COMPUTERISED LABORATORY RECORD SYSTEM

(CASE STUDY OF MECHANICAL ENGINEERING LABORATORY FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA)

BY

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CERTIFICATION

This is to certify that the work recorded in this report was carried out by

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DEDICATION

This book is certainly dedicated to the followings:-

(1)   The Almighty God.

(2)   My wife Mrs Lydia F. Aliyu

(3)   My children, Huldah, Jechonias, Denins, Isaiah.

(4)   F.U.T Minna

ACKNOWLEDGEMENT

Glory be to the Almighty God who gave me this glorious opportunity to pursuit my academic career in computer studies. I thank the Almighty God who made my endevour a great success for paving the way and guiding my path all along the wilderness of life.

I am greatly indepted to the entire members of the staff of the department of Maths/Computer Studies. To Mr. Audu Isah; my project supervisor. I owe so much for his inspiratory advice and tactical supervision. I commend his patience and elderly role. I'm also very grateful to the co-ordinator (Prince R. O. Badmus). To all others who have shown their precious seeds of knowledge in this write - up I'm very proud of you. In making this write - up a reality; I owe great thanks to the H.O.D Mechanical Enginering Prof. F. O. Akinbode and my sectional head Mr. Solomon Umoigeng.

To my wife Mrs. Lydia Aliyu who sacrifices her life, time finance etc to make ours sublime, I owe my ultimate debt and gratitude. To my friends and foes, who have been of help in one way or the other and hindrences, that actions which mould my person; I say thank you may GOD in his infinite mercy reward you all Amen.

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ABSTRACT

The invention of computer to the modern days technology makes problem solving to be faster than the human beings physical effort.

Base on this background, computerisation of events especially record keeping are programmed into computer for easy accessibility.

This study computerises laboratory records (with particular reference to Mechanical Engineering Department; FUT Minn) to improve the current system of record keeping in the laboratory.

To improve the present system, a new approach; using computer system will be developed.

The steps for the new methods for laboratory computerised record system are:-

(1)   System Analysis

(2)   System development & design

(3)   Software development

(4)   Hardware development.

(5)   Implementation and documentation.

CHAPTER ONE

1.0   INTRODUCTION

Computerising the record keeping of the laboratory equipments of Mechanical Engineering Departmen; Federal University of Technology, Minna is highly essential.

For effective detailed information on laboratory equipments, we need to collect data either inform of raw information, or through other means.

The data collected will serve as our point of reference of developing a new system of record keeping in the laboratory.

In Mechanical Engineering departmental laboratory at Federal University of Technology, Minna a lot of equipments are lodged in the lab, with or without proper record e.g. student's project, experimental equipment, have no records while other lab equipments like world bank equipments, items donated to the department, departmental materials bought like machine, iron pipes, rods have there records kept in different type, of record sheets without any master record and there is no any standard format of record keeping in the lab.

With the above situation, the department stands at the risk of loosing most of its item unknowingly and the missing items can not be traced to any body.

Using the latest electronic method of data processing, the problems of this lab can be improved.

The chapter 3 & 4 of this study will outline the system development and design of computerisng the mechanical laboratory which can be adopted to all other

labs. within and outside the University of Technology Minna.

The computer has the ability to keep records and that's why all organisation have changeover to the use of electronic devices in their business. Because computer involve input/output operation, internal movement of information from one part of the processor to another, (Arithmetic operation and Comparison and Logical type of operations) our laboratory equipments can perfectly be lodged into the processing unit and the information needed can be retrieved at anytime with much accuracy, high speed etc.

1.1 BRIEF HISTORY OF THE DEPARTMENT

The Mechanical Engr. department was created in January 1986. This was made possible by a team of hardworking and tireless professionals and academicians. The courses which were approved for the department are:-

(1) Automative & Plant Engineering

(2) Production Engineering

(3) Engineering Metallogy

(4) Industrial System Engineering

(5) Fandery Engineering

The above courses are offered at 400 - 500 level respectively including the P.G.D programmes.

Since the aim of the department is to produce graduates who are accademically sound with adequate practical background, Innovative and self employed, hence the need for the laboratory establishment.

The department was initially using the main Mechanical Engineering workshop, and civil Engineering workshop as it's laboratory centers where the whole university students have their practical training.

The idea was a great problem to the department, not until 1992, when the school of Environmental (SET) packed to their permanent site, that the mechanical engineering laboratory came into being.

Since the inception of the lab all student projects, Lab-Equipments, world bank equipments have ɔeen dumped without any record. Presently, the lab is expected to be more congested as the P.G.D programme has taken off within the department and more projects are expected at the end of the session.

1.2 STATEMENT OF THE PROBLEM

The present Mechanical Engineering lab. is about 24ft by 50ft which is sub-divided into 4 sections that can accommodate about 20 students at a time.

The section are:-

    (1)   Production and Manufacturing section

    (2)   Automobile workshop Lab.

    (3)   Thermo - fluid

    (4)   Strength of materials, theory of machines Applied mech.

With the present situation of lack of space, all equipments brought in to the lab are kept in lockers or elsewhere for safety.

This is now becoming difficult to keep records of many equipments that are kept else - where without proper record. A situation where some equipment are kept in

civil or central workshop store without records.

1.3 SIGNIFICANCE OF THE STUDY

With computerise system of keeping records the significance of this study is that:-

(a) There will be check and balances to the equipment / materials procured for use.

(b) This procedure save time to obtain our information.

(c) Recording, sorting and updating of informations are made easier.

(d) Computer have the ability to store millions of informations which will be an added advantage to the department.

With the facts above, it's better that every information as regard to the laboratories should be computerised.

The Mechanical dept./school of Engineering & Engineering Technology will benefit from this enormous significant of computerisation.

1.4 AIMS AND OBJECTIVES

The aim of this write-up is to investigate the current system of record keeping in the Mechanical Engineering laboratory identify it's problems and design a computer base system for effective management and location of equipment as the need may arise.

The term of reference for this study is to:-

(1)   To improve the record keeping system of the lab.

(2)   To reduce the processing time for getting the details of any item.

(3)   To suggest way of keeping all the equipment in the lab.

1.4 SCOPE OF STUDY

The scope of this study is limited to Mechanical Engr. dept. of F.U.T Minna due to the nature of procurement, installation and record keeping of materials/equipments in the department.

The scope can be broadened to any interested department in FUT Minna who wish to take advantage of inputs available in this study.

CHAPTER TWO

LITERATURE REVIEW

2.0 WHAT IS RECORD KEEPING?

As its name implies; record keeping is an administrative systematic exercise that enables one/establishment to keep accurate information about a particular facts or events. This information are stored with ease and speed with which these facts and figures are retrieved when needed.

2.1 LABORATORY ANALYSIS

The Mechanical Engineering laboratory in FUT, Minna, just as other type of Labs, is a place where scientific equipments, research and testing equipments are kept for use.

These equipments are meant to be accessible to a categories of persons who might be involved in carrying out an experiment or otherwise.

Base on the above facts, these equipments must be properly documented, since labs are always open to new delivery of equipments or maintenance exercise that might warrant the taking away of the machine elsewhere for service or as a sample.

2.2 RECORD MANAGEMENT

It would be ideal that, while the methods of keeping current records and the system of filling - all have the same objective, that is making a continuous records of the new deliveries of equipments all the time, the centralized unit or serial unit

system acting this objectives more, because all equipment record are filed accordingly. This shows that we can control our system of keeping our laboratory equipments records effectively. The system of controlling these records is known as Record Management. If a centralized unit system is in place, efficient and improved services will be achieved in terms of material utilization. This is because the space required for the filling of mechanical equipments records in growing rapidly due to increase in student admissions; the officers inchange with face the problem of accumulated delivery.

The available system and technics needed to support information, retention and retrieval at optimal level are not being used to any large degree; (This is supported by current estimate that about 70% of all records currently retained are valueless and this means extra cost to maintain).

This has lead to the development of highly sophisticated system of collecting, evaluating, storing retrieving reproducing and referencing information through mechanization and automation.

Finally, the adoption of some of the most elementary concepts and technique of record management will result in shrinking the number of idle records being processed and stored in other to provide easier and accurate record and retrieval of essential records.

2.3 OBJECTIVE OF RECORD MANAGEMENT

The objective of record management in any organisation can be summarise as follows:-

1. To protect the organisiation by preserving essentials and valuable information which are vital to the continuance of profitable activity, interposing meaningful control over the flow of records and safe guiding them against physical hazard, sabotage and business espionage.

2. It embraces the concepts of relevance of self improvement and custodianship.

3. It also improves the productivity of the administrative functions through the identification and addition of improved and responsive system techniques and equipment which enlarge information potentials, reduce records and file requirement, expand, dissemination capability and effective cost saving.

2.4 THE NEED FOR LABORATORY COMPUTERISATION

The need for laboratory computerisation system becomes very important base on the following reason:-

1. To have comprehensive records of and information for materials and equipments

2. To enable us to up-date the necessary information and records.

3. The information and records are better secured than majority of the manual system of record keeping

4. Accesibilty and accurate retrieval of such informations are made easy.

Therefore the need for laboratory computerisation.

2.5   TYPES OF COMPUTERS

Computers can be classified as follows:-

1   Digital computers

2   Analog computers

3   Hybrid computers

a.   *Digital Computers*

These type of computers represents data in a discontinuous manner using binary system. They are commonly found in business centres like calculators, Adding machine and Pc's

b.   *Analog Computers*

These type of computers represent data in a continuous manner using physical variables like pressure, temperature etc. like analog watch, filling station pump which gives you the amount of sales and the volume of gasoline in litres.

c.   *Hybrid Computers*

These type of computers combines both the digital and analog computers features. They represent data both in binary system and continuous system and commonly found in scientific centres.

As outlined above in "a" the digital general purpose computers can be distinguished as follows:-

1.   Micro computers

2.   Mini computer

3.   Mainframe computer

4.   Super computer

- **Micro Computers**

    A micro computer is a small general purpose digital computer which comprises the processor, primary and secondary storage devices. It is a single user and a single task oriented system that supports a wide range of applications. It is less costly compare to others.

- **Mini Computer**

    These type of computers can be separated from others base on their physical size, processing capability, processor design, memory capacity, the number of people that can be serviced simultaneously, environmental requirements (temperature and humidity) weight and building requirements.

    There is no clear distinction between micro and mini computers except for its operational speed and other features mentioned above. also ,mini can accomplish processing task that use to be reserved for mainframe.

- **Main Frame Computers**

    These type of computers are highly more powerful in terms of speed, storage capacity etc then minis. These type of computers are also very costly, also

they have more number of remote terminals they can service.

The speed at which main frame computers can performed operations allows more input, output, and storage devices with greater capacities to be configured in the computer system.

■ **Super Computers**

These computers are the fastest, largest, most expensive and most powerful computers which provide services to over 10,000 remote terminals. These computers produce a great deal of heat buildup due to densely packed integrated circuits. They can be seen as an improvement technologically on the main frame computers.

2.6 ADVANTAGES OF COMPUTERS

The invention of computers brought about a great deal of dynamic changes in life. Allot of human bottle-necks disappears for ever like in the Engineering field where allot of devices like slide rule, log book are used to maintain the existence of certain laws, theories and formulae.

The computers are now part and parcel of humanity. The computers are now present to replace the old method of keeping records and informations vital to human race. Their existence brought about the idea of retrieving informations on high speed and accuracy.

The existence of the computer brought about idealness in keeping and having computerised watches. It eradicates the typographic errors from the typist, constant

use of the erasers and tippets fluid and replacing them with word processor graphics and software.

The development of the computers enables the banks to be more dynamic in banking operations as the customers needs are treated without waste of time. It doesn't matter in which of the branches an account is maintained.

With the aid of computers, aeroplane are build up with super-computers which enables their pilot to go to sleep while the plane is cruising to her destination. Computers are highly necessary in space shuttle which are installed on-board. They also helps in transmission of live events from anywhere in the world.

2.7 HOW RECORDS ARE KEPT BY COMPUTERS

The computers have the ability to keep many records as possible depending on it memory capability. For us to use a computer to keep records we must have an access to an information,(which is now analysed or processed data that is now meaningful and decision can be made base on it). Informations are generated from the data collection centre via the processor. This means that their must be an input and output operations. Because computers are totally objective, it is apparent that the input, output and data storage hardware components are built along with the processing components for it to undertake input, output and processing operations.

Records are kept in permanent or secondary storage. This storage capability enables one to retrieve any related information needed any time as they are not volatile.

To keep records using computer means that the operator must entered input data through the key board or any other input device then the computer writes to output and storage devices.

The computer does not forgets any records kept with it, therefore, decision makers can adequately rely on adequate information for better management decisions.

Below is a sketch which shows how records can be kept

```
┌───────────────────────────────────────────────────────────────┐
│     ┌─────────────────────┐                                    │
│     │    ORIGINATION      │                                    │
│  ┌──│ (Name of manufac-   │                                    │
│  │  │ turing Dept. that   │                                    │
│  │  │ own the equipts etc │                                    │
│  │  └─────────────────────┘                                    │
│  │  ┌─────────────────────┐                                    │
│  │  │      INPUT          │                                    │
│  │  │ Name of Manufac.    │                                    │
│  │  │ Name of Dept.       │                                    │
│  │  │ Name of model etc   │                                    │
│  │  └─────────────────────┘         ┌──────────────────┐       │
│  │  ┌─────────────────────┐         │     STORAGE      │       │
│  │  │    PROCESSING       │         │   Tool file,     │       │
│  │  │ Operate as dire-    ├─────────│ Equipt. file,    │       │
│  │  │ cted by the prog-   │         │     etc.         │       │
│  │  │ am.                 │         └──────────────────┘       │
│  │  └─────────────────────┘                                    │
│  │  ┌─────────────────────┐                                    │
│  │  │     OUTPUT          │                                    │
│  ├──│ Show type of equip  │                                    │
│  │  │ Show total equipt.  │                                    │
│  │  │ & Sub               │                                    │
│  │  └─────────────────────┘                                    │
│  │  ┌─────────────────────┐                                    │
│  │  │   DISTRIBUTION      │                                    │
│  └──│   (End Users)       │                                    │
│     └─────────────────────┘                                    │
└───────────────────────────────────────────────────────────────┘
```
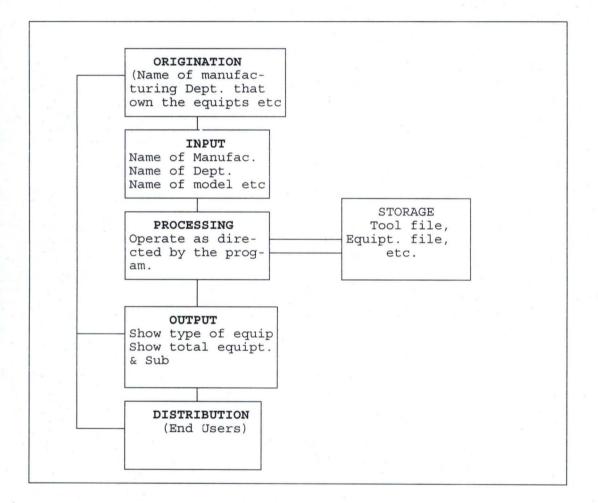
Fig. 2.0

CHAPTER THREE

3.0 SYSTEM ANALYSIS AND DESIGN

Necessity-they say is the mother of invention- this chapter leads us to analysed the current manual system of keeping the lab-equipments/materials records and how to change over to computerised system for more accuracy.

This chapter will pay particular attention on how to draw-up a detailed general manual system specification to enable us have accurate record during usage and also draw-up a new programme for effective computerised record keeping in the lab.

3.1 INVESTIGATION OF THE CURRENT SYSTEM

The aim of this section is to find out how the current manual system is been operated, by whom and what type of methods are used.

Investigation means scouting for available facts which might be informed of interviewing, questionaire, record searching. The method used for this study is interviewing and record searching. These methods will enable me obtain quantitative information. Such as observation, policies and actual description of the manual process.

The officers involved in getting the available facts for this study are:

i.   *The H.O.D Mechanical Engr. Dept., F.U.T. Minna,*

Dr. F. O. Akinbode

ii.   *The Chief Technologist (Mech. Engr. Dept.) F.U.T. Minna.*

Mr. Solomon Umoinyang.

From the information gathered so far, the current sections exist within the Mechanical Engineering laboratory Federal University of Technology, Minna. Which involved record keeping are:

    i.   Laboratory Equipments

    ii.   World Equipments

    iii.   Departmenal Equipments

    iv.   Donated Items

    v.   SWEP Equipments.

3.2 ANALYSIS OF THE CURRENT SYSTEM

- *Laboratory Equipments*

Below is the current manual method of keeping the above equipment.

Fig. 3.1

S/No	Name of Equipment	Qty

- **World Bank Equipment**

  The above equipments have no formal way of keeping departmental records.

  They are therefore grouped together with the laboratory equipments.

- **Departmental Equipments**

  The departmental equipments are categories as:

  a.   Working tools

b.   Consumable.

*   *Working Tools*

The working tools are equipments which are given to both the students
and staff for use during any practical work. They are expected to be
returned at the end of the job.

Fig. 3.2

S/No	Tool Name	Issued To	Reg. To	Reg. No.	Sign Out	Sign In

*   *Consumable*

The way and manner of issuing out the consumable are not
formalised.

■   **Donated Items**

There is know format of keeping records of donated equipments to the
department.

■   **SWEP Equipment**

The supply of these materials/equipments are procured by the School of Engr.
and Engr. Tech. These are done through contractors or direct purchase.

Comprehensive record keeping of these materials/equipments become difficult
between the SWEP- co-ordinator and the Chief technologist after SWEP.

- **Student Projects**

The students project record keeping have the current manual format.

Fig. 3.3

S/No.	Student Name	Reg. No	Project Title	Signature	Date	Remark

The above table is always reproduce every year. Also, the number of students increases yearly which implies another constraint for the above table. Due to the increase in the number of students every year, the yearly students project will be on the increase side which requires more advanced way of keeping records.

ANALYSING THE PROBLEM

3.3 After carrying out the investigation, the following highlights the problems of record keeping in the department.

1. Only the chief technologist (mechanical Department) carried out all the functions.

2. If the Chief technologist is not around, all records are not accessible.

3. The student and staff can't use any tool except the chief technologist is around.

4. Some items have know formal way of recording them.

5. The Chief technologist is only on the receiving end during SWEP.

6. Possibilities of incorrect supply by the contractors can not be verified.

7. Frequent production of record tables tend to west allot of time, energy and materials.

OBSERVATION AND RECOMMENDATIONS

3.4 From the above analysis of the problem, the current system prove to be inefficient, not accurate, not fast, not informative and need to be modernised.

The department will need a modern comprehensive record system device to take care of this present situations especially that the number of the students are increasing yearly.

The chief technologist, who is incharge of the laboratory, will need to be provided with a computer to enable him discharge his duties effectively.

I also recommended that at the department and school level, since they both have computers now, all the laboratory equipments should be lodge into their hard disk of the computers for easy record assessment and up-dating.

3.5 SYSTEM DESIGN

This chapter deals with the way of redesigning the current system of the laboratory record keeping.

The new system record is intended to carryout the specified function using a computer and a general format for keeping manual records as attached.

3.6 INPUT SPECIFICATION

Using database management system which is a set of programmes which deals with database management activities, including updating, deleting, adding, viewing and amending records." This is accomplished by selecting the required option from a menu displayed on the screen via the key-board.

Base on usefulness of the database, five database files will be used for our specifications.

3.7 OUT PUT SPECIFICATION

The output specification is intended to bring about the newly designed system to the users and how those concerned will benefit from it.

With this study, the following are expected to benefit from the out-put:-

1. The University labs.

2. The department staffs

3. The students

4. Outsiders who might need some informations about the laboratory equipments and materials

With the input specification data, the user, at the output end, can carryout any type of assignment he/she deem it wise on the PC. The input specification gives a better output environment for necessary changes like up-dating, view, browse through, printing exercise, record searching and sorting.

DATABASE STRUCTURE:C:\CC\MASTER.DBf

S/NO	FIELD NAME	TYPE	WIDTH	DEC.	INDEX
1.	Eqp.Code	Character	8		N
2.	Eqp.Code	Character	25		N
3.	Date	Date	8		N
4.	Model	Character	7		N
5.	Seqp	Character	25		N
	TOTAL		74		

Table 3.1

<u>**FEDERAL UNIVERSITY OF TECHNOLOGY MINNA.**</u>
<u>**COMPUTERISED LAB. EQUIPMENTS.**</u>
A.   New Laboratory Equipment Data
B.   Edit Laboratory Equipment Data
C.   View Laboratory Equipment Data
D.   Delete Laboratory Equipment Data
E.   Report Printing
Q.   Exit.
PICK YOUR CHOICE:

Table 3.2

```
ADD LABORATORY EQUIPMENT DATA

Equipment Code  (xx/xxx= Exit) : 98/0045

Equipment Description: Vibration Centre

Date of Procurement: 21/08/98 Model: z0012

Source of Equipment: Donation

Save data to File (Y/N):
```

Table 3.3

```
EDIT LABORATORY EQUIPMENT DATA

Equip. Code (**/***=Exit):98/0045

Equipment Description: Vibration Centre

Data of Procurement: 21/08/98 model z0012

Source of Equipment: Donation

Save Changes to file (Y/N):
```

Table 3.4

```
VIEW LABORATORY EQUIPMENT DATA

Equipment Code (xx/xxx= Exit): 98/0045

Equipment Description: Vibration Centre

Date of Procurement: 21/08/98 model: z0012

Source of Equipment Donation.

Press any key to continue
```

Table 3.5

GENERAL MANUAL FORMAT

Date	Dept	Name of Equipt	Qty	Name of Supplier	Name of receiver	Signature of supplier	Signature of receiver	Name of Borrower	Signature of Borrower	Dept Borrowed to	Remark

Table 3.5.1

LABORATORY EQUIPMENT FORMAT

Date	Type of items supplied. consumable or Non consumable	Name of suppliers	Name of receiver	Qty of supply	Name of SWEP co-ordinator

Table 3.5.2

SWEP FORMAT 199

Date	Type of materials issued consumable or Non-consumable	Issued by	Issued to student or staff	Qty of materials used during SWEP	Balance and types of materials left	Type and Qty of missing items	Name of SWEP co-ordinator

Table 3.5.3

END OF SWEP REPORT FORMAT 1999

Date	Type of project submitted and label No.	Name of student and Reg No.	Qty of project	Name of officer in-charge.

Table 3.5.4

STUDENT PROJECT FORMAT

Data	Type of items supplied. Consumable or non consumable	Name of suppliers	Name of receiver	Qty of supply	Name of SWEP co-ordinator

Table 3.5.5

WORLD BANK EQUIPMENT FORMAT 1999

Date	Name and type of items supplied.	Qty supplied	Qty brought forward	Total Qty in stock	Name of supplier	Name of receiver.

Table 3.5.6

DEPARTMENTAL EQUIPMENT FORMAT 1999

Date	Name of tool received	Type of tool received	Qty received	If student Reg No/Dept	If staff Dept.	Date returned	Is the tool faulty or missing?	Qty returned	Signature of receiver	Signature officer incharge	Remark

Table 3.5.7

REQUISITION FORMAT FOR WORKING TOOLS

Date	Type of materials needed	Qty needed	Issued to.......?	Purpose of material	Signature of receiver	Signature of officer

Table 3.5.8

REQUISITION FORMAT FOR CONSUMABLE.

DELETE LABORATORY EQUIPMENT DATA

Equip. Code (xx/xxx = Exit): 98/0045

Equip. Description: Vibration centre.

Date of procurement: 21/08/98 Model z0012

Source of Equipment: Donation.

remove data from file (Y/N):

Table 3.6

FEDERAL UNIVERSITY OF TECHNOLOGY MINNA

LIST OF LABORATORY EQUIPMENTS.

S/No.	CODE	EQUIPMENT DESCRIPTION	DATE	SOURCE OF EQUIPMENT
1.	97/0005	Rotary Grinder	12/02/97	Student Project (93/2172)
2.	97/0021	Coil Friction	01/04/97	Student Siwess 1997
3.	97/0032	Drilling Machine	01/02/98	Departmental
4.	97/0040	Marcet Boiler	23/05/98	Donation
5.	97/0045	Vibration Centre	21/08/98	Donation

Table 3.7

CHAPTER FOUR

4.0 SOFTWARE DESIGN

Developing a software for new system will depend on the type of the programming language chosen. This will entail developing the algorithm, imputing the necessary commands to run the algorithm to produce an output.

PROGRAMMING LANGUAGE

4.1 If a computer is expected to carryout a processing procedure, a program which is a set of instructions or commands in the form of statements are written for the computer to perform the functions. A lot of programming languages are developed for making the use of a computer to be more easier.

Some of the business and Arithmetical languages include:-

1. Basic

2. Pascal

3. Cobol

4. Fortran

5. dBase III & III plus.

6. dBase IV

7. Windows 95

This study employ the use of dBase IV to enable us to perform so many task because of its powerful facilities such as retrieval and debugging capabilities, large storage capacity very fast in operation.

4.2 RECORD SYSTEM IMPLEMENTATION

Implementation is a procedure whereby an on-line principle for operation is produced to be used in an organisation either to improve services or to make changes in certain areas of the sector.

At times it's easy to draw-up a new guideline for an organisation to be followed, but it's implementation are either not followed at all or slowly been implemented.

The computer age provides the need for improving our system of record keeping by changing from the former manual method to computerised system. This method give rise to conversion exercise from one system to another.

4.3 CONVERSION

The manual methods of keeping records have been identified to have problems and a new sophisticated method is discovered to take care of such problems.

Conversion is the switching or changing from the old method to the new method.

There are various methods of conversion; the need to know which method of conversion will suit the prevailing circumstances among those stated below justifying the current situation.

1.   Parallel System

2.   Direct System

3.   Pilot System

4.   Phase-In.

4.4 SOFTWARE SUPPORT

To enable the user to carryout the software operations:- the following requirements are necessary:-

1.   DISK operating system (Ms DOS 6.1)

2.   DBMS Packages (dBase IV)

4.5 HARDWARE SUPPORT

The entire system is needed to perform the operations and they are:-

1.   The CPU; which should have large memory.

2.   The Monitor; monochrome/colour graphics.

3.   Keyboard.

4.   Printer with specific capacity.

5.   Stabilizer of about 750 VA.

CHAPTER FIVE

5.0   LIMITATIONS

Computers which are machines capable of carrying out instructions (program) must obey directives from any operator irrespective of whom might be the operator. With this idea by us, it implies that anything good, there is the bad side of it. Record keeping using computer can be prone to danger of theft by a knowledgeable computer operators. If security devices are not put in place, the information system of that organisation is not safe because the quality, speed and accusation of information in that organisation will not be reliable.

The fire use for cooking is the same fire that can be use to burnt down the house.

5.1   TRAINING

Computer training is gaining more recognition everywhere which implies that every individual need to be computer literate.

The user could operate any system with little effort if he/she have the computer basic training. Computer training is therefore necessary for anyone who wishes to operate on this study because of the current sophisticated facilities in dBase IV.

The user should be knowledgeable in programming and must be aware of the danger of computer virus. The user who wishes to run the programme must recorgnize the existence of viruses and take precausionery measure.

5.2 TYPES OF VIRUS

(1)   Boot virus, size: 3072 bytes

(2)   Trojan Horse virus, size: 13312 bytes

(3)   File virus size: 1392 bytes

5.3 USER'S GUIDE

The computer has the keyboard for data and text, scanners for diagrams and mouse for instructions and commands which serves as means of sending scanner to the system while the monitor, printer and a tiny laud speaker serves as output devices.

The above analysis of the input/output devices enable the computer to take instruction from the user, process it and feed back the result.

With the above brief analysis on input/output devices, the user can operates the system as follows:-

1.   Setup the computer by making sure that all connection are done accordingly and then start up the computer.

2.   Boot the system

3.   Insert the appropriate Dos into drive A as your starting up drive.

4.   Make sure A: > or C:\ > is displayed on screen.

5.   Insert the diskette that contain the name of the file you want to see the contents. If the file is in C:\ > change to the directory.

6.   Type the file name with extension if any.

Press Escape to get back to the dot prompt then continue if you wish.

5.4   RECOMMENDATION

I recommend that the scope of this study be extended to other departments to improve their laboratory records keeping under the new dispensation. Also the implantation of the new method should be put into practice without delay.

This study is also subject to further research as those who wishes to continue on the study can improve on it by including more current facilities.

5.5   CONCLUSION

Having identified most of the problems associated with manual systems of keeping laboratory equipment/materials records in mechanical Engr. dept. Federal University of Technology Minna and with the increasing number of intake of students, lack of recognisant of keeping comprehensive record is why a computerised system is developed for the department.

REFERENCES

1. **C. K. AYO (M.Sc.)**   Computer   Literacy   (Operation   &
                                 Appreciation).

2. **AKIN FAPOHNDA (Ph.D)**   understanding & Using Micro-Computers.

```
┌─────────────────────────────────────────────────────┐
│  FEDERAL UNIVERSITY OF TECHNOLOGY - MINNA            │
│  ─────────────────────────────────────────────────  │
│                                                      │
│      COMPUTERISED LABORATORY EQUIPMENT               │
│      ─────────────────────────────────────           │
│                                                      │
│   A     NEW LABORATORY EQUIPMENT DATA                │
│                                                      │
│   B     EDIT LABORATORY EQUIPMENT DATA               │
│                                                      │
│   C     VIEW LABORATORY EQUIPMENT DATA               │
│                                                      │
│   D     DELETE LABORATORY EQUIPMENT DATA             │
│                                                      │
│   E     REPORT PRINTING                              │
│                                                      │
│   Q     EXIT                                         │
│  ─────────────────────────────────────────────────  │
│              PICK YOUR CHOICE:                       │
└─────────────────────────────────────────────────────┘
```

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```
┌─────────────────────────────────────────────────────────┐
│              ADD LABORATORY EQUIPMENT DATA                │
│          ─────────────────────────────────               │
│                                                           │
│  EQUIPMENT CODE (XX/XXXX = EXIT): 98/0045                 │
│                                                           │
│  EQUIPMENT DESCRIPTION: VIBRATION CENTRE                  │
│                                                           │
│  DATE OF PROCUREMENT: 21/08/98        MODEL: Z0012        │
│                                                           │
│  SOURCE OF EQUIPMENT: DONATION                            │
│  ─────────────────────────────────────────────────────   │
│             SAVE DATA TO FILE (Y/N):                      │
└─────────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────┐
│              EDIT LABORATORY EQUIPMENT DATA             │
│              ─────────────────────────────             │
│                                                         │
│  EQUIPMENT CODE (XX/XXXX = EXIT): 98/0045               │
│                                                         │
│  EQUIPMENT DESCRIPTION: VIBRATION CENTRE               │
│                                                         │
│  DATE OF PROCUREMENT: 21/08/98     MODEL: Z0012        │
│                                                         │
│  SOURCE OF EQUIPMENT: DONATION                          │
│  ─────────────────────────────────────────────────────│
│             SAVE CHANGES TO FILE (Y/N):                │
└─────────────────────────────────────────────────────────┘
```

```
+---------------------------------------------------------------+
|              VIEW LABORATORY EQUIPMENT DATA                   |
|              ------------------------------                   |
|                                                               |
| EQUIPMENT CODE (XX/XXXX = EXIT): 98/0045                      |
|                                                               |
| EQUIPMENT DESCRIPTION: VIBRATION CENTRE                       |
|                                                               |
| DATE OF PROCUREMENT: 21/08/98      MODEL: Z0012               |
|                                                               |
| SOURCE OF EQUIPMENT: DONATION                                 |
|---------------------------------------------------------------|
|              PRESS ANY KEY TO CONTINUE                        |
+---------------------------------------------------------------+
```

```
+------------------------------------------------------------+
|             DELETE LABORATORY EQUIPMENT DATA               |
|             -----------------------------                  |
|                                                            |
| EQUIPMENT CODE (XX/XXXX = EXIT): 98/0045                   |
|                                                            |
| EQUIPMENT DESCRIPTION: VIBRATION CENTRE                    |
|                                                            |
| DATE OF PROCUREMENT: 21/08/98      MODEL: Z0012            |
|                                                            |
| SOURCE OF EQUIPMENT: DONATION                              |
|------------------------------------------------------------|
|           REMOVE DATA FROM FILE (Y/N):                     |
+------------------------------------------------------------+
```

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==

LIST OF LABORATORY EQUIPMENT

/NO	CODE	EQUIPMENT DESCRIPTION	DATE	SOURCE OF EQUIPMENT
1	97/0005	ROTARY GRINDER	12/02/97	STUDENT PROJECT (93/2172)
2	97/0021	COIL FRICTION	01/04/97	STUDENT SIWES - 1997
3	98/0032	DRILLING MACHINE	01/02/98	DEPARTMENTAL
4	98/0040	MARCET BOILER	23/05/98	DONATION
5	98/0045	VIBRATION CENTRE	21/08/98	DONATION

ture for database: C:\CC\MASTER.DBF
r of data records: 5
of last update   : 06/02/99

Field Name	Type	Width	Dec	Index
EQPCODE	Character	8		N
EQPDESCR	Character	25		N
DATE	Date	8		N
MODEL	Character	7		N
SEQP	Character	25		N
tal **		74		

APPENDIX II

ALGORITHM

Below is the algorithm for the input specification to obtain an output.

MAIN PROGRAM

```
SET STATUS OFF
SET TALK OFF
SET SCOREBOARD OFF
DO WHILE .T.
  CLEAR
  PICK=' '
  @ 2,18 TO 22,61
  @ 3,20 SAY 'FEDERAL UNIVERSITY OF TECHNOLOGY - MINNA'
  @ 4,20 TO 4,59
  @ 6,23 SAY 'COMPUTERISED LABORATORY EQUIPMENT'
  @ 7,23 TO 7,55
  @ 9,21 SAY 'A    NEW LABORATORY EQUIPMENT DATA'
  @ 11,21 SAY 'B    EDIT LABORATORY EQUIPMENT DATA'
  @ 13,21 SAY 'C    VIEW LABORATORY EQUIPMENT DATA'
  @ 15,21 SAY 'D    DELETE LABORATORY EQUIPMENT DATA'
  @ 17,21 SAY 'E    REPORT PRINTING'
  @ 19,21 SAY 'Q    EXIT'
  @ 20,19 TO 20,60
  @ 21,30 SAY 'PICK YOUR CHOICE:' GET PICK PICTURE '!'
  READ
  IF PICK='A' .OR. PICK='B' .OR. PICK='C' .OR. PICK='D' .OR.
PICK='E' .OR. PICK='Q'
    CLEAR
  ELSE
    LOOP
  ENDIF
```

```
    IF PICK='A'
      DO ADD
    ENDIF
    IF PICK='B'
      DO EDIT
    ENDIF
    IF PICK='C'
      DO VIEW
    ENDIF
    IF PICK='D'
      DO DELETE
    ENDIF
    IF PICK='E'
      DO REPORT
    ENDIF
    IF PICK='Q'
      EXIT
    ENDIF
  ENDDO
  CLEAR
  RETURN
```

ADD PROGRAM
```
SET STATUS OFF
SET TALK OFF
SET SCOREBOARD OFF
USE MASTER
DO WHILE .T.
  CLEAR
  VEQPCODE=SPACE(7)
  VEQPDESCR=SPACE(25)
  VDATE=CTOD('  /  /  ')
  VMODEL=SPACE(7)
  VSEQP=SPACE(25)
```

```
@ 5,15 TO 18,64
@ 6,25 SAY 'ADD LABORATORY EQUIPMENT DATA'
@ 7,25 TO 7,53
@ 16,16 TO 16,63
@ 9,16 SAY 'EQUIPMENT CODE (XX/XXXX = EXIT):' GET VEQPCODE
PICTURE 'XX/XXXX'
READ
IF VEQPCODE='XX/XXXX'
  EXIT
ENDIF
@ 11,16 SAY 'EQUIPMENT DESCRIPTION:' GET VEQPDESCR PICTURE
'@!'
@ 13,16 SAY 'DATE OF PROCUREMENT:' GET VDATE
@ 13,50 SAY 'MODEL:' GET VMODEL
@ 15,16 SAY 'SOURCE OF EQUIPMENT:' GET VSEQP PICTURE '@!'
READ
DO WHILE .T.
  ANSWER=' '
  @ 17,27 SAY 'SAVE DATA TO FILE (Y/N):' GET ANSWER PICTURE '!'
  READ
  IF ANSWER='Y' .OR. ANSWER='N'
    EXIT
  ENDIF
ENDDO
IF ANSWER='Y'
  APPEND BLANK
  REPLACE EQPCODE WITH VEQPCODE
  REPLACE EQPDESCR WITH VEQPDESCR
  REPLACE DATE WITH VDATE
  REPLACE MODEL WITH VMODEL
  REPLACE SEQP WITH VSEQP
ENDIF
ENDDO
USE
```

```
CLEAR
RETURN


EDIT PROGRAM

SET STATUS OFF
SET TALK OFF
SET SCOREBOARD OFF
USE MASTER
DO WHILE .T.
  CLEAR
  VEQPCODE=SPACE(7)
  @ 5,15 TO 18,64
  @ 6,25 SAY 'EDIT LABORATORY EQUIPMENT DATA'
  @ 7,25 TO 7,54
  @ 16,16 TO 16,63
  @ 9,16 SAY 'EQUIPMENT CODE (XX/XXXX = EXIT):' GET VEQPCODE
PICTURE 'XX/XXXX'
  READ
  IF VEQPCODE='XX/XXXX'
    EXIT
  ENDIF
  LOCATE FOR EQPCODE=VEQPCODE
  VEQPDESCR=EQPDESCR
  VDATE=DATE
  VMODEL=MODEL
  VSEQP=SEQP
  @ 11,16 SAY 'EQUIPMENT DESCRIPTION:' GET VEQPDESCR PICTURE
'@!'
  @ 13,16 SAY 'DATE OF PROCUREMENT:' GET VDATE
  @ 13,50 SAY 'MODEL:' GET VMODEL
  @ 15,16 SAY 'SOURCE OF EQUIPMENT:' GET VSEQP PICTURE '@!'
  READ
```

```
  DO WHILE .T.
    ANSWER=' '
    @ 17,25 SAY 'SAVE CHANGES TO FILE (Y/N):' GET ANSWER
PICTURE '!'
    READ
    IF ANSWER='Y' .OR. ANSWER='N'
      EXIT
    ENDIF
  ENDDO
  IF ANSWER='Y'
    REPLACE EQPCODE WITH VEQPCODE
    REPLACE EQPDESCR WITH VEQPDESCR
    REPLACE DATE WITH VDATE
    REPLACE MODEL WITH VMODEL
    REPLACE SEQP WITH VSEQP
  ENDIF
ENDDO
USE
CLEAR
RETURN
```

VIEW PROGRAM

```
SET STATUS OFF
SET TALK OFF
SET SCOREBOARD OFF
USE MASTER
DO WHILE .T.
  CLEAR
  VEQPCODE=SPACE(7)
  @ 5,15 TO 18,64
  @ 6,25 SAY 'VIEW LABORATORY EQUIPMENT DATA'
  @ 7,25 TO 7,54
```

```
    @ 16,16 TO 16,63
    @ 9,16 SAY 'EQUIPMENT CODE (XX/XXXX = EXIT):' GET VEQPCODE
PICTURE 'XX/XXXX'
    READ
    IF VEQPCODE='XX/XXXX'
      EXIT
    ENDIF
    LOCATE FOR EQPCODE=VEQPCODE
    VEQPDESCR=EQPDESCR
    VDATE=DATE
    VMODEL=MODEL
    VSEQP=SEQP
    @ 11,16 SAY 'EQUIPMENT DESCRIPTION:' GET VEQPDESCR PICTURE
'@!'
    @ 13,16 SAY 'DATE OF PROCUREMENT:' GET VDATE
    @ 13,50 SAY 'MODEL:' GET VMODEL
    @ 15,16 SAY 'SOURCE OF EQUIPMENT:' GET VSEQP PICTURE '@!'
    CLEAR GETS
    @ 17,25 SAY 'PRESS ANY KEY TO CONTINUE'
    SET CONS OFF
    WAIT
    SET CONS ON
ENDDO
USE
CLEAR
RETURN


DELETE PROGRAM

SET STATUS OFF
SET TALK OFF
SET SCOREBOARD OFF
USE MASTER
```

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```
DO WHILE .T.
 CLEAR
 VEQPCODE=SPACE(7)
 @ 5,15 TO 18,64
 @ 6,24 SAY 'DELETE LABORATORY EQUIPMENT DATA'
 @ 7,24 TO 7,55
 @ 16,16 TO 16,63
 @ 9,16 SAY 'EQUIPMENT CODE (XX/XXXX = EXIT):' GET VEQPCODE
PICTURE 'XX/XXXX'
 READ
 IF VEQPCODE='XX/XXXX'
   EXIT
 ENDIF
 LOCATE FOR EQPCODE=VEQPCODE
 VEQPDESCR=EQPDESCR
 VDATE=DATE
 VMODEL=MODEL
 VSEQP=SEQP
 @ 11,16 SAY 'EQUIPMENT DESCRIPTION:' GET VEQPDESCR PICTURE
'@!'
 @ 13,16 SAY 'DATE OF PROCUREMENT:' GET VDATE
 @ 13,50 SAY 'MODEL:' GET VMODEL
 @ 15,16 SAY 'SOURCE OF EQUIPMENT:' GET VSEQP PICTURE '@!'
 CLEAR GETS
 DO WHILE .T.
   ANSWER=' '
   @ 17,25 SAY 'REMOVE DATA FROM FILE (Y/N):' GET ANSWER
PICTURE '!'
   READ
   IF ANSWER='Y' .OR. ANSWER='N'
     EXIT
   ENDIF
 ENDDO
 IF ANSWER='Y'
```

```
      DELETE
      PACK
    ENDIF
  ENDDO
USE
CLEAR
RETURN
```

REPORT PROGRAM

```
SET STATUS OFF
SET TALK OFF
SET SCOREBOARD OFF
USE MASTER
SET DEVICE TO PRINTER
@ 1,20 SAY 'FEDERAL UNIVERSITY OF TECHNOLOGY - MINNA'
@ 2,20 SAY REPLICATE('=',40)
@ 4,26 SAY 'LIST OF LABORATORY EQUIPMENT'
@ 5,26 SAY REPLICATE ('-',28)
@ 7,3 SAY REPLICATE('=',75)
@ 8,3 SAY '|S/NO| CODE | EQUIPMENT DESCRIPTION | DATE |'
@ 8,52 SAY ' SOURCE OF EQUIPMENT   |'
@ 9,3 SAY '|----|-------|------------------------|--------|'
@ 9,52 SAY '-------------------------|'
ROW=9
NUMBER=0
DO WHILE .NOT. EOF()
  VEQPCODE=EQPCODE
  VEQPDESCR=EQPDESCR
  VDATE=DATE
  VMODEL=MODEL
  VSEQP=SEQP
```

```
    ROW=ROW+1
    NUMBER=NUMBER+1
    @ ROW,3 SAY '|'
    @ ROW,4 SAY NUMBER PICTURE '9999'
    @ ROW,8 SAY '|'
    @ ROW,9 SAY VEQPCODE
    @ ROW,16 SAY '|'
    @ ROW,17 SAY VEQPDESCR
    @ ROW,42 SAY '|'
    @ ROW,43 SAY VDATE
    @ ROW,51 SAY '|'
    @ ROW,52 SAY VSEQP
    @ ROW,77 SAY '|'
    ROW=ROW+1
    @ ROW,3 SAY '|'
    @ ROW,8 SAY '|'
    @ ROW,16 SAY '|'
    @ ROW,42 SAY '|'
    @ ROW,51 SAY '|'
    @ ROW,77 SAY '|'
    SKIP
    IF EOF()
      ROW=ROW+1
      @ ROW,3 SAY REPLICATE('=',75)
    ENDIF
  ENDDO
USE
SET DEVICE TO SCREEN
CLEAR
RETURN
```