNIC
READER INFORMATION

Reg. No.	Author	Title	Acc. No.	Date
Xxxxx	xxxxx	xxxx	xxxxxx	xxxxx
Xxxxx	xxxxx	xxxx	xxxxxx	xxxxx

Table 3.5 Screen for reader information

3.11.4 INPUT SPECIFICATION

The input of data into a computer can be either on-line or off-line. In the former, the user directly enters data into the computer's secondary storage, namely a disk file that is done through a terminal connected to the computer.

While the latter, transactions are entered on forms manually at the point where the transaction originates. Many forms are collected to form a batch. A data entry operator then enters the batches of transactions from the forms into a computer's disk.

BORROWER REGISTRATION

FIELD	TYPE	WIDTH	DEC
Reg. No.	e	20	
Name	N	10	
Category	C	7	
Dept.	e	20	
Class/Rank	e	20	
Duration	N	10	
Date	N	8	

TRANSACTION FORM (LOAN)

FIELD	TYPE	WIDTH
Reg. No.	N	10
Name	C	20
Title	C	30

Acc. No.	N	10	
Author	C	20	
Date Issued	N	8	
Date Returned	N	8	
Fine	N	6	00

LIST OF BOOKS

FIELD	JYPE	WIDTH
Acc. No.	N	10
Author	C	20
Title	C	30
Class mark	AN	10

RESERVEDBOOKS

FIELD	JYPE	WIDTH	DEC
SINo.	N	6	
Author	C	20	
Title	C	30	
Acc. No.	N	10	
Date	N	8	

NOTE:

Dec = Decimal places

N = Numeric

C = Character

AN = Alphanumeric

CHAPTER FOUR

4.0 HARDWARE AND SOFTWARE REQUIREMENTS

The computer system is made up of two sub-systems, namely, the hardware sub-system and the software sub-system. (See Fig. 4.1 a,b, and c below).

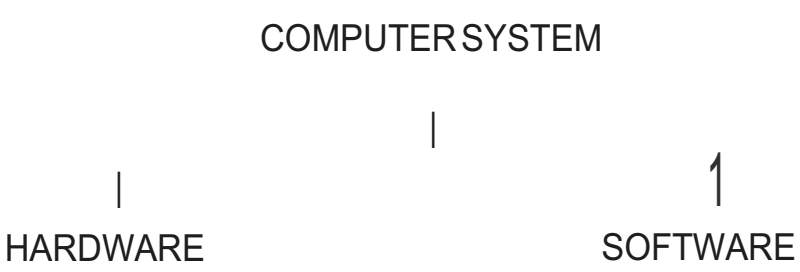

Fig 4.1 a) Overview of the computer system

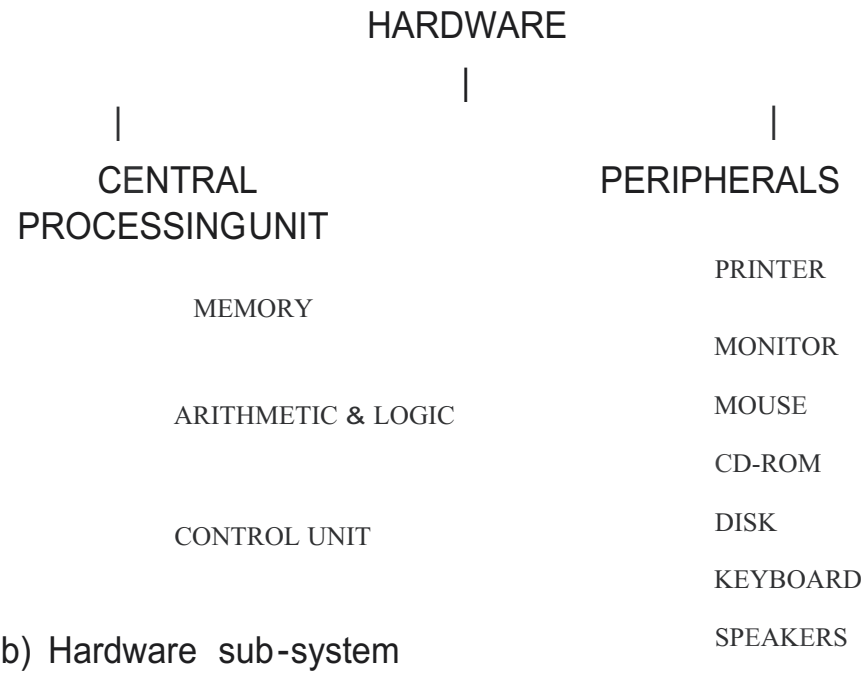

Fig 4.1 b) Hardware sub-system

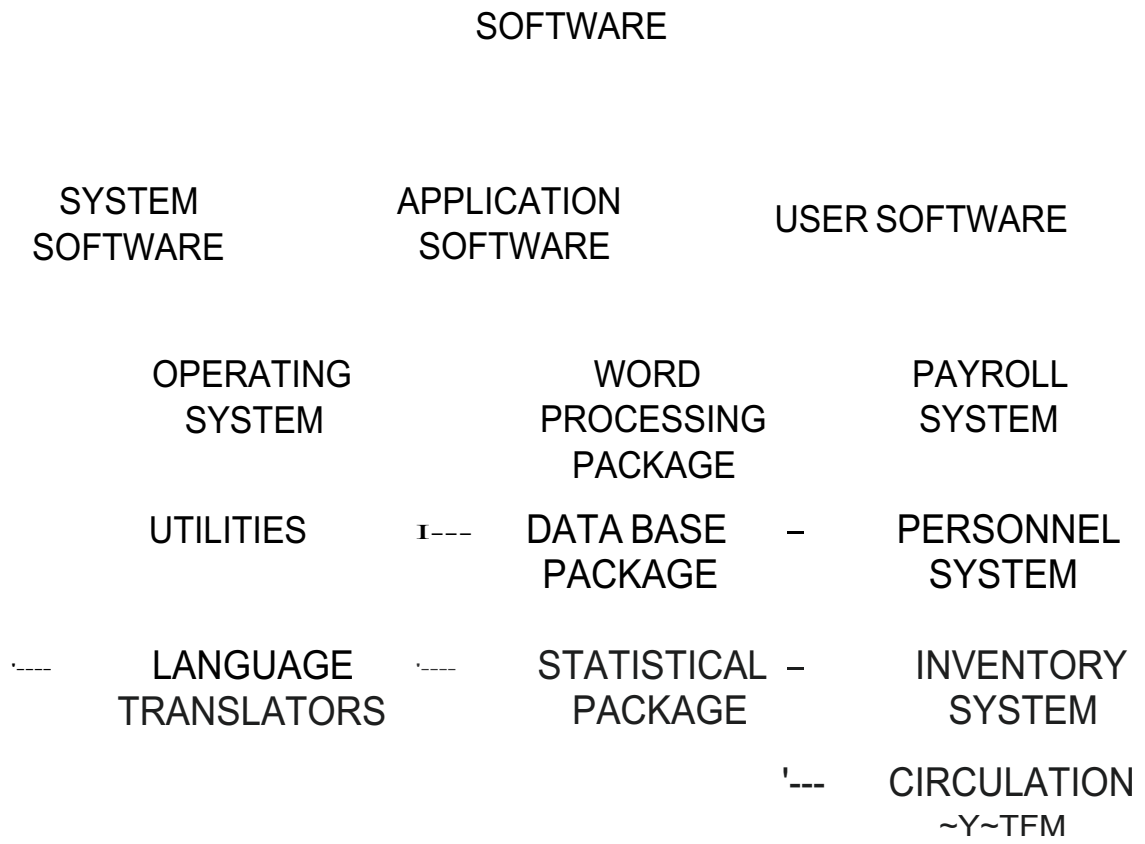

Fig. 4.1 c) Software sub-system

4.1 HARDWARE

The hardware is any component of the computer system that one can see or touch, which is sub-divided into the central processing unit and peripheral devices. The CPU is made up of the memory, the arithmetic and logic and the control unit. While the peripherals consist of all other components connected to the CPU for example; the mouse, printer, keyboard, monitor, etc.

4.2 SOFTWARE

The software is a set of instructions that the computer follows to accomplish a task. The software component of a computer system is invisible and not touchable. The following are the types of software sub-systems of a computer viz:

1. System Software
2. Application Software
3. User Software

1. System Software:

This software controls the activities of the computer, including some basic routine functions. It consists of the operating system (OS), the language translators (interpreter and compiler), and the utilities.

(a). Operating system (OS)

This is a collection of programmes that manage and control the activities of the computer system. It offers the ease of use of the hardware with minimum human intervention. The operating system is often called the resource manager or supervisor. The resources to be managed include:

The processor

The input/output devices

The primary memory

The secondary storage device

Examples of operating systems are MS-DOS, UNIX, Windows 95, 98, 2000 etc.

(b) Language translators

These are programmes that translate codes from one language to another. The language of the computer is called machine language and it consists of binary digits. Therefore, uniting programmes in other languages like low-level and high-level languages call for language translators to convert such programmes to machine language. The translators are: assembler, compiler and interpreter. An assembler translates programmes from low-level language to machine language, while the compiler and interpreter translate from high-level language to machine language.

(c) Utilities

These are software used to perform basic maintenance and housekeeping routines. They include the Editor, Disk Defragmenter, and Anti-Virus.

2. Application Software:

This is software that is designed to accomplish specific tasks or applications. Examples are the word processing, database management etc.

3. User Software:

This is software geared towards meeting the specific needs of each user. Examples are the Payroll, Inventory, Examination processing to mention a few.

4.3 CHOICE OF PROGRAMMING LANGUAGE

A programme is a sequence of instructions that can be executed by a computer. Every programme is written in some programming language. Microsoft Visual Basic, the latest and greatest incarnation of the old BASIC language, gives you a complete Windows

application development system in one package. Visual Basic (or VB, as we often call it) lets you write, edit and test Windows applications.

GETTINGSTARTED

When you want to use Visual Basic, you will follow these basic steps:

1. Start Visual Basic (from Windows start menu).

2. Create a new appliCation or load an existing application. When you create a new application, you might want to use Visual Basic's (VB) application Wizard to write your programme's initial shell.

3. Test your application with the debugging tools Visual Basic Supplies. The debugging tools help you locate and eliminate programme errors (or bugs) that can appear despite your best efforts to keep them out.

4. Compile your programme into a final application.

5. Quit Visual Basic (same as with most Windows applications).

6. Distribute the application to your users.

If your computer is running a version of the Microsoft Windows operating system (e.g. Windows 98 or Windows 2000), then it

already has two text editors. WordPad and Notepad. These can be started from the start key. In Windows 98, they are listed under accessories.

4.4 SYSTEMIMPLEMENTATION

The importance of this phase can hardly be overemphasised (see section 3.8). Once testing is completed, files are set up, stationery is delivered, and the system is ready to go live (see sample forms and sample output below).

Sample Forms

Author

Title

Classmark

Dl.latior(Sessoo) 1 ~___ __8.

Date

SIN

Author

Title

Accession #

Date

Eine | ,!:;tick To View Fine

IS.JL 1(jUq)I £I(jJ<JUl~'Y;1(jI(})V!NJf CP()£?!J!ECJ[WIC

BOOK LIST

Accession_No	Author	Title	Class_Mark
12	dghgfhd	hgdd	gdfhghh
45	fgfhdf45	gh9J9f	hghjhj
456	ghghgh	gfgd	gfjhdll
1	IOOOO(	IOOOO(	IOOOO(
2	IOOOO(	IOOOO(	IOOOO(
3	IOOOO(	IOOOO(	IOOOO(
4	IOOOO(	IOOOO(	IOOOO(
5	IOOOO(	IOOOO(	IOOOO(
6	IOOOO(	IOOOO(	IOOOO(

9 Record(s)

BORROWERS LIST

Reg_No	Name	Title	AccNo	Author	ISSD	RETD	Fine
9999001	lOOOCX	lOOOCX		lOOOCX	2)2)2003	8I2I2OO3	#310
9999002	lOO()()()	lOOOCX	2	lOOOCX	3/6/2003	6/25/2()()3	# 500
9999003	lOOOCX	lOOOCX	3	lOOOCX	*5/412003*	*7I5I2003*	#450
9999004	lOOOCX	lOOOCX	4	lOOOCX	*118/2003*	912512003	# 40

4 Record(s)

.READER INFORMATION

Reg_No	Name	Department	Class!	Rank	Duration
9999001	IOOOO(	IOOOO(	IOOOO(		Two
9999002	)()()()()(	IOOOO(	IOOOO(		Not Applicable
9999003	IOOOO(	IOOOO(	IOOOO(		Two
9999004	IOOOO(	IOOOO(	IOOOO(		One

4 Record(s)

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter is aimed at making summary of the research carried out, conclusion and recommendation.

5.1 SUMMARY

The whole project consists of five chapters:

Chapter I: Is on the background of the study, which traces the origin of the library under study, outlining the existing system i.e. circulation system and the reasons given for its automation.

Chapter II: Reviews the related literature on circulation or issue systems from different writers far and near which has an impact on the research.

Chapter III: Analyses and designs the new system. Which specifies the file, field, input and output.

Chapter IV: Outlines the system requirement and their sub-divisions; hardware and software.

The programming language used which is Visual Basic, the implementation phase inclusive (see section 3.8)

Finally is Chapter V: Where the summary, conclusion and recommendations are made.

5.2 CONCLUSION

It has been ascertained that some academic libraries have at one time or the other attempted automating some of their operations. Administrative, financial, operational and logistic problems have been identified to be the main problems that hindered successful automation of projects in the libraries.

Virtually, majority of the academic libraries in Nigeria are currently operating their circulation systems manually. Considering the increasing demand for quick services as against almost static library staff strength, high rise in student annual enrolment, continued increase in research works, new academic programmes and the sporadic increase in the library stocks, the academic libraries have no option in the near future but to go automation. Since the circulation

department serves to link the library with the clientele. To crown it all Rice (1984) stated that "from a logical stand point, circulation comprises three elements; the user, the item borrowed, and the circulation period (due date)."

5.3 RECOMMENDATION

Every organisation should have a security policy that defines the limits of acceptance behaviour and how the organisation will respond to violations of such behaviour. Data entering a data processing system and programmes processing the data must be kept secure. By security we mean protecting the data and programmes against accidental or intentional modification or destruction or disclosure to unauthorised persons. The following measures are recommended for security:

1. The data and programmes must be protected from theft, fire, disk corruption and other types of physical destruction. Duplicate copies are kept in a fire-proof vault in a place away form the data processing centre.

2. Data should be reconstruct able in case of loss despite precautions. Back-up copies of master files and transaction files are kept.

3. The system should be tamper-proof. Password system and file security keys are used to bar unauthorised access. If a clever programmer breaks a password system, a secrecy transformation may be used to transform the stored data. Where even if the data is accessed, it will not be meaningful if transformed. For example, secret mapping table:

1 to 8, 2 to 7, 3 to 5 etc.

A to W, B to U, C to X etc.

Note that the table should be kept secret.

4. Any person gaining access to a file should be identified. Such that an attempt to access data is logged and identity is also recorded. This will inhibit potential data lock breakers.

5. Only authorised persons should be allowed to change data.

Password system is used to prevent unauthorised access. Every access, authorised or unauthorised, should be logged by the system. Any change should be monitored by the system.

Lastly in addition it will naturally differ from organisation to organisation based on unique needs. Optional policies include:

a) No playing of computer games on corporate or organisation computers.

b) No visiting web sites using corporate or organisation Internet accounts or computers.

c) An embargo against the use of a specific protocol if it cannot be administered securely.

d) A prohibition against taking copies of certain corporate electronic documents out of the office.

e) No use of pirated software.

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APPENDIX

Programme Codes (Listings)

Program Codes

Users Registration Code:

```
Option Explicit

Private Sub mnuExit_ Clickt)
On Error Resume Next
Unload Me
End Sub

Private Sub cmdEdit_ Clickt)
Dim vBookmark As Variant
Dim stReg_No As String

vBookmark = datBorrowerReg.Recorclset.Bookmark
£tReg_No = InputBox("Enter A Registration Number To Edit or View A User")

datBorrowerReg.RecorclseLFindFirst "Reg_No= '" & stReg_No & "'"
If datBorrowerReg. Recordset.NoMatch = True Then
 MsgBox "No Record Was Found.", vblnformation, "No Match"
 datBorrowerReg. Rccordset.Bookmark = vBookmark
 End Il'
 txtRegNo.SetFocus
End Sub

Private Sub cmdGricl_ Clicki)
On Error GoTo cmdGrid Clickerr
Dim f As New frmDataGrid
Set f.datfrataflrid.Recordser = datBorrowerReg.Recordset
f.Caption = Me.Caption & " Enquiry Panel"
f.Show
Exit Sub
crndGrid Clickerr:

End Sub

Private Sub cmdLoaclPic_ClickO
With c1lgPhoto
 .Filter = "PICTURE FILE (*.GIF:';'..IPG:*.JPEG;';'.BMP)I*.GIF;*..IPG;* ..fPI-:G:*.BMP"
.ShowOpen
 ImgPieture.Picturc = LoadPicture(.FileName)

End With
```

```
Exit Sub
cmdGrid Clickerr:

End Sub
Private Sub cmdAdd_ClickO
On Error Resume Next
 .datBookList. Recordset.AddNew
  txtAccessionNo.SetFocus
End Sub

Private Sub cmdDelete_ Clickt)
On Error Resume Next
  With datBookList.Recordset
  'this may produce an error if you delete the last
  'record or the only record in the record set
       .Delete
       .MoveNext
       If .EOF Then
         .MovePrevious
         If .BOF Then
           MsgBox "Recorset is empty", vbOKOnly, App.Title
       End If
       End If
       End With
End Sub

Private Sub cmdRefresh_ClickO
  'this is really only needed for multi user apps
  On Error Resume Next
  datBookList.Refresh
  tx tAccessionNo. SetF ocus
End Sub

Private Sub cmdljpdateClickf)
  datBookList. UpdateRecord
  datBookList. Recordset. Bookmark= datBook List. Recordset. LastModi fied
End Sub

Private Sub datbooklist_Error(DataErr As Integer, Response As Integer)
  'This is where you would put error handling code
  'Ifyou want to ignore errors, comment out the next line
  'If you want to trap them, add code here to handle them
  MsgBox "Data error event hit err:" & Error$(DataErr)
  Response = 0 'throwaway the error
End Sub
```

```
End Sub


Private Sub cmdAdd _Clickt)
On Error Resume Next
 datBorrowerReg.    Recordset.AddNew
 tx tRegN o. Set Foc us
End Sub

Private Sub cmdDelete  ClickO
On Error Resume Next
 With datlsorrowcrlccg. Rccordset
 'this may produce an error ifyou delete the last
 'record or the only record in the recordset
      .Delete
      .MoveNext
      If .EOF Then
        .MoveFirst
        If .BOF Then
          MsgBox "Recordset is empty", vbOKOnly, App.Title
      End If
      End I!'
      End With
End Sub

Private Sub cmdkefresh  Click()
 'this is really only needed for multi user apps
 On Error Resume Next
 datlsorrowerkeg. Refresh
 txtRegNo.SetFocus
End Sub

Private Sub cmdUpdate_ ClickO
On Error Resume Next
 datBorrowerReg. UpdateReeord
 datBoITowerReg.Reeoi·dset.Bookmark    = datBorrowerReg.Recordset.LastModi±iecl
End Sub

Private Sub datborrowerreg_ Error(DataErr As Integer, Response As Integer)
 'This is where you would put error handling code
 'If you want to ignore errors, comment out the next line
 'II' you want to trap them, add code here to handle them
 MsgBox "Data error event hit err:" & Error$(DataErr)
 Response = 0 'throwaway the error
End Sub
```

```
Private Sub datborrowerreg_ Repositiont)
  Screen.MousePointer = vbDefault
  On Error Resume Next
  With datBorrowerReg.Recordset
  'This will display the current record position
  'for dynasets and snapshots
  datBorrowerReg.Caption = "Record: " & Str(.AbsolutePosition + 1)
  'for the table object you must set the index property when
  'the record set gets created and use the following line
  'datborrowerreg.Caption = "Record: " & (datborrowerreg.Recordset.RecordCount
(datborrowerreg.RecordseLPercentPosition * 0.01)) + 1
  End With
End Sub

Private Sub clatborrowerreg_ Validate(Action As Integer, Save As Integer)
  'This is where you put validation code
  'This event gets called when the following actions occur
  Select Case Action
    Case vbDataActionMoveFirst
    Case vbDataActionMovePrevious
    Case vbDataActionMoveNext
    Case vbDataActionMoveLast
    Case vbDataActionAddNew
    Case vbDataActionUpdate
    Case vbDataActionDelete
    Case vbDataActionFinci
    Case vbDataActionBookmark
    Case vbDataActionClose
  End Select
  Screen.MousePointer = vbHourglass
End Sub

Private Sub Forlll_UnloadrCanccl As Integer)
Screen.MousePointcr = vbfrefault
End Sub

Private Function GetNewDatabaseNameO
Dim iRcspollse As Integer
Dim stMsg As String
stMsg = "Database File Not Found." & vbCrLf & vbCrLf &
      "Do you want to locate the file?"
iR~sponse = MsgBox(stMsg, vbYesNo + vbQuestion, "File or Path not Found")
If iResponse = vbNo Then
GetNewDatabaseName = ""
Else
With dlgOpen
```

```
·.FileName   = datllorrowerkeg.Databasel-lame
 .Filter = "Database  Files (*.mdbj]"  .mdbl/vll  Files (*.*)1*.")"
 On Error Resume Next
 .ShowOpen
 If Err.Number  = cdlCancel  Then
  GetNewDatabaseName   = ""
  Else
  GetNewDatabascName   = .FileName
  End II'
  End With
  End If
End Function
Private Sub FormLoad/)
On Error GoTo HandleFormLoaderror
datBorrowerReg.Refresh
form_Load_Exit:
Exit Sub
HancileFormLoaderror:
Dim stNewDatabaseNatl1e  As String
Select Case Err.Number
 Case 3004, 3024, 3044
  stNewDatabaseName   = Getl-lewDatabaset-lame
  If stNewDatabaseName   = "" Then
 mnulixit   Click
   Else
   datBorrowerReg.DatabaseName    = stNewDatabaseName
   Resume
   End If
   Case Else
   MsgBox Err.Description,  vbOKOnly  + vbExclamation,  "Unexpexted  Error"
  mnuExit  Click
  End Select
End Sub

Private Sub cmdFirst_ Clickf)
On Error Resume Next
datBorrowerReg.Rccordset.MoveFirst
End Sub
Private Sub cmdLast_ Clickt)
On Error Resume Next
datBorrowerReg.  Recordset. MoveLast
End Sub


Private Sub cmdNext_ Clickt )
On Error Resume Next
```

```
With datBorrowerReg.Recordset
  .MoveNext
  If .EOr Then
        .MoveFirst
     End If
 End With
End Sub

Private Sub cmdPrevious_ Clickt)
On Error Resume Next
With datBorrowerReg.Recordset
    .MovePrevious
    If .BOF Then
  .MovcLast
End If
End With
End Sub
```

Book List Code

```
Option Explicit
Private Sub mnuExit_ Clickf)
On Error Resume Next
Unload Me
End Sub

Private Sub cmdEdit_ Clickf)
Dim vBookmark As Variant
Dim stAcc_No As String

vBookmark = datBookList.Recordset.Bookmark
stAcc_No = InputBox("Enter Accession Number Registration Number To Edit or View A Book")
datBookList.Recordset.FindFirst "Accession_No= " & Val(stAcc _No)
If datBookList.Recordset.NoMatch = True Then
 MsgBox "No Record Was Found.", vblnformation. "No Match"
 datBookList. Recordset. Bookmark = vBookmark
 End If
 txt/vccessioulvo.Setf'ocus
End Sub

Private Sub cmdGrid_ Clickt)
On Error GoTo cmdGrid Clickerr
Dim f As New frmfratatrrid
Set f.datDataGrid. Recordset = datBookList.Recordset
f.Caption = Me.Caption & " Enquiry Panel"
f.Show
```

```
Private Sub datbooklist_RepositionO
  Screen.MousePointer      = vbDefault
  On Error Resume Next
  With datBookList.Recordset
  'This will display the current record position
  'lor dynasets and snapshots
  datBookList.Caption   = "Record:  " & Str(.AbsolutePosition   + 1)
  'for the table object you must set the index property when
  'the rccordset gets created and use the following line
  'datbooklist.Caption   = "Record:  " & (datbooklist.Recordset.RecordCount      :~:
(datbooklist.Recordset.PercentPosition      * 0.01))  + 1
  End With
End Sub

Private Sub datbooklist_ Validate(Action   As Integer, Save As Integer)
  This  is where you put validation  code
  This  event gets called when the following  actions  occur
  Select Case Action
    Case vbDataAetionMoveFirst
    Case vbDataActionMovePrevious
    Case vbDataActionMoveNext
    Case vbDataActionMoveLast
    Case vbDataActionAddNew
    Case vbDataActionUpdate
    Case vbDataActionDelete
    Case vbDataActionFind
    Case vbDataActionBookmark
    Case vbDataAetionClose
  End Select
  Screen.MousePointer   = vbHourglass
End Sub

Private Sub Form_ Unload(Cancel   As Integer)
Scrcen.Mouse  l'ointcr  = vbDcfault
End Sub

Private Function  GetNewDatabaseNameO
Dim iResponse  As Integer
Dim stlvlse As Strine
stMsg = "Database  File Not Found."  & vbCrLf & vbCrLf &
      "Do you want to locate the file?"
ikesponse = MsgBox(stMsg,   vbYesNo  + vbQuestion,  "File or Path not Found")
If iResponse  = vbNo  Then
GetNewDatabaseName   = ""
Eisc
With dlgOpcn
```

```
  .FileName   = datBookList.DatabaseName
  .Filter = "Database  Files  (*.mdb)I*.mdbIAll  Files  (*·*)1*·*)"
  On Error Resume Next
  .ShowOpen
  If Err.Number  = cdlCancel  Then
   GetNewDatabaseName    = ""
   Else
   GetNewDatabaseName    = .FileName
   End If
   End With
   End If
End Function
Private Sub Form_LoadO
On Error GoTo l-landlcf'orml.oaderror
datBookList.Refresh
form_Load_Exit:
Exit Sub
Handlef'orml.oaderror:
Dim stNewDatabascName    As String
Select Case Err.Number
 Case 3004. 3024, 3044
   stNewDatabaseName    = GetNewDatabaseName
   If stNcwDatabaseName    = "" Then
  mnuExit   Click
    Else
    datBookUst.DatabaseName     = stNewDatabaseName
    Resume
    End If
    Case Else
    MsgBox Err.Description,   vbOKOnly  + vbExclamation,   "Unexpexted  Error"
  mnulixit   Click
   End Select
End Sub
```

```
Private Sub cl11dFirst_Clickt)
On Error Resume Next
datBookList.Recordset.MoveFirst
End Sub
Private Sub cmdLast_ CIickt)
On Error Resume Next
datBookList.Recordset.MoveLast
End Sub
```

```
'Private   Sub  cmdNext_   ClickO
 On  Error  Resume   Next
 Wi th  datBookList.    Recordset
   .MoveNext
,  If .EOF   Then
          .MoveFirst
      EndIf
 End  With
End  Sub

Private   Sub  cmdl'rcvious    , Clickt)
On  Error  Resume   Next
With  datBookList.Recorclset
    .Move  l'revious
    If .BOF   Then
  .MoveLast
End  If
End  With
End  Sub
```

Transaction Code

```
Option  Explicit

Private  Sub  cmdFine_  Clickt)
On  Error  Resume  Next
Dim  ilntcrval  As Long
Dim  cFine  As Currency
Dim  dDateDue   As Date
IftxtDateReturned     = "" Then
MsgBox  "No  Return  Date",  vblnforrnation   + vbOKOnly,   "Alert"
Exit  Sub
End  If
, dDateDue   = Cfratertxtfrateketurned)
 i1nterval = DateDiff("d",    dfrate Oue, Now)
 If ilnterval  > 0 Then
 cl-ine = (5  *  ilnterval)
 MsgBox  "You  have  spent"   & ilnterval  & " day(s)  extral  ". vblnformation   + vbOKOnly.   "Fine' Status  "
 txtFine  = "#"  & Format$(cFine,    "STANDARD")
 Else
```

```
MsgBox "You still have" & Abs(iInterval) & " more days", vblnformation + vbOKOnly.
"Notification"                .
txtFine = "#" & "0.00"
End If
End Sub

Private Sub mnulixi t_Clickt)
Unload Me
End Sub

Private Sub cmdEdit ClickO
Dim vBookmark As Variant
Dim stReg_No As String
vBookmark = dat'Iransact.Recordset.Bookmark
stReg_No = InputBox("Enter Accession Number Registration Number To Edit or View A Book")
datTransact.Recordset.FindFirst "Reg_No= " & Val(stReg_No).
If datTransact.Recordset.NoMatch = True Then
 MsgBox "No Record Was Found.", vbInformation, "No Match"
 datTransact.Recordset.Bookmark = vBookmark
 End If
 txtRegN o. SetF ocus
End Sub

Private Sub cmdGrid _Clickt)
On Error GoTo cmdGrid Clickerr
Dim f As New frmDataGrid
Set fdatDataGrid.Recordset = datTransact.Recorclset
f.Caption = Me.Caption & " Enquiry Panel"
f.Show
Exit Sub
cmdGrid _Clickerr:
Resume Next
End Sub
Private Sub cmdAdd_ Clickr)
On Error Resume Next
  datTransact.Recordset.AddNew
  txtRegNo.SetFocus
End Sub

Private Sub cmdDelete_ClickO
On Error Resume Next
  With datTransact.Recordset
  'this may prod uce an error if you delete the last
  'record or the only record in the recordset
       .Delete
       .MoveNext
```

```
        If .EOF Then
          .MovePrcvious
          II' .BOF Then
            MsgBox "Recorset is empty", vbOKOnly, App.Title
        End If
        End If
        End With
End Sub

Private Sub cmdRefresh_ Clickt)
 'this is really only needed for multi user apps
 On Error Resume Next
 da tT ransac t. Refresh
 txtAccessionNo.SetFocus
End Sub

Private Sub cmdUpdate_ Clickt)
 dat Transact. U pdateRecord
 datTransact.Recordset.Bookmark = datTransact.Recordset.LastModified
End Sub

Private Sub dattransact_Error(DataErr As Integer, Response As Integer)
 This is where you would put error handling code
 'If you want to ignore errors, comment out the next line
 'If you want to trap them, add code here to hand Ie them
 MsgBox "Data error event hit err:" & Error$(DataErr)
 Response = 0 'throwaway the error
End Sub

Private Sub dattransact_RepositionO
 Screen.MousePointer = vbDefault
 On Error Resume Next
 With datTransact.Recordset
 'This will display the current record position
 'for dynasets and snapshots
 datTransact.Caption = "Record: " & Str(.AbsolutePosition + 1)
 'for the table object you must set the index property when
 'the recordset gets created and use the following line
 'dattransact.Caption = "Record: " & (dattransacLRecordset.RecorciCount *
(ciattransact.Recorclset.PercentPosition * 0.01)) + 1
 End With
End Sub

Private Sub dattransact_ Validate(Action As Integer, Save As Integer)
 This iswhere you put validation code
 This event gets cal led when the following actions occur
```

```
  Select Case Action
    Case vbDataActionMoveFirst
    Case vblfata/vctionlvlovel'revious
    Case vbDataActionMoveNext
    Case vbfrata/vctionlvlovel.ast
    Case vbDataActionAddNew
    Case vbDataActionUpdate
    Case vbDataActionDelete
    Case vbDataActionFind
    Case vbDataActionBookmark
    Case vbDataActionClose
  End Select
  Screen.Mousel'ointer      = vbHourglass
End Sub

Private Sub Form_Unload(Cancel    As Integer)
Screen.MousePointer    = vb Default
End Sub

Private Function GetNewDatabaseNameO
Dim iResponse  As Integer
Dim stMsg  As String
stMsg = "Database  File Not Found."  & vbCrLf  & vbCrLf  & _
       "Do you want to locate the file?"
iResponse  = MsgBox(stMsg,   vbYesNo  + vbQuestion,   "File or Path not Found")
If iResponse  = vbNo  Then
GetNewDatabaseName    = ""
Else
With dlgOpen
  .FileName  = datTransact.DatabaseName
  .Filter=   "Database  Files (*.mdb)I*.mdbIAli  Files (*.*)1*.*)"
  On Error Resume  Next
  .ShowOpen
  If Err.Number  = cdlCancel  Then
   GetNewDatabaseName    = ""
   Else
   GetNewDatabaseName    = .FileName
   End If
   End With
   End If
End Function
Private Sub ForrnLoadr)
On Error GoTo l-IandleFormLoaderror
datTransact.Refresh
form_Load_Exit:
Exit Sub
```

```
HandleF  orm Loaderror:
Dim  stNewDatabaseName       As  String
Select  Case  Err.Number
 Case  3004,  3024,  3044
   stNewDatabaseName     = GetNewDatabaseName
   If stNewDatabaseName     = "" Then
  mnuExit   Click
    Else
    datTransact.DatabaseName      = stNewDatabaseName
    Resume
    End  If
    Case  Else
    MsgBox  Err.Description,   vbOKOnly   + vbfixclamation.   "Unexpexted   Error"
  mnuExit   Click
   End  Select
End  Sub

Private  Sub  cmdFirst_  Clicki)
On Error  Resume  Next
dat'Iransact.Recordset.Movel-irst
End  Sub
Private  Sub  cmdLast_  Clicki)
On Error  Resume  Next
datTransact.  Recordset.  MoveLast
End  Sub


Private  Sub  cmdNext_  Clickt)
On Error  Resume  Next
With  datTransact.  Recordset
  .MoveNext
  if .EOF  Then
         .MoveFirst
     End  If
  End  With
End  Sub

Private  Sub  cmdPrevioLls_  Clickr)
On Error  Resume  Next    .
With  dat'Iransact.Recordser
   .MovePrevious
   If .BOF  Then
  .MoveLast
End  If
End  With
End  Sub
```

```
Private Sub txtRegNo_LostFocusO
Dim vBookmark As Variant
Dim stRegNo As String
stRegNo = txtRegNo
datBorrowerReg.Recordset.FindFirst "Rcg_No= '" & stRegNo & "'"
If datBorrowerReg.Recordset.NoMatch = True Then
 MsgBox "No Match Was Found. ", vblnformation, "Search Status"
 dat'Transact.Rcfrcsh
 Else
 txtName = datBorrowerReg.Recordset!Name
 txtTi tIe.SetFocus
End If
End Sub
```

Data Grid Code

```
Option Explicit

Dim msSortCol As String
Dim mbCtrlKey As Integer

Private Sub cmdClose _Clickf)
  Unload Me
End Sub

Private Sub cmdFilter_ Clickf)
On Error GoTo FilterErr
Dim recRecordsetl As Recordset, recRecordset2 As Recordset
Dim sFilterStr As String
If datDataGrid.RecordsetType = vbRSTypeTable Then
Beep
  MsgBox "You Cannot Filter A table Recordset!l!", 48
  Exit Sub
  End 11"
Set reeRccordsct 1 = clatDataGrid.Recordset
sFilterStr = InputBox("Enter Filter Expression:")
If Len(sFilterStr) = 0 Then Exit Sub
Screen.MousePointer = vbHourglass
recRecordsetl.Filter = sFilterStr
Set recRecordset2 = recRecordsetl.OpenRecordset(recRecordsetl.Type)
Set datDataGrid. Recordset = recRecordset2
 Screen.MousePointer = vbDefault
 Exit Sub
FilterErr:
Screen.MousePointer = vbDefault
```

```
MsgBox  "Error:"  & vbCr & "" & Err.Description
Exit Sub
End Sub

Private Sub cmdRefrcsh_ Clickt)
On Error GoTo ReiErI'
datDataGrid. Refresh
'.Rccordset.r. Rcq ucry
Exit Sub
RelErr:
Msgfsox "Error: " & vbCr & Err.Description
Exit Sub
End Sub

Private Sub cmdSort_ClickO
On Error GoTo Sortlirr .
Dim recRccordset 1 As Recordset, recRecordsct2 As Recordset
Dim SortStr As String
If datDataGrid.RecordsetType = vbRSTypcTable Then
Beep
 MsgBox "You cannot ""Sort"" A table recordset!", 48
 Exit Sub
 End If
Set recRecordset 1 = datDataGrid.Recordset
If Len(msSortCol) = 0 Then
SortStr = InputBox("Entcr Sort Column:")
If Len(SortStr) = 0 Then Exit Sub
Else
SortStr = l11sSortCoI
End If
Screen.MousePointer = vbHourglass
recRecorclsct l.Sort = SortStr
Set reckecordsct? = recRccordsetl.0penRccorclset(recRecordsetl.Type)
'(dbOpenDynasel) .
Set datDataGricl.Recorciset = recRecorclset2
 Screen.MousePointer = vbDefault
 Exit Sub
SortErr:
.Screcn.MousePointcr = vbDefault
 Msg130x "Error:" & vbCr & "" & Err.Description
 Exit Sub
End Sub

Private Sub datDatuGrid_RepositionO
With datDataGrid.Rccordset
  datDataGricl.Caption =" Record "& (.AbsolutePosition + I) &" of " & .RecorciCount
```

```
End With
End Sub

Private Sub DBGridTransact_BeforeDelete(Cancel As Integer)
IfMsgBox("Delete Current Row?", vbYesNo + vbQuestion) <> vbYes Then
Cancel = True
End If
End Sub

Private Sub DBGridTransact_HeadClick(ByVal Collndex As Integer)
If datDataGrid.RecordsetType = vbRSTypeTable Then Exit Sub
If mbCtrl Key Then
  Il1sSortCol = "[" & datDataGrid.Recordset(Collndex).Nall1e & "]desc"
  mbCtrlKey = 0
  Else
  I11sSortCol = "[" & datDataGrid.Recordset(Collndex).Name & "]"
  End If
  cmdSort Click
  I11sSortCol = vbNullString
End Sub

Private Sub DBGridTransact_MouseUp(Button As Integer, Shift As Integer, X As Single, Y As
ingle).  (
mbCtrlKey = Shift
End Sub

Private Sub FormLoadt)
Dim bParmQry As Integer
Dim qdfTmp As QueryDef

On Error GoTo LoadErr
datfrataGrid.Databaselvarne = gsDatabase "'C:\Documents and Settings\Utomi
beto\Desktop\Library Record System\LibrarySystem.mdb" 'gsDatabase
datDataGrid.RecordSource = "" Transaction Data File" 'gsRecordsource
datDataGrid.Connect = gsConnect
datDataGrid.RecordsetType = 1
datDataGricI.Options = 0
datDataGrici. Refresh
Ir Lcn(datDataGrid.RccordSource) > 50 Then
  Me.Caption = "SQL Statement"
  Else
  Me.Caption = datDataGrid.RecordSource
  Endlf
 Exit Sub
LoadErr:
 MsgBox "Error:" & Err & Err.Description
```

```
    Unload Me
End Sub
```

Mainmenu Code

```
Option Explicit


Private Sub mnuAboutApp_ Clickf)
frillJ\bouLShow
End Sub

Private Sub mnuAlnfor_ ClickO
On Error Resume Next
frmReservedBooks.Show
End Sub

Private Sub mnuBlnfo Clickt)
On Error Resume Next
IrmBookl.ist.Show
End Sub

Private Sub mnuBorrowersList_ Clickt)
rptBorrowersList.Sbow
End Sub

Private Sub mnuExit_ Clicki)
End
End Sub

Private Sub mnuLInfo_ Clickr)
On Error Resume Next
frrn'Transaction.Show
End Sub

Private Sub mnul.Ols_Clickr)
rptfsookl.ist.Show
End Sub

Private Sub mnuReaderInformatiol1_ Clickt)
rptkeaderslnfo.Show
End Sub

Private Sub ll1nuRlnlo_ClickO
On Error Resume Next
frrn Borrower_ Reg. Show
End Sub
```

Module Code

```
Option Explicit
Global gsDatabase As String
Global gsConnect As String
Global gsRecordsource As String
Sub MainO
gslratabasc = "C:\ WINDOWS\Desktop\Circulation System\dbLibCirculation.mdb"
gsConnect = ""
Irrnl.ogin.Show
End Sub
```