

**COMPUTERIZATION OF PATIENTS RECORD SYSTEM OF  
AN HOSPITAL**

**(A CASE STUDY OF NITEL MEDICAL CENTRE MINNA)**

**BY**

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**April, 2002.**

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**Submitted to the Department of  
Mathematics/Computer Science  
Federal University of Technology, Minna.**

**In Partial fulfillment of the Requirements for the Award of Post-  
Graduate Diploma in Computer Science.**

**April, 2002.**

## Approval page

This project has been examined and found acceptable in the partial fulfillment of the requirements for the Post-Graduate in Computer Science of the Federal University of Technology, Minna.

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## CERTIFICATION

This is to certify that this project was carried out by *Mr. Daku I. Francis* to meet the requirement for the award of Post Graduate Diploma in Computer Science of Federal University of Technology, Minna, Niger State.



## ACKNOWLEDGMENT

I give my utmost gratitude to God Almighty. Also my gratitude goes to the following people for their immense contribution to the completion of this program; they are:

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## ABSTRACT

This research work is aimed at computerizing the operations of the NITEL Medical Centre (i.e. the patient record), to enhance accuracy, efficiency and speed that would otherwise be encountered when we use the manual system that is in operation already.

To this, the research work has analysed the existing mode patient's record system operations currently in use in the NITEL Medical Centre, Minna. This was necessary because to build a formidable computerized system the base must have to be from the analysis of the existing manual system. Hence the design and development was intended to solve the probes that are encountered in the department when we use the manual processes.

Therefore, automation of data processing through the use of computers has shown to be only way out for proper and improved management information system. This will hence increase the pace of health care delivery services and increase the overall efficiency of the NITEL Medical Centre, Minna.

For proper implementation then, of the proposed system, the documentation manual for the use of the system would be described as well as the conducive environment for the operation of the system.

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# CHAPTER ONE

## 1.0 GENERAL INTRODUCTION

Long time back, the use of computer was not known by most people, they were not even aware of its existence. But today, the scenario is different. We are all aware of the very important roles the computer plays in our daily work life.

We live in a computer age and the computer is reshaping our life and world.

The bridge between the computer and our present day is evident by the increased activities worldwide. The use of computers is so widespread that there are few people who are not affected by their use. Patients records operation in the hospital, electricity billing system, water-billing system, Bank Operation, accounting operation in various organizations and host of others are handled by computer system. The continued substitution of electronic data processing for manual operation is due to increased activities throughout the world. This has gone to the extent that the human effort alone can no longer cope with the increased pace of these activities. Therefore, with the industrial revolution which brought about the introduction and application of computers in many diverse fields, the problem is under control. This is because the computer has the capability of processing a large data within a very short period of time and with high accuracy.

However, a computer can be defined as an electronic device that accepts data as input, processes the input according to the instructions programmed in order to generate output. Specifically, the benefits of using a computer include

accuracy, speed and efficiency. This is because the computer has the ability to process a large data within a very short period of time and with the most possible accuracy.

Every business in general, regardless of its size or purpose is concerned with the processing of facts or data about its operations in order to provide current and accurate information to management and customers. Computers are well adapted to perform this task. It then becomes an indispensable part of any business concerned.

It is therefore, important to note that one of the areas that has benefited from the expansion of computer technology is the area of business. Business, of course uses computers for a variety of tasks which includes, stock inventory control, patients record system, Payroll processing, Account receivable, Account payable, Personal information management system etc.

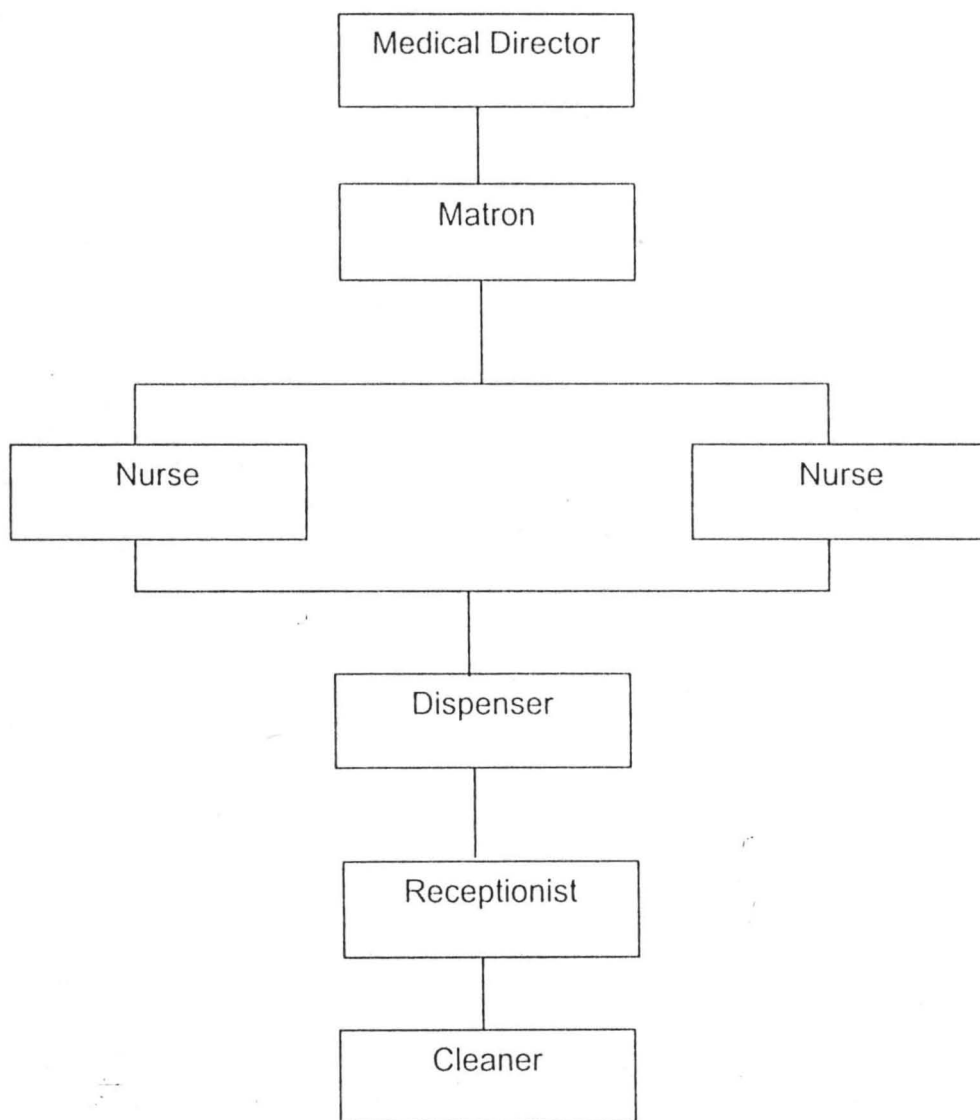
Given the above, it is then necessary to point out that computer application is of great relevance and importance in every aspect of man's life. This is why today's industries, commerce or governmental units can not shy away from the impact which the advent of the computer has brought.

### **1.1 AN OVERVIEW OF NITEL MEDICAL CENTRE**

The medical Centre is just a unit of NITEL which is aimed at providing health care services required by NITEL staff and staff dependants, it is located in the premises of NITEL, this has advantage of having staff around without any need of going out even on medical ground, hence improve productivity.

The staff strength of the medical centre could be summed to be seven, (i.e. One medical director, one matron, two nurses, one dispenser, one receptionist and one cleaner) all of whom see to the coordination of the medical centre in one way or the other.

We can draw up an organization chart of the medical centre as below.





## **1.2 OBJECTIVE OF THE STUDY**

The main objective of the computerization of patients record is to enhance efficient, reliable and fast mode of the operations of the medical centre. To avoid data duplication, to avoid unauthorized persons access to patient file/records, enhancement of updating patients file/records just to mention but few.

It is also to help the management of the hospital to improve its services to NITEL staff other.

## **1.3 SIGNIFICANT OF THE STUDY**

Successfully computerization of NITEL Medical Centre administration will project the system against alteration, tampering, damage or loss of original documents.

The problem of data duplication and inconsistency of data will be very much reduced if not totally avoided.

## **1.4 SCOPE OF THE STUDY**

Data acquisition and processing are central to efficient administration of any medical centre. The larger the number of patients, the greater the need for speedy handling and processing of data. This project therefore covers the acquisition of information, handling and general processing of data for the entire workforce of NITEL.

The project is also aimed at minimizing the time and cost of handling of all information relating to its patients with a view of improving the efficiency of administration of the NITEL medical centre, Minna.

## CHAPTER TWO

### 2.0 LITERATURE REVIEW

#### 2.1 HOSPITAL ADMINISTRATION

The NITEL Medical Centre, Minna is one of the departments that is managed by NITEL itself.

It is a 3-bed medical centre and offers both in-patient and out-patient healthcare delivery services to NITEL employed staff with families and dependents.

Presently the medical centre is headed by a medical director, matron nurse, dispenser, receptionist and cleaner whom are all NITEL employed. While the core medical personnel provide healthcare services from pre-natal to geriatrics, other auxiliary workers provides such services as maintenance and upkeep of the entire medical centre premises all of which hastens the recovery of both in and out patient.

It is evident that the number of patients being treated is on the increase, therefore for a speed and easier handling of patients medical records of this large number of patients requires some form of automation which brought about the need to computerized the patients records and medical history in order to enhance operations of this NITEL medical centre.

## **2.2 COMPUTER AS A PROCESSING MACHINE**

Electronic computers are essential tools of modern society. They have become the centre of an economic history. They found in offices and factories, landed on the moon, and will perhaps soon be as common in homes as television sets.

Information Technology often referred to as 'IT' includes computing, communication and control systems all based on digital microelectronic components more commonly known as chips. It provides us with a means of sending, receiving, manipulating and sorting information at a speed and quantities never before possible.

In their early days, computer had the image of mysterious electronic brains, with enormous power and a will of their own. With computers now being sold in millions and more and more people working with them, much of this system has disappeared. Computers are seen to be reliable, fast and efficient, but as is common with all machines, capable of occasional breakdown. Their capabilities as well as limitations have become better understood.

### **2.2.1 THE LIMITATIONS AND CAPABILITY OF THE COMPUTERS**

Firstly, computer is a machine which hardly has any moving parts and which carries out various tasks, arithmetic operations and logic operations without human intervention. In other words, a computer is a power driven machine equipped with keyboards, electronic circuit, storage components and recording devices that perform mathematic operations at high speed. Most of the work of a computer is done by tiny solid state electronic components called chips.

Chips can handle millions of items of information in one second, and some of them can store tens of hundreds of thousands of items of information. In addition to chips, a computer contains printed circuit boards to connect the various components display screen, keyboard a number of connections for power supplies, printers, etc.

In spite of its calculating and decision-making powers, a computer cannot think for itself. A computer does not understand what it is doing. It cannot make moral judgment or in any way go beyond the information at its disposal and the instructions it has for processing that information. Computers cannot interpret continuous passage in a natural language but can respond to individual words or phrase and anything more complicated is beyond them.

The process many kinds of information such prices, bank balances, name, addresses, letters, wages etc. While this information is inside a computer, it is in a special form often in a code. Everything a computer does is in response to instruction. It stores a large number of these information and then works through them one at a time.

## **2.2.2 THE STRUCTURE OF THE COMPUTER SYSTEM IN LAYOUT**

Computers come in various shapes and sizes. The smallest known as micro-computers are larger than a type writer, and they are based on a single chip micro-processor. Most micro computer can only be used by one person at time. Next in size and price are mini computers which may be occupy a small room and generally comprise several units. Most mini computers can be used

by about a dozen people at one time. The largest and most powerful of all are the main frame computers. These occupy large air-conditioned rooms and can cost millions of naira. A typical main frame computer can be accessed by up to one hundred people at any one time.

A typical digital computer consists of the following units: a central processing unit (i.e. CPU), input unit, output unit, and a number of peripheral devices including backing store.

### **The Central Processing Unit**

The central processing unit (CPU) has three parts, namely, memory arithmetic and logic units and control unit.

The actual processing of data takes place in the CPU. It consists of integrated circuit (chip) mounted on printed circuit boards. As illustrated in the figure below, the control unit coordinates the step by step running of the whole system. It shares control of all the units of the computer with the user. The arithmetic and logic unit (ALU) does all the calculations and makes logic decisions. The memory or main store holds the programs and data that are in use at the time. The memory consists of numbered storage locations or addresses.

The other devices connected to the CPU are called peripherals. They carry out the input, output, storage, retrieval and communications operation of the computer.

## Input Devices

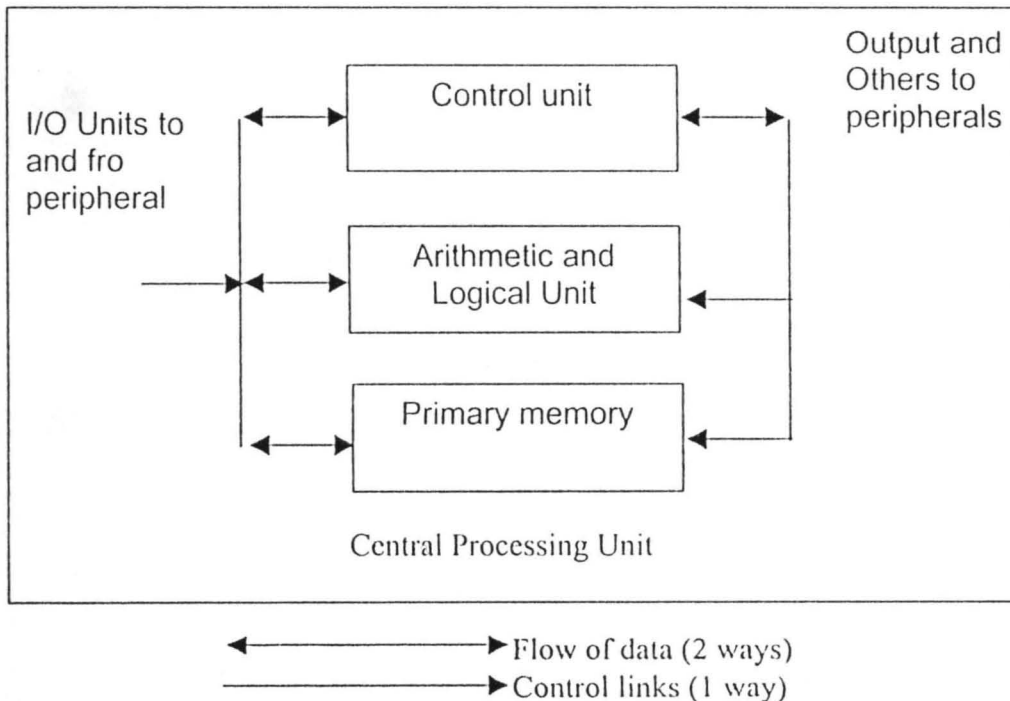
The input devices receive data from outside the computer. The data may be typed in directly or in the case of older computers read unit converts the data to the pattern of electrical pulses used by the CPU.

## Output Devices

The output unit changes the electrical pulses from the CPU into patterns understandable to the user by printing or displaying on the screen. In many applications, there is an increasing emphasis on output put in graphical form.

## Backing Store

Secondary store gives the computer rapid access to very large quantities of data for more than can be stored in the CPU memory. The most common backing store media are magnetic tapes and magnetic discs.



## INFLUENCING INTRODUCTION OF COMPUTER

Following factors makes the introduction of computers in the NITEL Medical Centre, Minna administration quite an attractive idea.

1. Computers have the ability to handle large amount of data that needs to be processed.
2. Once programmed, computers can perform complex calculations.
3. Computers also have the speed and ability to access data directly.
4. The use of computers increases efficiency, accuracy and consistency.

Computers can be copied into diskettes or other secondary storage devices as back-up copies to guard against loss of information. Data inside a computer can be corrupted or deleted accidentally or loss through a fire.

Therefore, the output of a validation routine. In a different file, the data is often collected at different times and different systems could well be inconsistent with the output of other systems. In computers, data can now be collected once and for all.

Therefore, data can now be collected once and for all. This ensures that good integrity and security features are maintained.

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### 2.3 FACTORS INFLUENCING INTRODUCTION OF COMPUTER

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1. Computers have the ability to handle large amount of data that needs to be processed.
2. Once programmed, computers can perform complex calculations.
3. Computers also have the speed and ability to access data directly.
4. The use of computers increases efficiency, accuracy and consistency.
5. Data inside a computer can be copied into diskettes or other secondary storage devices as back-up copies to guard against loss of information in case data is corrupted or deleted accidentally or loss through a fire accident.
6. With conventional file, the data is often collected at different times and validated by different validation routine. Therefore, the output produced by different systems could well be inconsistent with the introduction of computers, data can now be collected once and processed but it is essential that good integrity and security features operate in such systems.



## CHAPTER THREE

### 3.1 SYSTEM ANALYSIS AND DESIGN

At this stage, we would carryout a through analysis by studying the existing system operations in an attempt to highlight the advantages and shortcomings of the system. In this case, the system analyst uses all facts collected in other to make proper assessment of the system, the establishing the fact on the need for alternative system that will facilitate the activities of the administrative arm of the medical centre, and as such, overcome the shortcomings of the existing system.

### 3.2 PROBLEM IDENTIFICATION AND DEFINITION

Analysis of existing system will help in understanding the nature of the problems of the existing system. It will also help in setting the objectives and priorities. Failure to do this will amount to addressing the wrong issue.

Some of the problems identified with the existing system include:

1. Delay in providing adequate and accurate information as of the time it is mostly needed.
2. Difficulties is retrieving records of patients
3. Absence of articulate system of record management in respect of NITEL medical centre, Minna administration which led to non-standardization of records.
4. Pilfering of records.

### **3.3 FEASIBILITY STUDY**

The term feasibility study means possibility that is based on idea which simply ask the fundamental questions on whether the proposed system will work or not, its desirability, viability (costs and benefits), or practicability (operational and technical).

An objective feasibility study enables us to understand clearly the project request such as what to do and why it helps to determine the size of the project so as to estimate the amount of time and personal required to develop the system.

#### **3.4.0 ANALYSIS OF THE EXISTING SYSTEM**

A detailed analysis of the existing system is very necessary in order to continue that medical centre management and NITEL management that there are inherent weaknesses in the manner in which records and information are managed in the medical centre at present. For example, unless it is clearly explained, the uninformed mind which is not computer literate will find it difficult to understand that there could be savings in time and operational cost by changing the system of information management, especially through automation with the use of computers.

#### **3.4.1 LOSS OF OPERATIONAL TIME**

In the NITEL Medical Centre it is known to spend a minimum of five minutes for initial clerical works concerning very patient before the job of the core medical personal starts.

The clerical works involves the following:

1. Obtaining the patient's identification number (card number) from the patient.
2. Sorting out the patient's card from the rest (arranged serially).
3. Registering the patient for the day.
4. Booking the patient for the day

With computerization, the length of time will be greatly reduced.

### **3.4.2 DOUBTFUL ACCURACY OF INFORMATION**

Under the manual operational system, accuracy of information depends to a large extent on the individual handling the data. The accuracy of entries, accurate retrieval of data, and representation of retrieved information for immediate use depends on the disposition of the clerical staff involved. The risk and cost of misrepresentation of information can be enormous.

### **3.4.3 UNAUTHORIZED ACCESS TO DATA**

At present, all information about a patient is logged in a card and plain sheets which are kept in a flat file. Unauthorized access to these files cannot be controlled and as such, loss of information, alteration of data, unauthorized entry of data into files of interest and even loss of entire files are all possible consequences of this manual operational system.

In all, the manual operational system of data management in this medical centre is full of lapses which can be brought under control by the use of computers.

### **3.5 THE PROPOSED SYSTEM**

The numerous problems encountered in the manual operational system of patients' data management in the NITEL medical centre underscores the need for a new system. It is therefore proposed that a computerized system be adopted for efficient information management in this medical centre, leading to enhanced health care delivery system for the entire workforce NITEL and its dependant.

Since the medical centre has a workforce of seven staffs, it is then proposed that a multi-user computer system be adopted having a master station and other slave station. Two sets will be required, one on service, one on standby.

The workstation will be located at a central registry, while the slave stations will serve the doctor, matron, nurses and the auxiliary medical personnel's office where patient's vital medical statistics are kept.

### **3.6 OPERATIONAL PRINCIPLE OF THE PROPOSED SYSTEM**

Under the computerized system, the initial clerical work will be handled by the workstation where required information can be retrieved just at the tap of a button.

Other primary patient examination results and statistics like body temperature and body pressure will be taken by the auxiliary medical personnel and the information related to the central registry for inclusion in the patients existing prior to the patient being referred to the doctor or the matron for medical consultation.

From his substation, the consulting officer should be able to call up the patient's file for any relevant information during consultancy. Additional information to a patient's file however be referred to the central registry for inclusion into the data bank.

### **3.7 ADVANTAGES OF THE NEW SYSTEM**

The computerization of the medical centre's patients record will provide the management of NITEL the following advantages:

1. Loss of information on loose sheet and cards or loss and misplacement of entire files will be eliminated.
2. There will be a general improvement in the overall efficiency of the operation of medical centre.
3. Indiscriminate entry of data into files, and mutilation of data will be eliminated since entries can only be made through the master station which is always secured.
4. unauthorized dissemination of information will also be eliminated since print-outs can only be obtained from a printer which is also located at the work station.
5. Reductions in operational time will reflect in enhanced healthcare delivery in this medical centre especially in emergencies.
6. The medical centre will have a standard data bank for all classes of information about every patient.
7. The computerized system will provide quick access to stored information for the use of the medical personnel from all sub station simultaneously.

8. Illegal access to patient's data will be eliminated since the data files will be stored with a password known only to the authorized personnel.
9. Loss of operation time in clerical works prior to medical consultation will be greatly reduced.

### **3.8. SYSTEM REQUIREMENTS**

For effective operation of the computerized medical centre administrative management in NITEL, the following are required.

#### **3.8.1 HARDWARE REQUIREMENTS**

There are the physical components of the computer system which are used for input, storage, processing and output of data.

As stated in 3.5 earlier, a multi-user system is to be adopted. Out of the two sets of computers. One set will be in use at any given time, while the other set will be reserved as spare which will be used in the event of the system in service developing a fault.

It will be necessary to arrange for immediate repair to avoid the two sets of computers breakdown at the same time as this will paralyze the computerized operations of the medical centre.

#### **3.8.2 SOFTWARE REQUIREMENTS**

Software comprises all forms of programs which controls the operation of the computer. Apart from the disc operating system (DOS), one other software which would be required for effective implementation of the proposed system is the Microsoft Visual FoxPro.

This is a fully developed, pre-written and tested software which perform various data processing functions, and can be adapted to handle the patients' record (data) management needs of NITEL medical centre. The beauty of Microsoft Visual FoxPro is that it is an object oriented programming language (O.O.P.L) and it is know to be non procedural; hence a very high level of user friendliness.

### 3.8.8 INPUT SPECIFICATION

Since the medical centre in which the proposed system is being introduced is solely owned and managed by NITEL, and all patients are either NITEL staff or dependants, the input required is limited to patients' profiles, with provision for the updating of this profile when necessary, and provision for input of profiles of new patients.

A typical patient's profile will contain the following informations:

Name

Sex

Age

Address

Blood pressure

Genotype

Blood group

Medicine Allergy

Weight

Glasses (Used or not)

Current medication

Food Allergy

Next of kin

With these, full details relating to the above will be sought and fed into the system for all the patients.

### 3.8.4 OUTPUT SPECIFICATION

The output concerning every patient which will require to be printed out after every visit to the medical centre is the patient's name and the following:

1. Drugs prescribed
2. Patient's bill

Billing of staffs in for internal use in costing the operation of the medical centre and not for the purpose of payment.

#### **Patient Drug**

A print out of the drugs administered is necessary both for drugs collection at the drugs dispensary and for purchases of drugs that are out of stock. For drugs purchased, a past-purchase documentation will be carried out by returning prescription forms and cash receipts to the medical centre for updating in order to obtain the total expenditure of the organization on the medical centre on weekly, monthly and yearly bases as the case may be.

Every print-out of drugs administered will contain the following information  
type of drug.

Types of drug

Quality of each drug, and

Unit price of each drug



### 3.9 COST AND BENEFIT ANALYSIS

The estimated cost of computerizing the NITEL medical centre administrative system is subdivided into two main categories as follows:

1. Development cost
2. Operating cost

While the development cost comprises system analysis and design, software development, hardware and installation; operating cost comprise the cost of running the computerized system of administrative management including stationeries, equipment maintenance and all other miscellaneous expenses.

The Cost are listed as below:

#### 1. Development Cost

Items	Cost (N)
1. System analysis and design	70,000.00
2. Software development	120,000.00
3. Two multi-user computer system with 4 substation	500,000.00
4. Two printers (Laser Jet)	100,000.00
5. Two UPS	50,000.00
6. Two Stabilizers	20,000.00
7. Installation charges	50,000.00
8. Staff training (one month)	<u>20,000.00</u>
Total amount	<u>930,000.00</u>

## 2. Operating Cost

List	Cost (N)	Cost (N)
	Monthly	Annually
1. Material	10,000.00	100,000.00
2. Equipment maintenance	3,000.00	30,000.00
3. Miscellaneous	<u>2,000.00</u>	<u>15,000.00</u>
Total	<u>15,000.00</u>	<u>145,000.00</u>

Because the operators are still the same NITEL staff, there will be no extra cost required for wages, the only cost will be the training cost.

At the end the benefit of this computerization would be seen to be immense compare to the initial high cost of introducing this system.

The benefits could be summarized as:

1. Prompt health care delivery of the patients will be guaranteed and by so doing the medical centre will be in a better position to contain cases of emergencies, hence preventing to a great extent bad cases from getting worse.
2. There will be a reduction in cost of running the medical centre, as a result of quick access to information and speedy processing of data which the computerized system will provide.
3. With time the medical centre management will be able to generated a large and dependable data bank covering all the registered patients.
3. There will be great saving in operational time of handling and processing large data.

4. Experimental treatment of patient can be eliminated by this method since all patient's medical history can easily be obtained from the computer with these ever when we have a case of a new medical personnel, he would be able to know from the beginning how to go about any of the patient.

This system can therefore be recommended for any operational medical centre or hospital.

### **Summary**

In this chapter (three) a careful analysis of the case study in carrying out and effective analysis, the problems of the existing system has to be defined then a thorough feasibility study of the proposed system, how viable it will be, how cost effective and the general advantages over the existing system. Most importantly of all the cost and benefit analysis, design and implementation of the new system.

## **CHAPTER FOUR**

### **4.0 SYSTEM IMPLEMENTATION**

The systems implementation and application stage is required to put into use the newly designed system. This is always done to provide the environmental conducive for efficient working of the system of the system. This chapter begins with choice of language and software used and its features. The requirements in terms of hardware configuration and software types required for the computerized procedure is also stated. The mode testing of the new system and conversion to the system which are considered important are described in this chapter. Finally, the documentation of the workings of the system is also considered essential in order to aid references by the users as well as to aid proper understanding of the system.

### **4.1 CHOICE OF SOFTWARE PACKAGES AND ITS FEATURES**

The proposed is written in Microsoft Visual FoxPro which is a type of software of the Database management system (DBMS). This is because of the uniqueness of the visual FoxPro; its special feature of object orienting language (O.O.P.L) and it is no-procedural hence user friendly compliant.

DBMS is a package of computer programs and its documentation used to create, maintain, organize and retrieve information from a database. It is a software package that help establishment or institutions manage their data resources.

Some of the important functions of DBMS are:

1. Create and populate a database.
2. Makes it possible for database shared by users.
3. Update information in the database
4. Generate report from the database
5. Data retrieval from the database
6. Maintain integrity and consistency of data.

The other types of Database management software include Dbase, FoxBase Informix, Paradox, Oracle and host of others.

#### 4.2 PROGRAM AND PROGRAMMING

A program can be defined as a set or sequence of instructions which informs a computer of the steps required for achieving a defined task. Programming is simply mode of communicating with computers. It is the form an artificially defined set of characters, symbols and words plus the rules for combining these characters, symbols and words into meaningful communication, so designed to be conveniently used by humans is developing programs.

We will be dealing with only the operational procedures and description of the modular code is dealt with the main program codes are provided in the appendix.

The modular structure analysis is as below:

**Main Menu:** This program displays the main menu of the project, which contains all the operations to be performed. They are:

- a. **Patients' profile**
  - b. Billing
  - c. Drug
  - d. Report
- a. Patients' profile will include the informations about the patient. e.g. Name, Age, Sex, Address, Blood group and type, Medical history.
  - b. Billing includes the total cost of drugs and treatments received in the medical centre by the patient.
  - c. Drugs contains the number of drugs, types of drugs, and prescription being administered.
  - d. Report is responsible for generate the information on all the patients treated in the centre at a given period of time (i.e. their bills and drugs

#### 4.3 FILE CONVERSION

At this stage, we are converting the old data files into the form required by the new system, and is usually a very expensive stage in the whole project.

Although it is usually regarded as a part of change-over, file conversion is often a complete and separate system task in itself, involving fact finding, analysis, data capture, the design of processes from design to production of special training computer processes from design to production of special training course.

#### 4.4 SYSTEM CHANGE-OVER

This involves the conversion of the old to the new system. The condition that must be taken into consideration before change-over includes:

- a. The system has being proved to be satisfactory to the systems analyst and other implement activities have been completed.
- b. User managers are satisfied with the results of the system tests and staff training reference manuals.
- c. The target data for change-over is due.

The following are the different types of change-over:

1. Direct change-over
2. Parallel running change-over
3. Pilot change-over
4. Stage by stage change-over

The different methods have their advantages and disadvantages. However, parallel change-over have being recommended. With parallel change-over, one can process current data by suing both the old and new system to cross check results.

It main advantage is that the old system is kept advice and operational unuu the new system is proved for at least one system cycle, using full live data in the real operational environment of place, people, equipments and time, and the old systems is phased out gradually. This method gives room comparison of results of the new and old system before acceptance by the user, thereby promoting user confidence.

## Summary

In this chapter, we find ourselves in the very important stage, and care has to be taken. The already analyzed and designed system is ready for implementation. At this point a lot of procedures are involved, like what type of software is to be used and why. Then we got into the programming proper, creating at this point the source program to generate the appropriate object codes. We also have to be conscious of the conversion process from the old to system what type of change-over should be recommended will be taking also into consideration.



## CHAPTER FIVE

### 5.1 SYSTEM TESTING AND EVALUATION

What is expected of the program is examined. The system testing involving code and specification test were also carried out. The essence of the system evaluation is to check if:

1. The system is working effectively and as well as generating the required result.
2. The users are satisfied with the system or having problems with working the new system.
3. The system controls are functional.
4. Whether the project was completed within the budget amount and also determine the system's operating cost.

### 5.2 SUMMARY

This study has presented an overview of NITEL medical centre, Minna, ranging from its background, through its staffing, management and operations.

The operational difficulties encountered in the manual information management system currently in use have also been highlighted. Several man-hours are currently spent every day in manual handling and processing of patients medical records.

Automation at data processing through the use of computers has been shown to be the only option for enhanced information management, leading to prompt health care delivery services and improvement in the over-all efficiency of NITEL medical centres.

This will be easily achieved by the adoption of Microsoft Visual FoxPro Software, adapted to suit the various information requirements of the management of NITEL medical centre.

It is necessary to remark that redundancy of staff, leading to retrenchment of workers, which usually accompanies system automation is ruled out. In fact, the new system will entail the employment of more workers so that the master station will be manned round the clock by four workers on 8 – hour duty shift every day, making provision of course, for one staff on off-duty at any point in time.

### 5.3 RECOMMENDATIONS

The need for the installation of the proposed system is to ensure the maximization of its benefits. However, for the system to be of immense benefits, the following recommendations should be adopted.

1. **Manpower Requirement:** The use of computer in the organization requires a review of the manpower presently available. Some staff like the typist will have to be trained to the use of microprocessor and new staffs will definitely have to be employed. It is also recommended that NITEL should employ an in-house programmer who is fully knowledgeable

about the concept of Database management system. The programmer should be able to write program in Microsoft Visual FoxPro at least. This is to ensure future modifications.

2. **Security:** In any computer based system, there is the need for security in order to avoid both logical and physical problems. In view of this, people (both staff and outsider) should not be given any access into the computer room.
  
3. **Computer Environment:** Normally, a computer environment should be air-conditioned. NITEL should provide a good cooling facility for the commuter so as to ensure durability of the system. However, it should be realized that the above recommendations need to be adopted in order to fully maximize the importance of a computer based system.

#### 5.4 CONCLUSION

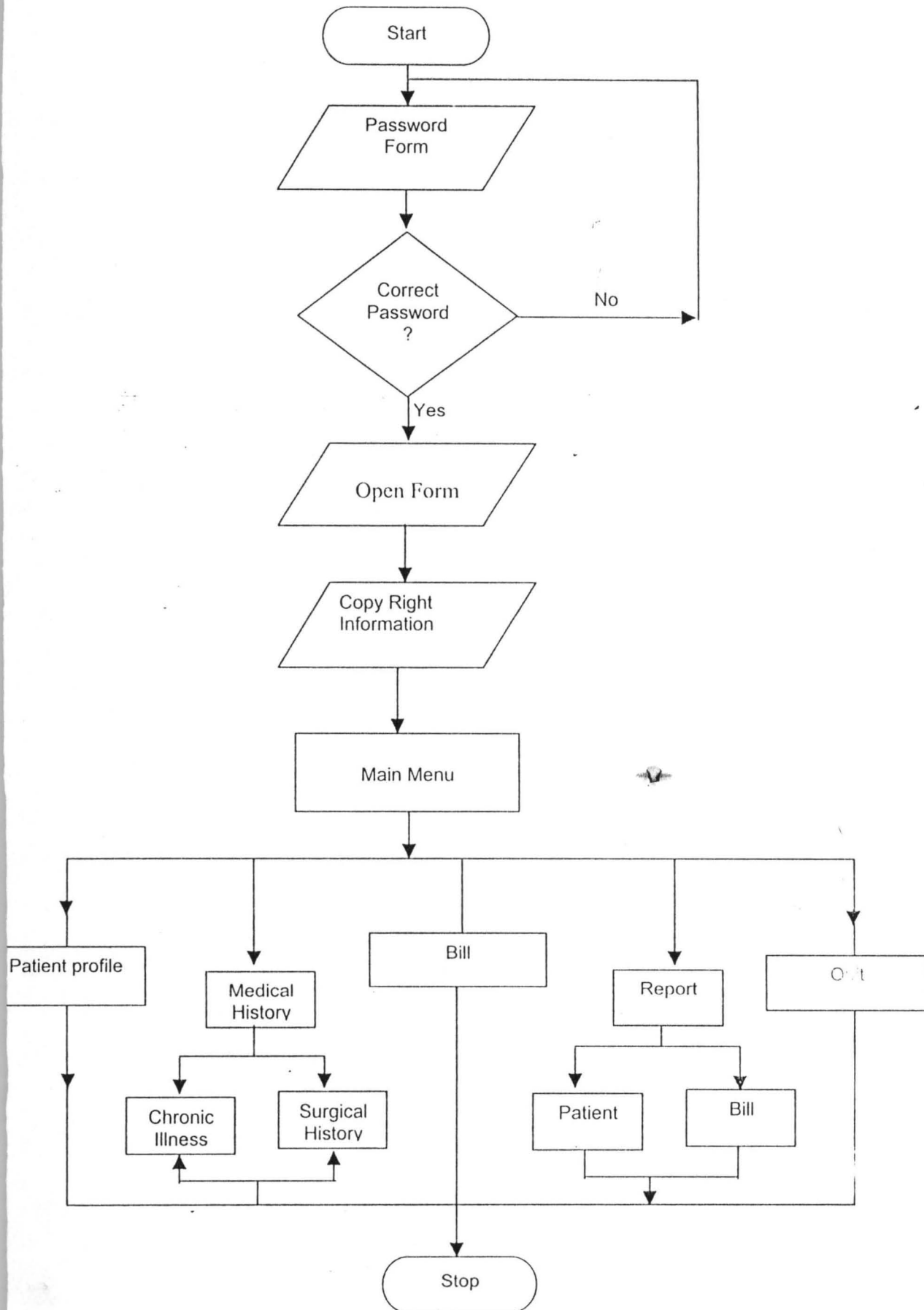
The continued substitution of computer based system for manual procedures has in modern days, become a world wide affairs. This is due to its relevance in virtually all aspects of human endeavour. This interest is, however, intensified by the capability of computers in performing a given set of procedures with all the necessary accuracy. It is not subjected to committing errors, and its ability to accomplishing any task at high speed.

Therefore, it could be stated that, the introduction of a computer based system in processing and storage of patients record would solve all the highlighted and any future problems.

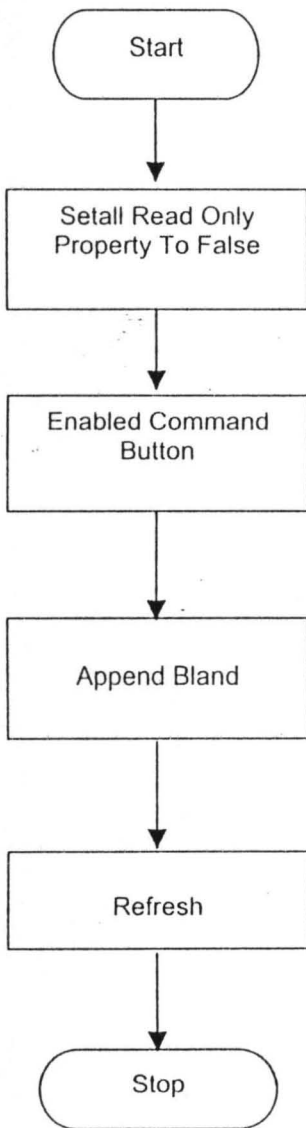
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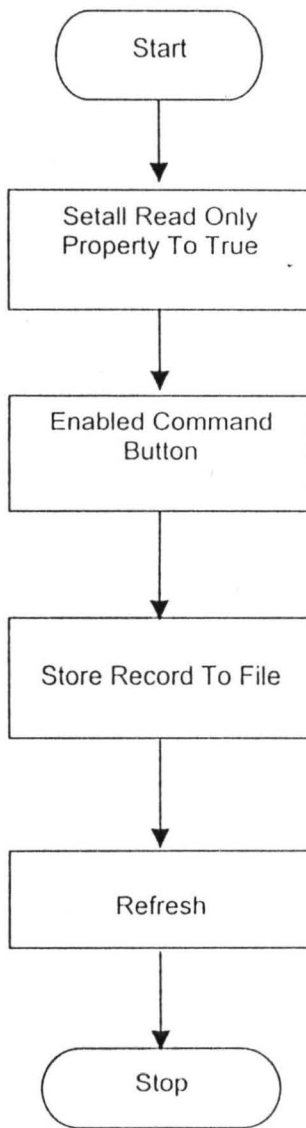
# PROGRAM SUMMARY FLOWCHART



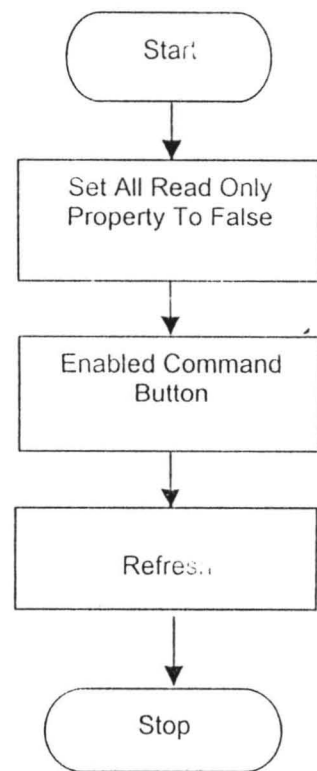
ADD



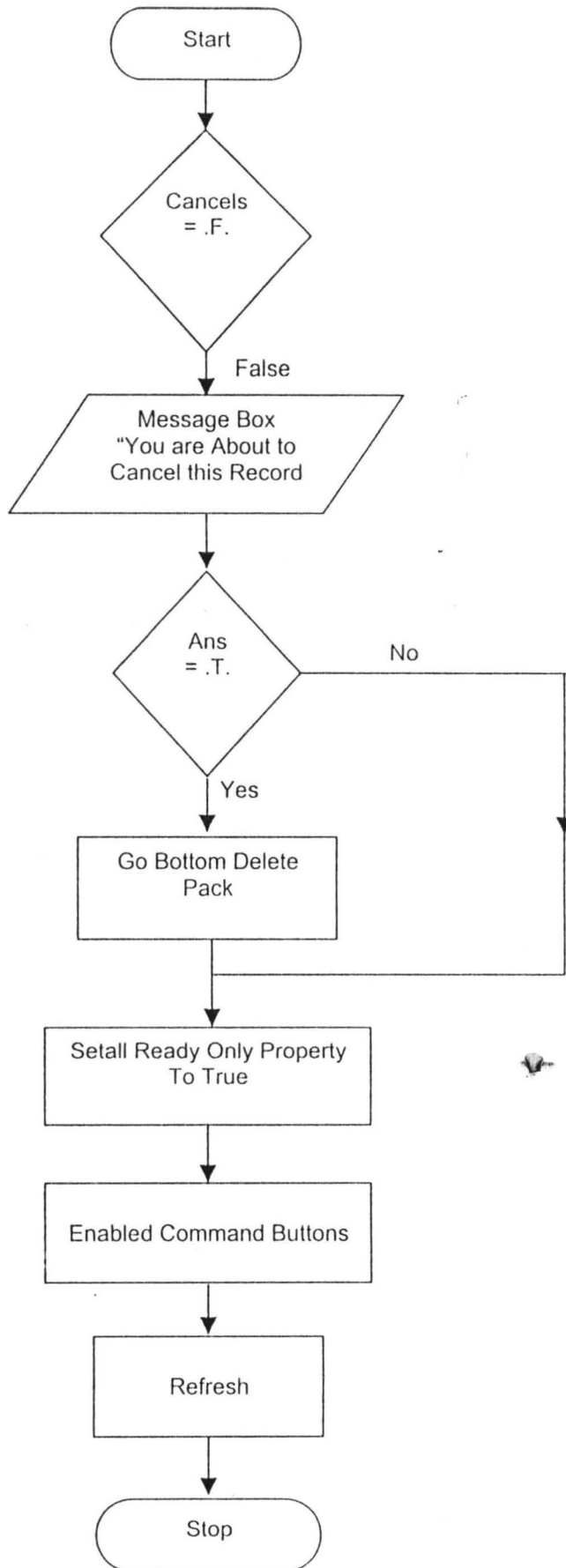
SAVE



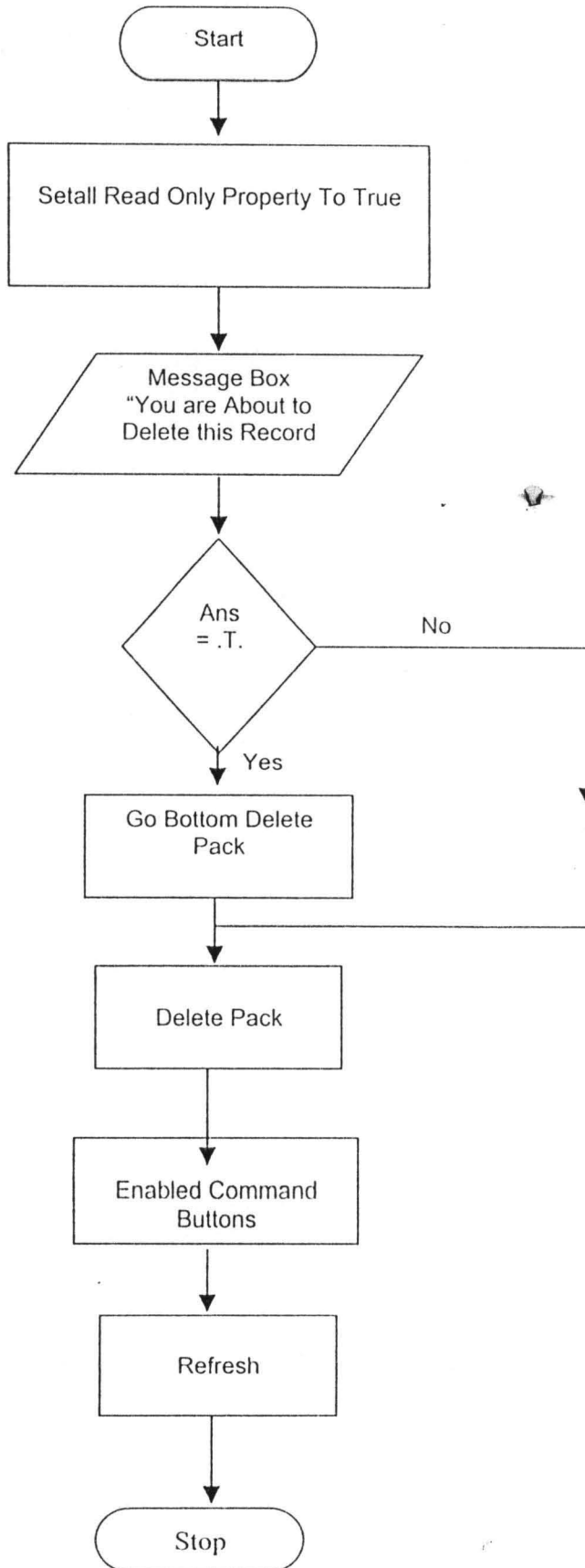
EDIT



# CANCEL

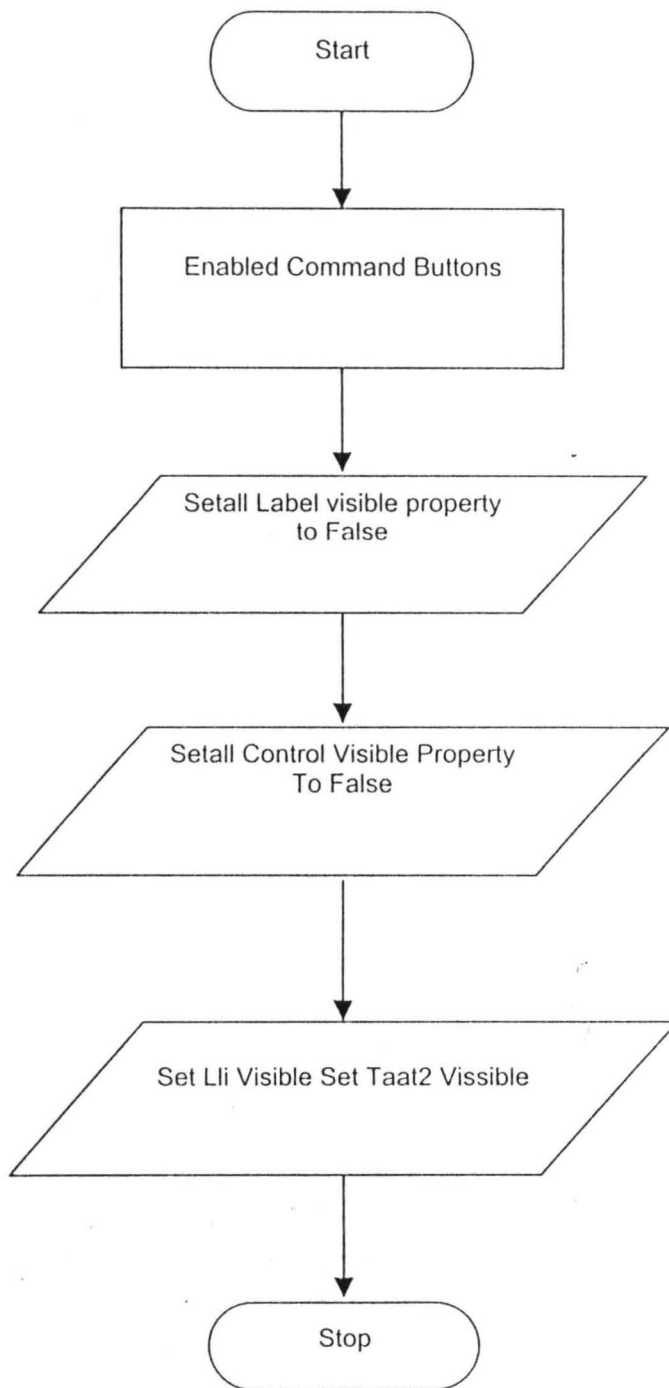


# DELETE

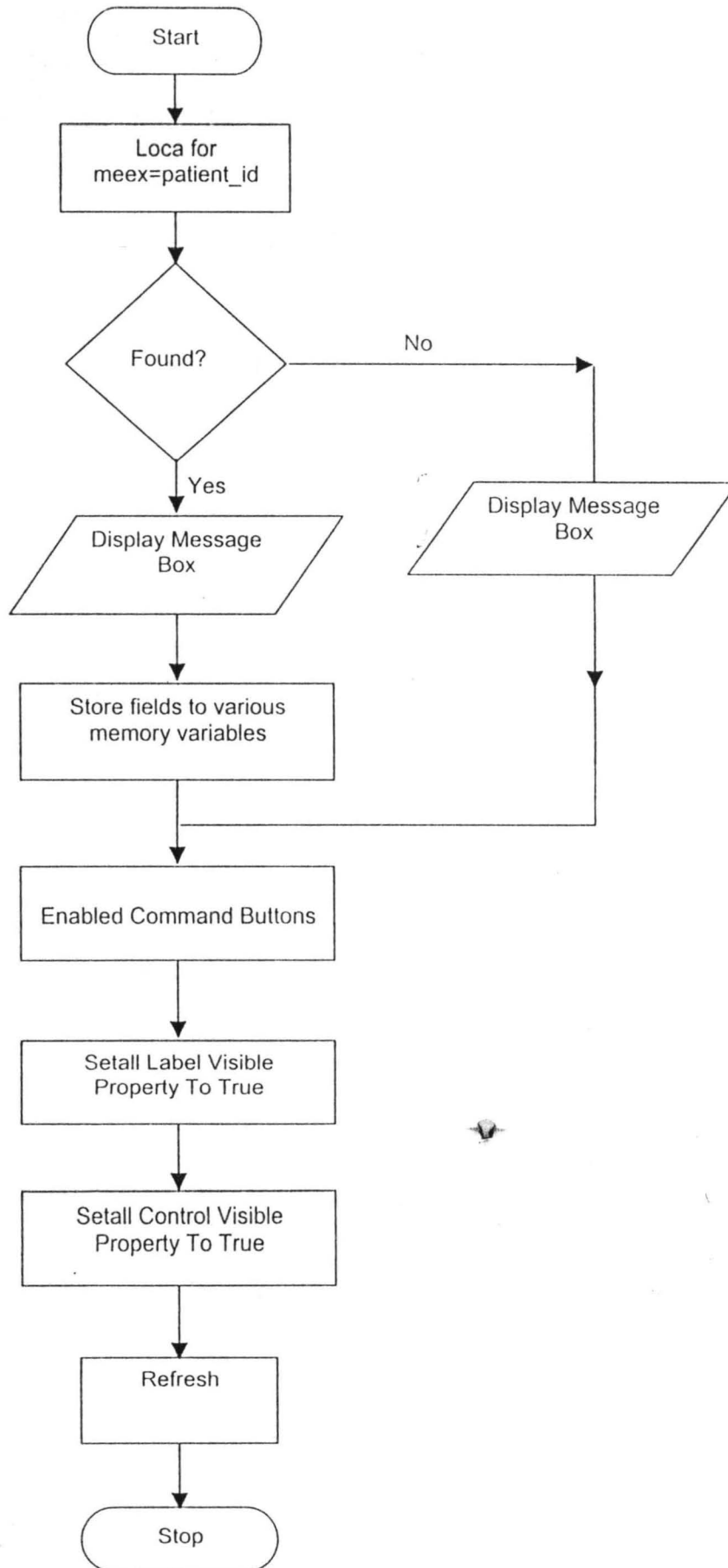




# LOCATE



# FIND



### Load

```
use patient_profile  
public cancels  
store .f. to cancels  
*go top  
thisform.refresh()
```

### Activate

```
thisform.setall("readonly",.t.,"textbox")  
thisform.setall("readonly",.t.,"combobox")  
*thisform.setall("readonly",.t.,"optiongroup")  
thisform.setall("readonly",.t.,"editbox")  
thisform.go.visible=.f.  
thisform.l1.visible=.f.  
thisform.text1.visible=.f.  
thisform.l11.visible=.f.  
thisform.text2.visible=.f.  
thisform.c2.visible=.f.  
thisform.refresh()
```

### Init

```
thisform.setall("readonly",.t.,"textbox")  
thisform.setall("readonly",.t.,"combobox")  
*thisform.setall("readonly",.t.,"optiongroup")  
thisform.setall("readonly",.t.,"editbox")  
thisform.go.visible=.f.  
thisform.l1.visible=.f.  
thisform.text1.visible=.f.  
thisform.l11.visible=.f.  
thisform.text2.visible=.f.  
thisform.c2.visible=.f.  
thisform.refresh()
```

### Go Command button

```
        cancels=.t.
    if !empty(thisform.text1.value)

        store thisform.text1.value to mpatient
        loca for patient_id= mpatient
        if found()
messagebox("This Identity number already exists",0,"Identity number is unique...
        ")
        thisform.text1.value=""
        return
        else
        thisform.text1.visible=.f.
        thisform.l1.visible=.f.
        thisform.go.visible=.f.
        thisform.c2.visible=.f.
        thisform.setall("readonly",.f.,"textbox")
        thisform.setall("readonly",.f.,"combobox")
        thisform.setall("readonly",.f.,"editbox")

        thisform.cmd1.new.enabled=.f.
        thisform.cmd1.save.enabled=.t.
        thisform.cmd1.edit.enabled=.f.
        thisform.cmd1.cancel.enabled=.t.
        thisform.cmd1.exit.enabled=.t.
        thisform.cmd1.delete.enabled=.f.
        appe blank

    endif
    else
Messagebox("The program does NOT accept null values.",0,"Error!")
    endif
    thisform.refresh()
```

### New command button

```
thisform.go.visible=.t.
```

```
thisform.cmd1.exit.enabled=.t.  
  thisform.txt1.setFocus  
  thisform.l1.visible=.t.  
  thisform.txt1.visible=.t.  
  thisform.c2.visible=.t.  
  thisform.txt1.readonly=.f.
```

```
  thisform.refresh()
```

### Save command button

```
  thisform.setall("readonly",.t.,"textbox")  
  thisform.setall("readonly",.t.,"combobox")  
*thisform.setall("readonly",.t.,"optiongroup")  
  thisform.setall("readonly",.t.,"editbox")  
  thisform.cmd1.new.enabled=.t.  
  thisform.cmd1.save.enabled=.f.  
  thisform.cmd1.edit.enabled=.t.  
  thisform.cmd1.cancel.enabled=.f.  
  thisform.cmd1.exit.enabled=.t.  
  thisform.cmd1.delete.enabled=.t.  
  thisform.add.enabled=.t.
```

```
  thisform.go.visible=.f.
```

```
  repl patient_id with thisform.txtpatient_id2.value  
  repl patient_name with thisform.txtpatient_name2.value  
  repl sex with thisform.opg1.value  
  repl age with thisform.txtage2.value  
  repl blood_group with thisform.CMB1.value  
  repl weight with thisform.txtweight2.value  
  repl height with thisform.txtheight2.value  
  repl address with thisform.edtaddress.value  
  repl blood_pressure with thisform.txtblood_pressure.value  
  repl medicine_allergic with thisform.edtmedicine_allergic.value  
*repl current_medication with thisform.edtcurrent_medication.value  
  repl food_allergic with thisform.edtfood_allergic.value
```

```
repl patient_relationship with thisform.patient_rela.value
    cancels=.f.
    thisform.refresh()
```

### Add command button

```
thisform.setall("readonly",.f.,"textbox")
thisform.setall("readonly",.f.,"combobox")
*thisform.setall("readonly",.f.,"optiongroup")
thisform.setall("readonly",.f.,"editbox")
```

```
thisform.cmd1.new.enabled=.f.
thisform.cmd1.save.enabled=.t.
thisform.cmd1.edit.enabled=.f.
thisform.cmd1.cancel.enabled=.t.
thisform.cmd1.exit.enabled=.t.
thisform.cmd1.delete.enabled=.f.
thisform.add.enabled=.f.
    appe blan
    cancels=.t.
    thisform.refresh()
```

### Edit command button

```
thisform.setall("readonly",.f.,"textbox")
thisform.setall("readonly",.f.,"combobox")
*thisform.setall("readonly",.f.,"optiongroup")
thisform.setall("readonly",.f.,"editbox")
```

```
thisform.cmd1.new.enabled=.f.
thisform.cmd1.save.enabled=.t.
thisform.cmd1.edit.enabled=.f.
thisform.cmd1.cancel.enabled=.f.
thisform.cmd1.exit.enabled=.t.
```

```
thisform.cmd1.delete.enabled=.f.  
  thisform.add.enabled=.f.  
    cancels=.f.  
  thisform.refresh()
```

### Cancel command button

```
  if cancels=.f.  
    return  
  endif  
  if cancels=.t.  
ans=messagebox("You are about to cancel this record",36,"Warning!")  
    if ans=6  
      go bottom  
      dele  
      pack  
      endif  
    endif  
    thisform.setall("readonly",.t.,"textbox")  
    thisform.setall("readonly",.t.,"combobox")  
    *thisform.setall("readonly",.f.,"optiongroup")  
    thisform.setall("readonly",.t.,"editbox")  
    thisform.cmd1.new.enabled=.t.  
    thisform.cmd1.save.enabled=.f.  
    thisform.cmd1.edit.enabled=.t.  
    thisform.cmd1.cancel.enabled=.f.  
    thisform.cmd1.exit.enabled=.t.  
    thisform.cmd1.delete.enabled=.t.  
    thisform.add.enabled=.t.  
    thisform.refresh()
```

### Delete command button

```
thisform.setall("readonly",.t.,"textbox")
thisform.setall("readonly",.t.,"combobox")
thisform.setall("readonly",.t.,"editbox")
```

```
ans=messagebox("You are about to delete this record",36,"Warning!")
    if ans=6
        *go bottom
        dele
        pack
    endif
```

```
thisform.cmd1.new.enabled=.t.
thisform.cmd1.save.enabled=.f.
thisform.cmd1.edit.enabled=.t.
thisform.cmd1.cancel.enabled=.f.
thisform.cmd1.exit.enabled=.t.
thisform.cmd1.delete.enabled=.t.
thisform.add.enabled=.t.
thisform.refresh()
```

### Locate command button

```
thisform.cmd1.new.enabled=.f.
thisform.add.enabled=.f.
thisform.cmd1.save.enabled=.f.
thisform.cmd1.edit.enabled=.f.
thisform.cmd1.cancel.enabled=.f.
thisform.cmd1.delete.enabled=.f.
```



thisform.cmd1.exit.enabled=.t.  
thisform.cmd2.locate1.enabled=.f.  
thisform.cmd2.locate2.enabled=.t.

thisform.l1.visible=.f.  
thisform.l2.visible=.f.  
thisform.l3.visible=.f.  
thisform.l4.visible=.f.  
thisform.l5.visible=.f.  
thisform.l6.visible=.f.  
thisform.l7.visible=.f.  
thisform.l8.visible=.f.  
thisform.l9.visible=.f.  
thisform.l10.visible=.f.  
\*thisform.l11.visible=.f.  
thisform.l12.visible=.f.  
thisform.l13.visible=.f.  
thisform.l14.visible=.f.  
thisform.c1.visible=.f.  
thisform.c2.visible=.f.

thisform.go.visible=.f.  
thisform.txt1.visible=.f.  
thisform.txtpatient\_id2.visible=.f.  
thisform.txtpatient\_name2.visible=.f.  
thisform.patient\_rela.visible=.f.  
thisform.edtaddress.visible=.f.  
thisform.opg1.visible=.f.  
thisform.txtage2.visible=.f.  
thisform.txtheight2.visible=.f.  
thisform.txtweight2.visible=.f.  
thisform.CMB1.visible=.f.  
thisform.txtblood\_pressure.visible=.f.  
thisform.edtmedicine\_allergic.visible=.f.  
thisform.edtfood\_allergic.visible=.f.  
\*thisform.edtcurrent\_medication.visible=.f.

thisform.l11.visible=.t.  
thisform.txt2.visible=.t.  
thisform.txt2.readonly=.f.

thisform.text2.setfocus

Find command button

```
store thisform.text2.value to mtex
  loca for mtex=patient_id
    if found()
messagebox("Click on OK to continue...",0,"Successful search")
  store patient_id to mpat
  store patient_name to mpname
  store patient_relationship to mprela
  store address to maddress
  store sex to msex
  store age to mage
  store height to mheight
  store weight to mweight
  store blood_group to mbgroup
  store blood_pressure to mbpressure
  store medicine_allergic to mmedicine
  store food_allergic to mfood
  store blood_group to mbgroup
*store current_medication to mcurrent

  thisform.txtpatient_id2.value=mpat
thisform.txtpatient_name2.value=mpname
  thisform.patient_rela.value=mprela
thisform.edtaddress.value=maddress
  thisform.opg1.value=msex
  thisform.txtage2.value=mage
  thisform.txtheight2.value=mheight
  thisform.txtweight2.value=mweight
  thisform.CMB1.value=mbgroup
  thisform.txtblood_pressure.value=mbpressure
thisform.edtmedicine_allergic.value=mmedicine
*thisform.edtcurrent_medication.value=mcurrent
  thisform.edtfood_allergic.value=mfood
```

```
else
messagebox("Record does not exist. Click on OK to continue...",0,"End of locate
scope!")
go top
endif
```

```
thisform.cmd1.new.enabled=.t.
thisform.cmd1.save.enabled=.f.
thisform.cmd1.edit.enabled=.t.
thisform.cmd1.cancel.enabled=.f.
thisform.cmd1.delete.enabled=.t.
thisform.cmd1.exit.enabled=.t.
thisform.add.enabled=.t.
thisform.cmd2.locate1.enabled=.t.
thisform.cmd2.locate2.enabled=.f.
```

```
thisform.l1.visible=.t.
thisform.l2.visible=.t.
thisform.l3.visible=.t.
thisform.l4.visible=.t.
thisform.l5.visible=.t.
thisform.l6.visible=.t.
thisform.l7.visible=.t.
thisform.l8.visible=.t.
thisform.l9.visible=.t.
thisform.l10.visible=.t.
*thisform.l11.visible=.t.
thisform.l12.visible=.t.
thisform.l13.visible=.t.
thisform.l14.visible=.t.
thisform.c1.visible=.t.
thisform.c2.visible=.t.
```

```
thisform.go.visible=.t.
thisform.txt1.visible=.t.
thisform.txtpatient_id2.visible=.t.
thisform.txtpatient_name2.visible=.t.
thisform.patient_rela.visible=.t.
thisform.edtaddress.visible=.t.
thisform.opg1.visible=.t.
```

```
thisform.txtage2.visible=.t.  
thisform.txtheight2.visible=.t.  
thisform.txtweight2.visible=.t.  
thisform.CMB1.visible=.t.  
thisform.txtblood_pressure.visible=.t.  
thisform.edtmedicine_allergic.visible=.t.  
thisform.edtfood_allergic.visible=.t.  
*thisform.edtcurrent_medication.visible=.t.
```

```
thisform.l11.visible=.f.  
thisform.text2.visible=.f.
```

```
thisform.refresh()
```

Exit command button

```
Thisform.release()  
Thisform.refresh()
```

# NITEL MEDICAL CENTRE MINNA

## NITEL STAFF RECORD

NO12 NTA Road Minna

Phone:066-221234

E-mail:nitmed@hospital.com

04/09/02

### Personal Data

ient no 1111111111  
ient name Patrick Blank  
Male  
26  
od group A  
od pressure 234  
ltionship Self  
(o staff)

### Medical History

mon sickness Malaria  
frequent Monthly  
ation 2 days  
apse time 3 weeks  
ociated factor Tiredness  
ication used Maloxine

### Surgical History

	<u>Operations gone for</u>	<u>Date</u>	<u>Age</u>
st	Apendix	02/02/90	26
ond		/ /	0
rd		/ /	0

tor's remark

Sign by:.....

For Medical director

# NITEL MEDICAL CENTRE MINNA

## NITEL STAFF RECORD

NO12 NTA Road Minna

Phone:066-221234

E-mail:nitmed@hospital.com

04/09/02

### Personal Data

Patient no 2222222222  
Patient name Mike Goods  
Sex Male  
Age 32  
Blood group A  
Blood pressure 34  
Relationship (to staff) Self

### Medical History

Common sickness Nausia  
How frequent Monthly  
Duration 1-2 days  
Relapse time Monthly  
Associated factor Stomach pains vomiting  
Medication used Pfizerix

### Surgical History

	<u>Operations gone for</u>	<u>Date</u>	<u>Age</u>
First	Apendix	12/12/91	32
Second		/ /	0
Third		/ /	0

Doctor's remark Still very fit

Sign by:.....

For Medical director

# NITEL MEDICAL CENTRE MINNA

## NITEL STAFF RECORD

NO12 NTA Road Minna

Phone: 066-221234

E-mail: nitmed@hospital.com

04/09/02

### Personal Data

patient no 3333333333  
patient name Frank Brown  
sex Male  
age 34  
blood group AB  
blood pressure  
relationship (to staff) Self

### Medical History

common sickness Breakly heat  
how frequent Seasonal  
duration 3 weeks  
recovery time Six months  
associated factor Itching  
treatment used Medicated Powder

### Surgical History

	<u>Operations gone for</u>	<u>Date</u>	<u>Age</u>
1st	Pile	11/11/99	34
2nd		/ /	0
3rd		/ /	0

doctor's remark

Sign by: .....

For Medical director

# NITEL MEDICAL CENTRE MINNA

## **NITEL STAFF RECORD**

NO12 NTA Road Minna

Phone: 066-221234

E-mail: nitimed@hospital.com

04/09/02

---

ent no: 111111111  
ent name: Patrick Blank  
tionship: Self  
nosis: Malaria  
s administered: Maloxine  
nt: 1500.0000

---

ent no: 111111111  
ent name: Yetunde Blank  
tionship: Daughter  
osis: Desentry  
administered: Talazole  
t: 2000.0000

---

amount: 3500.0000

Sign by: .....  
For Medical director



**NITEL MEDICAL CENTRE MINNA**

**NITEL STAFF RECORD**

NO12 NTA Road Minna

Phone:066-221234

E-mail:nitmed@hospital.com

04/09/02

---

ient no: 2222222222  
ient name: Mike goods  
ationship: Self  
gnosis: Malaria  
gs administered: Phansidal  
unt: 3000.0000

---

ount: 3000.0000

---

Sign by:.....  
For Medical director