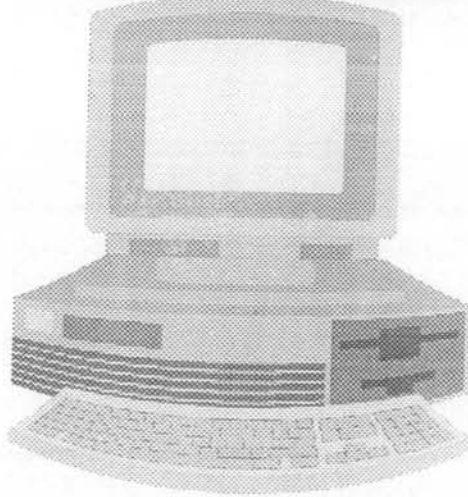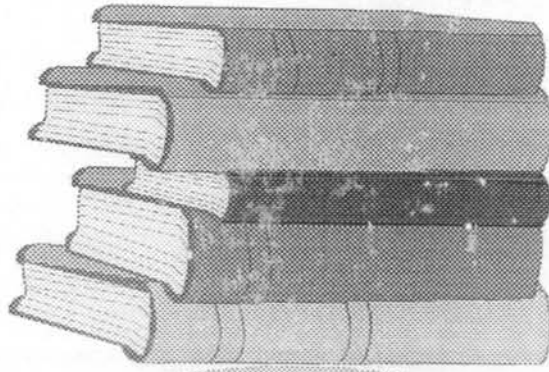بِسْمِ اللهِ الرَّحْمٰنِ الرَّحِيمِ

رَبِّ زِدْنِي عِلْمًا

COMPUTERIZED

INVENTORY CONTROL SYSTEM

FOR

DEPARTMENT OF CHEMISTRY
QUAID-I-AZAM UNIVERSITY
ISLAMABAD

BY

NISAR AHMAD

Submitted to

Computer Centre, Quaid-i-Azam University, Islamabad as
requirement for completion of PGD in Computer Sciences.

QUAID-I-AZAM UNIVERSITY

COMPUTER CENTRE

ISLAMABAD

FINAL APPROVAL

Certified that we have read project report submitted by

Nisar Ahmad
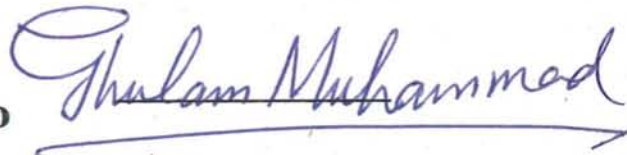
and found it of sufficient standard to warrant its acceptance by the Quaid-i-Azam University, Islamabad, for the Diploma in Computer Sciences.

COMMITTEE
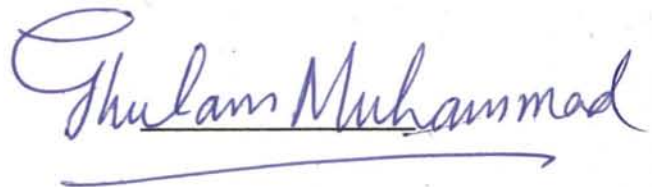
1. **EXTERNAL EXAMINER** SYED MASOOD HUSSAIN
   Vice President
   Regional Computer Centre
   NAME: National Bank of Pakistan
   ISLAMABAD

2. **SUPERVISOR**

   NAME: **DR. GHULAM MUHAMMAD**

   Computer Centre, QAU

   Islamabad.

3. **DIRECTOR**

   Dr. GHULAM MUHAMMAD

   Computer Centre, QAU

   Islamabad.

PROJECT BRIEF

PROJECT TITLE   Inventory Control System.

OBJECTIVE   To Computerize Store of Department of Chemistry.

PURPOSE   A project report for the partial fulfillment of Post Graduate Diploma in Computer Sciences.

ORGANIZATION   Department of Chemistry, Quaid-i-Azam University, Islamabad.

PROJECT VENUE   Computer Centre, Quaid-i-Azam University, Islamabad.

UNDERTAKEN BY   Nisar Ahmad

SUPERVISED BY   Dr. Ghulam Muhammad, Director, Comuter Centre, QAU, Islamabad.

LANGUAGE USED   FoxPro 2.5

OPERATING SYSTEM   MS-DOS 6.2

SYSTEM USED   486DX2 Compatible

ABSTRACT

The aim of this project is to minimise the complexities of working in the Department of Chemistry store and to maximise the output through performance and cost benefit concept. Obviously it is difficult to handle the situation manually.

To achieve the objectives I have utilized the facilities of FoxPro alongwith basic concepts of relational database techniques. All the time, it is kept in mind that the system should be easy to understand and user-friendly. Moreover, it should be useable by low qualified typists and steno-graphers, who have no previous computer knowledge. Two to three hours training is sufficient to handle the stream-line progress.

CONTENTS

CHAPTER 5:

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

It is well known reality that a good management is a backbone of good discipline. The art of discipline minimizes the utilization of resources and maximses the productivity and cost benefit. No doubt the manual system, when they are designed, leased open the doctrin of cost benefit. In the modern complication of life, where the world is full of research, technology and advancement, one has to think with a scientific brain and has to decide the route of advancement which has a correlation with science and technology.

Some times the manual process is easy and beneficial, but when electronic application concepts are involved, their status of easiness disturbs. Almost similar situation is seen in full magnitude when a manual system is converted into a computerized system. This is due to lack of knowledge of System Analysis and Design (SAD).

It is advisable that whenever a system is attempted for computerization, it should be fully analyzed and properly designed with the thinking that it should be helpful to the end users, rather than the show business.

My label of confidence for the present system of inventory is that it will run under the hand of lower qualified workers, who have no previous idea of computer usage.

The Department of Chemistry is a place of research for four disciplines namely.

1.   Analytical Chemistry.

2.   Inorganic Chemistry.

3.   Organic Chemistry.

4.   Physical Chemistry.

Almost all disciplines need computers for their calculation work, graphs and text processing. So many built-in functions are provided in modern computers like spread sheets, packages, which are of specific nature. Apart from over all situation the area of my assignment is slightly different with the respect of store.

As shown in Figure. 1.1, the store of Department of Chemistry, Quaid-i-Azam University, Islamabad Inventory System deals with the chemicals, equipments and glasswares items. These items are used in the laboratories.
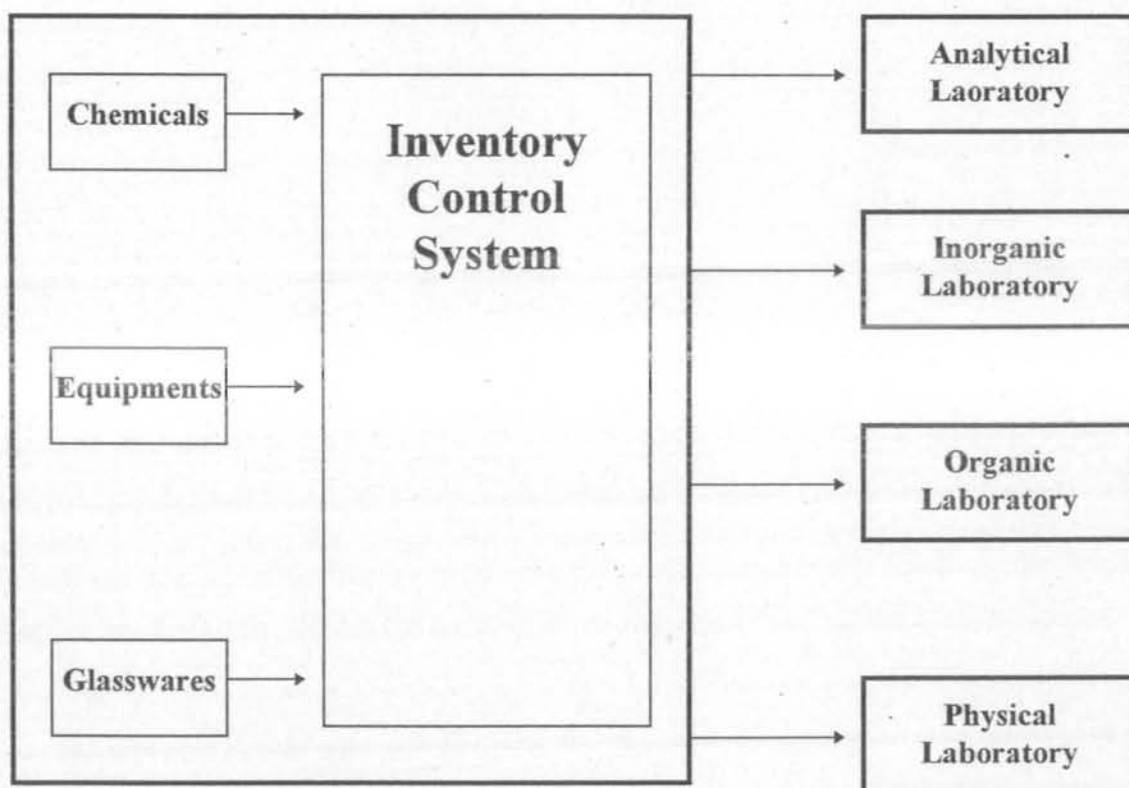
Figure 1.1:   Store Set up of Department of Chemistry

There are difficulties in the maintenance of record, wastage of time, human labor, stationery and inefficiency in error recovery. To overcome such difficulties, it was felt that a computerised system may be developed. It is hoped that this will help the department in improving their performance, access time, efficiency and system reliability.

1.2   CHEMISTRY DEPARTMENT.

The students are trained in theoretical as well as practical aspects of chemistry. The chemical principals taught in the class are demonstrated and tested in the laboratory. The master's degree students perform laboratory work in the following branches of chemistry.

i)   Analytical Chemistry
ii)   Inorganic Chemistry
iii)   Organic Chemistry
iv)   Physical Chemistry

i)   Analytical Chemistry

laboratory is equipped with a number of instruments like pH meters, Conductance bridges, colorimeters, potentiometers, electroanalyzers polarographs and analytical balances. These instruments are used to conduct experiments for analysis of materials containing even microgram quantities of metal ions. A number of simple experiments have been designed to demonstrate practical applications of various topics in analytical chemistry.

ii)   Inorganic Chemistry

Laboratory is used to study chemical reactions of acids and basin and metal slots under different conditions. Then laboratory is equipped with glassware like brunets, pippets, beakers, carical flasks, heating and cooling devices, centrifuge machines etc. Students are given exercises in qualitative and quantitative analysis of minerals as well as mixtures of synthetic metal slots. Further, synthesis of compounds using different techniques and under event atmosphere is carried out in the laboratory. The laboratory

experiments are designed to demonstrate the practical applications of inorganic chemistry in our life.

iii)   Organic Chemistry

Laboratory provide facilities for experiments for determination of melting points, boiling points, distillation, sublimation, fractional and vacuum distillation of organic compounds. Further, spectroscopic and chromatographic techniques are used to separate, identify and characterize organ in compounds and natural products. Further, a number of exercises demonstrating various synthetic procedures inorganic chemistry are also given to students.

iv)   Physical Chemistry

Physical Chemistry laboratory have a number of small instruments such as pH meters, refractometers, polarimeters, conductivity meters, water baths, calorimeters, analytical balances apart from regular glass apparatus. Students are given opportunity to conduct experiments for determination of rates of reactions, thermodynamic quantities, heats of reactions. Colour of compounds, polarography and potentiometer. Students are trained in these laboratories in various fields of physical chemistry.

After completing master's degree programme, the students have enough training in laboratory work to undertake independently any technical/research problem in industrial project or research organization.

In addition to these facilities, a number of specific laboratories are available for research students pursing advanced degree programmes. These laboratories houses modern, sophisticated scientific instruments such as Nuclear Magnetic Resonance (Jeol RM x 60) Spectrometer, Electron Spin Resonance (FEIXG) spectrometer, Optical Rotatory Dispersion and Circular Dichroism (Jasco-20A) spectropolarimeter, combined

Gas Chromatography and Mass (Shimadzm GC-MS-QP 1000 A) Spectrometer, Thermal Analyzer (Shimadzn DTA-30) instruments for cyclic voltammeter and impedance, Atomic absorption (AA - 670) spectrophotometer, and High Performance Liquid Chromatography (HPLC LC-6A). These instruments provide excellent facilities for research in different fields of chemistry.

1.3 OBJECTIVES OF THE PROPOSED SYSTEM

Chemistry Department Store gets a large number of demands for various sort of items i.e. Chemicals, Equipment and Glass-ware from different laboratories. It has to keep track of all these demands apart from fulfilling them at the right time. Store has to keep track of needy available balance of each item so that if an item needs replenishment, suppliers can be contacted for tenders/quotations and then supply orders can be issued to the most suitable supplier. In additions, the store also has to maintain the record of each suppliers credit and check his bills. To perform all these activities manually, it is difficult task.

In order to get rid of the laborious and tiresome activities of ledgers searching and file management, Department of Chemistry requested for the computerization of its Inventory Control System (ICS). The project has been initiated with the following objectives.

i)   **Access Time.**

File access and retrieval of information should be fast enough so that any desired information must be available within a small amount of time.

ii)   **System Reliability**

Computerized system should be accurate and error-free. For example, it should display the exact balance of the items which are received in the store and issued.

iii)   **Efficiency**

The computerized system should be an efficient system and must be friendly to the end-user. It should not confuse the user due to lot of technicalities and restrictions.

iv)   **Consistency**

There should not be redundant data in any file. This will be helpful for proper updating the system information contents.

v)   **Security**

The system should not be allowed to any unauthorized personnel to access the files.

1.4   *SYNOPSIS*

1.   In this chapter, brief introduction has been provided about the Chemistry Department, problems and objectives

2.   Chapter 2 describes details regarding overall setup of Department of Chemistry, its relevant subsections and laboratory work affiliations to store, the role of store in research and academic activities. It also covers the specifications of problems in the manual system.

3.   Chapter 3 explains the designing of the proposed system. The representation shows the files structures and data entering worksheets.

4.   Chapter 4 expresses the system and procedure flow-charts, programmes and their inter links, the files and associated keys. It also explains the mutual relationship of files according to the design of relational database.

5.   Chapter 5 describes conclusion and recommendation.

6.   At the end of this report a user guide has been provided. This explains the procedure how to install and start the inventory control system. It expresses the on-line help, quick reference guide, a short training procedure to the low qualified people.

CHAPTER 2

EXISTING SYSTEM

2.1 EXISTING SYSTEM

Chairman is the head of department and is responsible to look after all academic and non-academic activities in the department. Physically more than 30 people are under his supervision. In the modern day, when every room is provided with a small or medium level computer, his responsibility is increased.

The chairman is selected among the senior most professors for a period of three years. He is also the member of board of advance study and academic council of the University.

Apart from the academic functionality, the chairman has to manage the research equipment, chemicals, glassware to various laboratories. The master function of supply is in the hand of department store which has a status of a mini-department of supply to support researchers in their research work. The following shows the organizational setup of department.
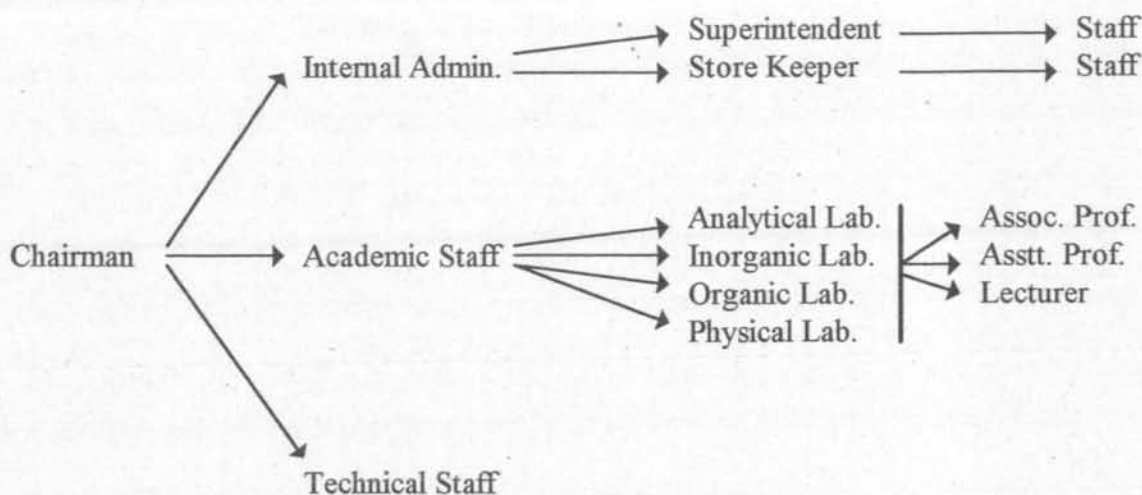
Figure 2.1   Organisation of Chemistry Department.

2.2 FUNCTION OF STORE

Function

O

Purchase Order ———————→ Local
→ Import Items

Receive Items ←——————— From Local Supplier
→ From P & S Section

Issue Items ←——————→ Teachers
→ Researchers
→ Students

Returned By ←———————————

Record of ←——————→ Damage Items
→ Dead Items
→ Auctioned Items
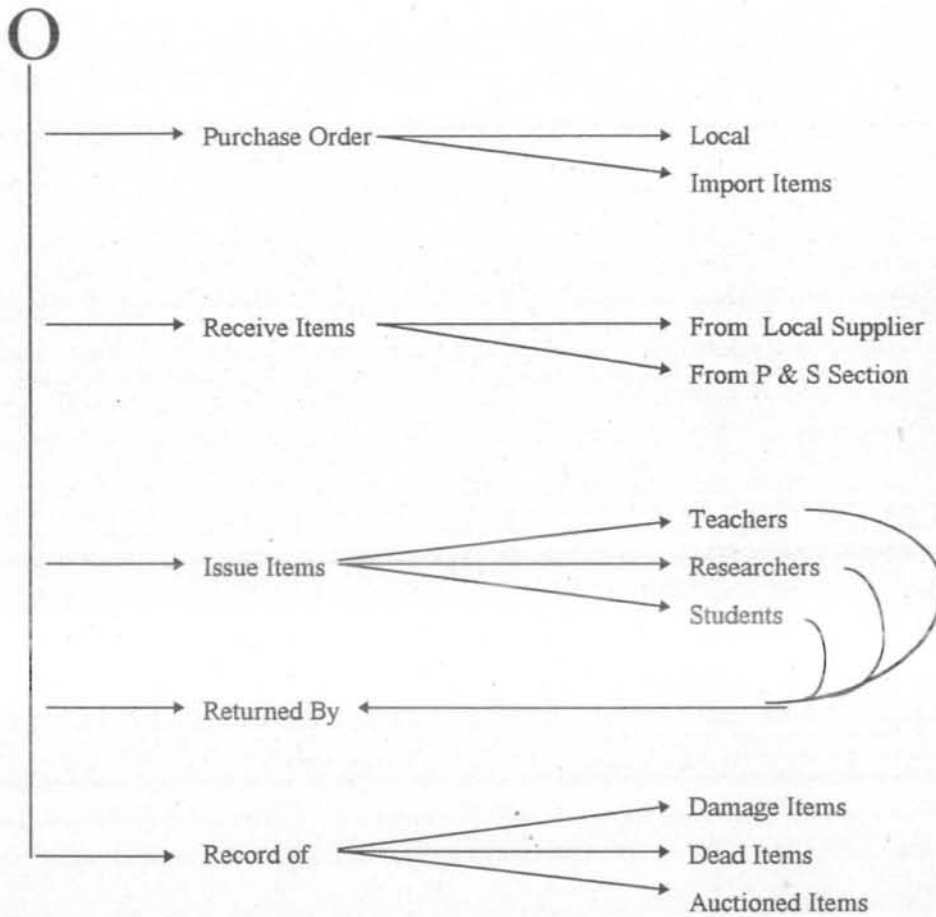
Store is authorized to purchase the items of certain limit. If the requirement go beyond that limit, then the requirement is sent to Purchase and Store Section of the University. They manage to provide such costly items on bases of budget provision and recommended way of tender.

2.3   PURCHASE PROCEDURE

Researchers send the request for their requirements of chemicals, glass-ware and equipment to store. If the request is within the authorized limited then an order is placed to local authorized vendor for supplying the requested items on cash or bill payment. When the items are received , these are properly examined and entered in a stock register. The entry contains all particular of items. The mode of payment is made as per agreement with the vendor which was decided at the time of ordering.

A limited amount is allocated for the said store to purchase the items within that limit. That allocated amount is called "Impressed amount". If the required items are within the range of impressed amount, the items are purchased. If the items are beyond the impressed amount then the demand is sent to Purchase & Store Section of the University. Purchase & Store Section has the authority to purchase the items within 10,000 rupees by collecting the quotations and if the items exceeds the limit of 10,000 rupees, then tenders for the items are called.

These tenders are opened by a purchase committee which is constituted by the Vice Chancellor of Quaid-i-Azam University. A tender of lowest quoted price is approved by the purchase committee. After that an order is placed to the party to supply the items. When a supplier receives the order from the Purchase & Store Section, he sends the items with delivery challan and invoice/bill. Purchase Committee examines the items whether these are according to specifications or not. If items are not according to the specifications, then these are sent back to the suppliers for replacement, otherwise the items are accepted and invoice/bill is sent to the Vice Chancellor for approval. After the approval, the payment is made through a cheque prepared by Accounts and Audit Section. After that the received items are sent to Store with an indent. This indent is returned by the store incharge with signatures that the items are received in the store.

Store incharge makes the entries in a stock register. Stock register is divided into two parts for an item. One part is for entry of a received item and the other part is for

issue of items to the researchers. Design of entry is provided at the end of this report (*Annexure-A*).

2.4 OBJECTIVES OF THE STORE

Store of Chemistry Department has been made to fulfill the following objectives.

i)   Purchase/procure the Chemicals, Equipment, Glass-ware and other research items.

ii)   To facilitate the teachers/staff and students of Chemistry Department.

iii) Provides research material to researchers of the Chemistry Department for their research work.

iv)   Keep/update the record of the purchases.

v)   Keep and update the record of issued material/items.

vi)   Updates the record of damaged items.

vii) Keep the record of dead items.

viii) Keeps the balance record of the items.

2.5 PROBLEMS IN MANUAL SYSTEM

The present manual inventory system involves several disadvantages and problems.

1.   A lot of stationary like papers, registers, pens etc. have to be used. This manual system implies a lot of cost.

2.   Manual system is time consuming process because all procedures have to be performed manually.

3.   Error-checking in manual system is not properly implemented.

4.   There is no guarantee of data consistency in manual system.

5.   Making entries and then retrieving the information from ledgers and registers make office work quite slow.

6.   Information stored on papers has greater chance of being destroyed or lost.

7.   Information on papers or files consume more space.

8.   In the manual inventory system, all the calculations are done manually. This not only causes errors, but also requires a lot of mental exertion.

In view of the problems mentioned above, it was desired to develop a computerised system. It is hoped that this system will greatly help the department to overcome their difficulties.

CHAPTER 3

PROPOSED SYSTEM

3.1 SYSTEM DESIGN

After analyzing the existing system and understanding its requirements including the improvements and modifications required, system design is undertaken. System design is conducted in four stages, viz inputs, outputs, codes and files. We discuss each of these in this chapter.

3.2 DESIGN OF INPUTS

First step is to analyze the input data. Here we extract the meaningful information from data to feed into computer to achieve our requirements. In this step, following data is needed as inputs.

    i)   Items data entry

    ii)   Purchase Items entry

    iii)   Receive Items entry

    iv)   Damage items entry

    v)   Dead items entry

    vi)   Firms data entry

    vii)   Issue items entry

    viii)   Items return data entry

    ix)   Budget Allocation Entry

Input design of above mentioned information is described separately:

3.2.1 ITEMS DATA ENTRY

In an inventory system, firstly items data is needed to feed into the computer. For this purpose different data entry worksheets are designed with different data files. The data files with data items and data entry worksheets are as under:-

1.   Items Data File: *ARTICLES.DBF*

This file is created to hold the data of whole items belongs to a scientific store. In this file all the items must be entered those are purchased for the store and also those items are not purchased. Items data file is very important file in which item information (Item Code, Item Name, Qty. Balance etc) is stored. This file is used with other files to produce different type of output. Two data entry worksheets are designed for this file. One is for new items entry and other is to modify items. Structure of data file and data entry worksheets are as under:

Structure of data file

Field No.	Field Name	Field Type	Length (Characters)
1.	Item_Code	Numeric	6
2.	Item_Name	Character	40
3.	Item_Size	Character	10
4.	Unit	Character	8
5.	Cap_Vol	Character	10
6.	Qty_Bal	Numeric	8
7.	Order_Level	Numeric	2

a)   **Data Entry Worksheet**

NEW ITEMS DATA ENTRY WORKSHEET

Item Code [   ]

Item Name [   ]

Item Size [   ]   Capacity/Vol. [   ]

Unit [   ]

Quantity Balance [   ]   Re-Order Level [   ]

UNIT
Kg.
Lb.
Inches
Feet
Box/Packet
Grame
Each
Other

Above Information is Correct...... (Y/N)

b)   **Modify Items Data Entry Worksheet**

MODIFY ITEMS DATA ENTRY WORKSHEET

Item Code [   ]

Item Name [   ]

Item Size [   ]   Capacity/Vol. [   ]

Unit [   ]

Quantity Balance [   ]   Re-Order Level [   ]

Above Information is Correct ... (Y/N)

15

2. Purchased Items Data File: *ORDER.DBF*

This file is used to enter the data when orders are to be placed for the purchase of items from different firms. In this file data elements are Item Code, Firm Code, Qty., and Order Dt. Structure of data file and design of the worksheet is given below:

Structure of data file

Field No.	Field Name	Field Type	Length (Characters)
1.	Item_Code	Numeric	6
2.	Firm_Code	Numeric	6
3.	Qty	Numeric	8
4.	Order_Dt	Date	8
5.	Remind_Dt1	Date	8
6.	Remind_Dt2	Date	8
7.	Remind_Dt3	Date	8

ENTRY OF PURCHASE ORDER FOR ITEMS

Item Name:

Firm Name

Item Code   Firm Code

Order Qty.   Order Date

Above Information is Correct .... (Y/N)

3. **Received Items Data File:** *RECEIVED.DBF*

This file is created to keep the record of purchased items. When an order is placed to a supplier, he supplies the items to the store. After receiving the items in the store, it is necessary to enter the received items record. This file holds the record of all items received in the store. To enter the information about received items, two data entry worksheets are designed. One worksheet is to entery quantity received in the store and other is to enter invoice/bill informtion. Structure of data file and data entry worksheets are shown below:

Structure of data file

Field No.	Field Name	Field Type	Length (Characters)
1.	Item_Code	Numeric	6
2.	Recv_Date	Date	8
3.	Bill_No	Character	10
4.	Bill_Date	Date	8
5.	Firm_Code	Numeric	6
6.	Qty_Recvd	Numeric	8
7.	Item_Price	Numeric	8
8.	Discount	Numeric	5
9.	Amount	Numeric	10

a)   To enter received quantity.

RECEIVED ITEMS NEWLY PURCHASED FROM FIRMS

Item Code ▯

Item Name ▯

Item Size ▯   Capacity_Vol. ▯

Qty. Bal. ▯   Unit ▯

Re_Order Level ▯   Qty. Received ▯

Above Information is Correct ..... (Y/N)

b)   Accept the contents of the Invoice/Bill of the Supplier.

DATA ENTRY OF ITEMS PURCHASED FROM THE FIRM

Item Code ▯   Firm Code ▯

Received Date ▯

Bill No. ▯   Bill Date ▯

Qty. Received ▯   Item Price ▯

Discount ▯   Amount ▯

Above Information is Correct ... (Y/N)

4. Damaged Items Data File   *DAMAGE.DBF*

This file is created to enter the damaged items information. The items may be damaged by the researchers, teachers, students or by the store staff. Whenever an item is damaged by someone this must be entered in this data file to keep proper record of damaged items. Main fields included in the file are Item Code, Qty.Damage, Damage dt., Reason and by whom damaged. Data entry worksheet is also created for this data file. Structure of the file and data entry worksheet are as under:

Structure of data file

Field No.	Field Name	Field Type	Length (Characters)
1.	Item_Code	Numeric	6
2.	Qty_Damage	Numeric	6
3.	Damage_dt	Date	8
4.	By_Whom	Character	30
5.	Reason	Character	20

Damaged Items Data Entry Worksheet

DAMAGED ITEMS DATA ENTRY WORKSHEET

Item Code   [_____]   Qty.Damaged   [_____]

Reason   [_____]

Damaged Date   [_____]

By Whom   [_____]

5. Dead Items Data File: *DEAD.DBF*

This file is created to keep the record of the items those are not repairable. These items are called "dead items". Dead items can be auctioned by the university at any time. Important data elements in this file are Item Code, Dead dt., Dead Qty., Auctioned and Auctioned Amount. File structure and data entry worksheet are detailed below:

Structure of data file

Field No.	Field Name	Field Type	Length (Characters)
1.	Item_Code	Numeric	6
2.	Dead_dt	Date	8
3.	Dead_Qty	Numeric	5
4.	Auctioned	Logical	1
5.	Amount	Numeric	8

DEAD ITEMS DATA ENTRY WORKSHEET

Item Name: [   ]

Item Code [   ]   Dead Date [   ]

Dead Qty. [   ]

Above Information is Correct ... (Y/N)

6.   Firms Data File: *FIRMS.DBF*

In this file user can store information about the firms, supply the items to the store. This file is created to keep the record of the firms. This file is also very important. Firm name must be present in this file when user wants to place an order to a firm. User can't place order to a firm which is not entered in the firm data file. Data entry worksheet is also designed for firms data entry. Structure of the data file and data entry worksheet are given below:

Structure of data file

Field No.	Field Name	Field Type	Length (Characters)
1.	Firm_Code	Numeric	6
2.	Firm_Name	Character	50
3.	Address	Character	100
4.	Origin	Character	10
5.	Product_tp	Character	15
6.	Telephone	Character	19
7.	Fax	Numeric	6

FIRMS DATA ENTRY WORKSHEET

Firm Code [   ]

Firm Name [   ]

Origin [   ]   Product Type [   ]

Address

[   ]

Telephone [   ]   Fax [   ]

Above Information is Correct ... (Y/N)

7.   Issued Items Data File: *ISSUE.DBF*

Items are issued to teachers/researchers/students for their research work. So they send their demands to the store. Store keeper issues the items to them. For this purpose issue data file is created to keep the record of issued items. Structure of the file and designed data entry worksheet are shown below:

Structure of data file

Field No.	Field Name	Field Type	Length (Characters)
1.	Item_Code	Numeric	6
2.	Issue_dt	Date	8
3.	Qty_Issued	Numeric	8
4.	Issued_To	Character	30
5.	Status	Character	15
6.	Address	Character	50

ITEMS ISSUE WORKSHEET

Item Name: [   ]

Item Code [ ]	STATUS Teachers/Employee S t u d e n t
Qty. Issued: [ ] Issue Date [ ]	Teacher/Employee Desig [ ] Dept. [ ]
Issued To: [ ]	STUDY Short Course Prof. Course Diploma (PGD) Master of Sc. Master of Phil. P.Hd.
Status [ ]	
Address [ ]	Year [ ]

Above Information is Correct ... (Y/N)

8.   Returned by Data File: *RETURNED.DBF*

Teachers/researchers/students return the items back to the store those are issued by them and now the items are not in their use. This file is created to keep record of all the items returned by the teachers/researchers/students. Main fields of the file are Item Code, Qty. Received, Receiving dt, Returned by with address. Structure of data file and designed data entry worksheet are shown below:

Structure of data file

Field No.	Field Name	Field Type	Length (Characters)
1.	Item_Code	Numeric	6
2.	Qty_Rcv_Bk	Numeric	8
3.	Rcv_Bk_Dt	Date	8
4.	Returned_by	Character	8
5.	Address	Character	8
6.	Status	Character	20

ITEMS RETURNED BACK WORKSHEET

Item Name: [_____]

Item Code [_____]

Returned By: [_____]

Status [_____]

Address

[_____]

Qty. Rec. Back: [_____]   Rcv. Back. Dt.: [_____]

Above Information is Correct ... (Y/N)

9. Budget Data File: *BUDGET.DBF*

This file is created to enter the allocated amount for the purchase of items. Main fields of data file are Budget year, Allocation, Expenditure and surplus/deficits. Structure of the file and data entry worksheets are as under:

Structure of data file

Field No.	Field Name	Field Type	Length (Characters)
1.	Budget_yr	Character	7
2.	Allocation	Numeric	10
3.	Expenditure	Numeric	10
4.	Surp_Defic	Numeric	10

BUDGET ENTRY WORKSHEET

Budget Year	
Allocation	
Expenditure	
Surplus/Deficits	

Above Information is Correct ... (Y/N)

3.3 DESIGN OF OUTPUTS

After detailed meetings and interviews with the end-users of the store, output design is decided and finalized. It is duty of the system analyst to decide whether the output is to be shown on the screen or directed to the printer. Store inventory system is designed to produce the following outputs.

1. List of all items present in store (on screen/printer).
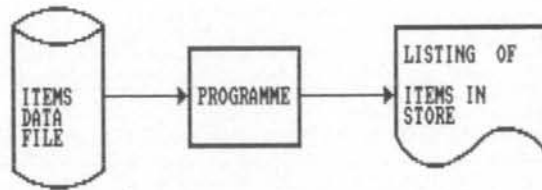
2. Single item balance list (on screen/printer).
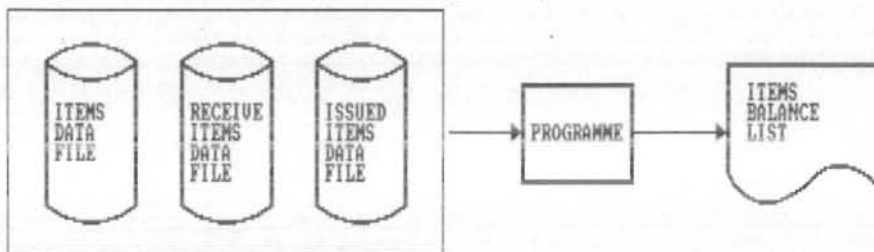
3. List of firms (on screen/printer)
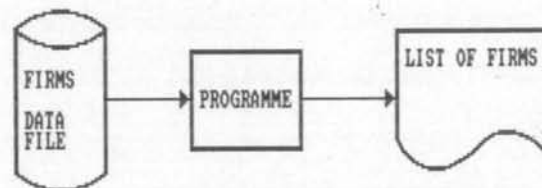
4. Output of whole items entered , concerned with store (on screen/printer).
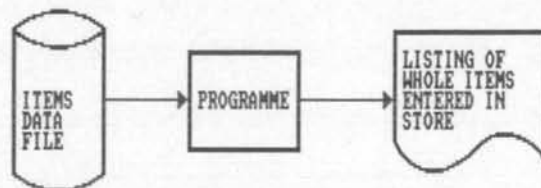
5.   List of items to purchase
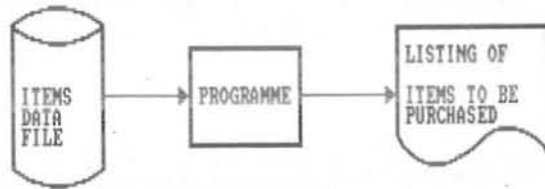

```
  ITEMS            LISTING OF
  DATA    PROGRAMME    ITEMS TO BE
  FILE            PURCHASED
```

6.   Received newly purchased items list.


```
  ITEMS   ORDER   RECEIVE                    LISTING OF
  DATA    FILE    ITEMS        PROGRAMME     RECEIVED
  FILE            DATA                       ITEMS IN
                  FILE                       STORE
```

7.   Issued items list


```
  ISSUED              ISSUED ITEMS
  ITEMS    PROGRAMME  LISTING
  DATA
  FILE
```

8.   Damaged items list.


```
  DAMAGED             DAMAGED ITEMS
  ITEMS    PROGRAMME  LISTING
  DATA
  FILE
```

9.   Output of dead items.


```
  DEAD                DEAD   ITEMS
  ITEMS    PROGRAMME  LISTING
  DATA
  FILE
```
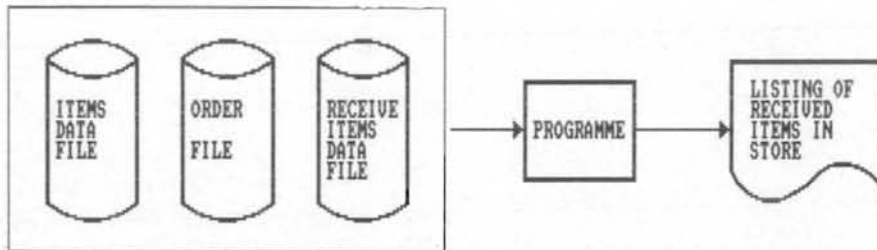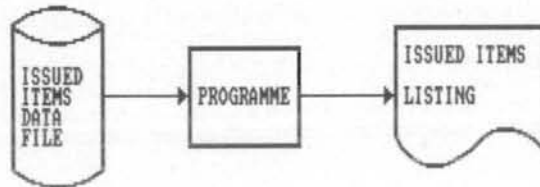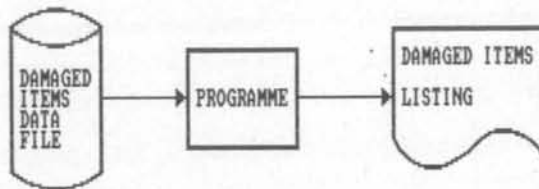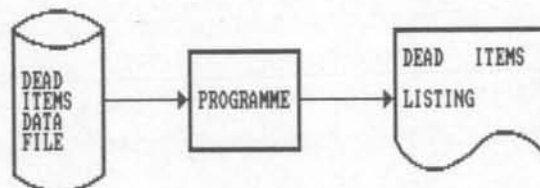
10.   List of items issued to the persons.


```
  ISSUED              ISSUED ITEMS
  ITEMS    PROGRAMME  LISTING
  DATA
  FILE
```
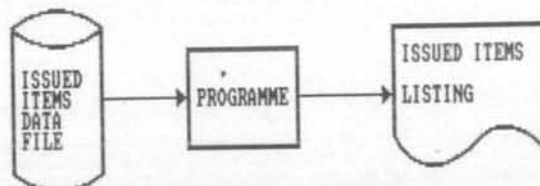
3.4   CODES DESIGNED

Code is a small unit of characters used to represent a large data items. Codes are used when the data to be handled is very large or where there is a chance of entering incorrect information. Issue of codes is a system claims many advantages, some are as under:

1.   Code saves computer storage as compared to actual data item.

2.   Codes are useful to reduce the chance of spelling errors.

3.   Codes are used to speed up the data entry process. The present system uses codes to represent the following entities:

   a)   Item Code

   b)   Firm Code

Item codes and firm codes are of 6 bytes long numeric type. Each item and firm is allotted a unique code.

For example:

Item Code	Item Name	Firm Code	Firm Name
000001	Diskette 5.25" HD	000001	Leo Computers Pvt.(Ltd.)
000002	Diskette 3.5" HD	000002	ABN Computers Ltd.

CHAPTER 4

SOFTWARE DEVELOPED

4.1 SOFTWARE DEVELOPED

Aim of the developed software is to develop computer programmes which are capable of processing inputs into desired outputs. This software is developed in FoxPro by using its built-in functions and programming facility. Software package and the programmes developed for the proposed system are discussed below in detail;

4.2 CHOICE OF FOXPRO 2.5

The FoxPro software is a sophisticated piece of software and has a very easy-to-use interface. In fact, if you are a beginner who is willing to experiment with FoxPro, you will discover in matter of minutes that FoxPro is simple to use. However, it is the programming capability of FoxPro that makes it an outstanding database management system. You can do useful things by learning only a half-dozen or so commands. The more you use FoxPro, the richer it becomes. After a week or so, you will begin to feel like a veteran computer user. It can be as simple or as complex as you want to make it. As you continue to experiment with FoxPro, things will begin to make sense. That is one reason why I like FoxPro.

4.3 HARDWARE AND SOFTWARE REQUIREMENTS

The FoxPro programme operates with the PC and MS-DOS operating systems. It also requires an IBM PC, XT,AT, or compatible microcomputer having 2MB or more of random access memory (RAM). Your system have one floppy disk drive and a fixed disk. There must be at least 4 megabytes of free space on the fixed disk to install FoxPro main

programme and enough space for storing the data. You will also need a printer if you want paper copies of your database reports.

4.4 INSTALLATION OF INVENTORY SYSTEM

Inventory system programmes are developed and tested. These programmes are available on a floppy diskette. Inventory system can be installed from the floppy diskette with a command "INSTALL". When this command is applied all the developed programmes will be copied on the Hard Disk of the Computer in a directory named "STORES".

After installation of inventory system, type "STORES" at DOS prompt to activate main programme, to create and initialize the databases. Every time when inventory system is started, required database files will be checked. If these files are not present, new files will be created and initialized.

4.5 DATA ENTRY PROGRAMMES

First of all, data entry programmes are called by the main programme. Item, firms and other necessary data entries can be carried out by these programmes. System flow chart and programmes are discussed in detail as under:

SYSTEM FLOW CHART

MAIN MENU

1. ENTRY
2. CIRCULATION
3. SEARCH
4. DISPLAY
5. PRINT
6. BACKUP
7. RESTORE
8. MAINTAIN
9. QUIT

E N T R Y

1. ITEMS
2. FIRMS
3. BUDGET

I T E M S

1. ADD NEW ITEMS
2. MODIFY ITEMS
3. PURCHASE ORDER
4. RECEIVED ORDER
5. DAMAGED ITEM
6. DEAD ITEM

CIRCULATION

1. ISSUE
2. RETURN

F I R M S

1. ADD NEW FIRM
2. MODIFY FIRM

ITEMS 1 DBF

ORDER 2 DBF

RECVD 3 DBF

BUDG. 4 DBF

DAMGD 5 DBF

DEAD 6 DBF

ISSUE 7 DBF

RETURN 8 DBF

FIRMS 9 DBF

UPDATE INDEX FILES

C:\) OR FoxPro

RESTORE

FLOPPY 0 → HDD

BACKUP

HDD → FLOPPY 0

SEARCH

1. ITEMS TO PURCHASE
2. PURCHASED ITEMS
3. ISSUED ITEMS
4. DAMAGED ITEMS
5. DEAD ITEMS
6. WHOME ISSUED
7. LAST PURCHASE ENTRY

DISPLAY

SEARCHED INFORMATION

4.5.1. ADD NEW ITEMS

There are two types of entries in add new items programme (ENT11.PRG). If item name is new, then the new items data entry worksheet will appear on the screen. If an item name is already entered and now wants to enter the same item name with different specifications, the system will accept first 3 characters of the item name. The items names starting from these 3 characters will be displayed on the screen with item code. Enter the item code of the item name to enter as a new item with different specifications. Here item code is searched from the items data file and item name is stored in the computer memory. Worksheet for Items data entry is displayed with the following data items to be entered.

1. **Item Code**:   Item Code is of 6 digits numeric.   Item code is assigned by the system automatically. User is not authorised to enter or change the Item Codes.

2. **Item Name:**   If item name already exist in the items data file then it will appear on the screen, otherwise type the item name.

3. **Item Size:**   Type here the item size which is given.

4. **Capacity/Vol.:**   Enter the capacity or volume of the item.

5. **Unit:**   A new window will appear on the screen with list of Units.   If required unit is in the list highlight that line and press enter otherwise highlight "Other" and press enter. Selected unit is accepted. If there is any change then it can also be changed.

6.   **Order Level**:   User has to enter the re-order level of the item. Type minimum level of the item when item is needed to be purchased.

FLOW CHART TO ADD NEW ITEMS

```
                    ┌──────────┐
                   (  START    )
                    └────┬─────┘
                         ▼
                    ┌──────────┐
                    │ USE      │
                    │ DATA     │
                    │ FILE     │
                    └────┬─────┘
                         ▼
                    ┌──────────┐
                    │ 1. NEW   │
                    │ 2. DUP.  │
                    │ 3. EXIT  │
                    └────┬─────┘
                         ▼
                    ◇ IF        YES   ┌────────┐   ┌────────┐   ┌────────┐
                      OPT = 3 ──────▶ │ UPDATE │──▶│ CLOSE  │──▶│ STOP   │
                    ◇               │ INDEX  │   │ FILES  │   └────────┘
                         │ NO         │ FILES  │   └────────┘
                         ▼            └────────┘
                    ◇ IF        YES   ┌────────┐   ┌────────┐   ┌────────┐
                      OPT = 2 ──────▶ │ ACCEPT │──▶│ LIST OF│──▶│ ACCEPT │
                    ◇               │ 3 CHR  │   │ ITEMS  │   │ ITEM   │
                     NO │            │ I.NAME │   │ NAMES  │   │ CODE   │
                        ▼            └────────┘   └────────┘   └────────┘
                    ┌──────────┐
                    │ ENTRY    │
                    │ WORK-    │
                    │ SHEET    │
                    └────┬─────┘
                         ▼
                    ┌──────────┐
                    │ WRITE    │
                    │ RECORD   │
                    └──────────┘
```
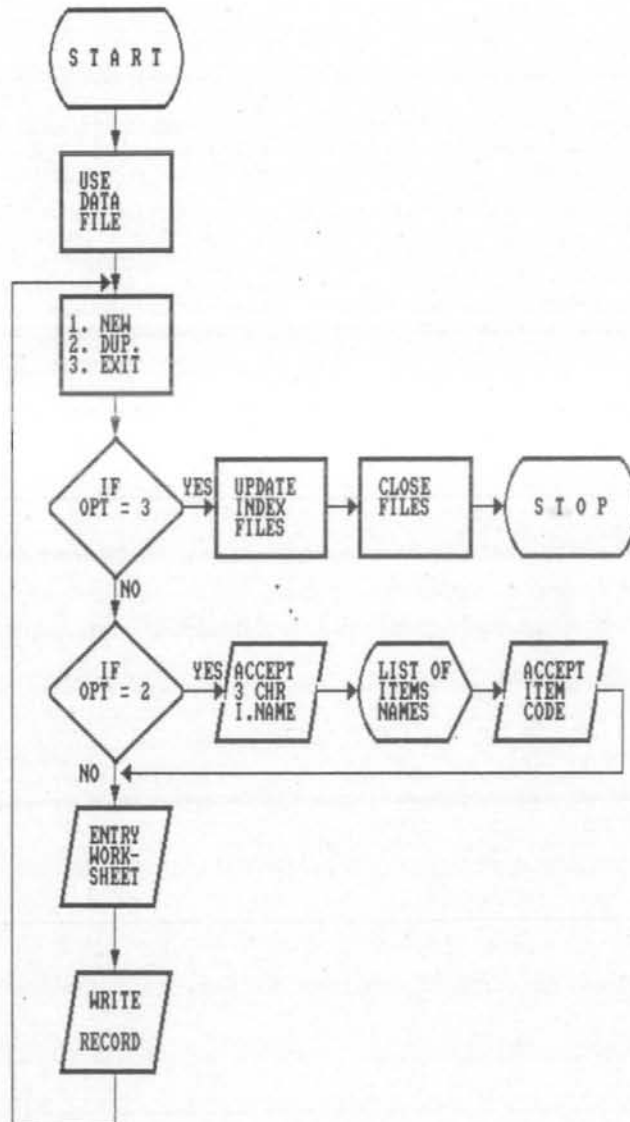
4.5.2. MODIFY ITEM NAME

A programme (ENT12.PRG) is developed to modify the existing items if needed. When this option is applied, the computer will accept first 3 characters of the item name. System will display all the item names with item codes starting from these 3 characters. At this stage system will ask to enter required item code. If item code is not typed correctly, system will display a message "Item Not Found", otherwise a worksheet to modify the item will appear on the screen to correct the item contents. At this point user can change, correct or delete any entry of the item. At the bottom of the screen a message "Above Information is Correct ... (Y/N)" appears. No other key is acceptable other than "Y" or "N". By typing "N" the user has the facility to correct the record again. If response is "Y" system will provide you the facility to correct more records.

FLOW CHART TO MODIFY ITEM NAME

```
                    ┌─────────────┐
                    │   START     │
                    └──────┬──────┘
                           │
                    ┌──────▼──────┐
                    │    USE      │
                    │    DATA     │
                    │    FILE     │
                    └──────┬──────┘
                           │
          ┌───────────────▼───────────────┐
          │       ACCEPT                    │
          │       3 CHR.                    │
          │       I.NAME                    │
          └──────────────┬─────────────────┘
                         │
                      ╱──▼──╲                    ┌──────────┐    ┌──────────┐    ╭──────────╮
                     ╱       ╲   YES             │  UPDATE  │    │  CLOSE   │    │          │
                    ╱ 3 CHRS. ╲──────────────────│  INDEX   │───▶│  FILES   │───▶│  S T O P │
                    ╲ BLANKS  ╱                  │  FILES   │    │          │    │          │
                     ╲       ╱                   └──────────┘    └──────────┘    ╰──────────╯
                      ╲──┬──╱
                         │ NO
                    ╭────▼────╮
                    │ DISPLAY │
                    │  ITEMS  │
                    │  LIST   │
                    ╰────┬────╯
                         │
                   ┌─────▼─────┐
                   │  ACCEPT   │
                   │   ITEM    │
                   │   CODE    │
                   └─────┬─────┘
                         │
                   ┌─────▼─────┐
                   │  MODIFY   │
                   │  WORK-    │
                   │  SHEET    │
                   └─────┬─────┘
                         │
                      ╱──▼──╲       NO
                     ╱       ╲──────────
                    ╱ CONFIRM ╲
                    ╲         ╱
                     ╲       ╱
                      ╲──┬──╱
                         │ YES
```
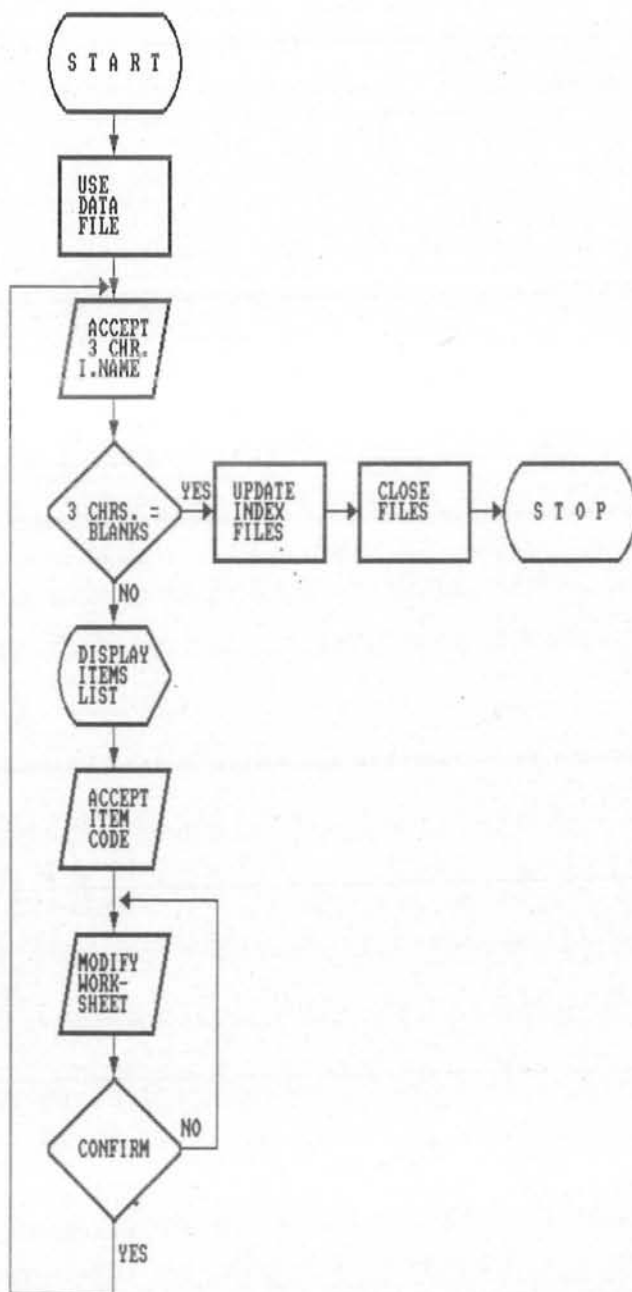
4.5.3. PURCHASE ORDER

If an item is needed to be purchased, place the order for that item. Entry of that order is needed to keep the record of the order. For this purpose a programme (ENT13.PRG) is developed to enter the data of purchase order in purchase data file. Following steps are involved:

1. Enter 3 characters of the **Item Name** to be purchased.

2. Item names are list on the screen. Enter correct item code of required item name to purchase.

3. Enter first 3 characters of the **Firm Name**. List of firms is displayed.Accept the firm code from the list.

4. Full information of the item is shown on the screen. Type "N" to discontinue or "Y" to make an entry.

5. Item Code and Firm Code are already provided.

6. Enter quantity of the item to purchase and date of placing the order to a firm.

7. Give response of the message at the end to correct the typed information or continue

PURCHASE ORDER ENTRY

START

USE FILES

3 CHR. ITEM NAME

ITEM NAME = BLANK

YES → UPDATE INDEX FILES → CLOSE DBF → STOP

NO

DISPLAY 10 REC. ITEMS

-MORE...
-I.CODE
-EXIT

EXIT — YES

NO

MORE — YES

NO

ACCEPT ITEM CODE

3 CHR. FIRM NAME

DISPLAY 10 REC. FIRMS

1

EXIT — YES

NO

MORE — YES

NO

ACCEPT FIRM CODE

DISPLAY ITEMS & FIRMS

CONTINUE — NO

YES

ACCEPT RECORD INFO.

CONTINUE — NO / YES
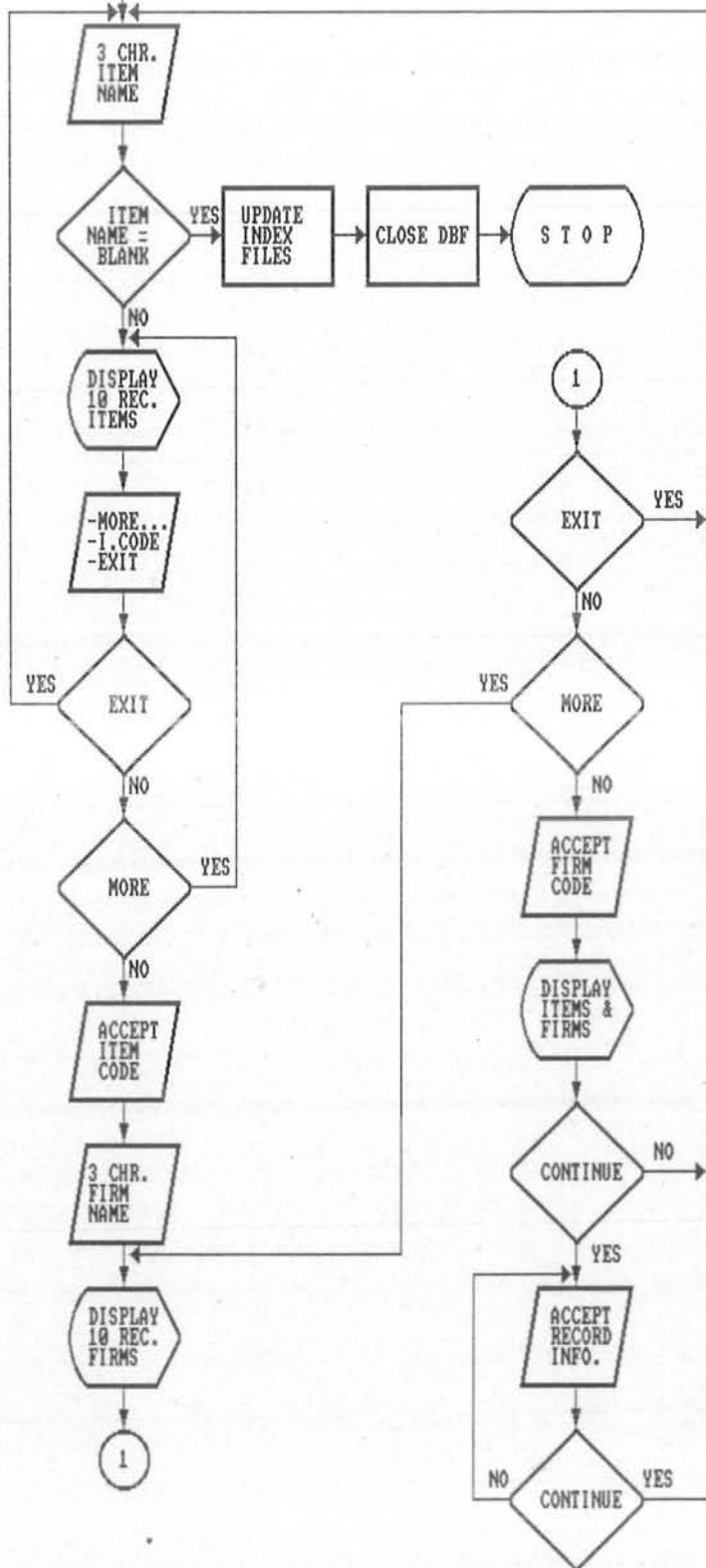
4.5.4. RECEIVED ORDER

Supplier received the order to supply the items to university. The supplier supplies the items alongwith delivery challan and invoice/bill. When these items are received in the store, entry must be made by the user. A programme (ENT14.PRG) is developed to do this type of entry. Procedure of the entry is as under:-

1. Enter first 3 characters of the Item Name. Items are enlisted on the screen starting from these 3 characters with Item Code.

2. Accept Item Code of the item which is received in the store.

3. Information of the item is displayed on the screen for confirmation.

4. Enter the quantity of the item received in the store.

5. Detailed information about the order placed is shown on the screen.

6. Fill the required information of the worksheet appeared on the screen. Item Code and Fir Code are already provided.

7. Confirm the entry made at the end of the worksheet when the message is displayed.

RECEIVED ITEMS ENTRY
=====================

(START)

USE FILES

3 CHR.
ITEM
NAME

ITEM NAME = BLANK → YES → UPDATE INDEX FILES → CLOSE DBF → STOP

NO

DISPLAY 10 REC. ITEMS

-MORE...
-I.CODE
-EXIT

EXIT → YES

NO

MORE → YES

NO

ACCEPT
- I.CODE
- OR.DT

DISPLAY INFO.

(1)

(1)

CONTINUE → YES

NO

ACCEPT QUANTITY RECVD.

DISPLAY INFO.

ACCEPT BILL INFO.

CORRECT ENTRY   NO / YES
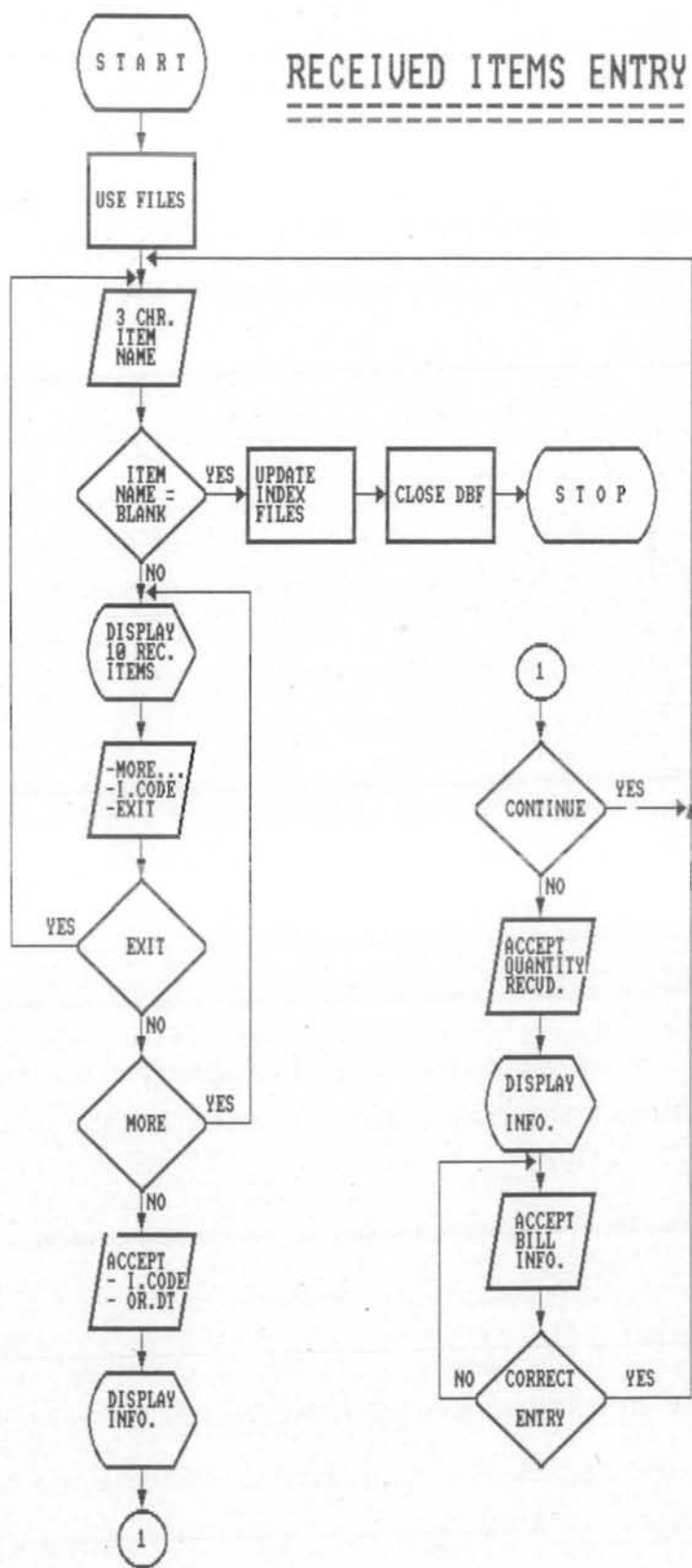
4.5.5. DAMAGED ITEMS

Using this programme, the entry of damaged items is possible. Items can be damaged by some one or damaged in the store. To keep the record of the damaged items, this programme (ENT15.PRG) is developed. Go through the following steps to enter the damaged items.

1. Enter the first 3 characters of the item name. A list of the item name starting from these characters is displayed.

2. Accept the Item Code of the required item.

3. Fill the damaged items data entry worksheet.

4. Item Name and Item Code are already provided.

5. Type the quantity damaged.

6. Type the reason of damage in one or two words.

7. Enter the date on which damage occured.

8. Enter the name of the person damage by.

9. Confirm the entry made.

10. User can correct the entry by type "N" on confirmation.

DAMAGED ITEMS ENTRY
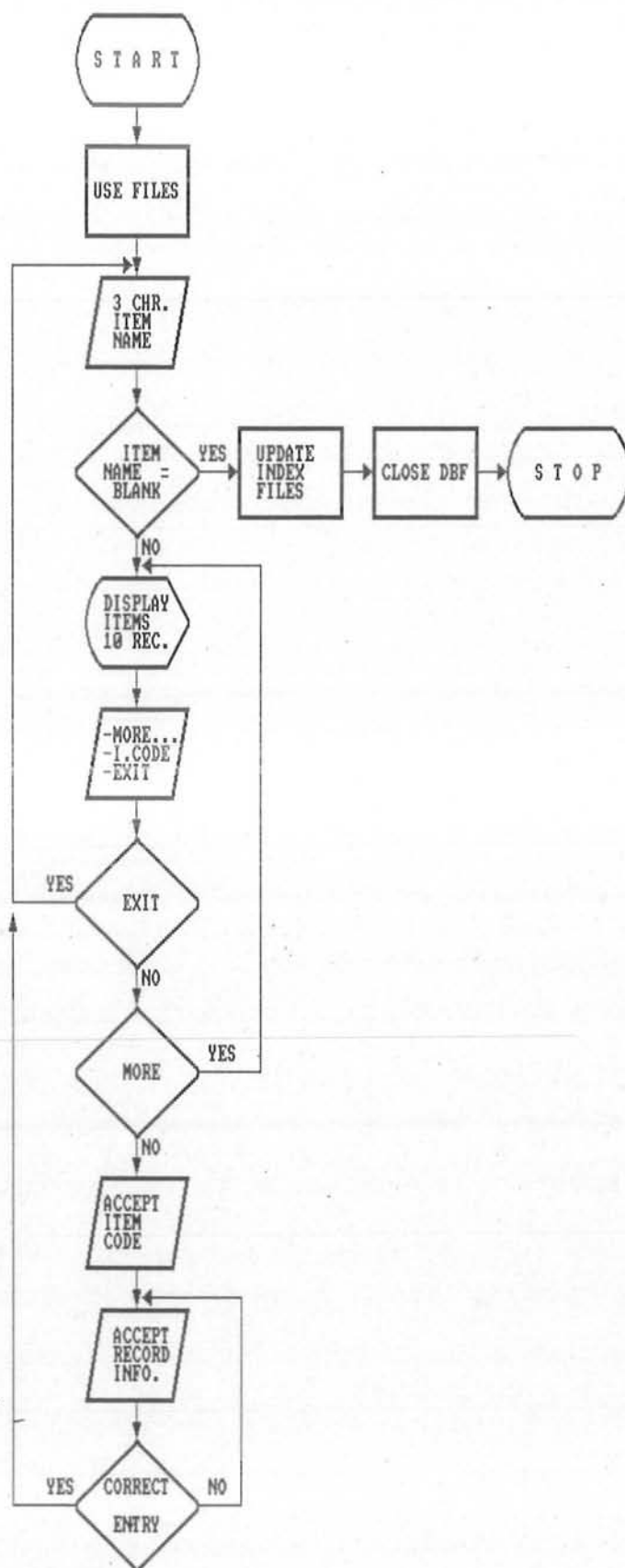
4.5.6. *DEAD ITEMS*

A programme (ENT16.PRG) is developed for dead items entry. If the items are not repairable, these items are considered as dead items. After a certain period, these dead items are auctioned. Both the Options; 1)Dead Items Entry and 2) Auction Entry are included in this programme. Procedure for dead items entry is as follows:

Enter first 3 characters to search the item name, list of the items is displayed on the screen. Enter the Item Code of required item name. A sub-menu is displayed on the screen having the options; 1)Dead Items Entry, 2) Auctioned Item Entry and 3) Exit.

a)   **Dead Item Entry**

1. Worksheet for Dead Item is displayed

2. Item Code and Item Name are already shown on the screen

3. Enter Dead Date of the Item.

4. Enter dead quantity of the item.

5. Confirm the entry at the end.

b)   **Auction Entry**

Full information of the item is displayed on the screen, when item name and item code is accepted and system will prompt.

1. **Auctioned the Item:**   Type "Y" if item is auctioned and "N" if not auctioned in response.

2. Type the total auctioned amount of an item.

3. Now the information of that item which is auctioned will appear on the screen. At this stage user is authorised to change the entries of the auctioned items.

DEAD ITEMS ENTRY

START

USE
DATA
FILES

3 CHR.
ITEM
NAME

ITEM
NAME =
BLANK → YES → UPDATE INDEX FILES → CLOSE FILES → STOP

NO

DISPLAY
ITEMS
10 REC.

-MORE...
-I.CODE
-EXIT

EXIT — YES

NO

MORE — YES

NO

ACCEPT
ITEM
CODE

-DEAD
-AUCTION
-EXIT

EXIT — YES

NO

1

1

DEAD
ENTRY → YES → ENTER INFO. → CONFIRM ENTRY (Y/N) → CONFIRM → YES

NO

DISPLAY
INFO.

CORRECT
INFO.
(Y/N)

CORRECT — NO

YES

RD/WRITE
AUCTION
AMOUNT

CORRECT
INFO.IF
NEEDED

CORRECT — NO / YES

45

4.5.7. FIRM ENTRY

A data entry programme (ENT21.PRG) is developed to enter the information of a firm. The firm name is used in other functions i.e. in purchase order, received order etc. Before placing order for an item to a firm for purchasing, firm name must be in the firms database, otherwise order can not be placed. Following steps are involv
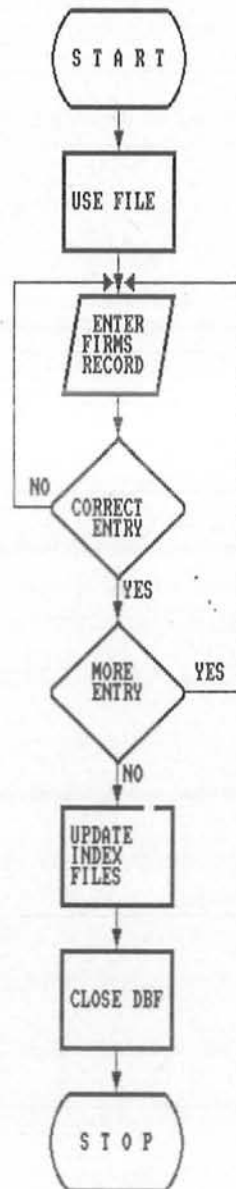
4.5.8 MODIFY FIRMS DATA

User can modify firms data by the programme (ENT22.PRG) which is developed for the purpose. First 3 characters of the firm name are accepted by the system. A list of firms starting from these 3 characters is displayed on the screen. Enter the firm code of the required firm. Following steps are involved to modify the firms data:

1.   Firm code is displayed on the screen but user can not change this code.

2.   Put the cursor where correction is needed and correct entries one by one.

3.   Confirm at the end of the correction.

MODIFY FIRMS DATA

```
                        ( START )

                       ┌──────────┐
                       │ USE FILES│
                       └──────────┘

                        ╱ 3 CHR. ╱
                        ╱  FIRM  ╱
                        ╱  NAME  ╱

                         FIRM        YES    ┌──────────┐    ┌──────────┐    ( STOP )
                         NAME =  ──────────▶│  UPDATE  │───▶│ CLOSE DBF│───▶
                         BLANK              │  INDEX   │    └──────────┘
                           │               │  FILES   │
                           │ NO            └──────────┘
                           ▼
                        ╱ DISPLAY ╲
                       │ 10 REC.  │
                        ╲ OF FIRM ╱

                        ╱ MORE... ╱
                        ╱ F-CODE  ╱
                        ╱ EXIT    ╱

              YES          EXIT
             ◀──────────    │
                           │ NO
                           ▼
                          MORE    YES
                           │     ─────▶
                           │ NO
                           ▼
                        ╱ ACCEPT ╱
                        ╱  FIRM  ╱
                        ╱  CODE  ╱

                        ╱ CORRECT ╱
                        ╱ RECORD  ╱

              YES        MORE        NO
             ◀──────── CORREC- ──────▶
                        TIONS
```

48
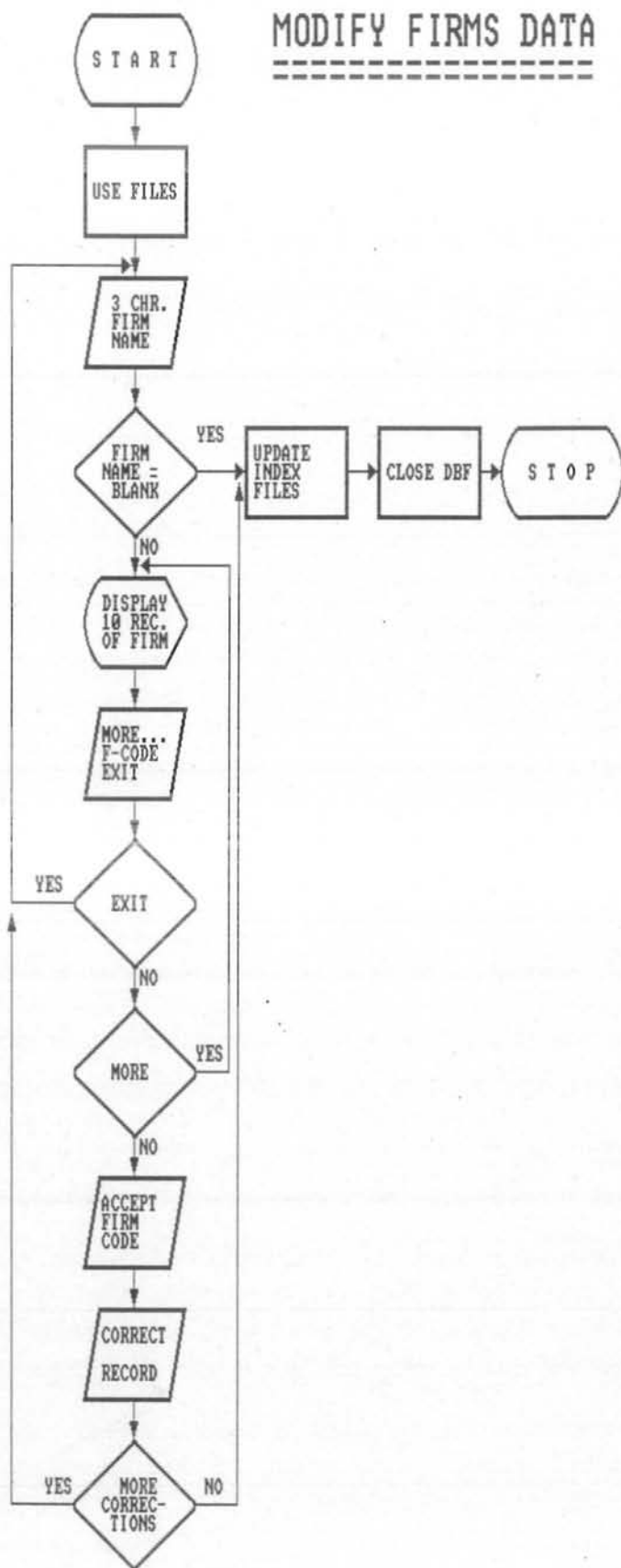
4.5.9 BUDGET ALLOCATION

Every year some amount is allocated for the purchase of store items. Items can be purchased within this limit. Programme ENT31.PRG is developed to enter the allocated amount for the purchase of items. Whenever an item is received in the store, received quantity, invoice/bill entry is made into the computer and also updated the budget data file.

```
                    ( S T A R T )
                         │
                         ▼
                    ┌─────────┐
                    │ USE     │
                    │ DATA    │
                    │ FILE    │
                    └─────────┘
                         │
                         ▼
                    ┌─────────┐
                    │ ENTER   │
                    │ YEAR    │
                    └─────────┘
                         │
                         ▼
                    ┌─────────┐
                    │ LOCATE  │
                    │ YEAR    │
                    └─────────┘
                         │
                         ▼
          ◇FOUND◇ ──► DISPLAY ──► ◇MODIFY◇ ──NO──┐
                     ALREADY                      │
                     EXIST            YES         │
                         │◄───────────────────────┘
                         ▼
                    ┌─────────┐
                    │ ENTRY   │
                    │ WORK-   │
                    │ SHEET   │
                    └─────────┘
                         │
                         ▼
          NO ◇CORRECT◇
             ◇ENTRY ◇
                 │YES
                 ▼
           ( S T O P )
```


49
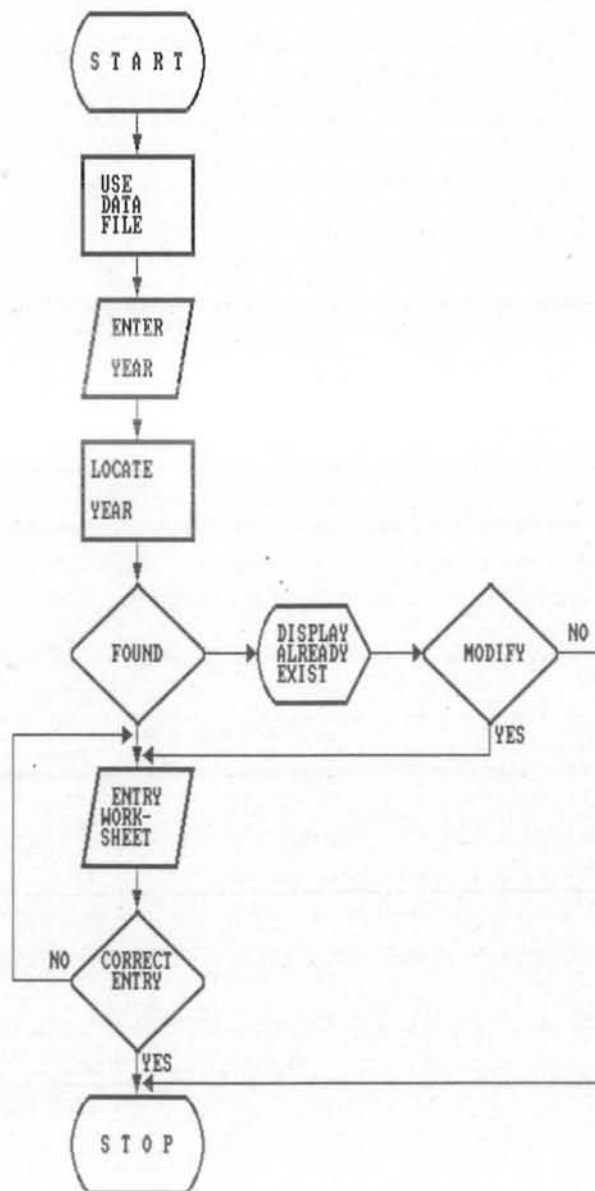
4.6 CIRCULATION

Circulation (Issue/Receive) facilities are provided in the software. These facilities are issue items and items return provided to the users and are discussed separately.

4.6.1 ISSUE ITEMS

Items are available in the store for the teachers/researchers/students. Users send their demands to store to issue items for their research work. Issue item programme (CIR1.PRG) is developed to keep the record of the items issued. This data is utilized for producing different outputs. Do the following steps for items issue entry:

1. Enter first 3 characters of the item name. List of items is displayed. ·

2. Select information of the item is displayed. Balance of item is also displayed. Here user can check the balance that he can fulfill the demand.

3. Confirm the message which is displayed.

4. Fill the Items Issue Worksheet which is shown.

5. Item Name and Item Code are already displayed.

6. Type the following:

   - Quantity Issued.

   - Issued Date.

   - Issued to (Name of Person)

   - Status of the Person. For this purpose a new window is displayed. Select the status from the window and other information.

   - Address of the individual.

   - Confirm at the end of the screen.

ISSUE ITEMS

```
                              ┌─────────┐
                             (  START   )
                              └─────────┘
                                   │
                              ┌─────────┐
                              │USE FILES│
                              └─────────┘
                                   │
                              ┌─────────┐
                              │ 3 CHR.  │
                              │ OF ITEM │
                              │ NAME    │
                              └─────────┘
                                   │
                               ╱ ITEM  ╲   YES    ┌────────┐   ┌─────────┐   ┌────────┐
                              ╱  NAME =  ╲────────▶│ UPDATE │──▶│CLOSE DBF│──▶( STOP   )
                              ╲  BLANK   ╱         │ INDEX  │   └─────────┘   └────────┘
                               ╲       ╱          │ FILES  │
                                  │NO              └────────┘
                              ┌─────────┐
                              │ DISPLAY │
                              │ ITEMS   │
                              │ 10 REC. │
                              └─────────┘
                                   │
                               ╱ EXIT ╲  YES
                               ╲     ╱──────────────▶
                                  │NO
                               ╱ MORE ╲  YES
                               ╲     ╱──────────────▶
                                  │NO
                              ┌─────────┐
                              │ ACCEPT  │
                              │ ITEM    │
                              │ CODE    │
                              └─────────┘
                                   │
                              ┌─────────┐
                              │ DISPLAY │
                              │ RECORD  │
                              │ INFO.   │
                              └─────────┘
                                   │
                               ╱CONTINUE╲  NO
                               ╲       ╱──────────────▶
                                  │YES
                              ┌─────────┐
                              │ ACCEPT  │
                              │ RECORD  │
                              │ INFO.   │
                              └─────────┘
                                   │
                         YES ╱ .CORRECT ╲ NO
                            ◀╲  ENTRY   ╱▶
                              ╲       ╱
```

51
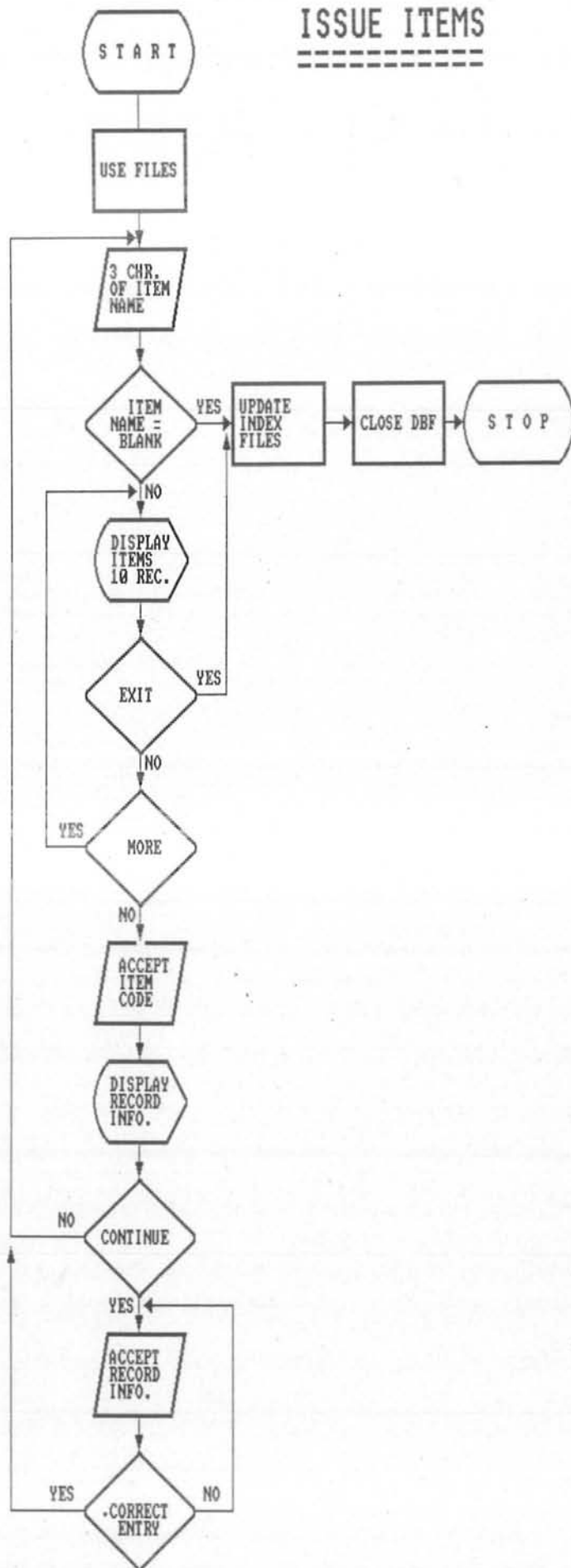
4.6.2　ITEMS RETURN

Item can be returned back which is issued in the past. Users return back the items those are not further needed. When item is returned and is useable, it can be reissued. The programme (CIR2.PRG) receives the items returned by the users and update issue items data file. Important steps are as under to enter the information.

1. Enter first 3 characters of item name. Accept the item code from the list.

2. Information about item is displayed and confirm it.

3. Fill the item returned back worksheet with the required entries.

4. Item Name and Item Code are already provided.

5. Confirm at the end of providing information.

ITEMS RETURNED

```
        ( START )              ITEMS RETURNED
                               ==============
           |
           v
     +-----------+
     | USE FILES |
     +-----------+
           |
           v
     /-----------/
    / 3 CHR.OF  /
   /  ITEM     /
  /   NAME    /
 /-----------/
           |
           v
       / ITEM  \     YES    +--------+      +-----------+      (       )
      < NAME =   >--------->| UPDATE |----->| CLOSE DBS |----->( S T O P )
       \ BLANK /            | INDEX  |      +-----------+      (       )
         \   /              | FILES  |
           |                +--------+
           | NO
           v
      / DISPLAY \
     (  10 REC.  )
      \         /
           |
           v
     /-----------/
    / MORE...   /
   /  I.CODE   /
  /   EXIT    /
 /-----------/
           |
           v
        / EXIT \     YES
       <        >--------> (back up)
        \      /
           |
           | NO
           v
        / MORE \      YES
       <        >--------> (loop)
        \      /
           |
           | NO
           v
     /-----------/
    / READ      /
   /  ITEM     /
  /   CODE    /
 /-----------/
           |
           v
     /-----------/
    / 3 CHR.    /
   /  PERSON   /
  /   NAME    /
 /-----------/
           |
           v
      / DISPLAY \
     ( PERSONS   )
      \ 10 REC. /
           |
           v
     /-----------/
    / MORE...   /
   /  CODE...  /
  /   EXIT    /
 /-----------/
           |
           v
         ( 1 )
```

```
         ( 1 )
           |
           v
        / EXIT \      YES
       <        >-------------------->
        \      /
           |
           | NO
           v
     /-----------/
    / ACCEPT    /
   /  PERSON   /
  /  LOCATION /
 /-----------/
           |
           v
     /-----------/
    / ACCEPT    /
   /  RECORD   /
  /   INFO.   /
 /-----------/
           |
           v
    NO  / CORRECT \   YES
 <-----<   ENTRY   >----->
        \         /
```

53
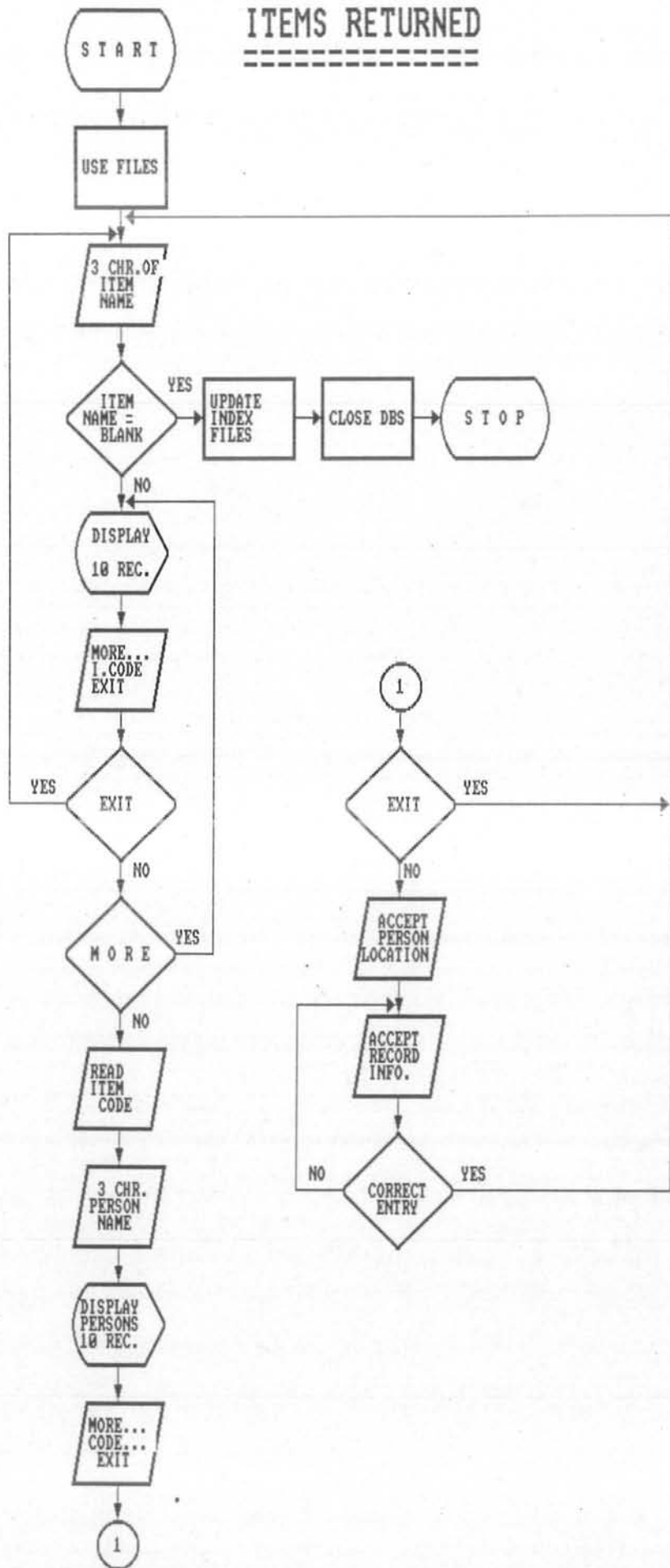
4.7   SEARCH

Users can search information of the store records. Different types of information can be searched which are detailed below

4.7.1   SEARCH THE ITEMS TO PURCHASE

Programme SRCH1.PRG searches the items which are due to purchase. This programme checks the re-order level of the item. If the quantity balance is less then or equal to the re-order level, it will be display on the screen.

SEARCH ITEMS TO PURCHASE

```
                    ╭─────────╮
                    │  START  │
                    ╰─────────╯
                         │
                         ▼
                   ┌──────────┐
                   │ USE      │
                   │ DATA     │
                   │ FILES    │
                   └──────────┘
                         │
          ┌──────────────▼──────────────────────────────────┐
          │              ▼                                   │
          │        ╱──────────╱                              │
          │       ╱ -ALL     ╱                               │
          │      ╱ -SPECIF  ╱                                │
          │     ╱ -EXIT    ╱                                 │
          │    ╱──────────╱                                  │
          │        │                                         │
          │        ▼                                         │
          │      ◇─────◇   YES  ┌────────┐   ╭─────────╮     │
          │      ◇ EXIT ◇─────▶ │ CLOSE  │──▶│  STOP   │     │
          │      ◇─────◇        │ FILES  │   ╰─────────╯     │
          │        │            └────────┘                   │
          │      NO│                                         │
          │        ▼                                         │
          │    ◇────────◇  YES  ┌──────┐   ◇──────────◇  YES ┌─────────┐  ◇──────◇ YES
          │    ◇ OPT = 1 ◇────▶ │ READ │─▶ ◇ BALANCE<= ◇───▶ │ DISPLAY │─▶◇ E O F ◇──┘
          │    ◇────────◇       │ FILE │   ◇ RE-ORDER  ◇     │ RECORD  │  ◇──────◇
          │        │            └──────┘   ◇──────────◇      └─────────┘    │NO
          │      NO│               ▲          │NO                           │
          │        ▼               └──────────┴─────────────────────────────┘
          │   ╱──────────╱
          │  ╱ ACCEPT   ╱
          │ ╱ 3 CHR.   ╱
          │╱ I.NAME   ╱
          │ ╱────────╱
          │    │
          │    ▼
      YES ◇────────◇
     ◀────◇ BLANK  ◇
          ◇────────◇
              │
            NO│
              ▼
          ⬡──────────⬡
          │ LIST OF  │
          │ ITEMS    │
          │ NAMES    │
          ⬡──────────⬡
              │
              ▼
          ╱──────────╱
         ╱ ACCEPT   ╱
        ╱ ITEM     ╱
       ╱ CODE     ╱
       ╱────────╱
              │
              ▼
          ┌──────────┐
          │ SEARCH   │
          │ ITEM     │
          │ CODE     │
          └──────────┘
              │
              ▼
          ⬡──────────⬡
          │ DISPLAY  │
          │ RECORD   │
          ⬡──────────⬡
```

55
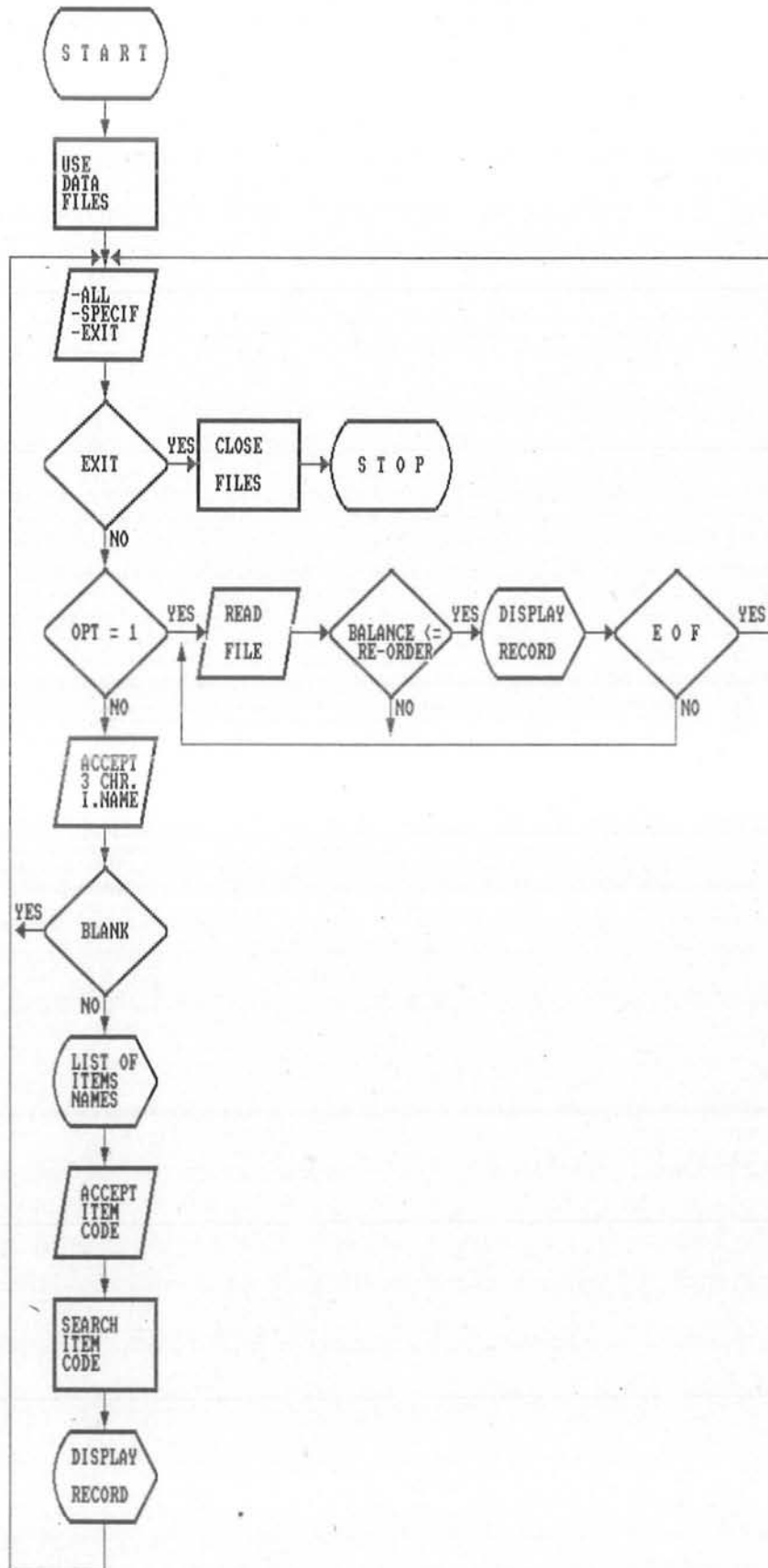
4.7.2. SEARCH PURCHASED ITEMS

A programme (SRCH2.PRG) is developed to search the items purchased by the store. A sub menu is created having the following options.

1) **Search all items purchased**:   All the items will be searched which are purchased. Output of the searched items is displayed on the screen.

2) **Search Through Item Name**:   Search an item by name whether it is purchased or not

3) **Purchased on Specific Date**:   Facility is also provided to search certain items purchased on specific date.

PURCHASED ITEMS

```
    ( START )

       │
       ▼
   ┌────────┐
   │  USE   │
   │  FILE  │
   └────────┘
       │
       ▼ ◄─────────────────────────────────────────────────┐
   ┌──────────┐                                             │
   │-ALL ITEM │                                             │
   │-THR.NAME │                                             │
   │-THR.DATE │                                             │
   └──────────┘                                             │
       │                                                    │
       ▼                                                    │
      ╱╲           YES    ┌────────┐      ┌─────────┐        │
     ╱  ╲────────────────►│ CLOSE  │─────►│ S T O P │        │
    ╱EXIT╲                │ FILE   │      └─────────┘        │
    ╲    ╱                └────────┘                         │
     ╲  ╱                                                    │
      ╲╱                                                     │
       │ NO                                                  │
       ▼                                                     │
      ╱╲        YES    ┌─────────┐       ╱╲      YES          │
     ╱  ╲─────────────►│ DISPLAY │──────╱  ╲──────────────────►
    ╱OPT=1╲            │  ITEMS  │     ╱EOF ╲                 │
    ╲     ╱            └─────────┘     ╲    ╱                 │
     ╲   ╱                              ╲  ╱                  │
      ╲╱                                 ╲╱                   │
       │ NO                              │ NO                 │
       ▼                                                      │
      ╱╲      YES   ┌────────┐  ┌─────────┐    ╱╲    YES       │
     ╱  ╲──────────►│ACCEPT  │─►│ DISPLAY │───╱  ╲────────────►
    ╱OPT=2╲         │3 CHR.  │  │ RECORDS │  ╱EOF ╲           ▲
    ╲     ╱         │I.NAME  │  └─────────┘  ╲    ╱           │
     ╲   ╱          └────────┘      ▲         ╲  ╱            │
      ╲╱              ▲             └──────────╲╱             │
       │ NO           │                        │ NO          │
       ▼              └────────────────────────┘             │
   ┌────────┐                                                │
   │ACCEPT  │                                                │
   │ITEM    │                                                │
   │RCV.DT. │                                                │
   └────────┘                                                │
       │                                                     │
       ▼ ◄──────┐                                            │
   ┌────────┐   │                                            │
   │ SEARCH │   │                                            │
   │ RECORD │   │                                            │
   └────────┘   │                                            │
       │        │                                            │
       ▼        │                                            │
   ┌─────────┐  │                                            │
   │ DISPLAY │  │                                            │
   │ RECORD  │  │                                            │
   └─────────┘  │                                            │
       │        │                                            │
       ▼        │                                            │
 NO   ╱╲   YES  │                                            │
  ◄──╱  ╲───────┼────────────────────────────────────────────┘
    ╱EOF ╲      │
    ╲    ╱      │
     ╲  ╱───────┘
      ╲╱
```
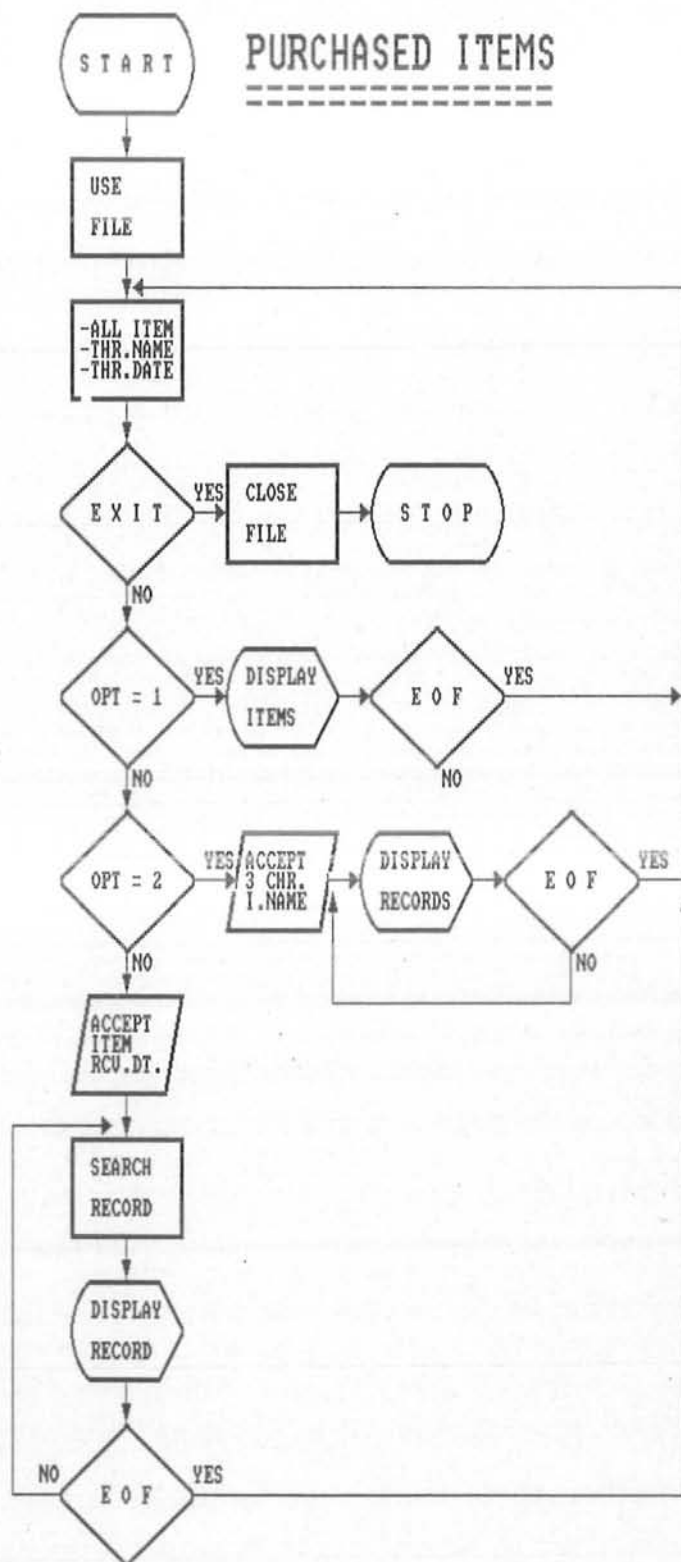
4.7.3   SEARCH ISSUED ITEMS

Items are issued from the store to the teachers/researchers/students.   Users can search the items issued on different ways.   The programme (SRCH3.PRG) is developed for the purpose and the procedure is as under:

1.   Search all items issued

2.   Search an item through item name.

3.   Search the items issued on a specific date.

ISSUED ITEMS
=============

```
        ( START )

        ┌─────────┐
        │  USE    │
        │  FILE   │
        └─────────┘

        ┌─────────────┐
        │ -ALL ITEM   │
        │ -THR.NAME   │
        │ -THR.DATE   │
        └─────────────┘

         ╱EXIT╲  ──YES──▶  ┌───────┐        ( STOP )
         ╲    ╱            │ CLOSE │
           │              │ FILE  │
           NO             └───────┘

         ╱OPT = 1╲ ──YES──▶ ⬡ DISPLAY   ╱E O F╲ ──YES──▶
         ╲      ╱            ⬡ ITEMS     ╲    ╱
           │                              NO
           NO

         ╱OPT = 2╲ ──YES──▶ ┌────────┐  ⬡ DISPLAY  ╱E O F╲ ──YES──▶
         ╲      ╱            │ ACCEPT │  ⬡ RECORDS  ╲    ╱
           │                │ 3 CHR. │              NO
           NO               │ I.NAME │
                            └────────┘

        ╱ ACCEPT  ╱
       ╱  ITEM   ╱
      ╱ RCV.DT. ╱

        ┌─────────┐
        │ SEARCH  │
        │ RECORD  │
        └─────────┘

        ⬡ DISPLAY
        ⬡ RECORD

   NO  ╱E O F╲  YES
       ╲    ╱
```

59
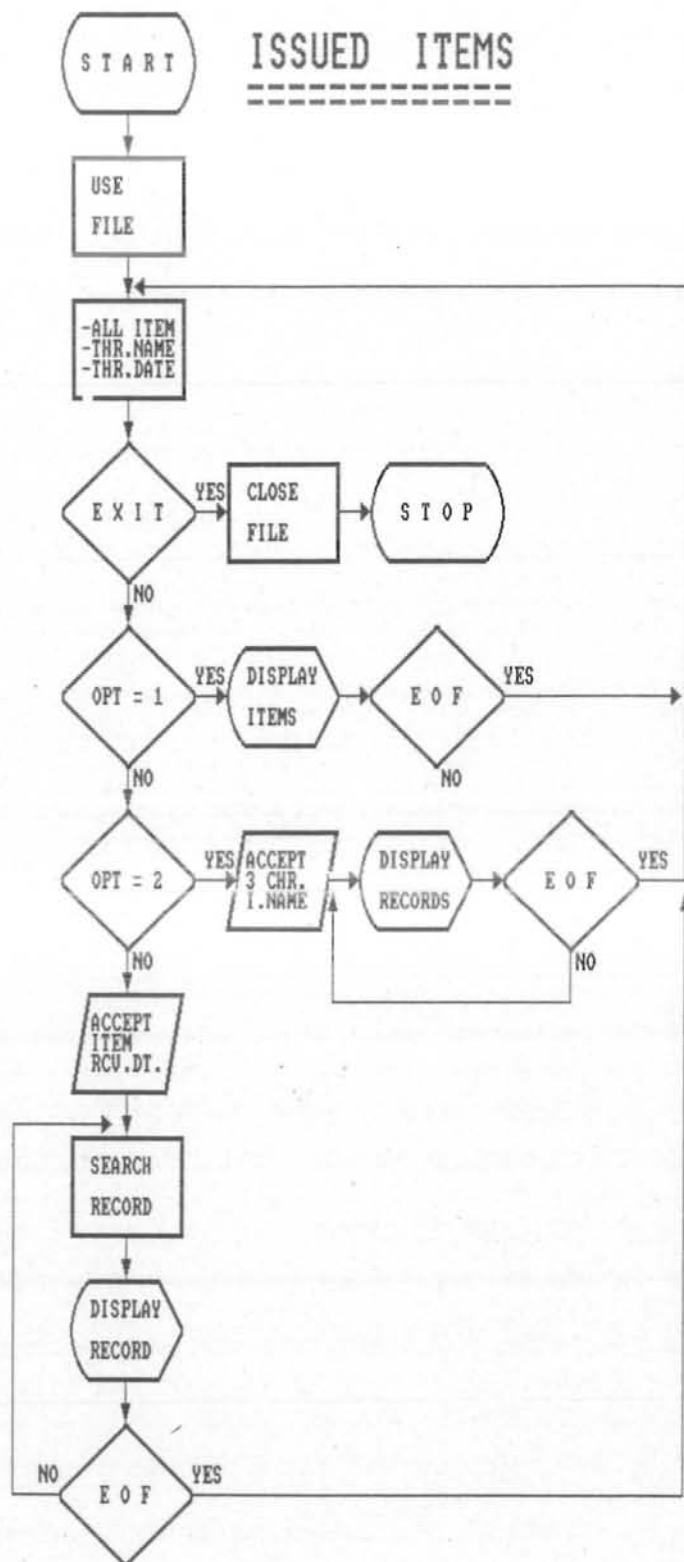
4.7.4 SEARCH DAMAGED ITEMS

User can search the damaged items. The programme (SRCH4.PRG) is developed to search the damaged items by different angles:

1)   Search all damaged items.

2.   Search a damaged items by entering the item name

3)   Search all items damaged on a specific date.

DAMAGED ITEMS
==============

```
        ( START )

           │
           ▼
        ┌──────┐
        │ USE  │
        │ FILE │
        └──────┘
           │
           ▼
        ┌──────────┐
        │ -ALL ITEM│ ◄────────────────────────────┐
        │ -THR.NAME│                               │
        │ -THR.DATE│                               │
        └──────────┘                               │
           │                                       │
           ▼                                       │
         ◇ EXIT ◇──YES──► ┌──────┐ ──► ( STOP )    │
           │              │CLOSE │                 │
           │NO            │FILE  │                 │
           ▼              └──────┘                 │
         ◇ OPT = 1 ◇──YES──► ⬡DISPLAY──► ◇ E O F ◇──YES──┤
           │                  ITEMS         │NO          │
           │NO                                           │
           ▼                                             │
         ◇ OPT = 2 ◇──YES──► ╱ACCEPT╱──►⬡DISPLAY──► ◇ E O F ◇──YES─┤
           │                 ╱3 CHR.╱     RECORDS      │NO         │
           │NO               ╱I.NAME╱ ◄────────────────┘           │
           ▼                                                       │
        ╱ACCEPT ╱                                                  │
        ╱ITEM   ╱                                                  │
        ╱RCV.DT.╱                                                  │
           │                                                       │
           ▼                                                       │
        ┌──────┐ ◄──┐                                              │
        │SEARCH│    │                                              │
        │RECORD│    │                                              │
        └──────┘    │                                              │
           │        │                                              │
           ▼        │                                              │
        ⬡DISPLAY    │                                              │
         RECORD     │                                              │
           │        │                                              │
           ▼        │                                              │
   NO──◇ E O F ◇──YES───────────────────────────────────────────┘
       │
       └──┘
```

61
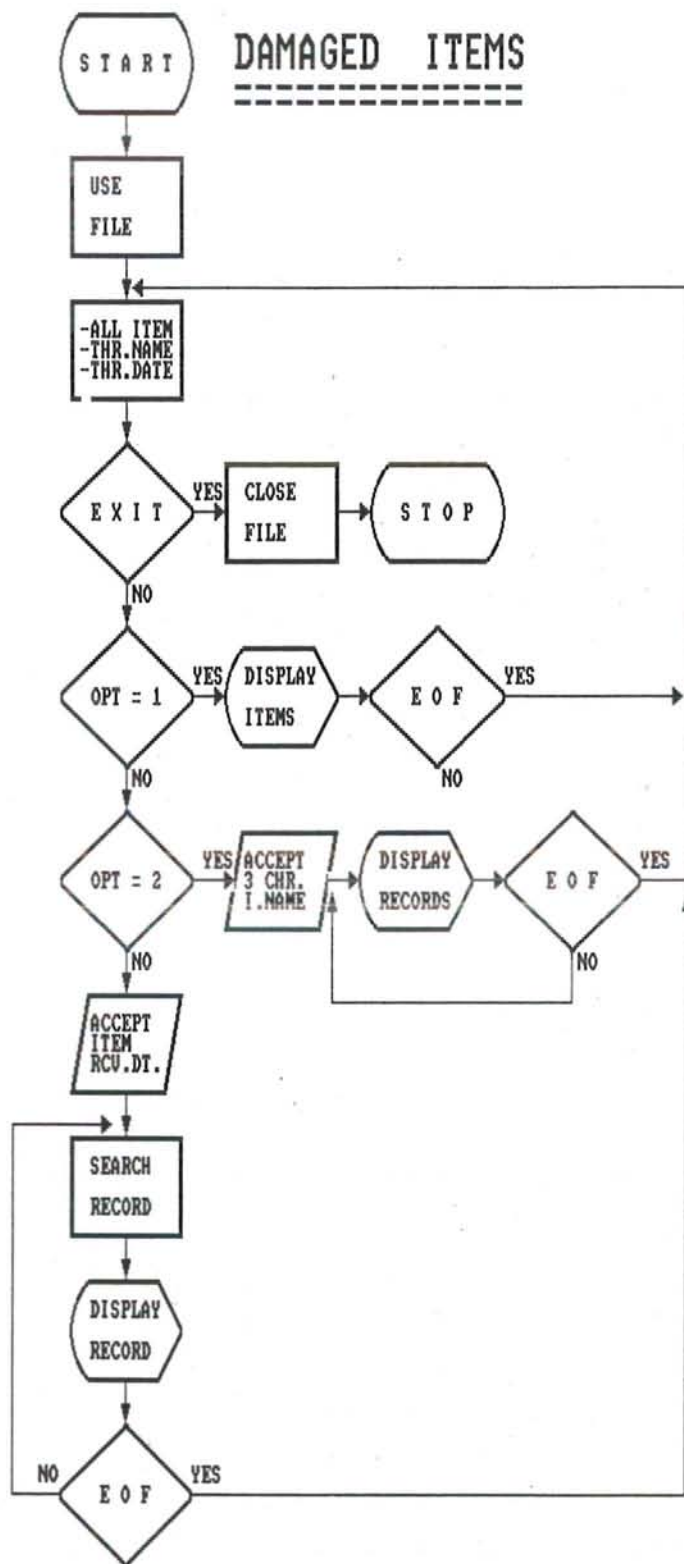
4.7.5   SEARCH DEAD ITEMS

Programme name SRCH5.PRG is developed which makes search for dead items. Three options have been provided and these are:

1)   Search all dead items.

2)   Search dead item by its name.

3)   Search all dead items by mentioning a specific date.

DEAD ITEMS
==========

START → USE FILE →

-ALL ITEM
-THR.NAME
-THR.DATE

EXIT — YES → CLOSE FILE → STOP
  NO

OPT = 1 — YES → DISPLAY ITEMS → E O F — YES →
  NO   NO

OPT = 2 — YES → ACCEPT 3 CHR. I.NAME → DISPLAY RECORDS → E O F — YES →
  NO   NO

ACCEPT ITEM RCV.DT.

SEARCH RECORD

DISPLAY RECORD

E O F — YES
NO

63
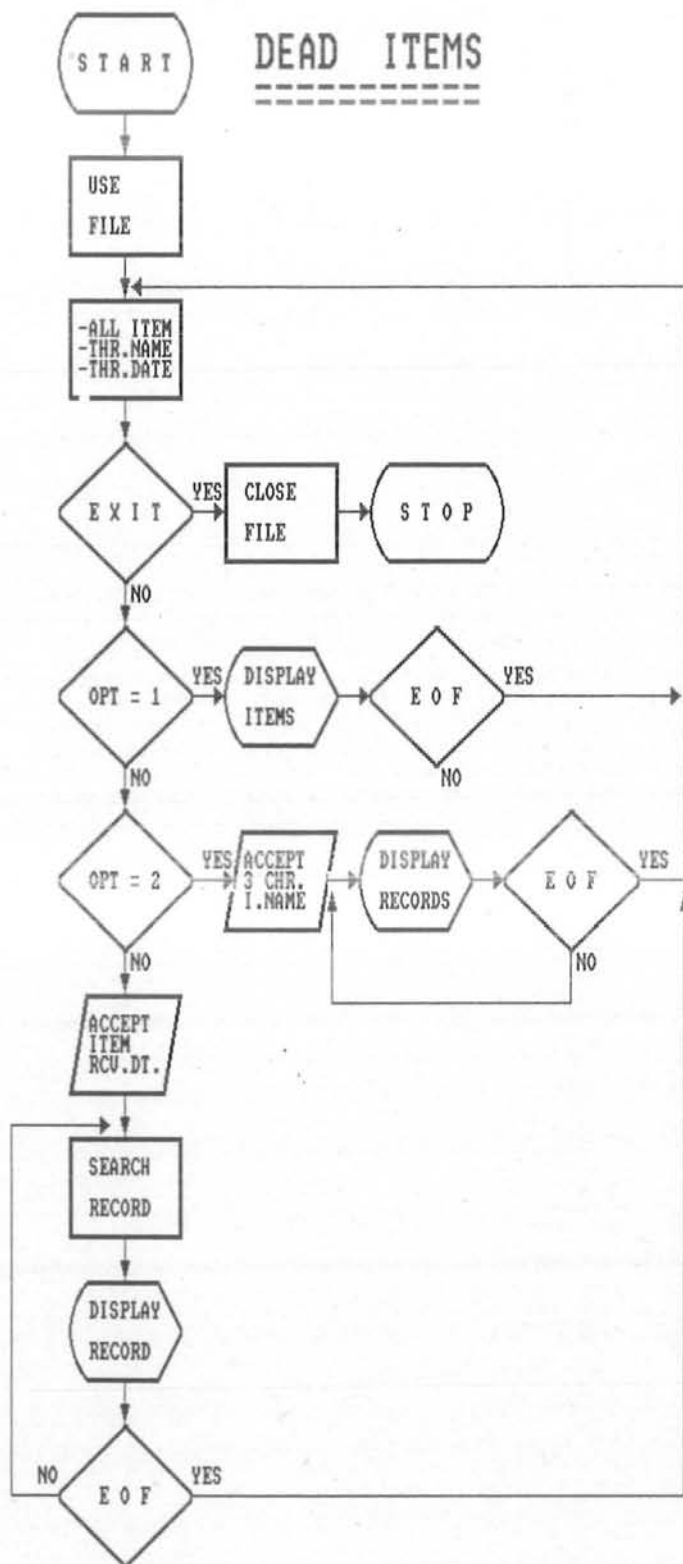
4.7.6 ITEMS TO WHOM ISSUED

Items are issued to the users and entered in the issued data file. The programme (ENT7.PRG) to search the items by users names. First of all 3 character of user name are accepted. A complete list users names is displayed on the screen. Accept the code of required user name. All the items will be displayed on the screen which are issued to the selected user.

```
                    START
                      |
                      v
                    USE
                    FILE
                    ISSUED
                      |
             +------->|
             |        v
             |      READ
             |      FILE
             |      ISSUED
             |        |
             |        v
             |      E O F -----YES-----+
             |        |                |
             |       NO                |
             |        v                |
             |     DISPLAY             |
             |     RECORD              |
             |        |                |
             |        v                |
             |      - MORE             |
             |      - EXIT             |
             |        |                |
             |        v                |
        NO   |      EXIT               |
        +----+        |                |
                     NO                |
                      v<---------------+
                    STOP
```

64
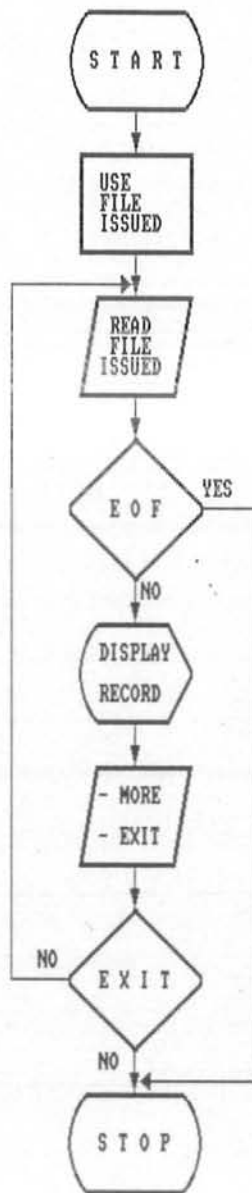
4.7.7   SEARCH LAST PURCHASED ENTRY.

All the entries of the purchased items are made, when these items are received in the store. User break the session of the entry and come out from the system. After some time he again wants to make the entries, but he does not know the last record entered by him. The facility is provided in this programme (SRCH7.PRG) to check which is the last record entered by the user in purchase order database. This programme will display the last entry on the screen made by the user. User can move backward/forward in this searching process.

```
                    ( START )

                        │
                        ▼
                  ┌──────────┐
                  │ USE      │
                  │ FILE     │
                  │ RECEIVED │
                  └──────────┘
                        │
                        ▼
                  ┌──────────┐
                  │ GO TO    │
                  │ FILE     │
                  │ BOTTOM   │
                  └──────────┘
                        │
                        ▼
                  ╱ DISPLAY ╲
                  ╲ LAST    ╱
                   ╲RECORD ╱
                        │
    ┌───────────────────┼─────────────────────────────────────────┐
    │                   ▼
    │              ╱ -NEXT  ╲
    │              ╲ -BACK  ╱
    │               ╲-EXIT ╱
    │                   │
    │                   ▼
    │                 ◇ EXIT ◇ ──YES──▶ ( STOP )
    │                   │
    │                   │ (no)
    │                   ▼
    │                 ◇ NEXT ◇ ──YES──▶ ┌──────┐         ◇ EOF ◇ ──YES──▶ ╱DISPLAY╲
    │                   │               │ READ │ ──────▶                  ╲ EOF   ╱ ──┐
    │                   │               │ FILE │                           ╲MESSAGE╱   │
    │                   │               └──────┘            │ NO                       │
    │                   ▼                                    ▼                         │
    │              ┌──────────┐                        ╱ DISPLAY ╲                     │
    │              │ READ     │                        ╲ RECORD  ╱ ────────────────────┤
    │              │ PREV.    │                                                        │
    │              │ RECORD   │                                                        │
    │              └──────────┘                                                        │
    │                   │                                                              │
    │   ╱DISPLAY╲       ▼                                                              │
    │   ╲ BOF   ╱◀─YES─ ◇ BOF ◇                                                        │
    └───╲MESSAGE╱       │                                                              │
                       NO                                                              │
                        ▼                                                              │
                   ╱ DISPLAY ╲                                                         │
                   ╲ RECORD  ╱ ───────────────────────────────────────────────────────┘
```

66

4.8   OUTPUT ON THE SCREEN

The facility is provided to the user to display different types of information on the screen. For this purpose programmes are developed which produces different kinds of reports.. The facilities provided are as under with details.

4.8.1   LIST OF ALL ITEMS IN STORE

User can display all the items enter in the item data file on the screen. Approximately 5 records information can be displayed on the screen. User can also check the balance of an item easily on the screen at this stage. Programme developed for the purpose is DISP1.PRG.

```
                    ( START )
                        |
                        v
                    +-------+
                    | USE   |
                    | FILE  |
                    +-------+
                        |
                        v
                    +-------+
                    | READ  |
                    | FILE  |
                    +-------+
                        |
                        v
                   /--------\   YES   +-------+      +-------+
                  <   EOF    >------->| CLOSE |----->| STOP  |
                   \--------/         | FILE  |      +-------+
                        | NO          +-------+
                        v
          YES     /--------\
     <-----------<   IF     >
                  \ BAL. = 0/
                   \--------/
                        | NO
                        v
                    ( DISPLAY )
                    ( RECORD  )
```

67
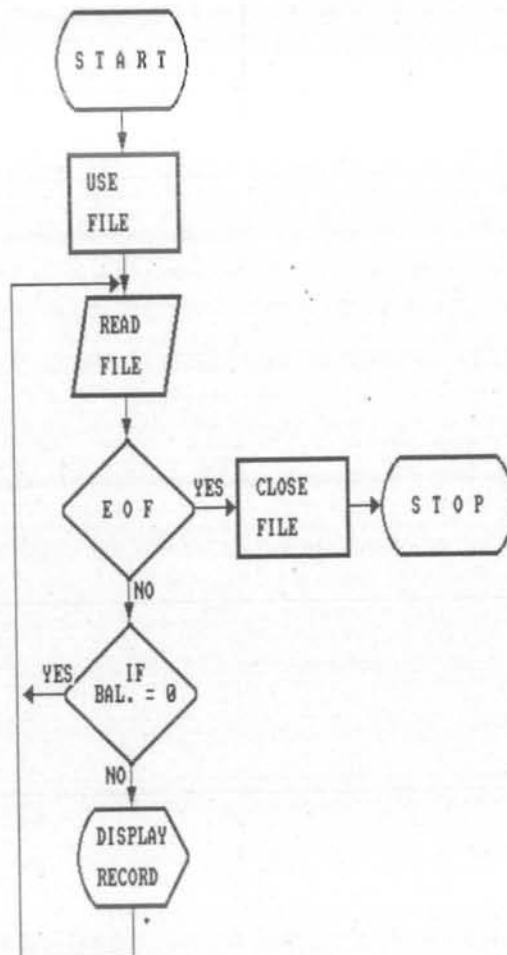
4.8.2   SINGLE ITEM BALANCE

A programme DISP2.PRG is developed and with this programme store keeper can check the balance of a single item on the screen. First 3 characters of an item name are accepted from the screen. List of item names starting from these letters shown on the screen with item code. Accept the item code. Detail of purchases and issue are shown.

```
                    ( S T A R T )
                          |
                          v
                    +-----------+
                    |   USE     |
                    |   FILE    |
                    +-----------+
                          |
          +------------>  v
          |         +-----------+
          |         |  ACCEPT   |
          |         |  3 CHR.   |
          |         |  I.NAME   |
          |         +-----------+
          |               |
          |               v
          |           / 3 CHR. \    YES
          |          <    =      >------->  ( S T O P )
          |           \ BLANK  /
          |               | NO
          |               v
          |          / DISPLAY \
          |          \  LIST   /
          |               |
          |               v
          |         +-----------+
          |         |  ACCEPT   |
          |         |  ITEM     |
          |         |  CODE     |
          |         +-----------+
          |               |
          |               v
          |         +-----------+
          |         |  SEARCH   |
          |         |  ITEM     |
          |         |  CODE     |
          |         +-----------+
          |               |
          |               v
          |          / DISPLAY \
          |          \ RECORD  /
          |               |
          +---------------+
```
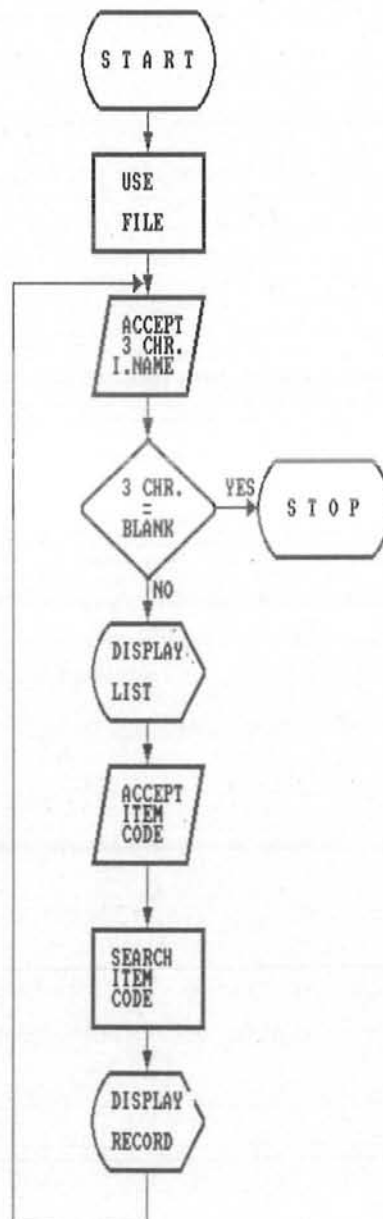
4.8.3   LIST OF FIRMS

When all the firm names those are on purchase panel, entered in the firm data file. It is necessary to keep complete hard copy of all the firms.   So the programme DISP3.PRG is developed to get the output of the firms. The output is displayed on the screen.

```
                    ┌─────────────┐
                    │    START    │
                    └─────────────┘
                           │
                    ┌─────────────┐
                    │    USE      │
                    │   FILE      │
                    └─────────────┘
                           │
                    ╱─────────────╲
                    │    READ     │
                    │    FILE     │
                    ╲─────────────╱
                           │
                      ╱─────────╲        YES
                     ╱   E O F   ╲──────────────┐
                     ╲           ╱              │
                      ╲─────────╱               │
                           │ NO                 │
                    ┌─────────────┐             │
                    │  DISPLAY    │◄────────────┤
                    │  10 REC.    │             │
                    └─────────────┘             │
                           │                    │
                      ╱─────────╲        YES     │
                     ╱  M O R E  ╲──────────────┘
                     ╲           ╱
                      ╲─────────╱
                           │ NO
                    ┌─────────────┐
                    │   CLOSE     │
                    │   FILE      │
                    └─────────────┘
                           │
                    ┌─────────────┐
                    │   STOP      │
                    └─────────────┘
```

69
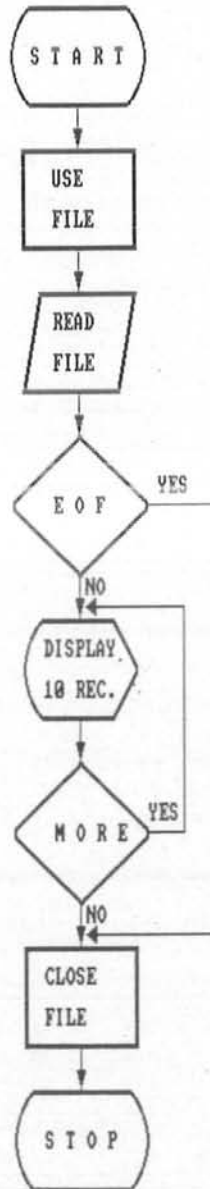
4.8.4 LIST OF WHOLE ITEMS ENTERED

Whole the items related to a scientific store are entered. User is authorised to get the output of the whole items those are purchased for the researchers and also those items which are not purchased but entered in the items database. Hard copy of these items can be prepared by the programme DISP4.PRG.

```
                    ( S T A R T )
                         |
                         v
                    +---------+
                    |  USE    |
                    |  FILE   |
                    +---------+
                         |
                         v
                    /---------/
                   /  READ   /
                  /  FILE   /
                 /---------/
                      |
                      v
                  / DISPLAY \
                  \ 4 REC.  /
                      |
                      v
                  / 1. MORE /
                  / 2. EXIT /
                      |
                      v
                   <       >      YES    +---------+
                   <  E O F >----------->|  CLOSE  |
                   <       >             |  FILE   |
                      |                  +---------+
                      | NO
                      v
          YES   <       >
         <-------<  M O R E >
                   <       >
                      |
                      | NO
                      v
                   ( S T O P )
```
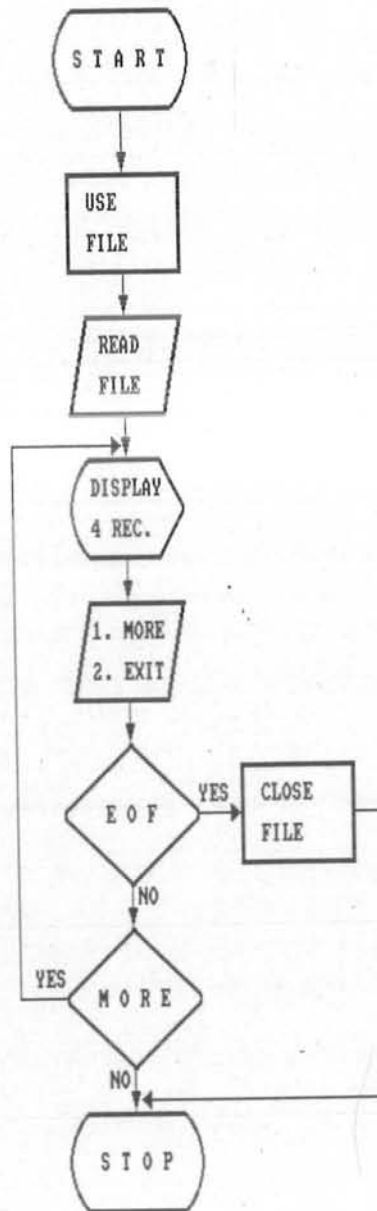
4.8.5 BUDGET POSITION

An amount of budget is allocated for the scientific store every year. Budget data file holds the information about the budget. Budget position information can be displayed on the screen. User can draw a graph to check the budget position i.e. Allocated amount, Expenditure, surplus/deficits and financial year. Programme DISP5.PRG is developed for this purpose.

```
                    ┌─────────────┐
                    │   START     │
                    └─────────────┘
                           │
                    ┌─────────────┐
                    │ USE         │
                    │ DATA        │
                    │ FILE        │
                    └─────────────┘
                           │
                    ┌─────────────┐
                    │ SEARCH      │
                    │ CURRENT     │
                    │ YEAR        │
                    └─────────────┘
                           │
                    ┌─────────────┐
                    │ - GRAPH     │
                    │ - INFO.     │
                    │ - EXIT      │
                    └─────────────┘
                           │
                         ◇ EXIT ◇ ── YES ──► ┌────────┐
                           │                  │ CLOSE  │
                          NO                  │ FILE   │
                           │                  └────────┘
                        ◇ GRAPH ◇ ── YES ──► ⬡ DIPLAY
                           │                   GRAPH ⬡
                          NO
                           │
                    ⬡ DISPLAY
                      INFO. ⬡
                           │
                    ┌─────────────┐
                    │   STOP      │
                    └─────────────┘
```
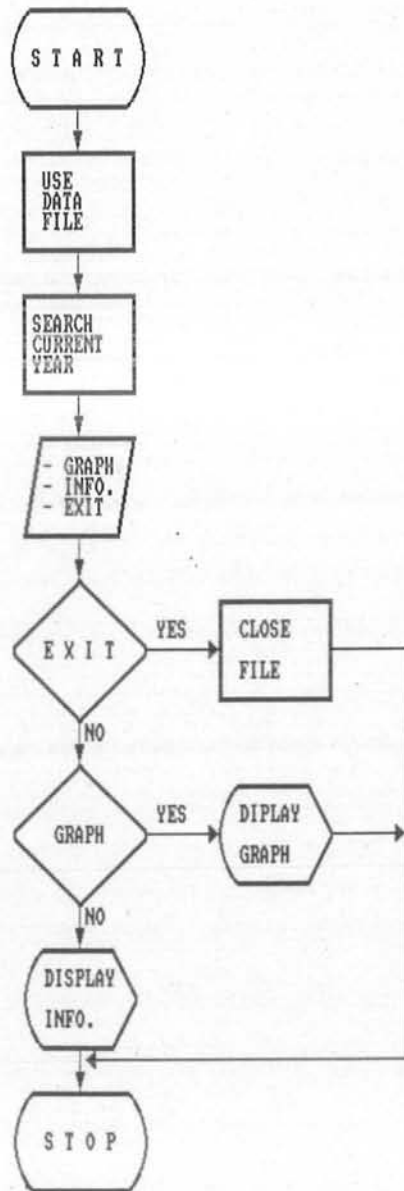
4.9   OUTPUT DESIGN FOR HARD COPY.

Reports are needed on a hard copy to keep the proper record of the items. The store keeper keeps the purchase/issue record on a register and this is called the ledger. Following reports are generated for the hard copy of the items.

1)   List of all items in store (See Annexure B-1)

2)   List of single item balance (See Annexure B-2)

3)   List of firms (See Annexure B-3)

4)   List of whole items entered (See Annexure B-4)

5)   List of items to purchase (See Annexure B-5)

6)   Received newly purchased items list (See Annexure B-6)

7)   Issued items list (See Annexure B-7)

8)   Damaged items list (See Annexure B-8)

9)   Output of dead Items (See Annexure B-9)

10)   List of items issued to persons (See Annexure B-10).

Flow chart of the above options are shown in the following pages

ITEMS IN STORE

```
        ( START )           ITEMS IN STORE
            |               ==============
            v
       +---------+
       |  USE    |
       |  FILE   |
       +---------+
            |
            v
        /---------/
       /  READ   /
      /  FILE   /
     /---------/
            |
            v
         /\
        /  \      YES    +---------+        +---------+
       / EOF \--------->|  CLOSE  |------->(  STOP  )
       \     /          |  FILE   |         +---------+
        \   /           +---------+
         \/
          | NO
          v
         /\
  YES   /  \
<------/ IF  \
      / BAL. = 0 \
       \        /
        \      /
         \    /
          \  /
           \/
          | NO
          v
       +---------+
       |  PRINT  |
       | RECORD  |
       +--------\_/
```

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START

USE FILES
ART/RCV/ISS/
DAMG/DEAD

READ
FILE
ARTICLES

E O F → YES → 3

NO

SEARCH
I.CODE IN
RECEIVED

FOUND
NO
YES

PRINT
RECORD INFO.

READ
FILE
RECEIVED

COMPARE
I.CODE OF
BOTH FILE

BOTH
ITEM CODES
EQUAL
YES
NO

PRINT RECORD
OF ARTICLES
FILE

1

1

SEARCH
I.CODE IN
ISSUED

FOUND → NO
YES

PRINT
RECORD

READ
ISSUED

BOTH
FILES I.CD
EQUAL
YES
NO

SEARCH
I.CODE IN
DAMAGED

FOUND → NO
YES

PRINT
RECORD

READ
FILE
DAMAGED

BOTH
FILES I.CD
EQUAL
YES
NO

2

2

SEARCH
I.CODE IN
DEAD FILE

NO FOUND
YES

PRINT
RECORD
INFORMATION

READ
FILE
DEAD

BOTH
FILES I.CD
EQUAL
YES
NO → 3

CLOSE
ALL
FILES

STOP

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LIST OF FIRMS

```
                    ┌──────────┐
                   (   START    )
                    └─────┬────┘
                          │
                    ┌─────▼────┐
                    │   USE    │
                    │  FILE    │
                    └─────┬────┘
          ┌───────────────│
          │         ┌──────▼─────┐
          │        /    READ     /
          │       /    FILE     /
          │      └──────┬──────┘
          │             │
          │          ◇──▼──◇        YES   ┌────────┐        ┌─────────┐
          │         ◇  E O F ◇ ───────────│  CLOSE │────────(  STOP   )
          │          ◇─────◇              │  FILE  │        └─────────┘
          │             │ NO              └────────┘
          │             │
          │      ┌──────▼──────┐
          │      │   PRINT     │
          │      │   RECORD    │
          │      └─────────────┘
          └─────────────┘
```

WHOLE ITEMS LIST

```
        ┌─────────┐
        │  START  │
        └────┬────┘
             ▼
        ┌─────────┐
        │   USE   │
        │  FILE   │
        └────┬────┘
             ▼
        ┌─────────┐
        │  READ   │
        │  FILE   │
        └────┬────┘
             ▼
        ┌─────────┐
        │  PRINT  │
        │ RECORDS │
        └────┬────┘
             ▼
    NO    ◇ E O F ◇   YES   ┌───────┐      ┌────────┐
    ◄─────         ─────────►│ CLOSE │─────►│ STOP   │
                            │ FILE  │      └────────┘
                            └───────┘
```

```
                    ┌───────────┐
                   (   START     )
                    └─────┬─────┘
                          │
                    ┌─────┴─────┐
                    │  USE      │
                    │  DATA     │
                    │  FILES    │
                    └─────┬─────┘
          ┌───────────────┤◄──────────────────────────────────────────┐
          │         ┌─────┴─────┐                                      │
          │        /  -ALL      /                                      │
          │       /  -SPECIF   /                                       │
          │      /  -EXIT     /                                        │
          │     └─────┬─────┘                                          │
          │           │                                               │
          │        ◇──┴──◇  YES  ┌────────┐    ┌───────────┐          │
          │       ◇ EXIT  ◇─────►│ CLOSE  │───►(  STOP     )          │
          │        ◇─────◇       │ FILES  │    └───────────┘          │
          │           │ NO       └────────┘                          │
          │           │                                               │
          │        ◇──┴──◇ YES ┌──────┐  ◇──────────◇ YES ┌────────┐  ◇──────◇ YES
          │       ◇ OPT=1 ◇───►│ READ │─►◇ BALANCE<= ◇───►│ PRINT  │─►◇ EOF  ◇───┘
          │        ◇─────◇     │ FILE │  ◇ RE-ORDER  ◇    │ RECORD │  ◇──────◇
          │           │ NO     └──────┘   ◇────────◇      └────────┘     │ NO
          │           │            ▲          │ NO                       │
          │           │            └──────────┴──────────────────────────┘
          │      ┌────┴─────┐
          │     / ACCEPT    /
          │    / 3 CHR.     /
          │   / I.NAME     /
          │   └────┬─────┘
          │        │
          │     ◇──┴──◇
       YES│    ◇ BLANK ◇
       ◄──┼────◇──────◇
          │        │ NO
          │    ┌───┴────┐
          │   / LIST OF  \
          │   \ ITEMS    /
          │   / NAMES    \
          │   └───┬────┘
          │       │
          │   ┌───┴────┐
          │  / ACCEPT  /
          │ / ITEM     /
          │ / CODE    /
          │  └───┬────┘
          │      │
          │  ┌───┴────┐
          │  │ SEARCH │
          │  │ ITEM   │
          │  │ CODE   │
          │  └───┬────┘
          │      │
          │  ┌───┴────┐
          │  │ PRINT  │
          │  │        │
          │  │ RECORD │
          │  └───┬────┘
          └──────┘
```

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LIST OF RECEIVED ITEMS
=======================

```
              ( START )
                  |
                  v
             +---------+
             |  USE    |
             |  FILE   |
             +---------+
                  |
      +---------->|
      |           v
      |      /---------/
      |     /  READ   /
      |    /  FILE   /
      |   /---------/
      |        |
      |        v
      |       /\
      |      /  \    YES
      |     / EOF \------->( STOP )
      |      \    /
      |       \  /
      |        \/
      |        | NO
      |        v
      |   +---------+
      |   | PRINT   |
      |   | RECORD  |
      |   +---------+
      |        |
      +--------+
```

ISSUED ITEMS LIST

```
                    ┌─────────────┐
                    │   START     │
                    └──────┬──────┘
                           │
                           ▼
                    ┌─────────────┐
                    │ USE         │
                    │ FILE        │
                    └──────┬──────┘
        ┌──────────────────┤
        │                  ▼
        │           ┌─────────────┐
        │           │ READ        │
        │           │ FILE        │
        │           └──────┬──────┘
        │                  │
        │                  ▼
        │                ◇─────◇        ┌─────────┐
        │               ╱       ╲  YES  │         │
        │              ◇  E O F   ◇─────▶│  STOP   │
        │               ╲       ╱        │         │
        │                ◇─────◇         └─────────┘
        │                  │ NO
        │                  ▼
        │           ┌─────────────┐
        │           │ PRINT       │
        │           │ RECORD      │
        │           └──────┬──────┘
        └──────────────────┘
```

DAMAGED ITEMS LIST

```
                  ┌─────────┐
                 (  START   )
                  └────┬────┘
                       │
                       ▼
                  ┌─────────┐
                  │  USE    │
                  │  FILE   │
                  └────┬────┘
                       │
       ┌───────────────┤
       │               ▼
       │          ╱─────────╱
       │         ╱  READ   ╱
       │        ╱  FILE   ╱
       │       ╱─────────╱
       │            │
       │            ▼
       │          ◇─────◇       YES   ┌─────────┐
       │         ◇  E O F ◇──────────►(  STOP   )
       │          ◇─────◇             └─────────┘
       │            │
       │          NO│
       │            ▼
       │       ┌─────────┐
       │       │ PRINT   │
       │       │ RECORD  │
       │       └──┐  ┌───┘
       └──────────┘  │
```

LIST OF DEAD ITEMS

```
                    ┌─────────────┐
                    │   START     │
                    └──────┬──────┘
                           │
                           ▼
                    ┌─────────────┐
                    │    USE      │
                    │    FILE     │
                    └──────┬──────┘
                           │
          ┌────────────────┼
          │                ▼
          │         ┌─────────────┐
          │         │    READ     │
          │         │    FILE     │
          │         └──────┬──────┘
          │                │
          │                ▼
          │              ╱  ╲        YES    ┌─────────────┐
          │             ╱EOF ╲──────────────│    STOP     │
          │             ╲    ╱              └─────────────┘
          │              ╲  ╱
          │                │ NO
          │                ▼
          │         ┌─────────────┐
          │         │   PRINT     │
          │         │   RECORD    │
          └─────────└─────────────┘
```

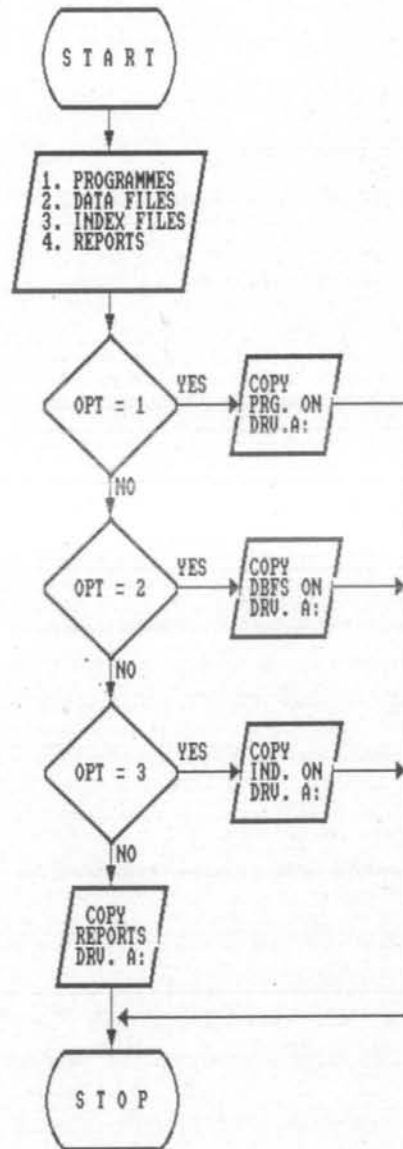## 4.10 BACKUP

It is a best practice to keep the backup of any system. Complete backup facility is provided to the user to keep a duplicate copy of programmes and data on floppy diskettes. This programme is developed to provide this facility for the following files those are necessary for an inventory system.
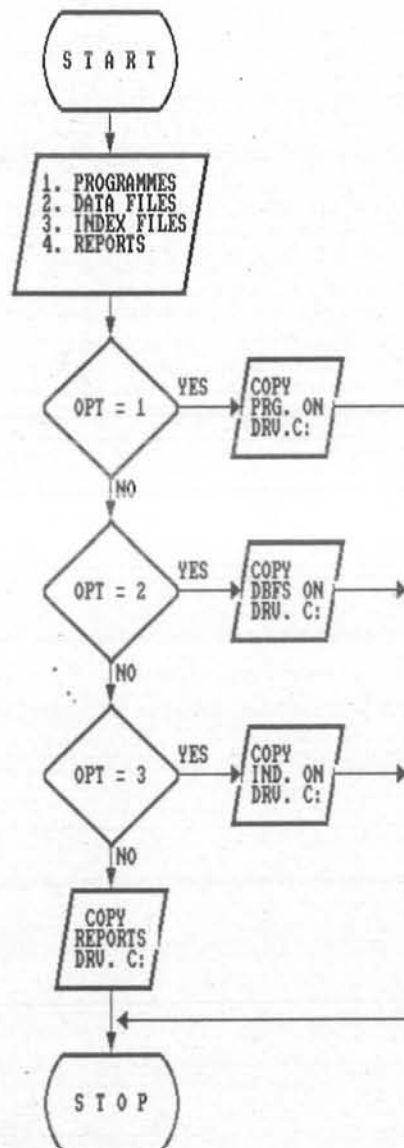
1)   Programmes

2)   Data Files

3)   Index Files

4)   Reports

```
                    ( S T A R T )
                          |
                          v
                   +-------------------+
                   | 1. PROGRAMMES     |
                   | 2. DATA FILES     |
                   | 3. INDEX FILES    |
                   | 4. REPORTS        |
                   +-------------------+
                          |
                          v
                     / OPT = 1 \  YES   / COPY      /
                     \         /------->/ PRG. ON   /----+
                      \       /         / DRV.A:    /     |
                          |NO                             |
                          v                               |
                     / OPT = 2 \  YES   / COPY      /      |
                     \         /------->/ DBFS ON   /----> |
                      \       /         / DRV. A:   /      |
                          |NO                              |
                          v                                |
                     / OPT = 3 \  YES   / COPY      /       |
                     \         /------->/ IND. ON   /----> |
                      \       /         / DRV. A:   /      |
                          |NO                              |
                          v                                |
                   / COPY     /                            |
                   / REPORTS  /                            |
                   / DRV. A:  /                            |
                          |<-----------------------------+
                          v
                     ( S T O P )
```
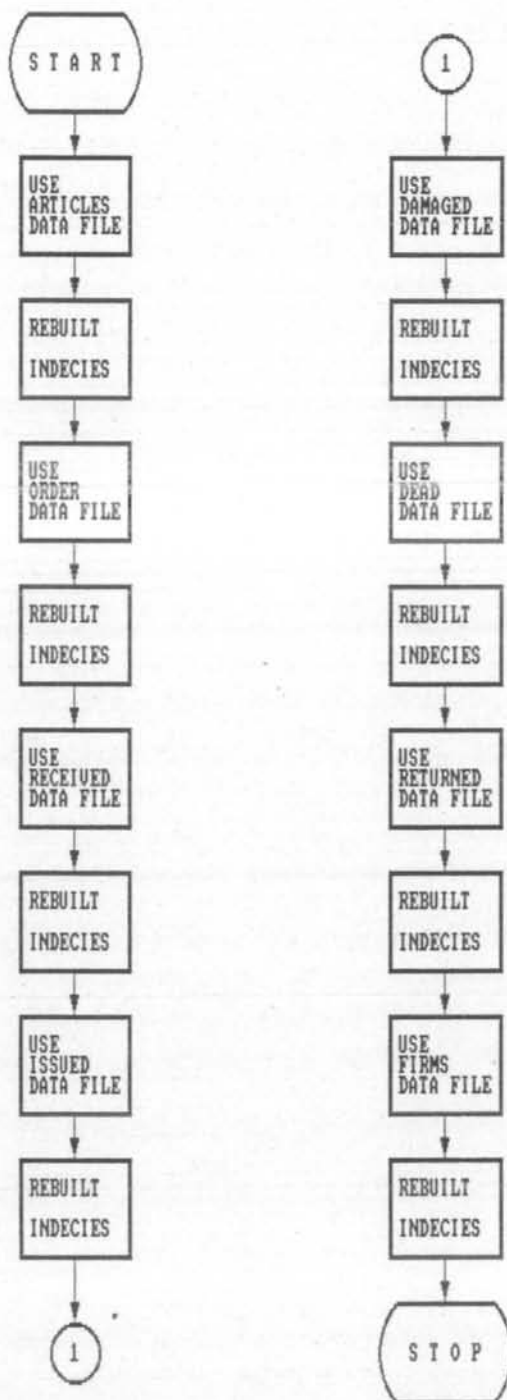
82

4.11   RESTORE

Some times system becomes inoperational due to some reasons. If user has a backup of the system on a floppy, he can restore the system again from these floppy diskettes. Restore facility is provided to copy all the following programmes and other necessary files on the computer.

1)   Programmes
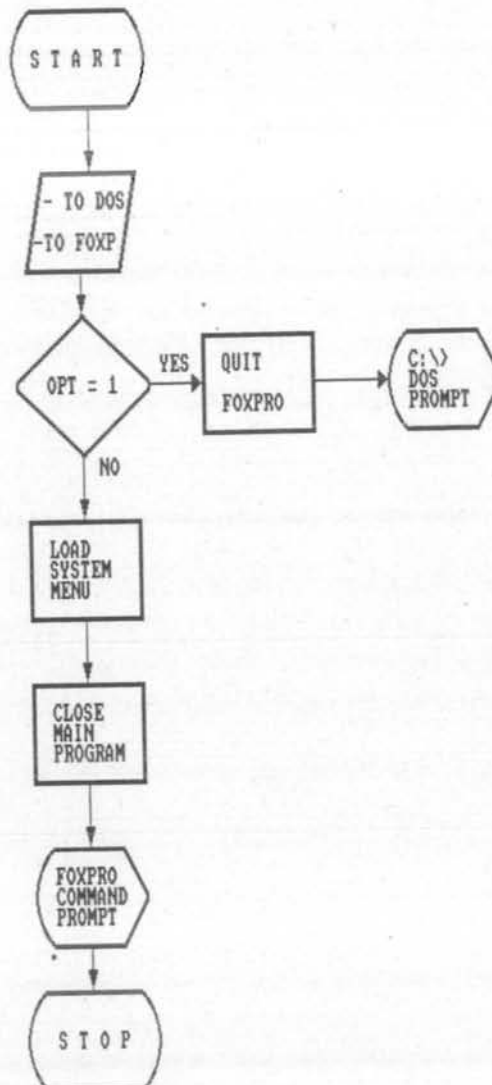
2)   Data Files

3)   Index Files

4)   Reports

```
                    ┌─────────┐
                    │  START  │
                    └─────────┘
                         │
                         ▼
                  ╱─────────────╲
                 │ 1. PROGRAMMES │
                 │ 2. DATA FILES │
                 │ 3. INDEX FILES│
                 │ 4. REPORTS    │
                  ╲─────────────╱
                         │
                         ▼
                   ╱─────────╲    YES   ┌──────────┐
                  │ OPT = 1   │────────▶│ COPY     │──────┐
                   ╲─────────╱          │ PRG. ON  │      │
                         │ NO           │ DRV.C:   │      │
                         ▼              └──────────┘      │
                   ╱─────────╲    YES   ┌──────────┐      │
                  │ OPT = 2   │────────▶│ COPY     │─────▶│
                   ╲─────────╱          │ DBFS ON  │      │
                         │ NO           │ DRV. C:  │      │
                         ▼              └──────────┘      │
                   ╱─────────╲    YES   ┌──────────┐      │
                  │ OPT = 3   │────────▶│ COPY     │─────▶│
                   ╲─────────╱          │ IND. ON  │      │
                         │ NO           │ DRV. C:  │      │
                         ▼              └──────────┘      │
                  ┌──────────┐                            │
                  │ COPY     │                            │
                  │ REPORTS  │                            │
                  │ DRV. C:  │                            │
                  └──────────┘                            │
                         │◀───────────────────────────────┘
                         ▼
                    ┌─────────┐
                    │  STOP   │
                    └─────────┘
```

4.12   MAINTENANCE

Maintenance facility means to rebuilt the index files. Index files are corrupted by some reasons or due to power failure. Over come to this problem index files can be re-indexed by using maintenance option. When this option is selected all the databases are re-indexed.

```
      ( START )                         ( 1 )
          |                               |
          v                               v
   +--------------+              +--------------+
   | USE          |              | USE          |
   | ARTICLES     |              | DAMAGED      |
   | DATA FILE    |              | DATA FILE    |
   +--------------+              +--------------+
          |                               |
          v                               v
   +--------------+              +--------------+
   | REBUILT      |              | REBUILT      |
   | INDECIES     |              | INDECIES     |
   +--------------+              +--------------+
          |                               |
          v                               v
   +--------------+              +--------------+
   | USE          |              | USE          |
   | ORDER        |              | DEAD         |
   | DATA FILE    |              | DATA FILE    |
   +--------------+              +--------------+
          |                               |
          v                               v
   +--------------+              +--------------+
   | REBUILT      |              | REBUILT      |
   | INDECIES     |              | INDECIES     |
   +--------------+              +--------------+
          |                               |
          v                               v
   +--------------+              +--------------+
   | USE          |              | USE          |
   | RECEIVED     |              | RETURNED     |
   | DATA FILE    |              | DATA FILE    |
   +--------------+              +--------------+
          |                               |
          v                               v
   +--------------+              +--------------+
   | REBUILT      |              | REBUILT      |
   | INDECIES     |              | INDECIES     |
   +--------------+              +--------------+
          |                               |
          v                               v
   +--------------+              +--------------+
   | USE          |              | USE          |
   | ISSUED       |              | FIRMS        |
   | DATA FILE    |              | DATA FILE    |
   +--------------+              +--------------+
          |                               |
          v                               v
   +--------------+              +--------------+
   | REBUILT      |              | REBUILT      |
   | INDECIES     |              | INDECIES     |
   +--------------+              +--------------+
          |                               |
          v                               v
        ( 1 )                         ( STOP )
```

4.13 QUIT

The most powerful and interested facility is also provided in every computerised system. This facility is called "QUIT". Whenever a user wants to finish his work and is interested to come out from the inventory system he has to choose this option. When this option is selected following two messages will appear on the screen

1) **DOS Prompt:**   After finishing the work user wants to exist from the system and is interested to work on DOS. This option jumps the user to the DOS prompt.

2) **Foxpro Prompt:**   If a user is an expert in the computer package "FOXPRO" and interested to work in this package then he has to select this option.

```
                    ( S T A R T )
                          |
                          v
                   +--------------+
                   / - TO DOS     /
                   / - TO FOXP    /
                   +--------------+
                          |
                          v
                        / \        YES   +---------+        /  C:\>    \
                       / OPT \----------->|  QUIT   |------>/   DOS     /
                       \ = 1 /            | FOXPRO  |       \  PROMPT   /
                        \ /              +---------+
                         |
                         | NO
                         v
                   +----------+
                   |  LOAD    |
                   | SYSTEM   |
                   |  MENU    |
                   +----------+
                         |
                         v
                   +----------+
                   |  CLOSE   |
                   |  MAIN    |
                   | PROGRAM  |
                   +----------+
                         |
                         v
                   /  FOXPRO   \
                  /  COMMAND    \
                  \  PROMPT     /
                         |
                         v
                    ( S T O P )
```

CHAPTER 5

CONCLUSIONS & RECOMMENDATIONS

5.1   *CONCLUSIONS AND RECOMMENDATIONS*

In the project work, a new organization of database has been discussed. This approach seams to be superior to classical organization for a large class of application.

1) The relational database shows better retrieval in a short possible time, which saves user's time and reduces the area allocated inside the disk. Keys and indexes play an important role. This is the programming techniques how the whole game can be arranged logically. So far as my assignment is concerned, I have fully utilized the facilities of indexing.

2) As it is already defined that the objective of storage utilization is kept in mind all the time, so that maximum information can be stored in minimum space. No duplication occurs. To avoid the duplication, a proper way of normaliztion is adopted.

3) The prime objective of all computerised system is the cheep and cost-benifit aspects, otherwise there will be no justification for computerisation. My system is arranged and developed on the basis of same aspects.

4) Keeping in view all the dimension of usage, my level of confidence is that it works up to maximum satisfaction of user. At no stage it need to be altered unless the existing policy is changed. This can said that this is a highly stable database.

5) The operation of this system is easy to learn and use and required no programming skills. The keyboard commands are short and logically related. Normal functions occur by default. The updating and editing of files can be done with a simple available commands. For each request and response by the user, there is some visible messages at the display that computer has perform the requested operation. If request is invalid, it is also informed to user within no time.

6) Graphic display provides an excellent media of communication between user and machine and between administration. The departmental Administration has step by step control on the assistance from the computer.

7) The changes may be made in existing database files rapidly. This is perhaps a greatest benefit of conversational graphic system.

8)   At present it is an open and password free system. Every one is authorised

to use it or to change it from any where. But after certain period, when it

will be practically implemented, it will go under proper protection system.

No person can allow to start the system unless he is authorised according

to his status and nature of responsibility.

9)   At present, the computer environment of chemistry department works with

stand-alone system. All jobs and research applications work on personal

computers. But at later stage, possibility is there that the present setup will

be replaced with networking environment. Then the present system will

need to be updated accordingly. But my system will work equally good

because I have already put additional facilities to work under networking

environment.

Although an attempt has been made to computerise different aspects of Inventory

Control System, but still there is lot of room for the improvement of the computerised

system.

USER GUIDE

USER'S GUIDE

The end user of any system can be a layman. Although the developed system is totally menu driven, all the options are self explanatory. Proper messages for the user are provided at every stage where user faces any difficulty in operating the inventory system. This guide is for the user of the system to operate it easily without facing any difficulties.

HOW TO START INVENTORY SYSTEM.

To start the inventory system switch on the computer if it is not on. On DOS prompt "C:\>" type "START" to activate the inventory system. Computer will display the Main Menu of the Inventory system with the following options.

1. Entry
2. Circulation
3. Search
4. Display
5. Print
6. Backup
7. Restore
8. Maintain
9. Quit

MAIN MENU

INVENTORY CONTROL SYSTEM

DEPARTMENT OF CHEMISTRY
QUAID-I-AZAM UNIVERSITY,
ISLAMABAD

ENTRY	CIRCULATION	SEARCH	DISPLAY	PRINT	BACKUP	RESTORE	MAINTAIN	QUIT

ITEMS	Add New Items
	Modify Items
	Items Purchase Order
FIRMS	Items Received
	Damaged Items
	Dead Items
BUDGET	

	Add New Firms
	Modify Firm

To select an option highlight it and press <ENTER> or Click the Mouse button

MAIN MENU

INVENTORY CONTROL SYSTEM

DEPARTMENT OF CHEMISTRY
QUAID-I-AZAM UNIVERSITY,
ISLAMABAD

ENTRY	CIRCULATION	SEARCH	DISPLAY	PRINT	BACKUP	RESTORE	MAINTAIN	QUIT

Issue To
Returned By

To select an option highlight it and press <ENTER> or Click the Mouse button

MAIN MENU

INVENTORY CONTROL SYSTEM

DEPARTMENT OF CHEMISTRY
QUAID-I-AZAM UNIVERSITY,
ISLAMABAD

ENTRY	CIRCULATION	SEARCH	DISPLAY	PRINT	BACKUP	RESTORE	MAINTAIN	QUIT

Items to Purchase
Purchased Items
Issued Items
Damaged Items
Dead Items
Whom Issued
Last Purchase Entry

To select an option highlight it and press <ENTER> or Click the Mouse button

MAIN MENU

INVENTORY CONTROL SYSTEM

DEPARTMENT OF CHEMISTRY
QUAID-I-AZAM UNIVERSITY,
ISLAMABAD

ENTRY	CIRCULATION	SEARCH	DISPLAY	PRINT	BACKUP	RESTORE	MAINTAIN	QUIT

List of All Items in Store
Single Item Balance
List of Firms
List of Whole Items Entered

To select an option highlight it and press <ENTER> or Click the Mouse button

MAIN MENU

INVENTORY CONTROL SYSTEM

DEPARTMENT OF CHEMISTRY
QUAID-I-AZAM UNIVERSITY,
ISLAMABAD

ENTRY	CIRCULATION	SEARCH	DISPLAY	PRINT	BACKUP	RESTORE	MAINTAIN	QUIT

List of All Items in Store
List of Single Item Balance
List of Firms
List of Whole Items Entered
List of Items to Purchase
Received newly Purchased Items
Issued Items List
Damaged Items List
Output of Dead Items
List of Items Issued to Persons

To select an option highlight it and press <ENTER> or Click the Mouse button

MAIN MENU

INVENTORY CONTROL SYSTEM

DEPARTMENT OF CHEMISTRY
QUAID-I-AZAM UNIVERSITY,
ISLAMABAD

ENTRY	CIRCULATION	SEARCH	DISPLAY	PRINT	BACKUP	RESTORE	MAINTAIN	QUIT

Programmes
Data Files
Index Files
Report Files

To select an option highlight it and press <ENTER> or Click the Mouse button

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Reindex Files

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ENTRY	CIRCULATION	SEARCH	DISPLAY	PRINT	BACKUP	RESTORE	MAINTAIN	QUIT

DOS Prompt
Foxpro Prompt

To select an option highlight it and press <ENTER> or Click the Mouse button

RECEIPT

Name of Article _Tubing Pressor_   A/U _____

Date	Bill No.	Name of Firm	Qty. Purchased	PRICE	
				Rs.	Ps.
28.5.84	CR...n19	M/s A. Zaman & Co R. pindi	13 Meter	975	40
5.6.84	CHA.no46	M/s Microbiological Asso. R. pind.	12 „	900	0
17.6.84	„ „ 49	———— do ————	13 „	975	0
19.6.84	„ „26	M/s A Zaman & Co R. pindi	12 „	900	0
26.11.84	CHM no 56	M/s A. Zaman & Co R. pindi	40 parts (Set)(Piris)	1000/	
13.3.85	CHM no 454 13.3.85	M/s Haroon Electronics & Gas Appliances Island	10 Feb	250	00
6.7.85	CKO1 no 984	———— do ————	40 part	1000/	
20.8.85	CHM no 549	M/s Haroon Electric & Gas co Island	40 part	1000/	
24.11.85	CHM no 119	M/s Haroon Electronic, Island	50 part (For Fan Gas)	1,000/	
24.12.85	CHM. no 471	———— do ————	40 part	1,000/	
	—				

UNIVERSITY

Name of Article_____ A/U _____

Date of issue	To whom Issued	Quantity Issued	Balance	Remarks
—	— — —	—	13 Meters	sid
—	— — —	—	25 "	sid
—	—	—	38 "	sid
—	— —	—	50 "	sid Lilpha
13·7·84	Issue to DR Dr. Jaffar	35 bas	115 feets	sid
18·8·84	" " Muj/may don	19 "	96 "	sid
1·10·84	" " "	6 M	90 "	sid
	—	—	40 feet × 90 feet	sid
·11·84	Issue to Dr. M. Jaffri Resllox	20 feet	20 " + 90 "	sid
·85	Ingry 15	one me	17 + 90 "	sid
2·85	cery 61 Res	13 feet	4 + 90 "	sid
3·85	" Phy Sch	4 "	NIL + 90 "	
	—	—	10 feet + 90 "	sid
	DR, Shagufla D. Jappre Reshlkoy	10 feet	90 feet	sid
	—	—	40 feet + 90 feet 3	sid
7·85	for ang 64	30 feet	10 " + 90 feet	sid
2·85	" Phy Sch 28	2 "	8 " + 90 "	sid
	—	—	48 " + 90 "	sid
1·85	for ang Rett·pil lel	10 "	38 + 90 "	sid
1·85	" Phy los	30 "	8 + 90 "	sid
11·85	Issue to Phy lab 22	50 "	NIL + 8 + 90 "	sid
—	— — —	—	48 + 90 "	sid
5·12·85	" may Sch	30 feet	10 + 90 "	sid
1·3·86	" " " 42	6 "	10 + 84 "	sid
1·3·86	" cery 64	3 "	07 + 24 "	sid
2·3·86	" Run 42	07 "	NIL + 24 "	sid
3·3·86	" " "	3 "	" 81 "	sid
0·3·86	" " Ory Sec	40 "	41 "	Sun
4·3·86	" Org /Anj	12 "	29 "	sid
				Seep Do

LIST OF ITEMS IN STORE (ALPHABETICAL ORDER)

ITEM CODDE	ITEM NAME, SIZE AND CAPACITY/VOLUME	UNIT	QTY. BALANCE	ORDER LEVEL
16	ACETONE, 100ML	Ltr.	10	1
1	BEAKER, 30/32, 50ML	Each	20	5
18	CARBON TETRACHLORIDE, 1000ml	Ltr	10	2
4	CONDENSER, 400 mm	Each	5	1
14	CONDUCTIVITY METER, 017590	Each	20	5
6	DESICCATORS, 200mm	Each	10	2

QUAID-I-AZAM UNIVERSITY, ISLAMABAD

RECEIPT

Name of Article____ BEAKER _____ A/u _____

DATE	BILL NO.	NAME OF FIRM	QTY. PURCHASED	PRICE
23-08-96		FROM STOCK REGISTER	20	
10-01-96	A-100	CHEMICAL HORIZONE	50	4500.00
25-05-96	F-345	CHEMICAL HORIZONE	30	3000.00
		TOTAL :-	100	
		BALANCE :-	82	

QUAID-I-AZAM UNIVERSITY, ISLAMABAD

ISSUED

Name of Article_____BEAKER_____ A/u _____

DATE OF ISSUE	TO WHOM ISSUED	QTY. ISSUED	BALANCE	REMARKS
15-03-96	AFTAB KHAN, M.Sc. 1995	2	98	
30-05-96	GULL MUHAMMAD, Prof..	5	93	
14-07-96	AZIZ-UR-REHMAN, Student, P.Hd. 1994	6	87	

Total Issued :-   13

Damaged :-   3

Dead :-   2

Balance :-   82

LIST OF FIRMS ON PANEL (ALPHABETICAL ORDER)

FIRM CODE	FIRM NAME	ADDRESS, ORIGIN, TELEPHONE
2	CHEMICAL HORIZONE	56, Super Jinnah Islamabad, Pakistan 821356
1	LEO PVT. (LTD.)	13, Murree Road Rawalpindi, Pakistan 550987
4	MERCK	New Yard, USA, 411-234-4356
5	SIEMENSE PVT. (LTD.)	Ferozpur Road, 44F Lahore, Pakistan, 5752345
3	SIGMA CHEMICAL CORP	Manzoor Plaza, 44D, Blue Area, Islamabad, Pakistan 812234

LIST OF WHOLE ITEMS ENTERED (ALPHABETICAL)

ITEM CODDE	ITEM NAME, SIZE AND CAPACITY/VOLUME	UNIT	QTY. BALANCE	ORDER LEVEL
16	ACETONE, 100ML	Ltr.	10	1
1	BEAKER, 30/32, 50ML	Each	20	5
18	CARBON TETRACHLORIDE, 1000ml	Ltr	10	2
4	CONDENSER, 400 mm	Each	5	1
14	CONDUCTIVITY METER, 017590	Each	20	5
6	DESICCATORS, 200mm	Each	10	2
5	DISHES, 70/40, 100ml	Each	0	0
17	ETHANOL, 100ml	Ltr	0	0
20	FORMALDEHYDE, 250ml	Ltr	0	0
11	FURNANCE 1300 °C	Each	0	0

FOLLOWING ITEMS ARE DUE TO PURCHASE

ITEM CODDE	ITEM NAME, SIZE AND CAPACITY/VOLUME	UNIT	QTY. BALANCE	ORDER LEVEL
16	ACETONE, 100ML	Ltr.	1	1
1	BEAKER, 30/32, 50ML	Each	5	5
18	CARBON TETRACHLORIDE, 1000ml	Ltr	1	1
4	CONDENSER, 400 mm	Each	2	2
14	CONDUCTIVITY METER, 017590	Each	5	5
6	DESICCATORS, 200mm	Each	3	3

ITEMS PURCHASED AND RECEIVED IN THE STORE

ITEM CODE	FIRM CODE	RECV. DATE	BILL/NO. DATE	QTY. REC.	ITEM PRICE	DISCOUT	AMOUNT
1	1	10-01-96	A-100 08-01-96	50	100.00	500.00	4500.00
5	2	15-05-96	340 14-05-96	20	50.00	50	950.00
7	5	22-06-96	NE-765 2-06-96	10	200.00	200	1800.00
13	2	28-07-96	AA-987	30	150.00	500.00	4000.00
18	5	30-07-96	NE-780 26-07-96	10	100.00		1000.00

LIST OF ISSUED ITEMS

ITEM CODE	QTY ISSUED/ ISSUE DATE	ISSUED TO / ADDRESS
1	2	SULTAN MAHMOOD, STUDENT, M.Sc., 1989, Chem. Dept. QAU
2	4	MAHMOOD HUSSAIN, STUDENT, M.Sc., 1990, Chem. Deptt. QAU
3.	8	KHALID MAHMOOD, Glassblower, Chem, Dept.
4	1	DR. M. AFZAL, Prof., Chem. Dept.
5	3	ALLAUDDIN KHAN, P.Hd, 1993, Chem. Dept. QAU

DAMAGED ITEMS LIST

ITEM CODE	QTY	DATE	DAMAGED BY	REASON
1	2	01-01-96	GUL NAWAZ	Cleaning time
2	1	10-04-96	KHALID MAHMOOD	Fallon down
5	5	12-07-96	MAHMOOD HUSSAIN	Fallon from shelf
9	1	28-9-96	DR. M. AFZAL	Electric fault
14	1	02-10-96	QADIR KHAN	Short circuit

DEAD ITEMS LIST

ITEM CODE	QUANTITY / DATE	AUCTIONED	AMOUNT
4	1 10-05-96	No	
6	1 20-08-96	Yes	1000.00
10	1 22-09-96	No	
15	1 29-09-96	No	

LIST OF ITEMS ISSUED TO PERSONS
(ALPHABETICAL)

ITEM CODE	QTY ISSUED/ DATE	ISSUED TO / ADDRESS
5	3	ALLAUDDIN KHAN, P.Hd, 1993, Chem. Dept. QAU
4	1	DR. M. AFZAL, Prof., Chem. Dept.
3.	8	KHALID MAHMOOD, Glassblower, Chem, Dept.
2	4	MAHMOOD HUSSAIN, STUDENT, M.Sc., 1990, Chem. Deptt. QAU
1	2	SULTAN MAHMOOD, STUDENT, M.Sc., 1989, Chem. Dept. QAU

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