

BENAZIR BHUTTO HOSPITAL EMERGENCY DEPARTMENT COMPUTERIZATION PROJECT

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INITIAL CORRESPONDANCE AND PLAN OF ACTION

I had the luck to be offered a project instead of going out and looking for clients myself. The screenshot taken from the day of the conversation is given below.

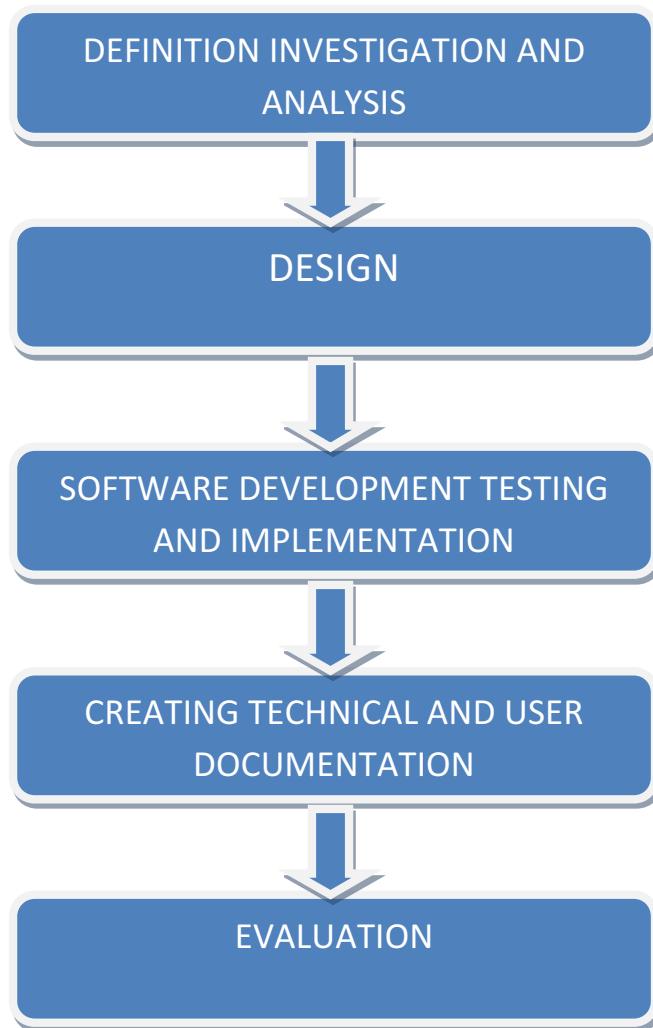
The screenshot shows an email inbox interface with the following messages:

- Doctor Rafiq <dr.rafiq.bb@gmail.com>** to me [dropdown] 7:12 PM (4 hours ago) Star Forward Print
Hi, Salar this is Dr. Rafiq. I have a colleague at Holy Family Hospital, Dr. Haroon who told me about how you computerized their Emergency department a few years ago. Since we were also thinking of automating our emergency department here we'd like you to design a software for us. The requirements are almost the same with some minute changes so I guess it'll not be very difficult for you. Waiting for a reply from your end.
- Dr. Rafiq**
AMS Emergency Department.
Benazir Bhutto Hospital.
- Salar Ather <salar.ather@gmail.com>** to Doctor [dropdown] 7:40 PM (4 hours ago) Star Forward Print
Hi, Dr. Rafiq, I would be most happy to carry on the project. In fact I was just about to start with my A Levels computing coursework so your timing could not have been better. And even after what you said about the requirements, I'll need to visit the organization and gather information on your system so that I can analyze your system and therefore interpret the requirements. I'll be more than happy to drop off any day after 2 PM or any time during the weekend
- Doctor Rafiq** to me [dropdown] 10:28 PM (1 hour ago) Star Forward Print
Perfect. You can drop by any time this Saturday and carry on your investigation. I'll be sure to let the receptionist know you're coming so that he can help in any way he can

Click here to [Reply](#) or [Forward](#)

PLAN OF ACTION:

The first step was finding an organization which really didn't prove to be difficult for me. The AMS was familiar with my work thanks to a colleague who worked in another hospital for which I designed a software 2 years ago. He contacted me himself for help with the automation. The following plan of action was used.



TIMELINE:

| TASK NO | TASK NAME | DEC | JAN | | FEB | | MAR |
|---------|----------------------------|-------|------|-------|-------|------|-------|
| | | 20-31 | 1-10 | 11-20 | 21-31 | 1-10 | 11-20 |
| 1 | ANALYSIS | | | | | | |
| 2 | DESIGN | | | | | | |
| 3 | SOFTWARE DEVELOPMENT | | | | | | |
| 4 | TESTING AND IMPLEMENTATION | | | | | | |
| 5 | COMPLETE DOCUMENTATION | | | | | | |
| 6 | USER DOCUMENTATION | | | | | | |
| 7 | EVALUATION | | | | | | |

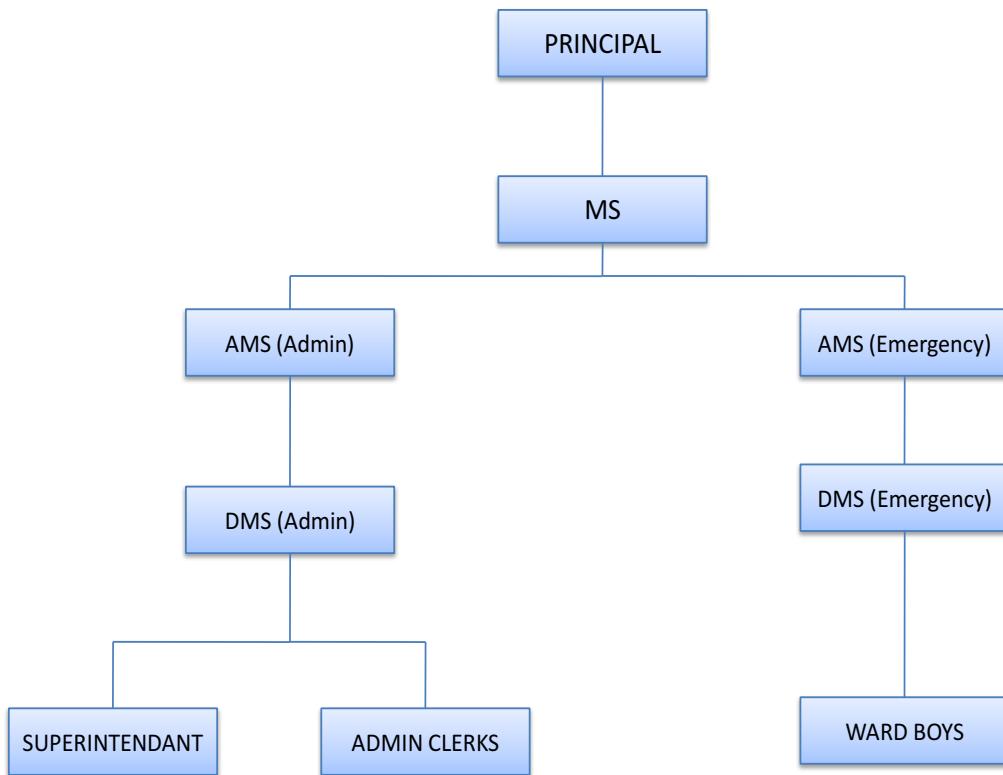
1. DEFINITION INVESTIGATION AND ANALYSIS

1.1 THE ORGANIZATION

1.1.1 BACKGROUND OF THE ORGANIZATION:

Benazir Bhutto Hospital, previously known as the Rawalpindi General Hospital, is a hospital located on the Murree Road, Rawalpindi, Pakistan. It is a major teaching hospital offering basic specialties as well as psychiatry, orthopaedics, urology and cardiology. It is associated with Rawalpindi Medical College. It was founded in 1962 and handed over to the government in 1980. In 2008 it was renamed from Rawalpindi General Hospital to Benazir Bhutto Hospital after the late Benazir Bhutto passed away there. Since it is a governmental organization all emergency treatments are free of cost and patients are not charged. Doctors are given a basic salary per month and no additional income from checking patients in emergency department.

1.1.2 HEIRARCHICAL STRUCTURE OF THE EMERGENCY DEPARTMENT:



1.2 NATURE OF THE PROBLEM TO BE SOLVED:

The problem is to automate the record keeping system of the Emergency as well as the automation of the departments within the emergency department for quick treatment of critically ill patients.

The Emergency Department has a manual record keeping system and many problems occur for patients as most of them are in critical condition and require urgent attention but having a manual system delays the patient from being attended to immediately as the patient has to go to the end user who takes a lot of time to input patient information. Another problem is that accurate data is not kept. Therefore the problem must be overcome by computerizing the manual record keeping system of the main emergency along with the departments included for the quick and efficient service of critical patients.

1.3 INVESTIGATION AND ANALYSIS

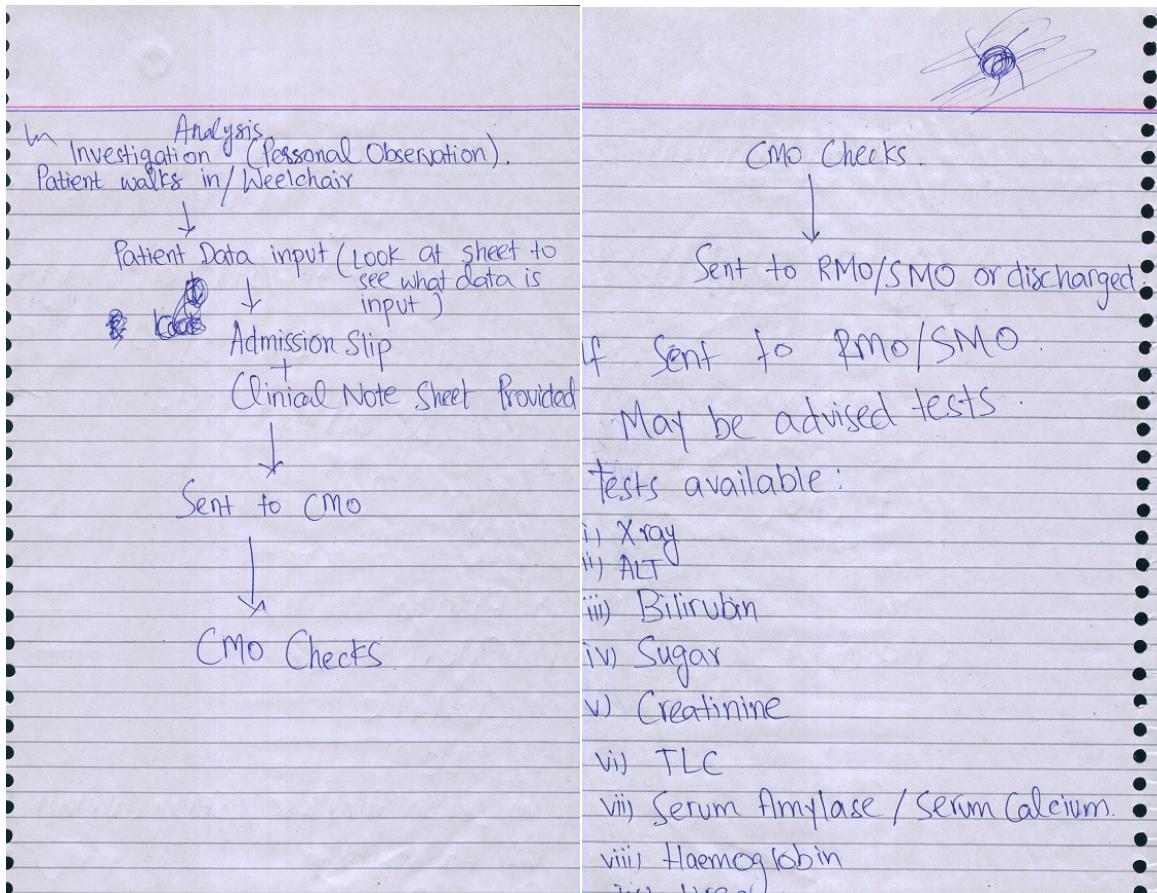
1.3.1 DESCRIPTION OF EXISTING SOLUTION:

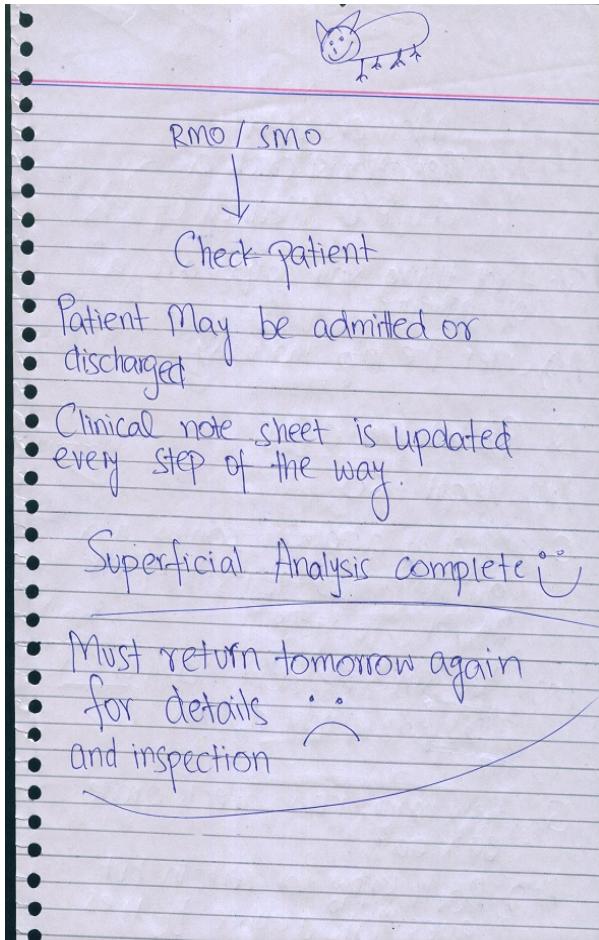
I visited the hospital and got familiarised with the system through following strategies:

- Interview with the receptionist who is the end user.
- Personal observation of the inflow of patients.
- Inspecting the documents.

NOTES TAKEN:

Below are my notes from the investigation and interview:





Interview with Receptionist and a couple of Medical Officers.

Q.) First thing you do upon arrival of patient
Ans) Enter the info manually

Q.) Patients per day?
Ans) About 150

Q.) What if a patient comes in a 2nd time. Do you still enter his/her info again? ↳ Impairment
Ans) Yes since we don't have unique ID's so we must do this

Q.) How many new patients arrive each day.
Ans) Don't know for certain but I guess mid to late double figures.

Q.) Do you file info of doctors?

Ans) Yes

Q.) About how many patients does the CMO ^{forward} every day to RMO / SMO

Ans) About half of those checked.

Q.) How many patients advised tests each day

Ans) 30-40.

Q.) How many admitted / discharged each day:

Ans. 15-20. / 15-20.

The questions about ~~statistics~~ number of patients will allow me to ~~use~~ calculate file size limitations

Q.) ~~What~~ Were there any anomalies while I was analysing your system?

Ans) No. Typical day.

Q.) What are the biggest issues regarding your system.

Ans) Many:

i) Data Security

ii) Data Duplication

iii) If Patient revisits, info not present
Medical History would help but patients don't keep clinical note sheets.

iv) Critical patients have to wait very long often

Major issue that needs resolution

WRITTEN DESCRIPTION:**EMERGENCY RECEPTION:**

Over the period a manual record keeping system has been used. The patient arrives in the emergency reception and if he/she is critically ill a wheelchair is provided by the ward boy and the receptionist inputs the data manually. The data input requirements include Date of admission, Yearly and monthly number, P.Name (Patient Name), Age, Sex, Residence/Occupation and Time of arrival. All this data is entered in the main Emergency register for future use. The patient will also be issued an **admission slip** and **clinical note sheet**. The patient is then sent to the CMO (Casualty Medical Officer)

Below are pages from the clinical note sheet.

| | |
|--|--|
| <p style="text-align: center;">1</p> <p>CASUALTY DEPARTMENT BENAZIR BHUTTO HOSPITAL RAWALPINDI</p> <p>Y / No. _____ Date: _____</p> <p>Book No. _____ S. No. _____</p> <p>Name: _____ Age: _____ Sex M/F: _____</p> <p>Address: _____</p> <p>CMO'S Notes Date _____ Time _____</p> <p>Assessment: _____</p> <p>Investigations _____ Treatment given _____</p> <p>Discharge: _____ (Page4)</p> <p>Transfer/Refer to _____</p> <p style="text-align: right;">Signature _____ (Name _____)</p> | <p style="text-align: center;">2</p> <p>Registrar/Notes RMO</p> <p>Date: _____ Time: _____</p> <p>Assessment: _____</p> <p>Investigation: _____ Treatment: _____</p> <p>Discharge: _____</p> <p>Refer/Transfer to: _____</p> <p>Admit to: _____</p> <p>Observe in ER: _____</p> <p style="text-align: right;">Signature _____ (Name _____)</p> |
|--|--|

BENAZIR BHUTTO HOSPITAL EMERGENCY DEPARTMENT COMPUTERIZATION

3

Observation notes:

4

Admit to _____

Refer/Transfer to _____

Discharge: _____

Investigations: Treatment
(at home)

Further Advice:-

Signature

(Name _____)

PATIENT CHECKUP WITH CASUALTY MEDICAL OFFICER AND SENIOR (REGISTRAR) MEDICAL OFFICER:

The CMO examines the patient and decides whether to discharge the patient or send him or her to the senior medical officer depending on the patient's medical condition. If the patient is critically ill the patient is referred to the concerned Medical/Surgical wards where he/she is examined. The House Officer of the concerned unit (The SMO or RMO) will write down the plan on the **clinical note sheet (See previous page)** and sign it.

PATHOLOGY AND RADIOLOGY LABS AND ADMISSIONS IN WARDS:

The Medical/Surgical team examine the patient evaluate the patient and advise investigation for which patients are sent to the Pathology/Radiology department for tests after which he is discharged after treatment or admitted in his/her respective ward. The data input requirements include the P.Name (Patient Name), and patient yearly number for that particular ward. If the patient is admitted in the ward, both **admission slip** and **clinical note sheet** will be attached with the admission documents.

Note that in cases senior medical officer can admit the patient without the tests performed if he considers it

DISCHARGING PATIENTS FROM WARDS:

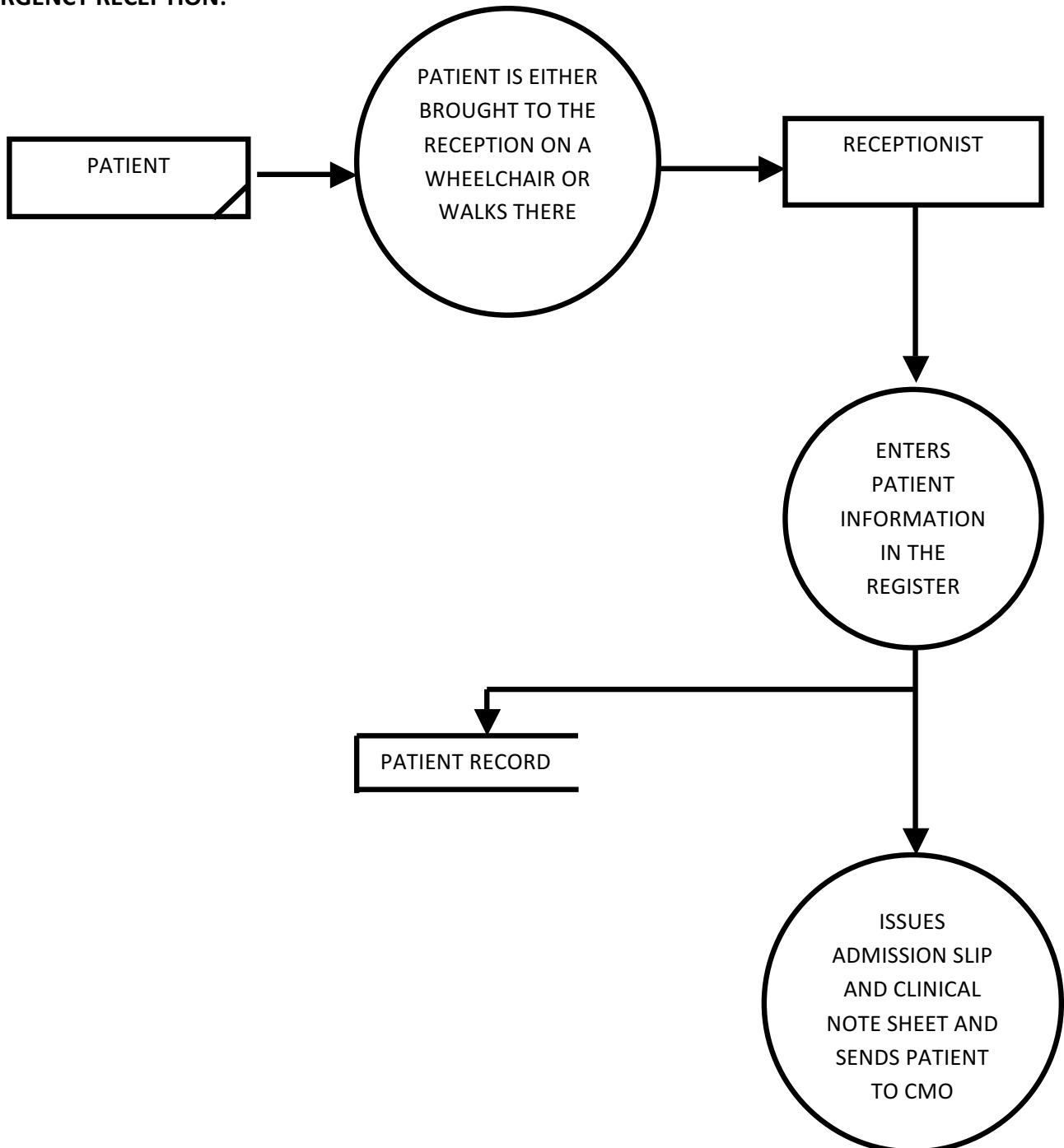
The patient is treated and after treatment patient is discharged. On discharging the patient the **clinical note sheet** will be kept as a record in the emergency department.

DAILY CENSUS REPORT:

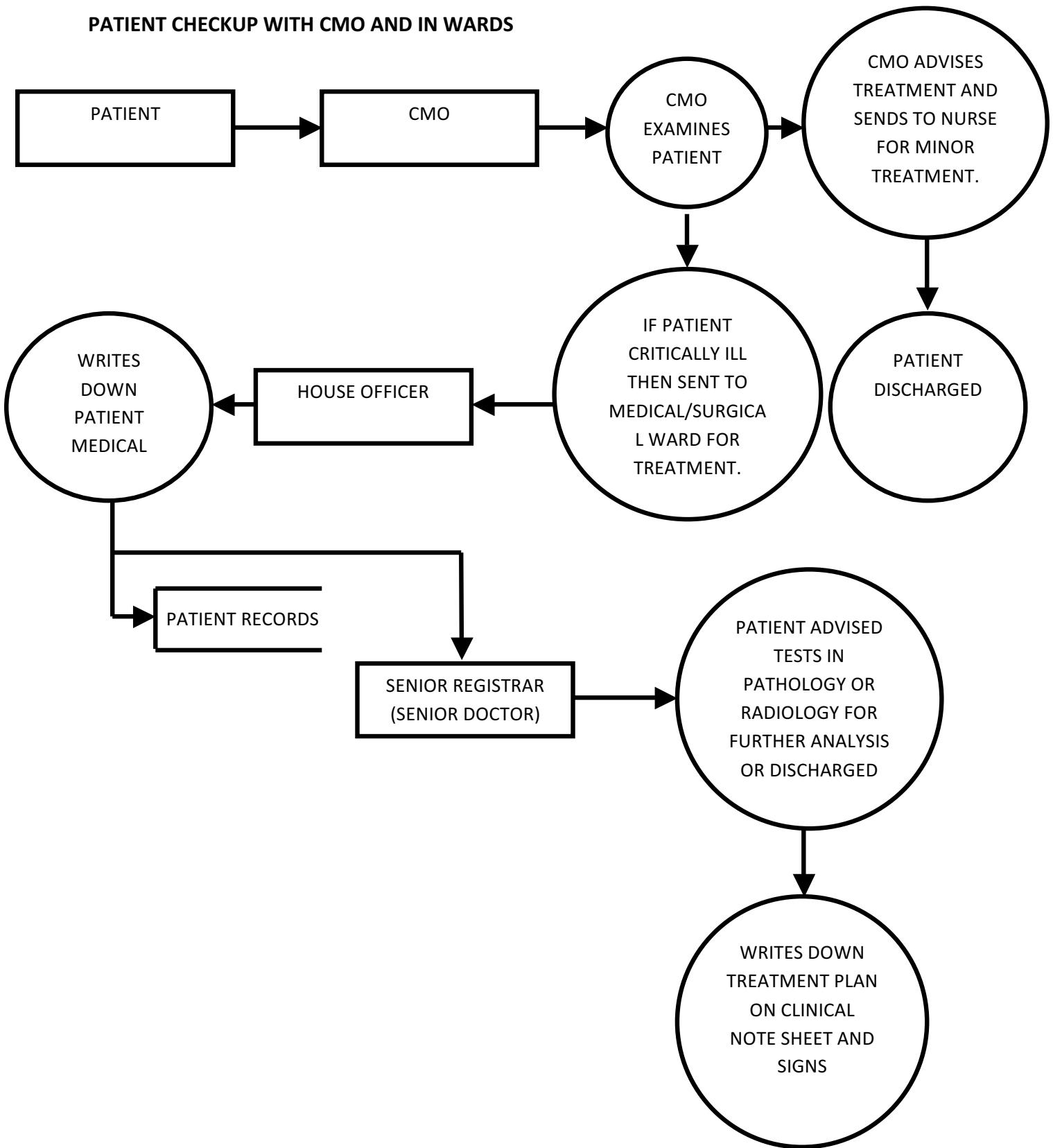
At the end of the day a census report of the emergency department is generated containing following data. All data is acquired manually for example, number of patients in each ward are calculated by counting the patients in each ward who are admitted. I could not get a copy of the report since it was with doctors who needed it for health analysis but I did ask around for the details of the report so that I know what the requirements are.

1.3.2 DATA FLOW DIAGRAMS

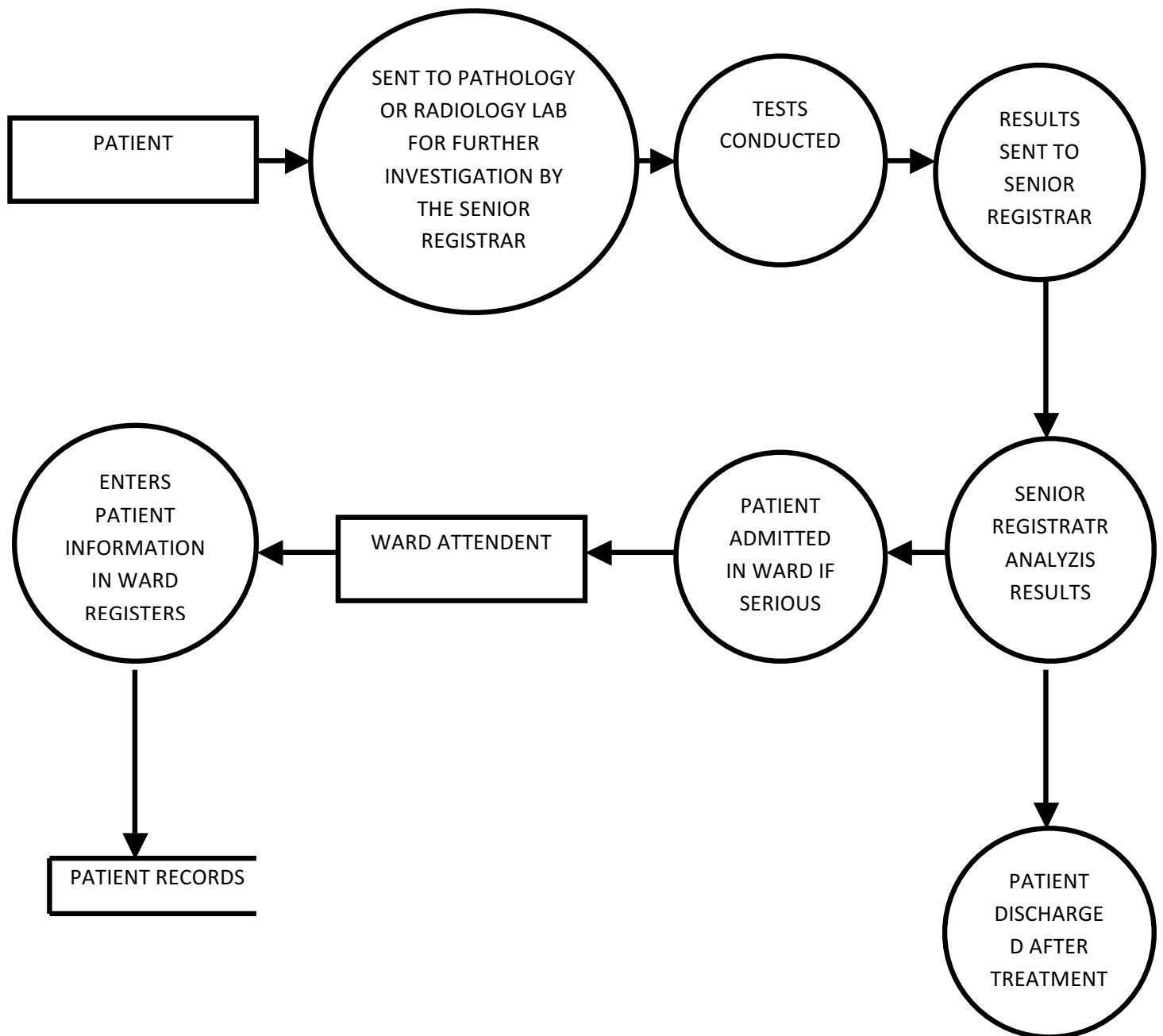
EMERGENCY RECEPTION:



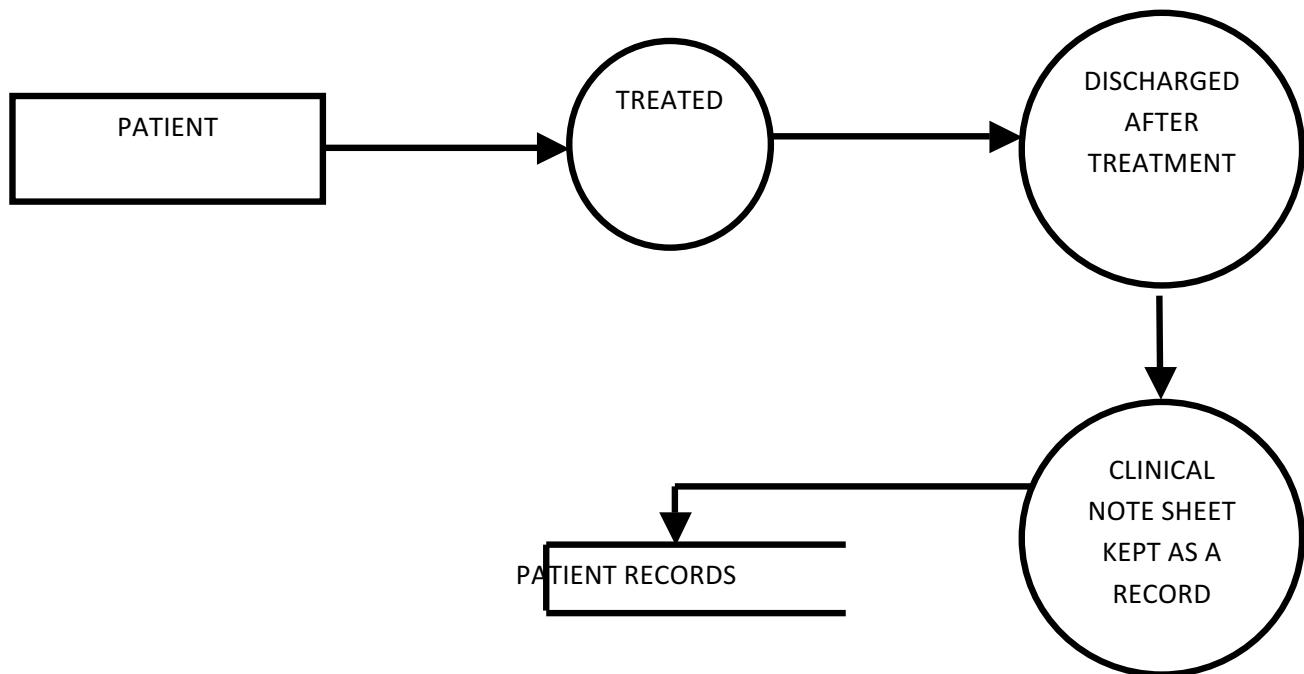
PATIENT CHECKUP WITH CMO AND IN WARDS



PATHOLOGY AND RADIOLOGY LABS:



DISCHARGING PATIENTS FROM WARDS:



1.3.2 EVALUATION OF EXISTING SOLUTION:

BENEFICIAL FEATURES

- The staff does not need to be trained in this particular method as any literate person can enter data in registers.
- The registers can be taken anywhere in the department making data easily available for medical officers.
- No long waits during power cuts or failures which is a huge advantage as critical patients require urgent attention which would have been difficult to provide if the data had to be entered in a computer during a power loss.
- Quick hands on training is possible

LIMITATIONS

- Data security is not available and personal information of patients recorded at emergency reception like address is easily available to everyone within reach of the registers.
- Data may be lost due to reasons like natural hazards or theft.
- Data integrity is a problem as wrong data is entered in registers for example time of entrance was entered in the field of resident occupation when I checked the documents.
- Searching is a problem as all the files need to be searched to find a particular item and doctors can't find patient history as the patients are critically ill and the doctors do not have enough time to go through the clinical notes sheets to find the information.
- No disease specific data is available which hinders health analysis.
- Low Operational Efficiency as manual inputting of data is time consuming which is dangerous for critical patients.
- Too much paper work is in use.
- Due to loss of backup documents which are sometimes lost are harmful to both patients and the administration as patients have their personal information in wrong hands and administration cannot access previous information.
- Very difficult to generate reports which further hinder health analysis.
- Concurrency issues are a problem as there are multiple copies of the same data in different folders of the department.

1.3.3 DESCRIPTION AND EVALUATION OF OTHER POSSIBLE SOLUTIONS

IMPROVEMENTS IN THE MANUAL SYSTEM:

This can be done by hiring more staff and more literate staff for proper maintenance of the records related to patients for example having two receptionists and two receptions instead of one and more literate staff than the previous can result in better and faster service of critical patients

ADVANTAGES

- With more staff the patients would not have to wait in long lines which is very dangerous for them
- More accurate recording of data and data entered in correct fields in forms due to more literate staff.
- No expensive equipment has to be bought for these changes.
- No training of staff

DISADVANTAGES

- Searching is still a problem as manual databases are difficult to access and search.
- Increase in staff would increase employee salaries which is a burden on the organization.
- Data security still remains a problem.
- There is limited space available in the organization and so an extra reception would be difficult to make.
- Data will be more scattered due to increase in staff who are assigned different registers. and so data analysis will be more of a problem for health officers.
- More registers mean more cabinets for keeping data safe which is an additional cost.
- The factor of human error is not removed as data entries will still be by hand.

PARTIALLY COMPUTERIZED SOLUTION:

This can be done by purchasing a computer primarily for the emergency reception along with a pre-written software for example a Database software like Microsoft Access can be purchased for tending to the requirements of patient data input.

ADVANTAGES:

- Not a very expensive solution to the problems.
- Data input will be faster.
- Searching is much easier with computerized databases.
- With partially computerized solution backup facility will be available and so data loss will no longer be much of a threat.
- Networking can be used to send data from the reception to the medical officers and

DISADVANTAGES

- Does not fulfil all the requirements.
- Staff has to be trained to some extent even if not a lot.
- If the employee who knows how to work the system is ill or on a leave then the system stops working.
- Viruses are very common in computer systems which are harmful to data.
- Data security is still a problem as partially computerized solution does not provide full security of patient information.
- It does not remove the tendency of mistakes as there will still be mistakes due to human error.

FULLY CUSTOMIZED COMPUTERIZED SOLUTION (THE PROPOSED SOLUTION):

In this method we will develop a specifically designed software that will tend to our 100% needs. A well developed database along with a user friendly interface will not only be beneficial to patients but will also work in favour of the staff. This would cover all problems encountered by the hospital and the patients making it much better than the previous solutions hence it is our proposed solution.

ADVANTAGES:

- The storing and searching of data would be 100% accurate and searching would be made faster by using a primary key assigned to each patient information field and every patient would have a unique ID and would not need to re-enter all data on next visit.
- Security problems would be solved as the receptionists would be given their very own user name and passwords which would safeguard patient information from falling into unwanted hands.
- The software would be more systematic than pre written software which would reduce time taken to input all requirements.
- Validation checks can be performed to ensure data integrity.
- The system would take automatic backups in equal intervals of time to prevent data losses.
- Networking would allow data transfer between receptionist, ward officers and senior medical officers which would increase health analysis.
- The computerized system would make it much easier to provide an overall daily report through databases than making a report manually.
- The existing system requires quite some space to store all resources in one place and these too have to be duplicated, this will not be the case with the computerized system.

DISADVANTAGES:

- The system would be expensive to install as tailor made softwares are expensive.
- The staff needs to be trained very efficiently in using the new system.
- Incase of power loss it will be catastrophic as the whole system depends on the computer

BENAZIR BHUTTO HOSPITAL EMERGENCY DEPARTMENT COMPUTERIZATION

I emailed the AMS and he made sure that he was ready to go on with the computerization plan.

Salar Ather <salar.ather@gmail.com>
to Doctor [x] 7:59 PM (2 hours ago) ☆ ↗ ↘

Respected Sir, after thorough investigation, I have come up with 3 possible solutions. I know you had your heart set on full automation but please do take a look at the analysis and the possible solutions and let me know if you are satisfied with the analysis. If you choose to go with full automation please let me know as soon as possible so that I can get on with the design phase.

Analysis.docx

Doctor Rafiq
to me 9:22 PM (1 hour ago) ☆ ↗ ↘

Salar I have seen the analysis and assure you that we are ready to go on with the full automation. Please carry on with your development.

Click here to [Reply](#) or [Forward](#)

1.4 REQUIREMENTS

1.4.1 HARDWARE REQUIREMENTS

| COMPONENT | MINIMUM | RECOMMENDED |
|---------------------|--------------------------|----------------------------------|
| CPU | 1.2 GHz Pentium | Intel Core 2 Duo 2.4 GHz |
| HARD DISK DRIVE | 250 GB | 1 TB |
| RAM | 512 MB | 2 GB |
| MOUSE | Standard Mouse | Optical Mouse |
| KEYBOARD | Standard Keyboard | Anti RSI Keyboard |
| VISUAL DISPLAY UNIT | 15' Monitor | 17' LCD |
| GRAPHICS CARD | 16 MB Integrated Chipset | 128 MB Integrated Graphics Card |
| BACKUP | | USB Port with 4 32GB USB's |
| BACKUP POWER SUPPLY | | Uninterrupted Power Supply (UPS) |
| PRINTER | Inkjet Printer | Laser Printer |
| CD/DVD ROM DRIVE | CD ROM Drive | CD/DVD Combo ROM Drive |

The following hardware has been recommended for the organization. These are not the minimum the requirements and the system will still work with less efficient hardware as stated in the table however for the quick treatment of critical patients the following hardware is ideal as using them there will be no problems for the hospital to cope with.

Intel Core 2 Duo 2.4 GHz Processor

Reasons:

- The processor will be able to handle all the work at the hospital at a high speed.
- With the high speed the time taken on individual patients would reduce.

2GB RAM

Reasons:

- This is to ensure the quick execution of commands.
- Having a lower RAM can cause speed problems which cannot be afforded as the patients are mostly in a critical condition when they arrive.

250GB Hard Disk Drive (HDD)

Reasons:

- Needed to store patient information, doctor information as well as all records related to patient treatment.
- A large HDD is required because Benazir Bhutto Hospital being a Govt. Hospital doesn't charge treatment to patients therefore a large number of patients prefer this hospital (According to analysis about 200 patients visit per day) Therefore these large records need to be kept which require a lot of space.
-

Optical Mouse:

Reasons:

- Will be used to select icons on the interface.
- The optical mouse will be more responsive and will speed up the process.

Anti RSI Keyboards:

Reasons:

- A keyboard is required to key in data regarding patients and doctors.
- The anti RSI keyboard will prevent RSI (Repetitive Strain Injury) as there is a lot of data to key in with a lot of inflow of patients which can cause harm to the user's health.

17 inch LCD:

Reasons:

- They are needed to view the data.
- They do not emit radiations like the CRT Monitors and since the user needs to spend the whole day in front of the screen it will be less harmful

HP Laser Printers:

Reason:

- Reports are needed to be printed out on regular intervals and laser printers are not only efficient but also cost effective in the long run.

32MB Integrated Graphics Card:

Reason:

- Required for a few graphical functions in the program.

USB Port with 4 8GB USB's

Reason:

- Required to keep backup of patient/doctor records and reports.

CD/DVD Combo ROM Drive:

Reason:

- Required to run most additional softwares required in future as most softwares nowadays come on DVD ROMs and previous softwares come in CD ROMs and we will need to run both.

UPS:

Reasons:

- There is a power problem in the country and the hospital cannot wait for the power to come back on as this would be disastrous for critical patients who require immediate attention, the UPS will therefore provide a backup power source and the system would not halt.
- The UPS also has the ability of auto switching i.e. it does not require to be switched on incase of power failure. It automatically turns on without any interruption, hence the system would run smoothly and the patients would not have to wait even for a little while.
- A high capacity UPS will be needed for running not only computers but also Hospital machinery like Xray Machine. Hence no process of the Hospital will be halted.

1.4.2 SOFTWARE REQUIREMENTS

The software that will be used was tailor made software developed to cater to the organizations 100% demands.

The following softwares will be used in the development of my software:

- Microsoft Access 2007
- Microsoft Visual Basic 6.0

Software Requirements:

The following software is required to run my software:

OS: MS Windows 7/8 Professional Edition:

Windows 7/8 have been chosen as the operating software because they are the latest operating systems and are very user friendly and the software is completely compatible with both these softwares.

Database: MS Access 2007:

Needed as the backend i.e. database manager of the software.

MS VB 6.0 Enterprise Edition:

Needed for debugging by technical experts in case of any fault.

Justification to the software used:

My software was developed using VB 6.0 and MS Access. MS Access was used because a database was needed to store all information of related patients and doctors. VB 6.0 was used because a programming language was needed to design an interface which would be user friendly and would be very easy for the staff to adjust to. Apart from that automation was necessary in the system which could be provided best with a programming language. The reason why I used was VB and not any other programming language was that it is easy to use and being an O Level student I decided to use it rather than go for complex programming languages. Another reason is that VB 6.0 is completely compatible with MS Access and minimum errors occurred while using them together. Visual Basic 6.0 employs powerful tools for database programming and has an excellent development environment in which my software can be developed.

1.4.2 REQUIREMENT SPECIFICATIONS

- To store all data at one particular place.
- To have a permanent record of patients to avoid entry of data again in future.
- To store personal information of doctors
- To store information about incoming patients.
- To store information involving patients' treatment by doctors
- To store information about patient admission and discharge.
- To have an easy to use system.
- To view availability of beds in wards.
- To automatically calculate how many beds are available in each ward.
- To store patient medical history with the CMO, Senior Medical Officer and previous medical record of patient tests.
- Minimize the time taken to enter patient information upon arrival.
- To have a unique id for each patient
- To make sure that beds are available in wards when patient is being admitted.
- To secure patient personal information from falling into wrong hands and only allow authorized personnel to make changes to data.
- To easily search through patient records.
- To ensure that the data in the field is accurate.
- To ensure that all data requirements are fulfilled and that the data isn't too long or short
- To move through records
- To have reports of visiting patients
- To have a report on doctor contact information incase of emergency
- To have a ward status report.
- To have multiple reports created through different fields of different tables for example a report on performance comprising on when the patient visited, when was he checked by the CMO and when by the Senior Medical Officer
- To have report on all patient tests performed separately.
- To have a unique ID for doctors

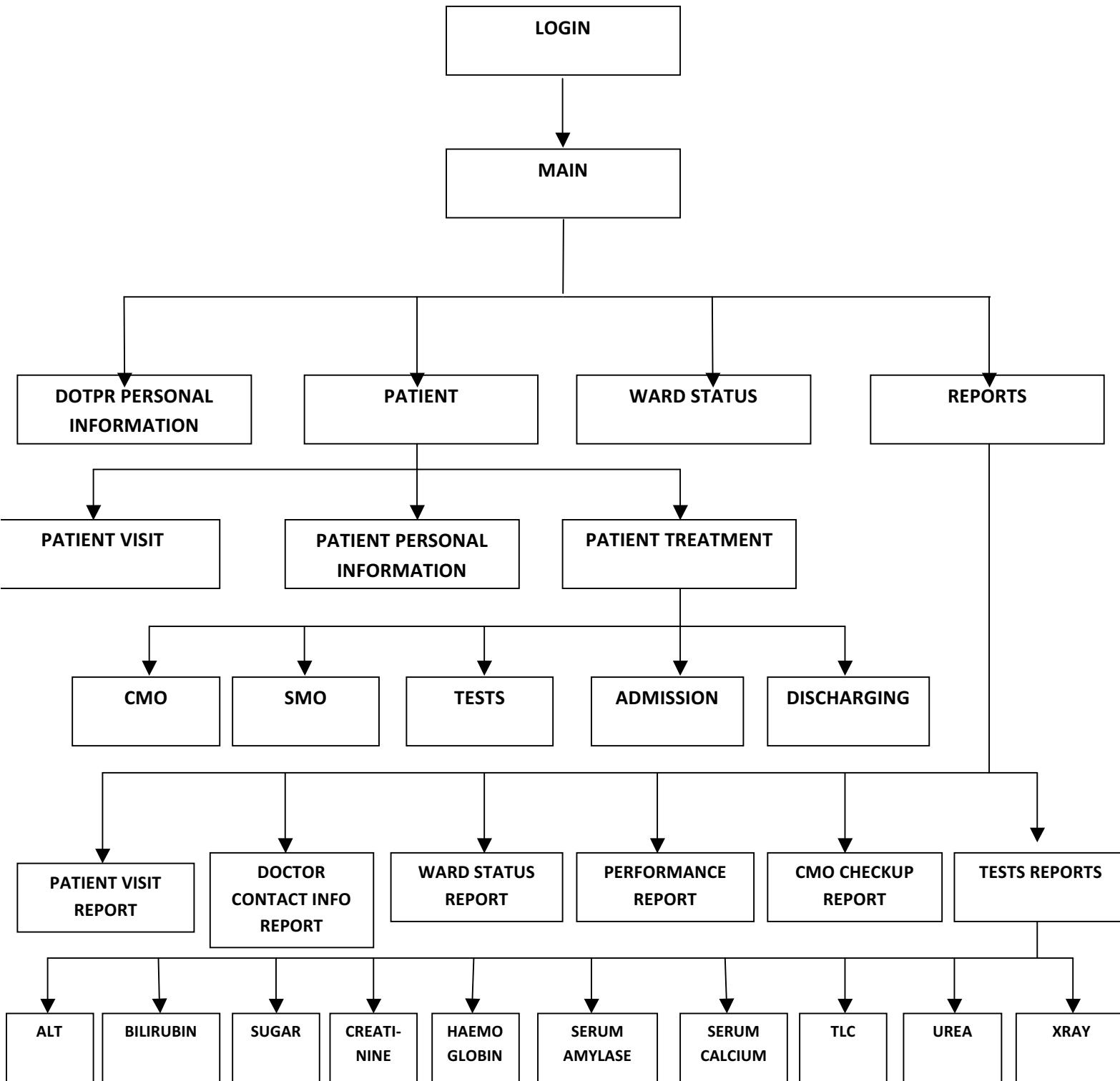
2. DESIGN

2.1 DESCRIPTION OF THE METHOD OF SOLUTION:

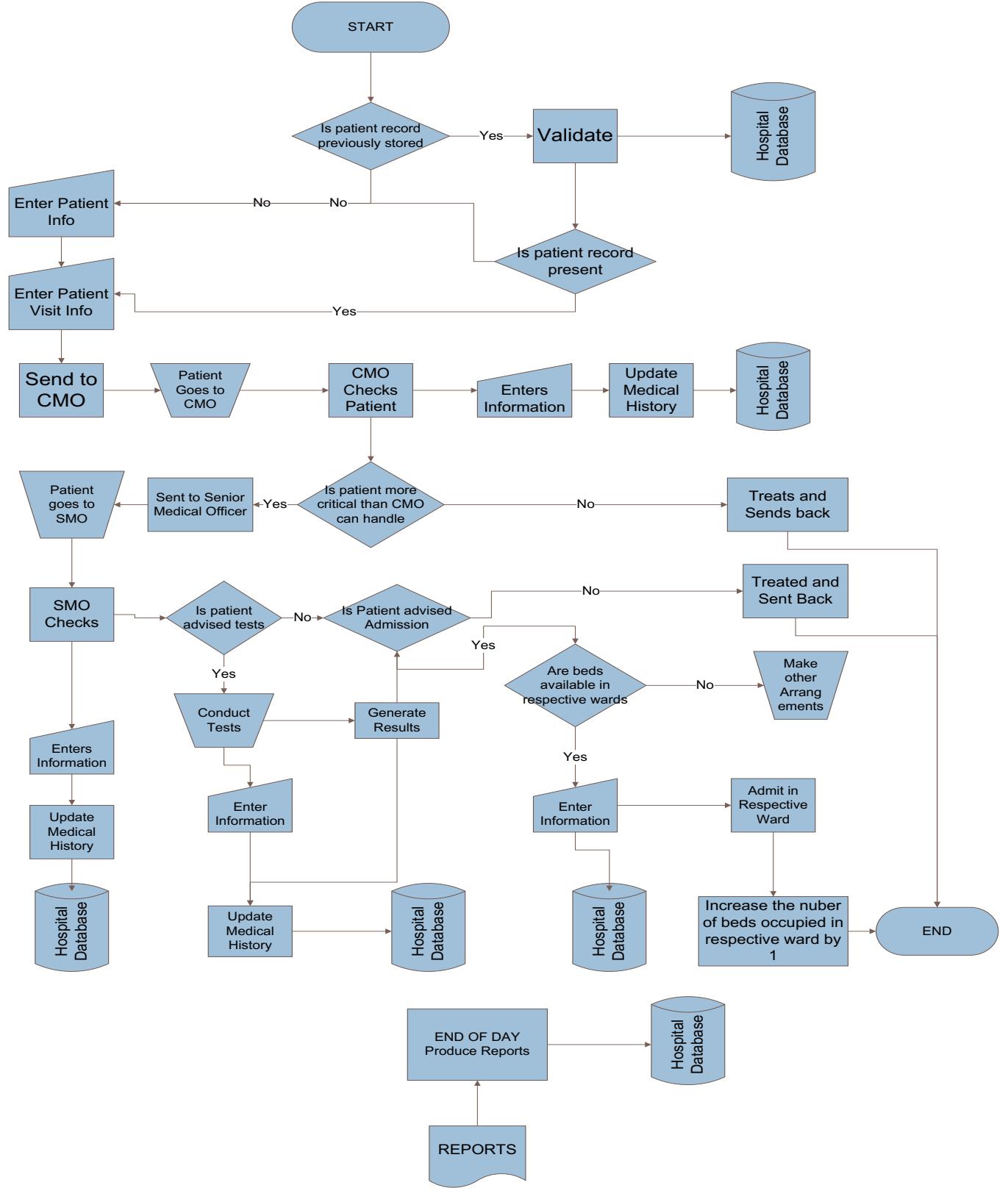
2.1.1 AGREED SET OF OBJECTIVES

1. Create a database to store all required information.
2. To accept input and record information of patients.
3. To accept input and record information of doctors.
4. To accept input and enter data regarding patient upon visit.
5. To accept and record information regarding patient treatment.
6. To input and accept data regarding patient admissions and discharge.
7. To design a user friendly interface in a programming language.
8. To have the ability to show ward information.
9. To have the ability to automatically change the status of wards upon admissions and discharging through mathematical coding
10. To use database grids in the forms for easy access for doctors to patient medical history.
11. To ensure through coding that minimum time be taken to enter patient information upon arrival for e.g automatic entry of date and time.
12. To have the ability to automatically generate a unique numeric id for patients.
13. To only accept patient admission if beds are available.
14. To secure patient information by applying passwords so only authorized personnel can access data. User rights will be applied so that only authorized personnel can make changes in data.
15. To apply search coding for efficient and quick searching of data.
16. To apply validation checks on the front end through coding to check if correct data type was entered.
17. Apply presence checks and length checks.
18. To have navigation buttons for quick navigation through records
19. To obtain a report of patient visit information through the respective table.
20. To develop a report through specific field from the doctor personal information table to contact him in case of emergency.
21. To develop a report through ward_information form fields to show ward status.
22. To develop queries for the generation of performance, CMO checkup reports through different tables and different fields.
23. To generate reports on each individual test.
24. To generate a unique Doctor ID using coding.

2.1.2 STRUCTURE DIAGRAM OF SOLUTION (TOP DOWN MODEL)



2.1.3 SYSTEM FLOWCHART OF THE PROPOSED SYSTEM



2.1.4 DATA STRUCTURES

DATA ITEMS

The following data items will be needed.

beds_occupied_by_medicine, beds_occupied_by_surgery, total_beds_in_medicine,
total_beds_in_surgery, patient_id, patient_name, patient_date_of_birth, patient_contact_number,
patient_address, blood_group, hyoertensive, diabetic, doctor_id, doctor_name,
doctor_contact_number, designation, department, doctor_address, doctor_date_of_birth, gender,
visit_id, date_visited, time_visited, problem, diagnosis, treatment, time_examined, date_examined,
blood_pressure, temperature, date_of_test, time_of_test, referring_doctor_id, xray, creatinine,
haemoglobin, serum_calcium, serum_amylase, blood_sugar, tlc, alt, urea, bilirubin, process,
date_admitted, time_admitted, ward_name, date_discharged, notes_kept, description.

DATA DICTIONARY

| Expected Form where the item will appear | Item | Description |
|---|-------------------------|--------------------------------------|
| CMO | txt_patient_id | Patient ID is entered here |
| | txt_doctor_id | Examining Doctor ID is entered here |
| | txt_time | Examination time is input here |
| | txt_date | Examination date is input here |
| | txt_blood_pressure | Patients Blood Pressure is entered |
| | txt_temperature | Patients temperature is entered |
| | txt_problem | Encountering problem is entered |
| | txt_diagnosis | Doctors diagnosis is entered |
| | txt_process | Process carried out is entered |
| Discharging Patients | txt_patient_id | Patient ID is entered here |
| | txt_ward_name | The ward name is selected |
| | txt_date_discharged | Date of discharge is input |
| | txt_description | Description of process entered |
| | txt_notes_kept | Notes entered |
| Doctor Information | txt_doctor_id | Doctor ID is generated here |
| | txt_sex | Doctor Gender is entered |
| | txt_name | Doctor Name is entered |
| | txt_designation | Doctors designation is entered |
| | txt_department | The respective department is entered |
| | txt_contact_number | Doctors Contact number is entered |
| | txt_address | Doctors Address is entered |
| | txt_date_of_birth | Doctors Date of Birth is entered |
| Ward Admissions | txt_patient_id | Patient ID is entered here |
| | txt_referring_doctor_id | Admitting doctors ID is entered |
| | txt_date_of_admission | Date of admission is entered |
| | txt_time_of_admission | Time of admission is entered |
| | txt_ward_name | Ward in which admitted is selected |
| | txt_problem | Reason for admission entered |
| | txt_treatment | Treatment plan entered |

| | | |
|------------------------|------------------------------------|---|
| Senior Medical Officer | txt_patient_id | Patient ID is entered here |
| | txt_doctor_id | Examining Doctor ID is entered here |
| | txt_date | Date of examination entered |
| | txt_time | Time of examination entered |
| | txt_diagnosis | Diagnosis by doctor entered |
| | txt_process | Process to be carried out entered |
| Patient Tests | txt_patient_id | Patient ID is entered here |
| | txt_referring_doctor_id | Doctor who advised ID is entered |
| | txt_date | Date of test is input |
| | txt_time | Time of test is input |
| | txt_xray | X Ray result is entered |
| | txt_haemoglobin | Haemoglobin result is entered |
| | txt_creatinine | Creatinine result is entered |
| | txt_serum_calcium | Serum Calcium result is entered |
| | txt_serum_amylase | Serum Amylase result is entered |
| | txt_bilirubin | Bilirubin result is entered |
| | txt_blood_sugar_random | Sugar result is entered |
| | txt_urea | Urea result is entered |
| | txt_tlc | TLC result is entered |
| | txt_alt | ALT result is entered |
| | txt_diagnosis | Diagnosis is entered |
| | txt_process | Process carried out is entered |
| Patient Visit | txt_visit_id | Patient Visit ID is generated here |
| | txt_patient_id | Patient ID is entered here |
| | txt_time | Time visited is entered |
| | txt_date | Date visited is entered |
| | txt_problem | Encountering Problem is entered |
| Patient Information | txt_patient_id | Patient ID is generated here |
| | txt_name | Patient Name is entered |
| | txt_contact_number | Patients Contact number is entered |
| | txt_date_of_birth | Patients Date of Birth is entered |
| | txt_address | Patients Address is entered |
| | txt_diabetic | Is patient diabetic? |
| | txt_hypertensive | Is patient hypertensive? |
| | txt_blood_group | Patients Blood Group is entered |
| | txt_serious_diseases_in_famil y | Serious diseases in family entered if any |

NORMALIZATION:

The following data items are needed

1st Normal Form (1NF):

The key attributes have been identified and are shown in bold. The table is now isomorphic to some relation.

beds_occupied_by_medicine, **beds_occupied_by_surgery**, **total_beds_in_medicine**,
total_beds_in_surgery, **patient_id**, patient_name, patient_date_of_birth, patient_contact_number,
patient_address, blood_group, hypertensive, diabetic, **doctor_id**, doctor_name,
doctor_contact_number, designation, department, doctor_address, doctor_date_of_birth, gender,
visit_id, date_visited, time_visited, problem, diagnosis, treatment, time_examined, date_examined,
blood_pressure, temperature, date_of_test, time_of_test, referring_doctor_id, xray, creatinine,
haemoglobin, serum_calcium, serum_amylase, blood_sugar, tlc, alt, urea, bilirubin, process,
date_admitted, time_admitted, ward_name, date_discharged, notes_kept, description.

2nd Normal Form (2NF):

Now in the 2nd Normal Form partial dependencies have been removed. The primary keys are in bold while the foreign keys are italicized.

beds(beds_occupied_by_medicine, beds_occupied_by_surgery, total_beds_in_medicine,
total_beds_in_surgery)

patient_information(**patient_id**, patient_name, patient_date_of_birth, patient_contact_number,
patient_address, blood_group, hypertensive, diabetic)

doctor_information(**doctor_id**, doctor_name, doctor_contact_number, designation, department,
doctor_address, doctor_date_of_birth, gender)

patient_visit(**visit_id**, *patient_id*, date_visited, time_visited, problem)

patient_treatment(*patient_id*, *doctor_id*, **visit_id**, problem, diagnosis, treatment, time_examined,
date_examined, blood_pressure, temperature, date_admitted, time_admitted, ward_name,
date_discharged, notes_kept, description)

patient_tests(*patient_id*, referring_doctor_id, date_of_test, time_of_test, xray, creatinine,
haemoglobin, serum_calcium, serum_amylase, blood_sugar, tlc, alt, urea, bilirubin, diagnosis, process)

3rd Normal Form (3NF):

beds(beds_occupied_by_medicine, beds_occupied_by_surgery, total_beds_in_medicine, total_beds_in_surgery)

patient_information(patient_id, patient_name, patient_date_of_birth, patient_contact_number, patient_address, blood_group, hypertensive, diabetic)

doctor_information(doctor_id, doctor_name, doctor_contact_number, designation, department, doctor_address, doctor_date_of_birth, gender)

patient_visit(visit_id, patient_id, date_visited, time_visited, problem)

cmo(patient_id, doctor_id, problem, diagnosis, process, time_examined, date_examined, blood_pressure, temperature)

senior_medical_officer(patient_id, doctor_id, date_examined, time_examined, diagnosis, process)

patient_tests(patient_id, referring_doctor_id, date_of_test, time_of_test, xray, creatinine, haemoglobin, serum_calcium, serum_amylase, blood_sugar, tlc, alt, urea, bilirubin, diagnosis, process)

ward_admissions(patient_id, referring_doctor_id, date_admitted, time_admitted, problem, treatment, ward_name)

discharging_patients(patient_id, visit_id, date_discharged, description, notes_kept, ward_name)

2.1.5 DESIGNING THE TABLES AND RELATIONSHIPS FOR THE BACKEND

For the complete computerization of the system a tailor made software will be developed using Microsoft Access as backend and Microsoft Visual Basic as the front end To do this, a top down approach will be used in which each task will be broken down into smaller tasks and then each part will be solved and tested separately. A detail of what I will be doing has been given in

THE DATABASE:

A total of 9 tables will be created which will tend to all data input requirements. These will make the process of input of data very easy and user friendly.

(Objective 1 will be fulfilled)

1. **Beds:** Holds information about availability of beds in wards.

Record Size: 12 bytes

| Field Name | Field Length | Data Type | Sample Data |
|---------------------------|--------------|-----------|-------------|
| total_beds_in_medicine | 3 | Number | 100 |
| total_beds_in_surgery | 3 | Number | 45 |
| beds_occupied_by_medicine | 3 | Number | 10 |
| beds_occupied_by_surgery | 3 | Number | 20 |

Note: The fields of this table will be kept disabled in the front end and will be updated through coding (mathematical calculations) when changes occur in tables 8 and 9.

2. **Patient Personal Information:** Holds personal information regarding patients who have visited the hospital some time in the past.

Record Size: 138 bytes

| Field Name | Field Length | Data Type | Sample Data |
|---------------------------|--------------|-----------|-----------------|
| patient_id (primary key) | 4 | Number | 1 |
| name | 30 | Text | Saad |
| date_of_birth | 8 | Date/Time | 27/11/1997 |
| contact_number | 15 | Text | 051-5502035 |
| address | 40 | Text | 22C, RMC Colony |
| diabetic | 3 | Yes/No | Yes |
| hypertensive | 3 | Yes/No | No |
| blood_group | 10 | Text | O +ive |
| serious_disease_in_family | 25 | Text | None |

(Objective 2 will be fulfilled)

3. **Doctor Personal Information:** Contains personal information of doctors who are currently working in the Emergency Department

Record Size: 124 bytes

| Attribute (Field Name) | Field Length | Data Type | Sample Data |
|-------------------------|--------------|-----------|-----------------------------|
| doctor_id (primary key) | 10 | Text | AliMed1981 |
| name | 20 | Text | Ali |
| gender | 1 | Text | M |
| designation | 20 | Text | Medical Officer |
| Department | 10 | Text | Medicine |
| Contact_number | 15 | Text | 0333-5556789 |
| Address | 40 | Text | Askari 14 Street 5 House 21 |
| Date_of_birth | 8 | Date | 12/21/1971 |

(Objective 3 will be fulfilled)

4. **Patient Visit:** Contains information to be recorded upon each patient visit.

Record Size: 124 bytes

| Attribute (Field Name) | Field Length | Data Type | Sample Data |
|------------------------|--------------|-----------|-------------|
| visit_id (primary key) | 4 | Number | 1 |
| patient_id | 4 | Number | 1 |
| date_visited | 8 | Date | 12/11/2011 |
| time_visited | 8 | Time | 11:29 AM |
| problem | 100 | Text | Chest Pain |

(Objective 4 will be fulfilled)

5. **CMO:** Contains details of patient's checkup with the CMO.

Record Size: 65,754 bytes

| Attribute (Field Name) | Field Length | Data Type | Sample Data |
|------------------------|--------------|-----------|--------------------------------|
| patient_id | 4 | Number | 1 |
| doctor_id | 10 | Text | AliMed1981 |
| time_examined | 8 | Date/Time | 12:20 PM |
| date_examined | 8 | Date/Time | 22/10/2010 |
| blood_pressure | 7 | Text | 120/80 |
| temperature | 7 | Text | 104°F |
| problem | 100 | Text | Severely High Fever |
| diagnosis | 65,535 | Memo | Pneumonia |
| process | 75 | Text | Sent to Senior Medical Officer |

6. Senior Medical Officer: This table contains information of patient's checkup with SMO
Record Size: 65,640 bytes

| Attribute (Field Name) | Field Length | Data Type | Sample Data |
|------------------------|--------------|-----------|--------------------------|
| patient_id | 4 | Number | 2 |
| doctor_id | 10 | Text | AhmSur1967 |
| date | 8 | Date | 22/01/2012 |
| time | 8 | Time | 11:15 AM |
| diagnosis | 65,535 | Memo | Possible Dengue Patient. |
| process | 75 | Text | Advised Tests. |

7. Patient Tests: Contains information regarding patient tests and their results.
Record Size: 65,713 bytes

| Attribute (Field Name) | Field Length | Data Type | Sample Data |
|------------------------|--------------|-----------|----------------|
| patient_id | 4 | Number | 1 |
| referring_doctor_id | 10 | Text | AliMed1981 |
| date | 8 | Date | 21/12/2010 |
| time | 8 | Time | 12:20 PM |
| xray | 10 | Text | Broken arm. |
| creatinine | 7 | Text | NA |
| haemoglobin | 7 | Text | 12.5 |
| serum_calcium | 7 | Text | NA |
| tlc | 7 | Text | NA |
| alt | 7 | Text | 45 |
| blood_sugar_random | 7 | Text | 120 |
| serum_amylase | 7 | Text | NA |
| urea | 7 | Text | NA |
| bilirubin | 7 | Text | NA |
| diagnosis | 65,535 | Memo | Fractured arm. |
| process | 75 | Text | Plastered. |

(Through tables 4-6 Objective 5 will be fulfilled)

8. **Ward Admissions:** This table will be used to store information about patients being admitted into wards.

Record Size: 65,675 bytes

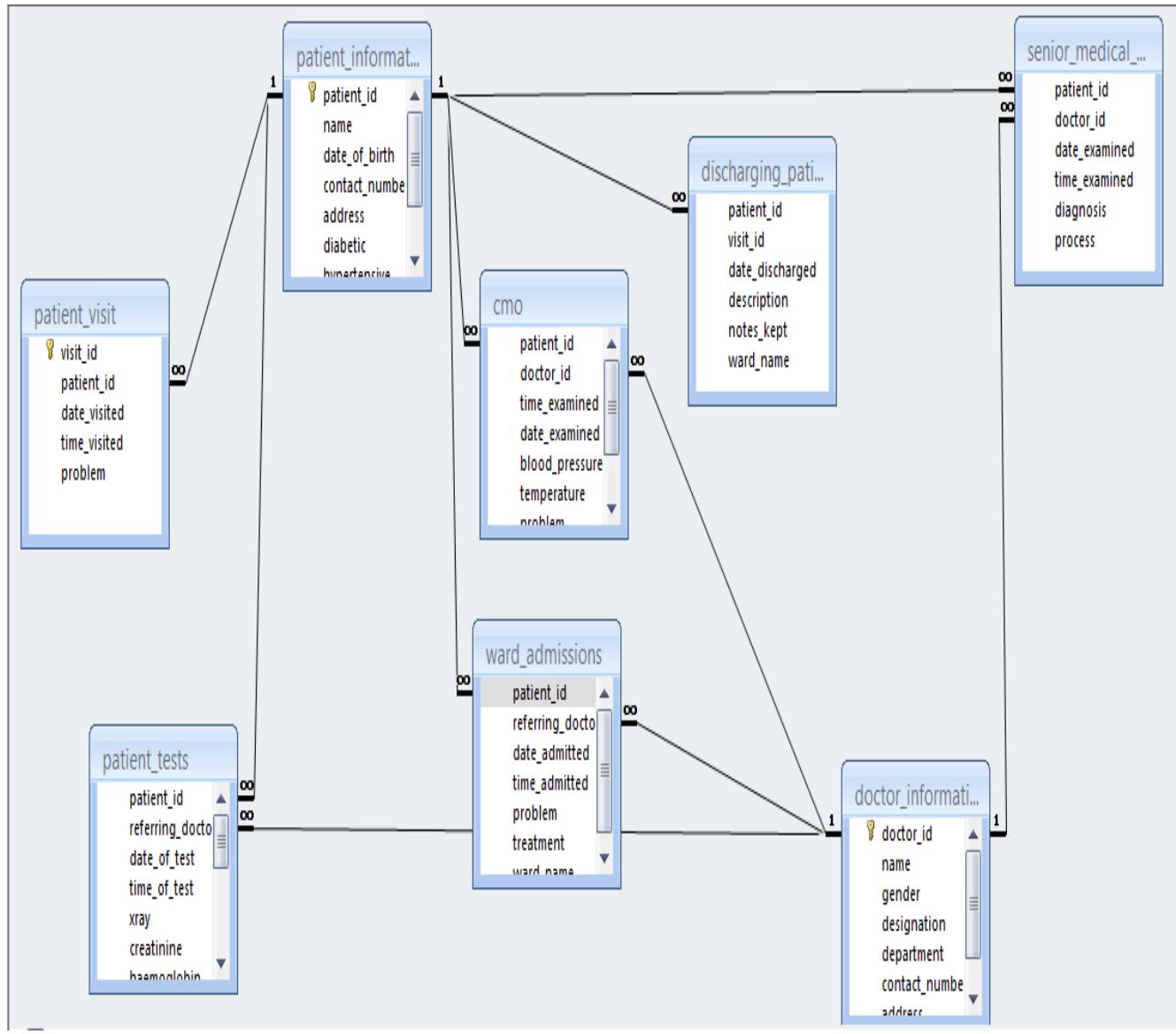
| Attribute (Field Name) | Field Length | Data Type | Sample Data |
|------------------------|--------------|-----------|--------------------------------------|
| ward_name | 10 | Text | Surgery |
| patient_id | 4 | Number | 2 |
| referring_doctor_id | 10 | Text | AhmSur1967 |
| date_admitted | 8 | Date | 22/01/2012 |
| time_admitted | 8 | Time | 11:15 AM |
| problem | 100 | Text | Diagnosed with swine flu. |
| Treatment | 65,535 | Memo | Kept in ward with special attention. |

9. **Ward Discharging:** This table will be used to store information upon discharging patient from ward after complete treatment.

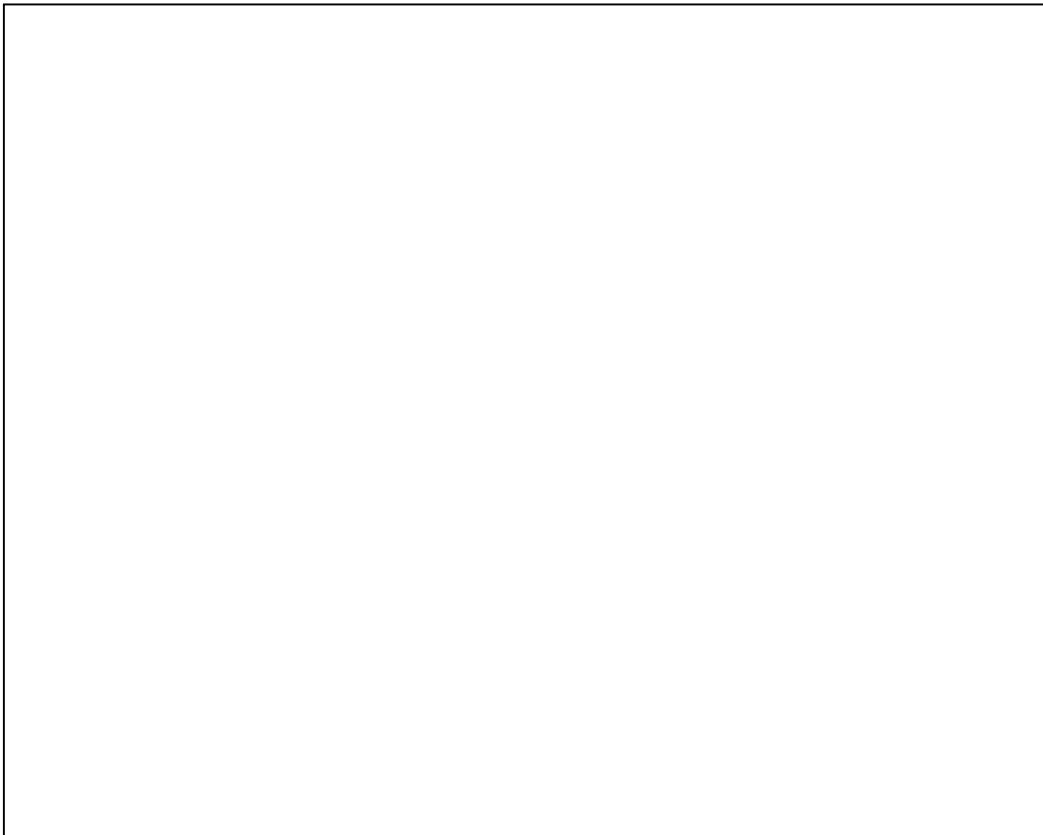
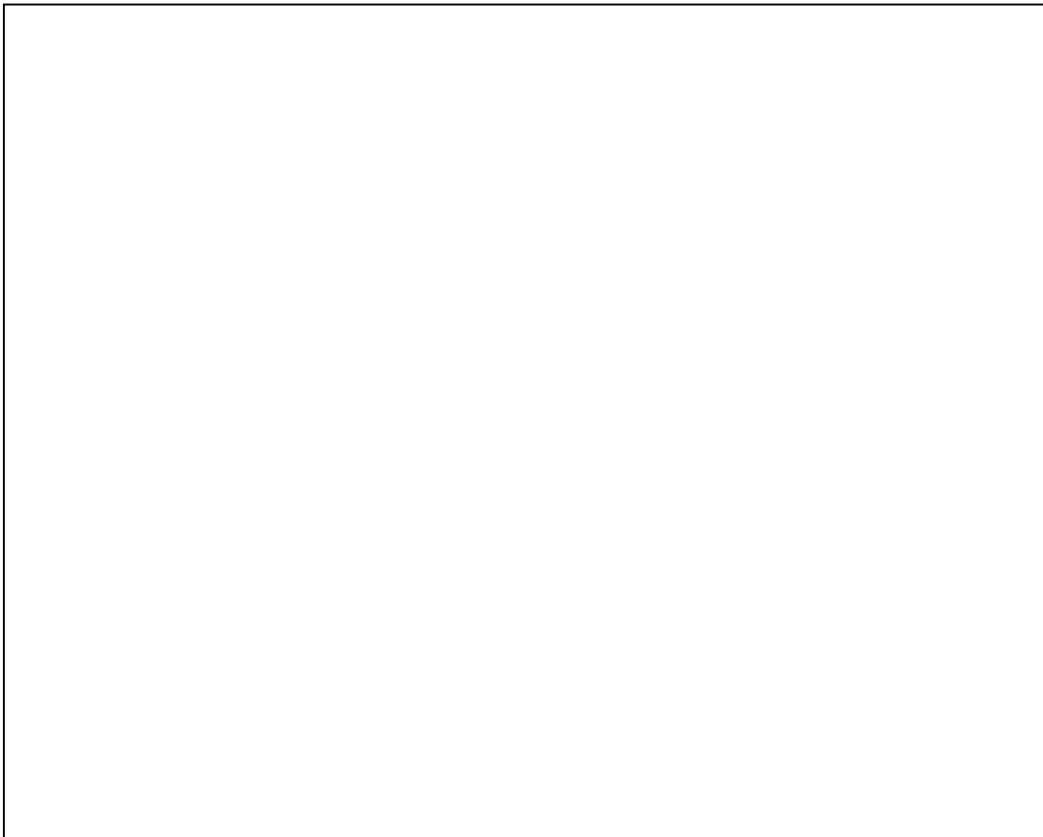
Record Size: 65,591 bytes

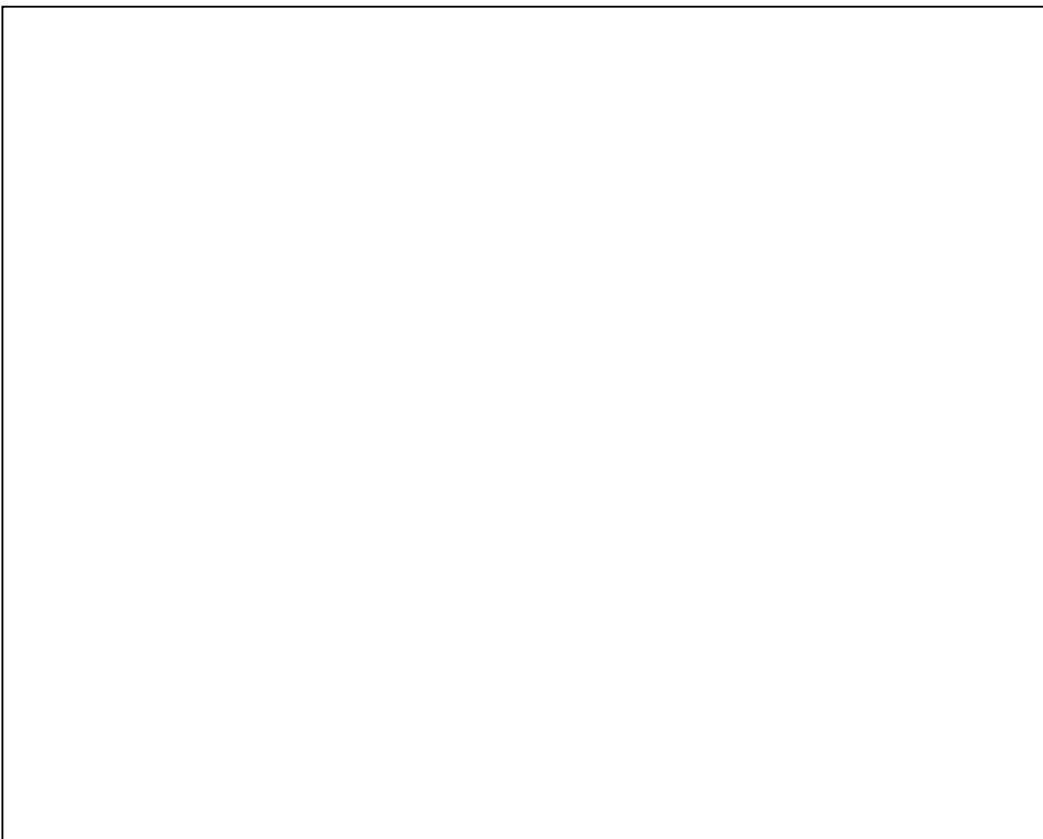
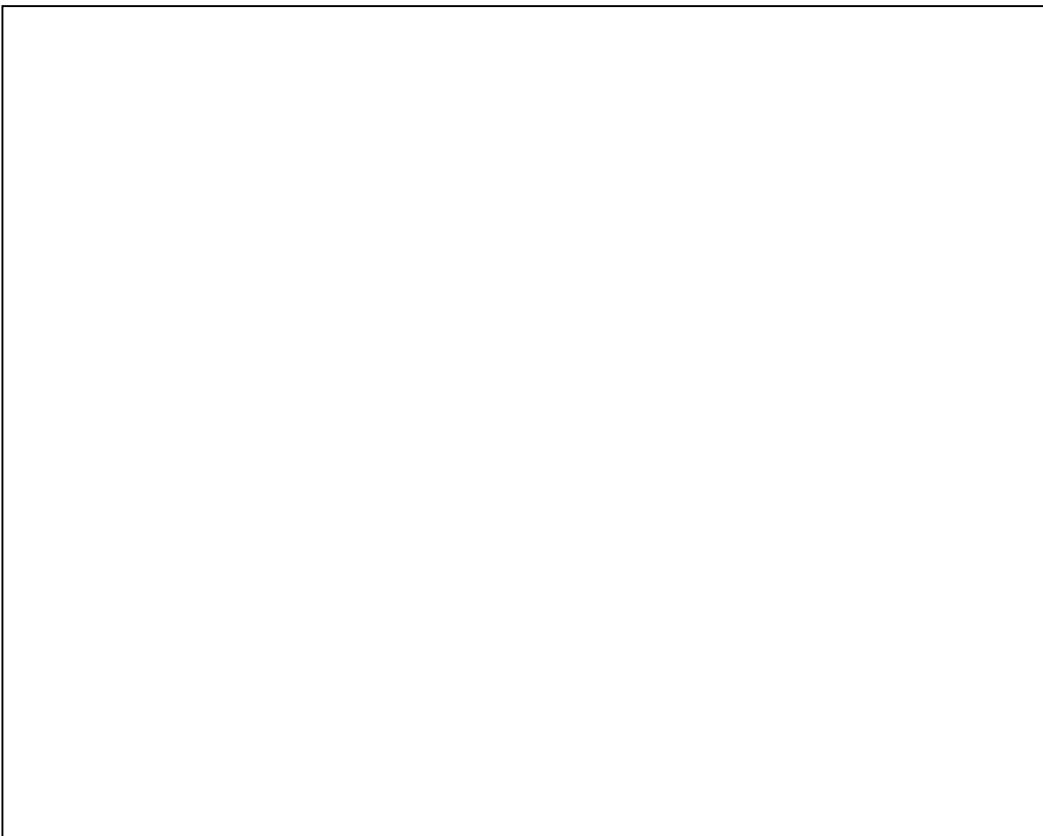
| Attribute (Field Name) | Field Length | Data Type | Sample Data |
|------------------------|--------------|-----------|----------------------|
| ward_name | 10 | Text | Surgery |
| patient_id | 4 | Number | 2 |
| visit_id | 4 | Number | 1 |
| date_discharged | 8 | Date | 22/01/2012 |
| description | 65,535 | Memo | Fully treated. |
| Notes_kept | 30 | Text | Clinical note sheet. |

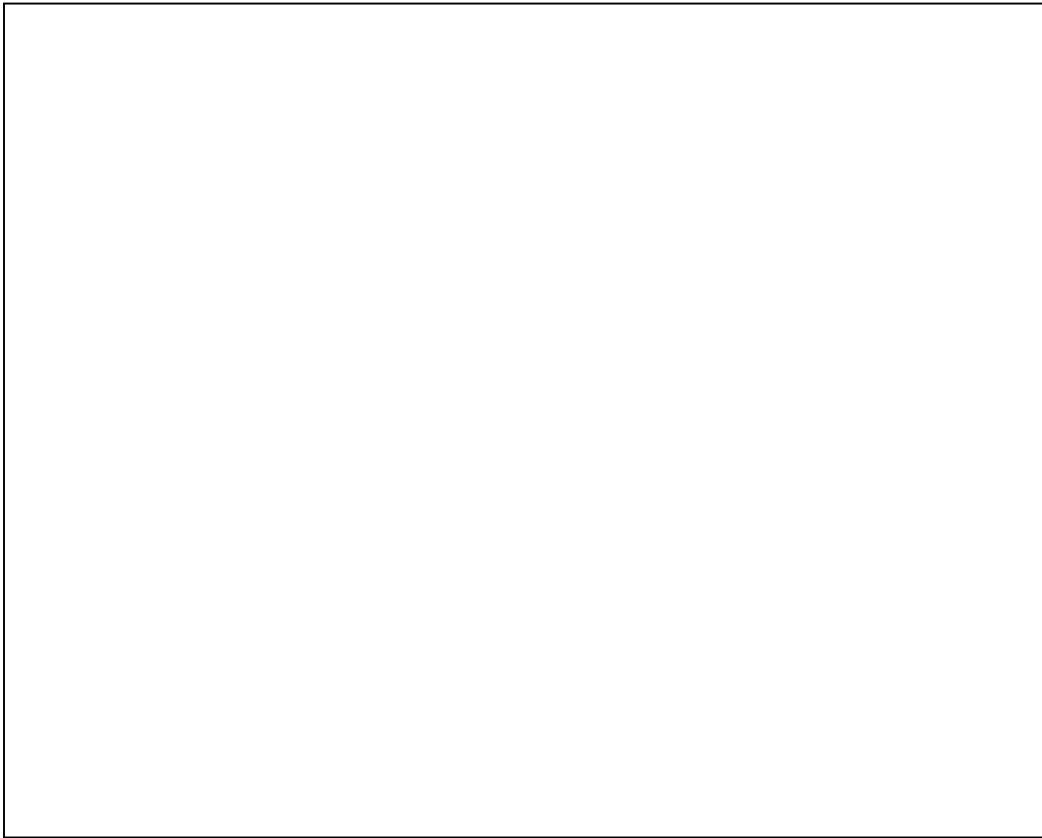
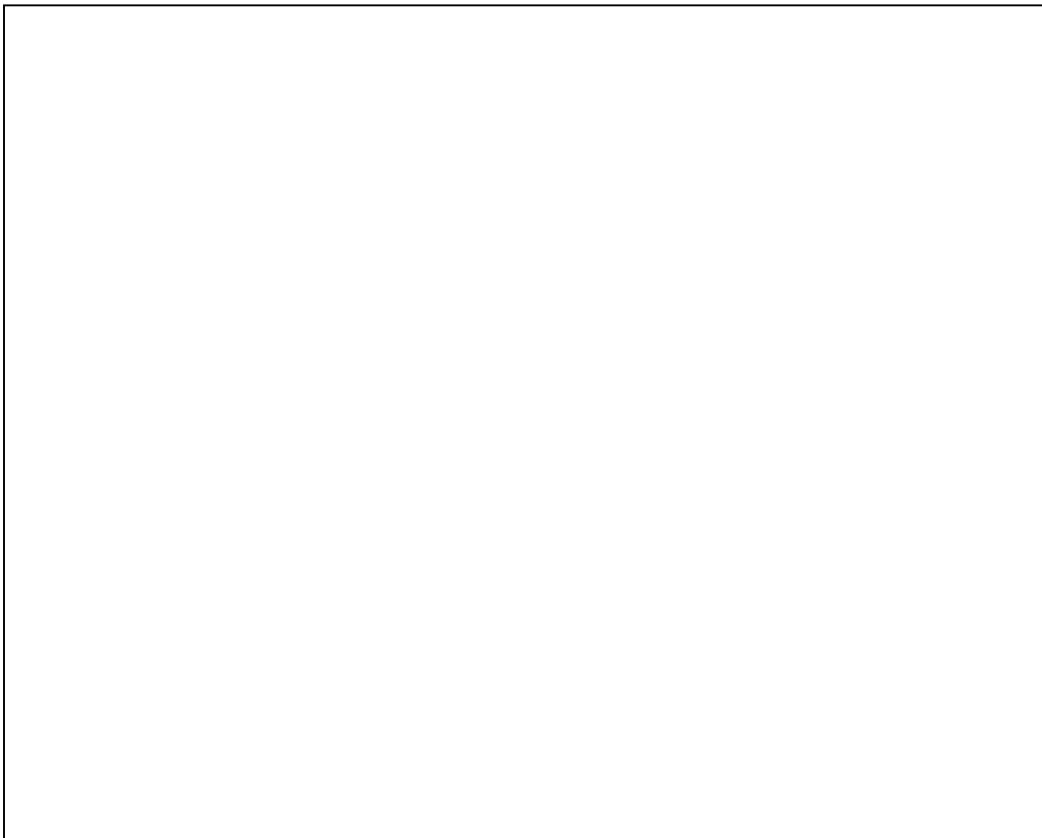
(Through tables 7-8 Objective 6 will be fulfilled)

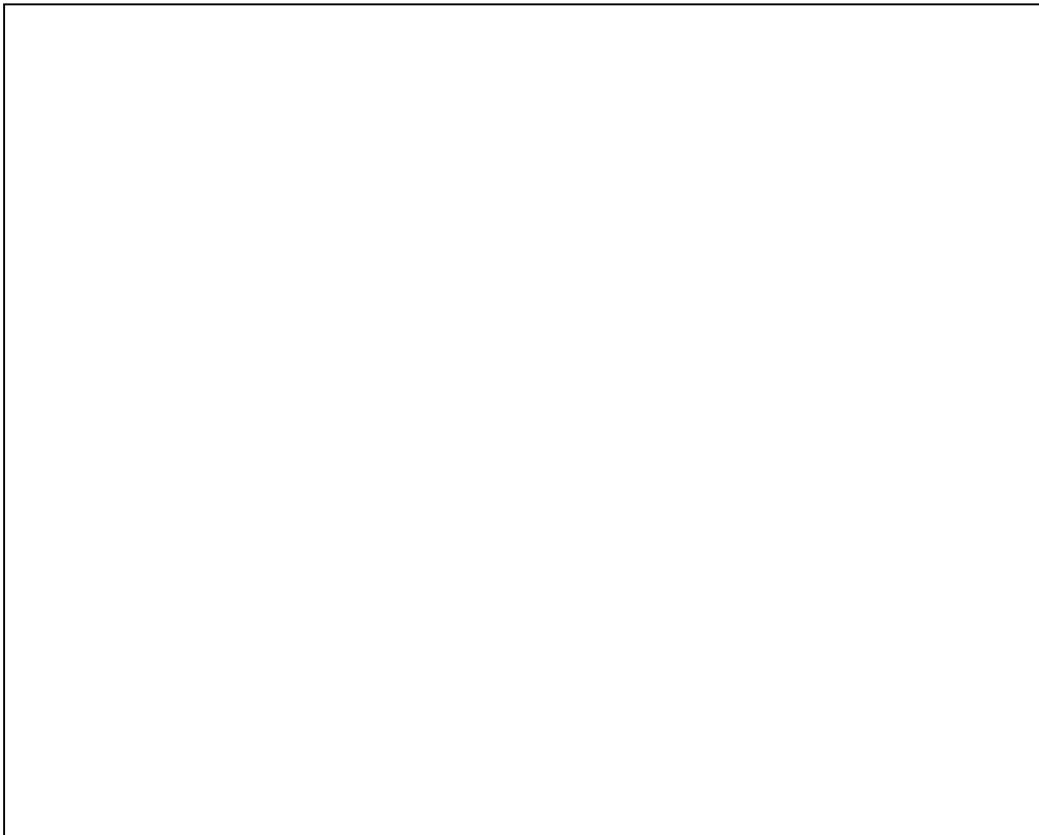
RELATIONSHIPS:

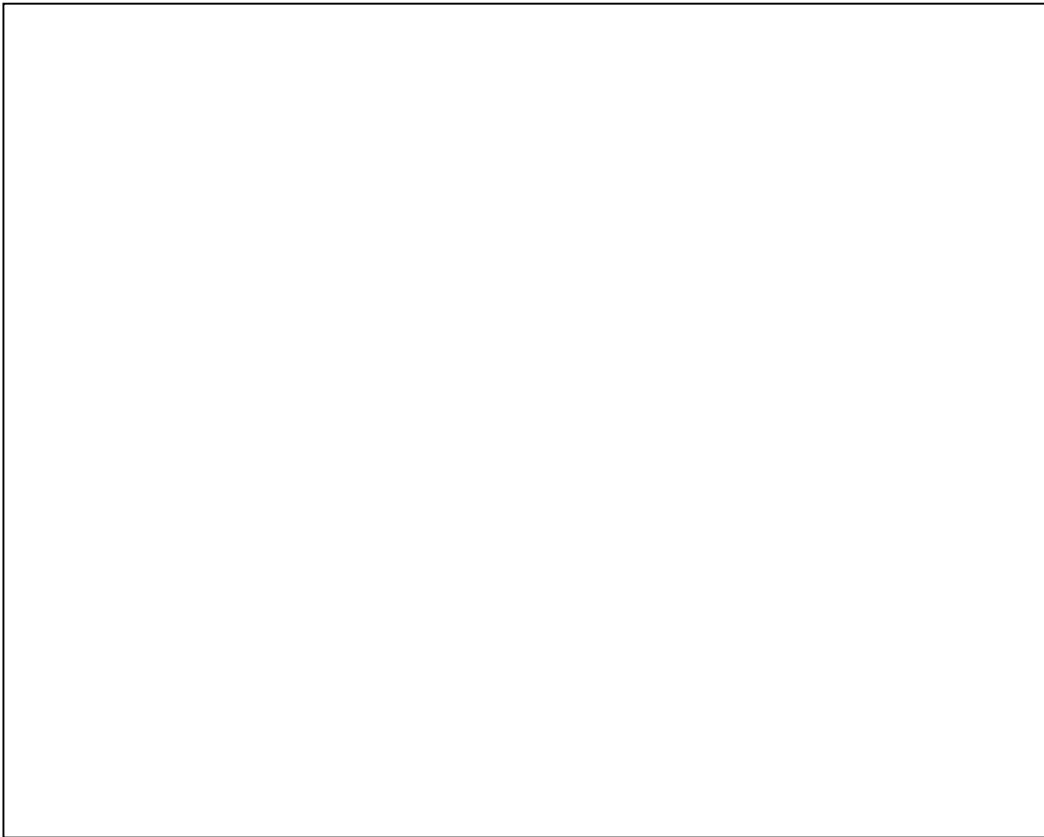
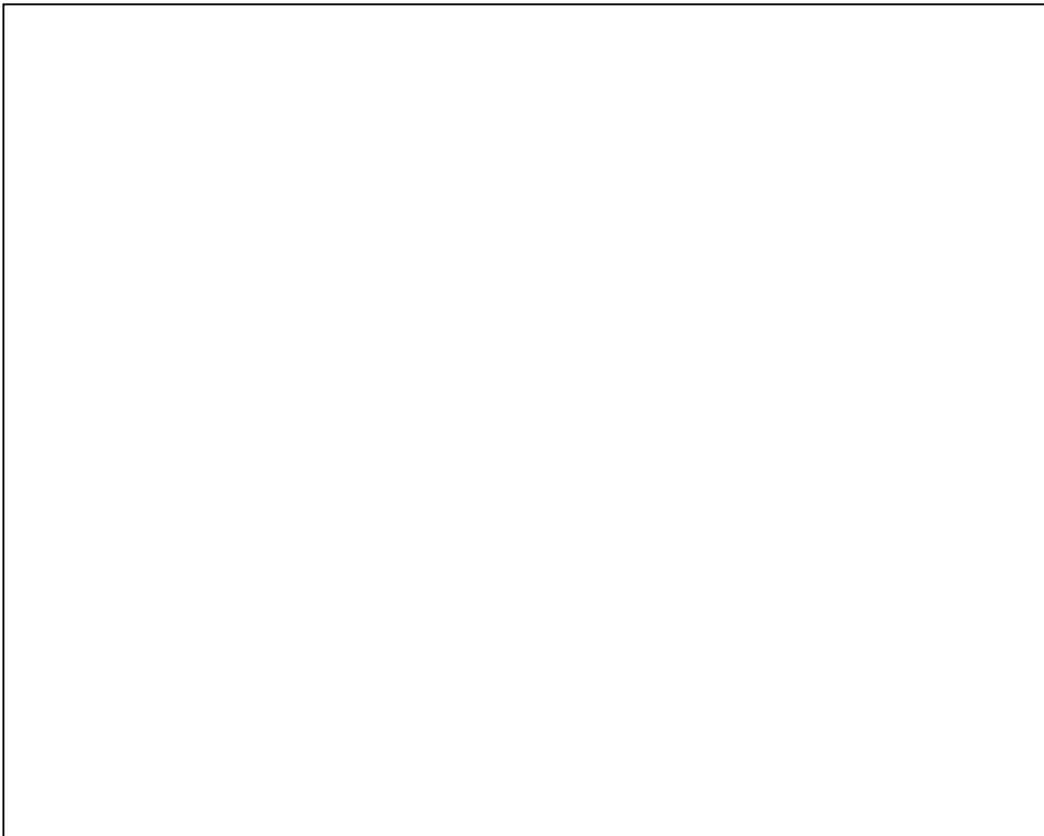
2.1.6 INPUT DESIGN



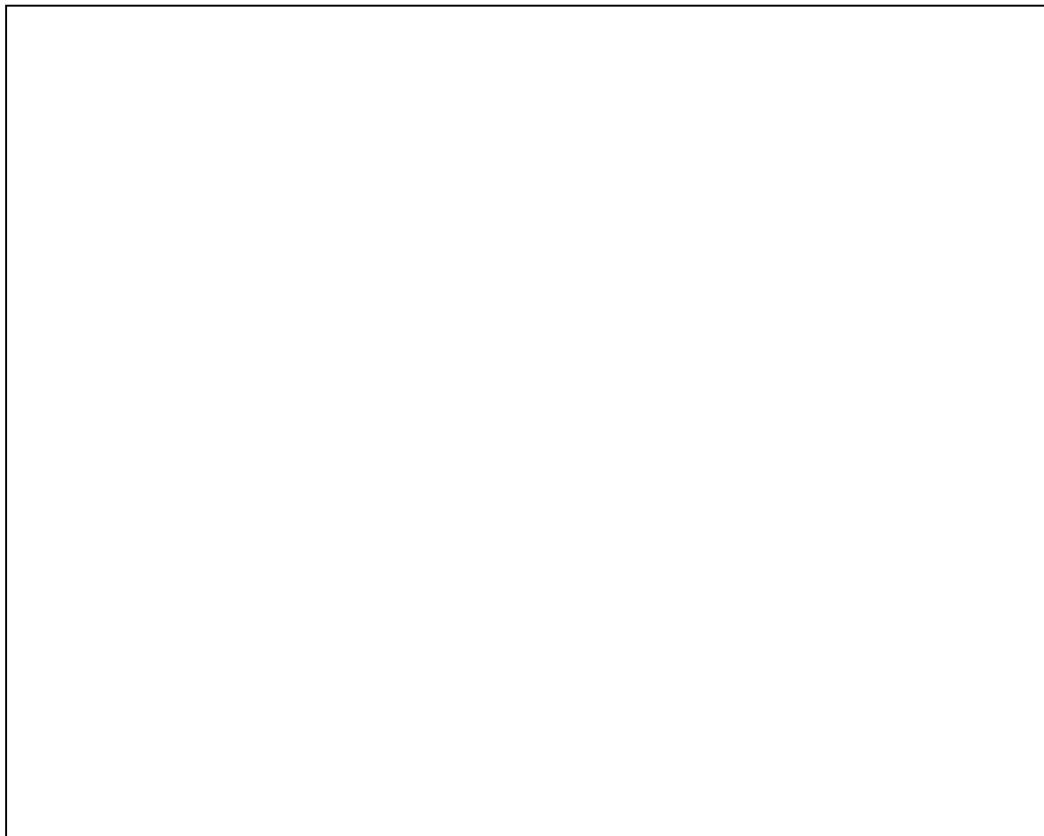
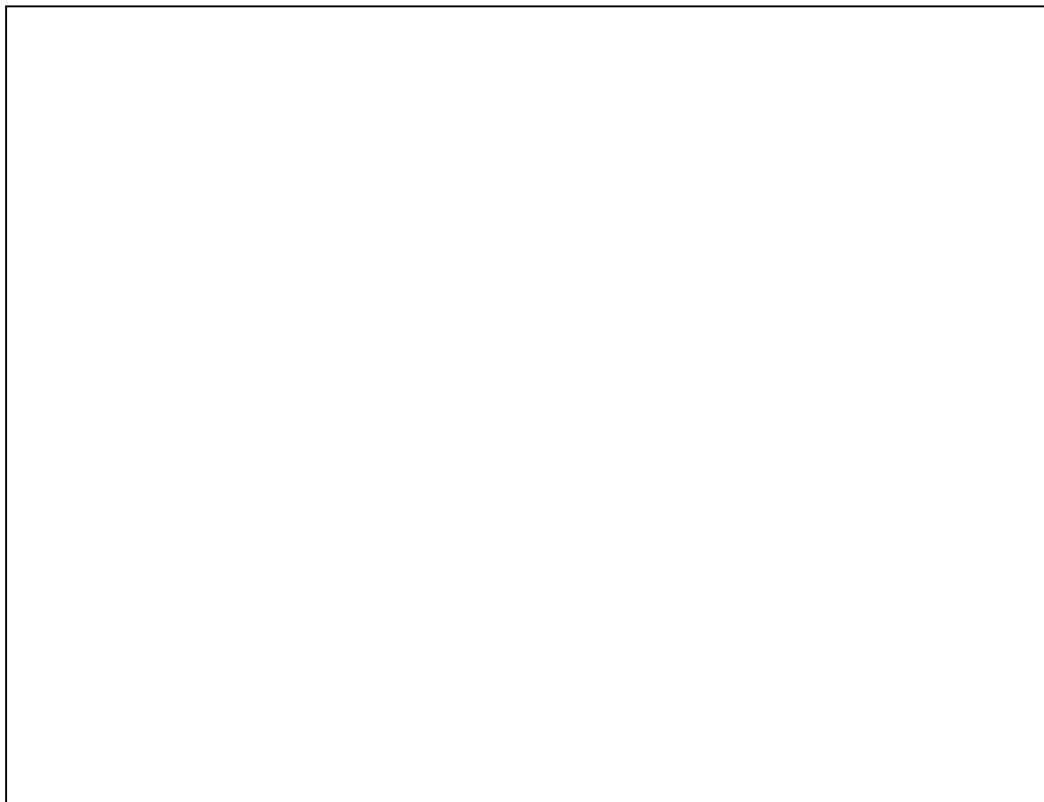


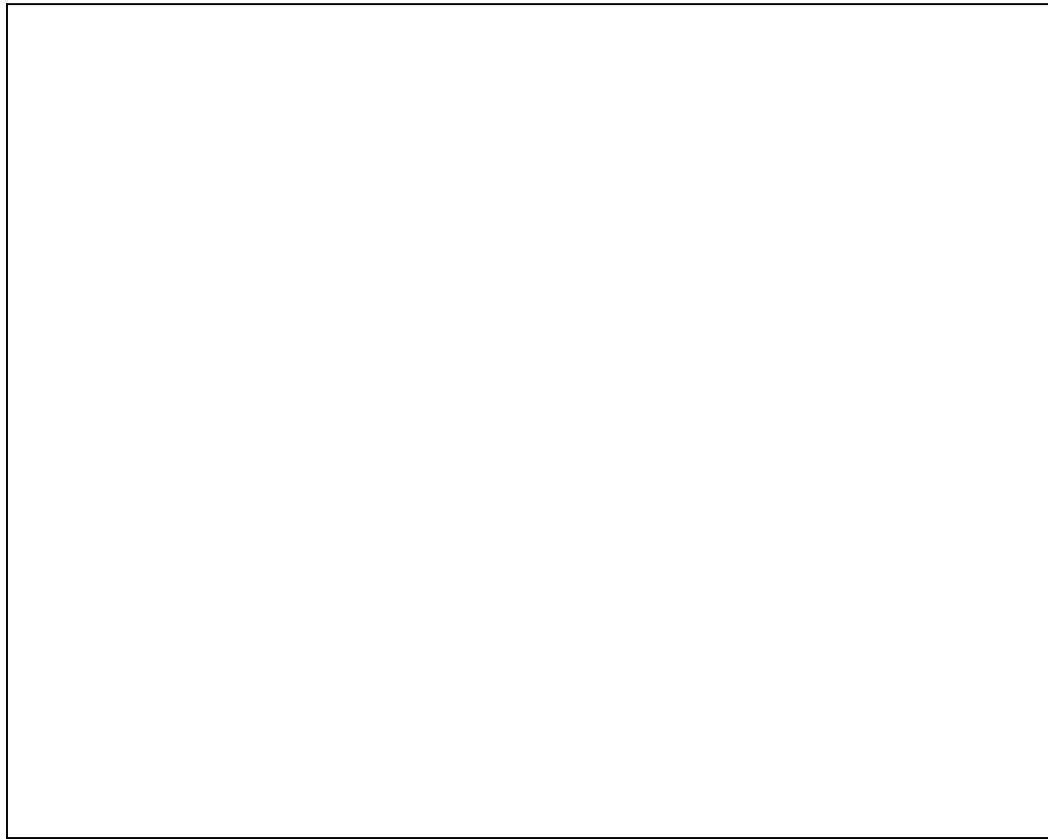




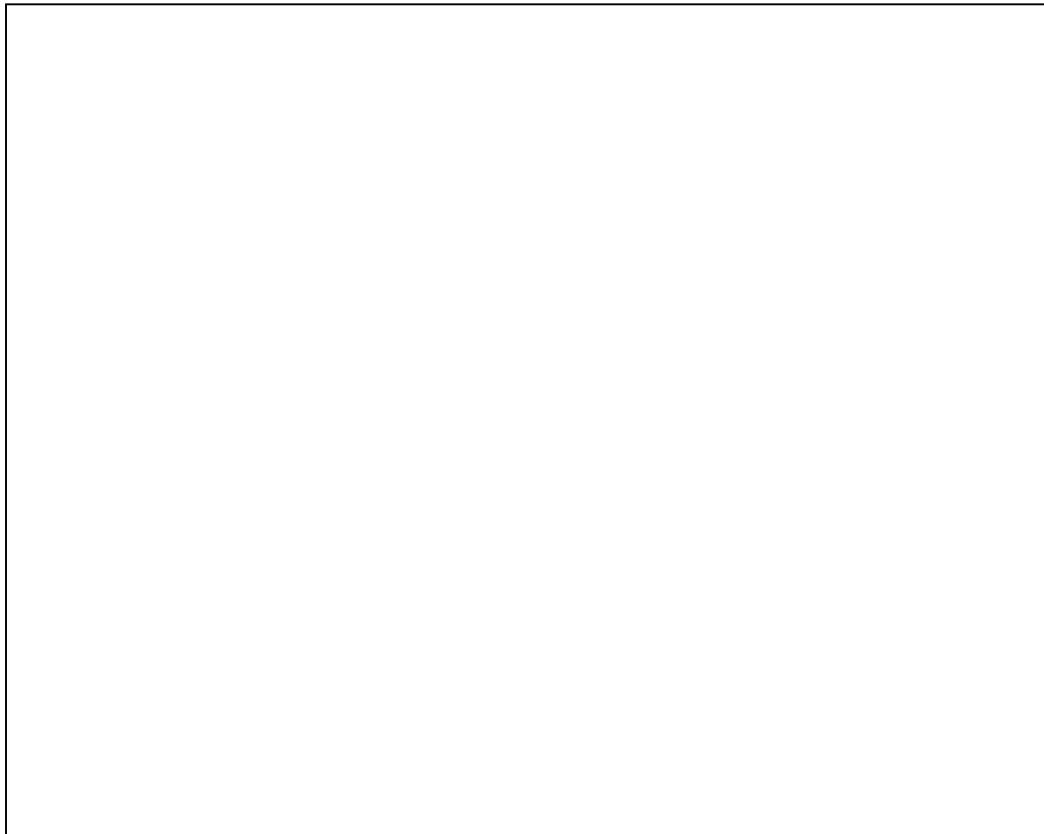


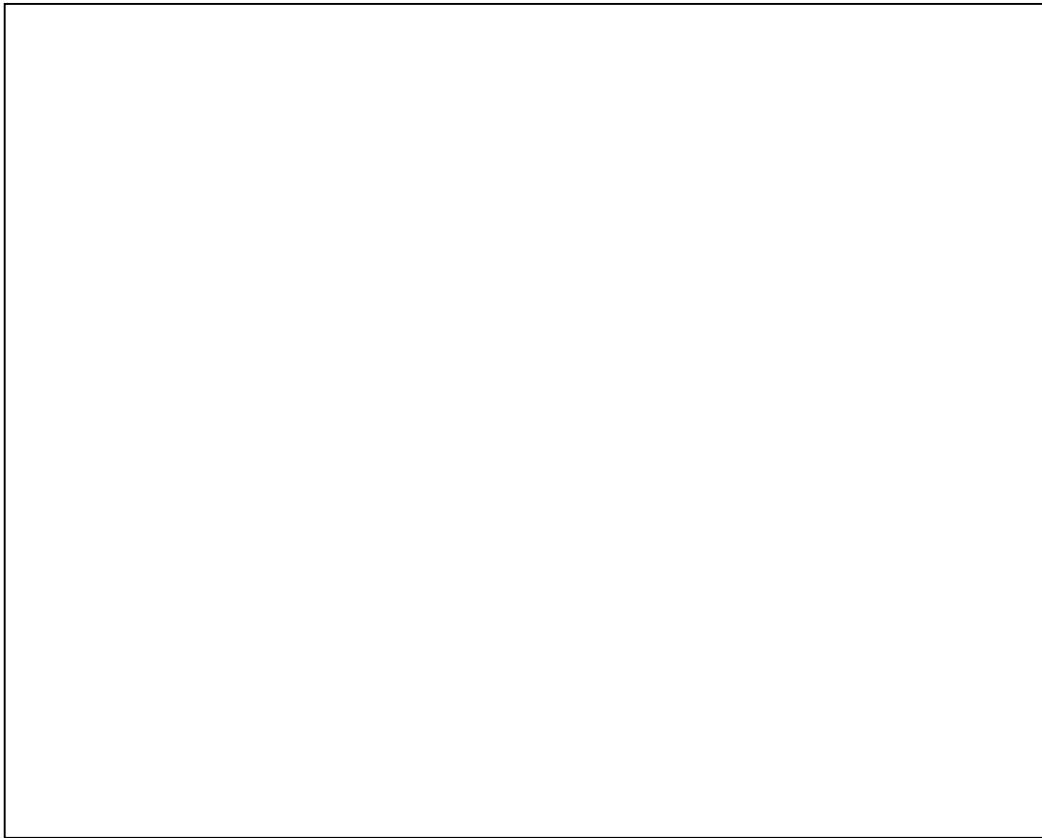
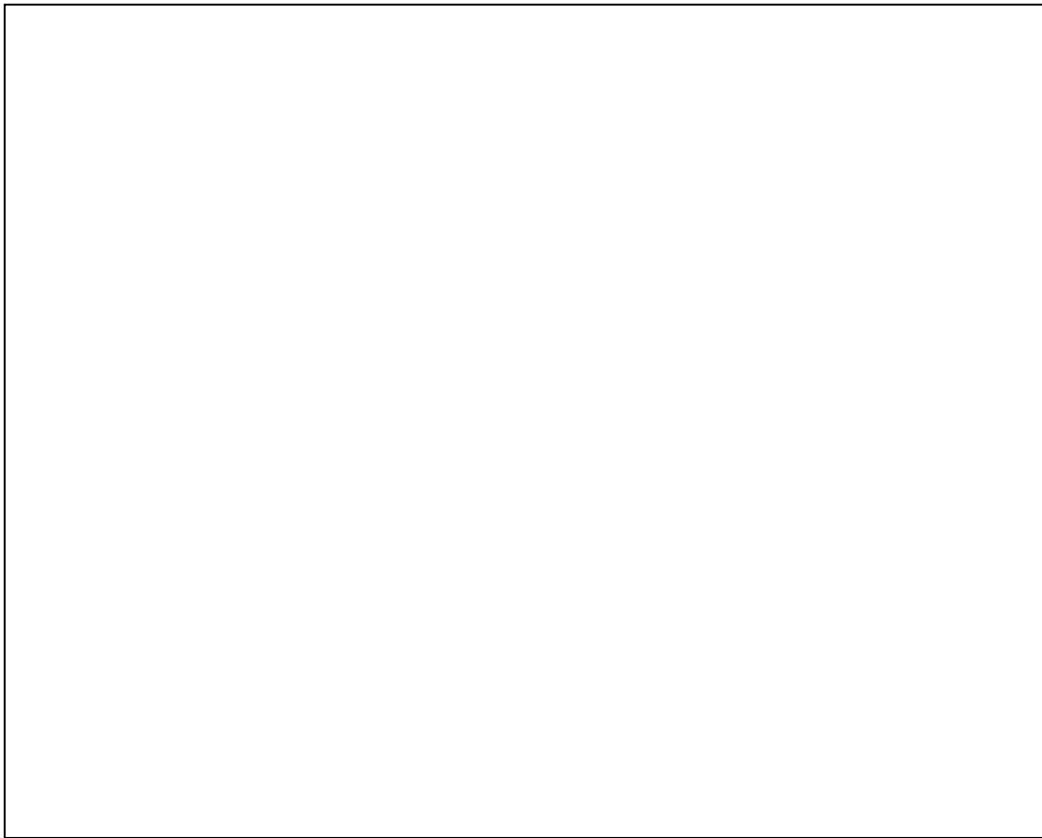


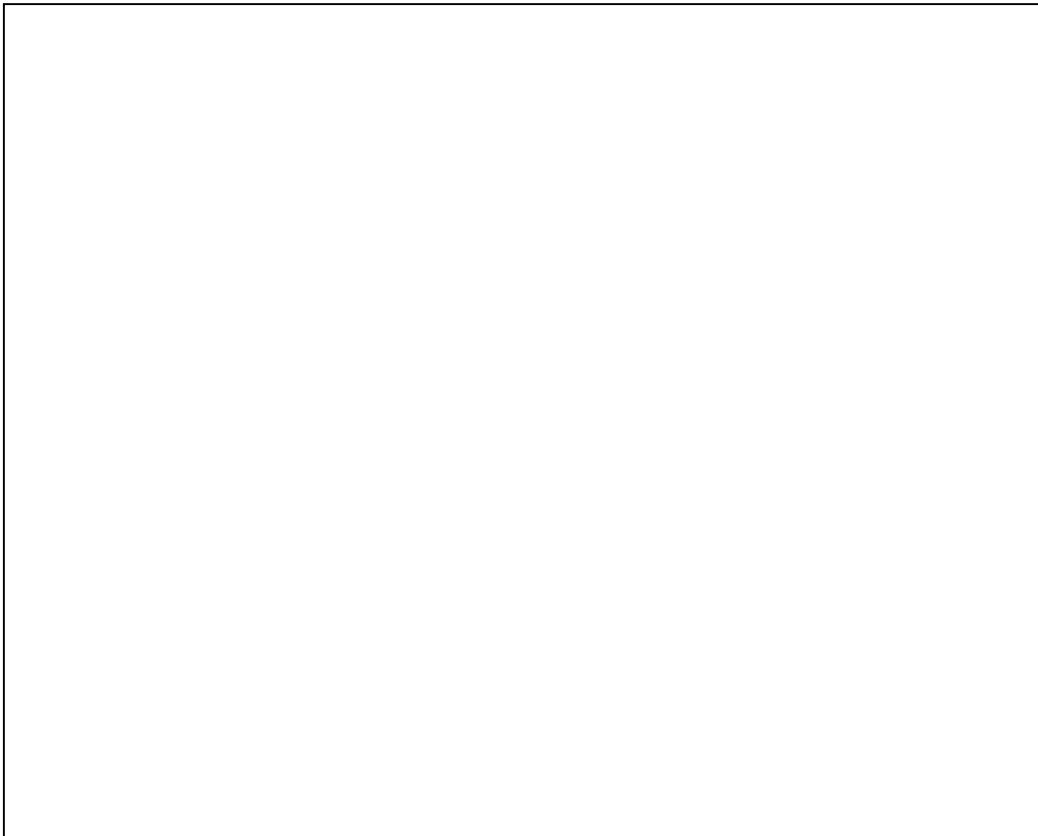




2.1.7 OUTPUT DESIGN (REPORT DESIGN)







2.1.8 ALGORITHMS AND FLOWCHARTS

ALOGORITHMS:

LOGIN FORM:

Ask the user to enter username.

Ask the user to enter password.

Give the user two options:

1. Case of cmd_login

If username and password are correct

Then Go to **Splash Form**

Else if username or password is incorrect

Then give message box “Username or Password or both Incorrect”

2. Case of cmd_cancel

Shutdown Window/Exit Program.

Endcase

(Objective 14 will be fulfilled)

SPLASH FORM:

If user clicks on screen

Then Go to Main Form.

Endif

Endcase

MAIN FORM:

A total of six options are available for the user on this form.

Case of cmd_patient

Move to Patients Main Form

Case of cmd_doctor_information

Move to Doctor Information Form

Case of cmd_beds

Move to Ward Information Form

Case of cmd_reports

Move to Reports Form

Case of cmd_logout

Logout and Go to Login Form

Case of cmd_exit

Shutdown window/Exit Program

PATIENTS MAIN FORM:

A total of three options are available for the user on this form.

Case of cmd_patient_information

Move to Patients Personal Information Form

Case of cmd_patient_visit

Move to Patient Visit Form

Case of cmd_patient_treatment

Move to Patient Treatment Main Form

DOCTOR PERSONAL INFORMATION FORM:

A total of 10 options will be available for the user on this form.

Case of cmd_first

 Show First Record

Case of cmd_previous

 Show Previous Record

Case of cmd_next

 Show Next Record

Case of cmd_last

 Show Last Record

Case of cmd_add

 Add a new record to the database

 Ask user to input all required fields

 Give the user two options

Case of cmd_update

 Automatically generate doctor id from given fields.

 Save the added record

Case of cmd_cancel

 Do not save the added record

End Case

Case of cmd_delete

 Display a confirmation box

 Give the user two options

Case of cmd_yes

Delete the current record

Case of cmd_no

Do not delete the current record

End Case

Case of cmd_edit

Allow the user to edit the current record

Give the user two options

Case of cmd_update

Save the edited record

Case of cmd_cancel

Do not save the edited record

End Case

Case of cmd_search_by_id

A DBcombo is used to search for the required ID.

Case of cmd_search_by_name

A DBcombo is used to search for the required name.

Case of cmd_main_form

Go to the Main Form

REPORTS FORM:

A total of 3 options will be available for the user on this form.

Case of cmd_doctor_contact_information_report

Generate Doctor Contact Information Report

Case of cmd_patient_visit_information_report

Generate report of Patients who had visited.

Case of cmd_ward_report

Generate a ward information report.

Case of cmd_performance_report

Generate a general performance report showing time taken to examine an individual.

Case of cmd_CMO_checkup_report

Generate a report showing patients checked by different CMOs.

Case of cmd_tests_reports_form

Move to tests reports form.

(Objective 18-22 will be fulfilled)

TESTS REPORTS FORM:

Multiple reports can be generated for each individual test showing how many patients had that test performed and what was the result.

(Objective 23 will be fulfilled)

WARD INFORMATION FORM:

Case of cmd_edit

Edit information relating only to total beds available.

(Objective 8 will be fulfilled)

PATIENT VISIT FORM:

A total of 10 options will be available for the user on this form.

Case of cmd_first

Show First Record

Case of cmd_previous

Show Previous Record

Case of cmd_next

Show Next Record

Case of cmd_last

Show Last Record

Case of cmd_add

Add a new record to the database

Ask user to input all required fields

Automatically generate patient visit ID **(Objective 12 will be fulfilled)**

Give the user two options

Case of cmd_update

Save the added record

Case of cmd_cancel

Do not save the added record

End Case

Case of cmd_delete

Display a confirmation box

Give the user two options

Case of cmd_yes

Delete the current record

Case of cmd_no

Do not delete the current record

End Case

Case of cmd_edit

Allow the user to edit the current record

Give the user two options

Case of cmd_update

Save the edited record

Case of cmd_cancel

Do not save the edited record

End Case

Case of cmd_search_by_visit_id

A DBcombo is used to search for the required ID.

Case of cmd_main_form

Move to the Main Form

Case of cmd_back

Move back to previous Form

PATIENT PERSONAL INFORMATION:

A total of 11 options will be available for the user on this form.

Case of cmd_first

 Show First Record

Case of cmd_previous

 Show Previous Record

Case of cmd_next

 Show Next Record

Case of cmd_last

 Show Last Record

Case of cmd_add

 Add a new record to the database

 Ask user to input all required fields

 Automatically generate patient id. (**Objective 12 will be fulfilled**)

 Give the user two options

 Case of cmd_update

 Save the added record

 Case of cmd_cancel

 Do not save the added record

 End Case

Case of cmd_delete

 Display a confirmation box

Give the user two options

Case of cmd_yes

Delete the current record

Case of cmd_no

Do not delete the current record

End Case

Case of cmd_edit

Allow the user to edit the current record

Give the user two options

Case of cmd_update

Save the edited record

Case of cmd_cancel

Do not save the edited record

End Case

Case of cmd_search_by_patient_id

A DBcombo is used to search for the required ID.

Case of cmd_search_by_name

A DBcombo is used to search for the required name.

Case of cmd_main_form

Move to the Main Form

Case of cmd_back

Move back to previous Form.

PATIENT TREATMENT MAIN FORM:

A total of seven options are available for the user on this form.

Case of cmd_cmo

Move to CMO Form

Case of cmd_senior_medical_officer

Move to Senior Medical Officer Form

Case of cmd_patient_tests

Move to Patients Pathology/Radiology Tests Form

Case of cmd_ward_admissions

Move to Patient Ward Admission Form

Case of cmd_discharging_patients

Move to Discharging Patients Form

Case of cmd_back

Move back to Previous

Case of cmd_main_form

Move to Main Form

CMO FORM:

A total of 11 options will be available for the user on this form.

Case of cmd_first

 Show First Record

Case of cmd_previous

 Show Previous Record

Case of cmd_next

 Show Next Record

Case of cmd_last

 Show Last Record

Case of cmd_add

 Add a new record to the database

 Ask user to input all required fields

 Give the user two options

 Case of cmd_update

 Save the added record

 Case of cmd_cancel

 Do not save the added record

 End Case

Case of cmd_delete

 Display a confirmation box

 Give the user two options

 Case of cmd_yes

 Delete the current record

Case of cmd_no

Do not delete the current record

End Case

Case of cmd_edit

Allow the user to edit the current record

Give the user two options

Case of cmd_update

Save the edited record

Case of cmd_cancel

Do not save the edited record

End Case

Case of cmd_search_by_patient_id

A DBcombo is used to search for the required ID.

Case of cmd_medical_history

Show the current patients complete medical history with the CMO.

Case of cmd_main_form

Move to the Main Form

Case of cmd_back

Move back to previous Form.

Case of cmd_medical_history

Show Patients past medical history. (**Objective 10 will be fulfilled**)

SENIOR MEDICAL OFFICER FORM:

A total of 11 options will be available for the user on this form.

Case of cmd_first

 Show First Record

Case of cmd_previous

 Show Previous Record

Case of cmd_next

 Show Next Record

Case of cmd_last

 Show Last Record

Case of cmd_add

 Add a new record to the database

 Ask user to input all required fields

 Give the user two options

 Case of cmd_update

 Save the added record

 Case of cmd_cancel

 Do not save the added record

 End Case

Case of cmd_delete

 Display a confirmation box

 Give the user two options

 Case of cmd_yes

 Delete the current record

Case of cmd_no

Do not delete the current record

End Case

Case of cmd_edit

Allow the user to edit the current record

Give the user two options

Case of cmd_update

Save the edited record

Case of cmd_cancel

Do not save the edited record

End Case

Case of cmd_search_by_patient_id

A DBcombo is used to search for the required ID.

Case of cmd_medical_history

Show the current patients complete medical history with the Senior Medical Officer.

Case of cmd_main_form

Move to the Main Form

Case of cmd_back

Move back to previous Form.

Case of cmd_medical_history

Show Patients past medical history. (**Objective 10 will be fulfilled**)

PATIENT TESTS:

A total of 11 options will be available for the user on this form.

Case of cmd_first

 Show First Record

Case of cmd_previous

 Show Previous Record

Case of cmd_next

 Show Next Record

Case of cmd_last

 Show Last Record

Case of cmd_add

 Add a new record to the database

 Ask user to input all required fields

 Give the user two options

 Case of cmd_update

 Save the added record

 Case of cmd_cancel

 Do not save the added record

 End Case

Case of cmd_delete

 Display a confirmation box

 Give the user two options

 Case of cmd_yes

 Delete the current record

Case of cmd_no

Do not delete the current record

End Case

Case of cmd_edit

Allow the user to edit the current record

Give the user two options

Case of cmd_update

Save the edited record

Case of cmd_cancel

Do not save the edited record

End Case

Case of cmd_search_by_patient_id

A DBcombo is used to search for the required ID.

Case of cmd_medical_history

Show the current patients complete medical history tests history.

Case of cmd_main_form

Go to the Main Form

Case of cmd_back

Go back to Previous Form.

Case of cmd_medical_history

Show Patients past medical history. (**Objective 10 will be fulfilled**)

WARD ADMISSIONS FORM:

A total of 10 options will be available for the user on this form.

Case of cmd_first

 Show First Record

Case of cmd_previous

 Show Previous Record

Case of cmd_next

 Show Next Record

Case of cmd_last

 Show Last Record

Case of cmd_add

 Add a new record to the database

 Ask user to input all required fields

 Give the user two options

 Case of cmd_update

 If beds are available in ward then

 Automatically cause an increment in the beds_occupied field in the wards information form linked with the backend.**(Objective 9 will be fulfilled)**

 Save the added record

 Case of cmd_cancel

 Do not save the added record

 End Case

Case of cmd_delete

 Display a confirmation box

Give the user two options

Case of cmd_yes

Delete the current record

Case of cmd_no

Do not delete the current record

End Case

Case of cmd_edit

Allow the user to edit the current record

Give the user two options

Case of cmd_update

Save the edited record

Case of cmd_cancel

Do not save the edited record

End Case

Case of cmd_search_by_patient_id

A DBcombo is used to search for the required ID.

Case of cmd_medical_history

Show the current patients complete medical history with the CMO.

Case of cmd_main_form

Move to the Main Form

Case of cmd_back

Move back to previous Form.

DISCHARGING FROM WARDS FORM:

A total of 10 options will be available for the user on this form.

Case of cmd_first

 Show First Record

Case of cmd_previous

 Show Previous Record

Case of cmd_next

 Show Next Record

Case of cmd_last

 Show Last Record

Case of cmd_add

 Add a new record to the database

 Ask user to input all required fields

 Give the user two options

 Case of cmd_update

 Automatically cause a decrement in the beds_occupied field in the wards information form linked with the backend. (**Objective 9 will be fulfilled**)

 Save the added record

 Case of cmd_cancel

 Do not save the added record

 End Case

 Case of cmd_delete

 Display a confirmation box

 Give the user two options

Case of cmd_yes

Delete the current record

Case of cmd_no

Do not delete the current record

End Case

Case of cmd_edit

Allow the user to edit the current record

Give the user two options

Case of cmd_update

Save the edited record

Case of cmd_cancel

Do not save the edited record

End Case

Case of cmd_search_by_patient_id

A DBcombo is used to search for the required ID.

Case of cmd_medical_history

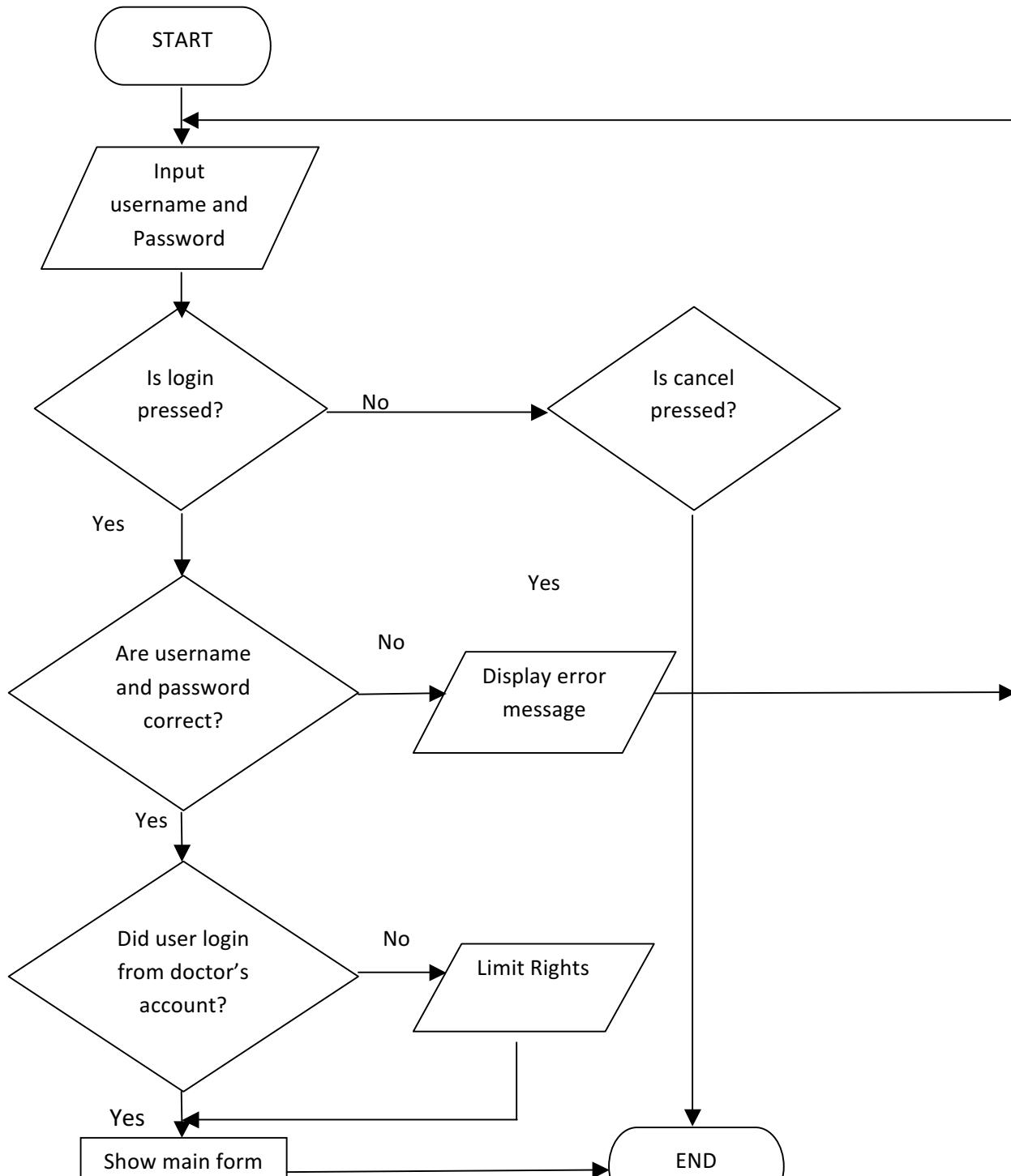
Show the current patients complete medical history with the CMO.

Case of cmd_main_form

Move to the Main Form

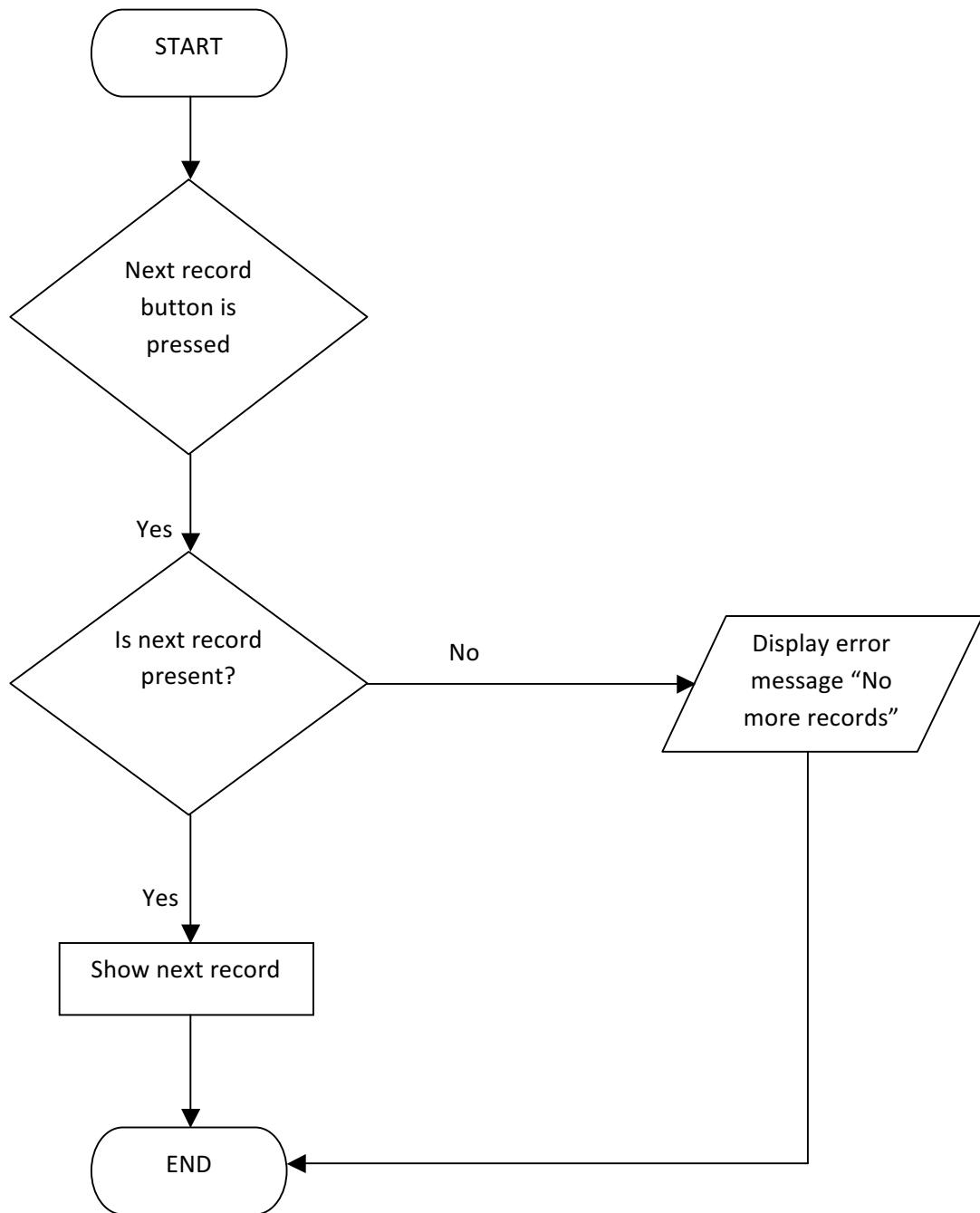
Case of cmd_back

Move back to previous Form.

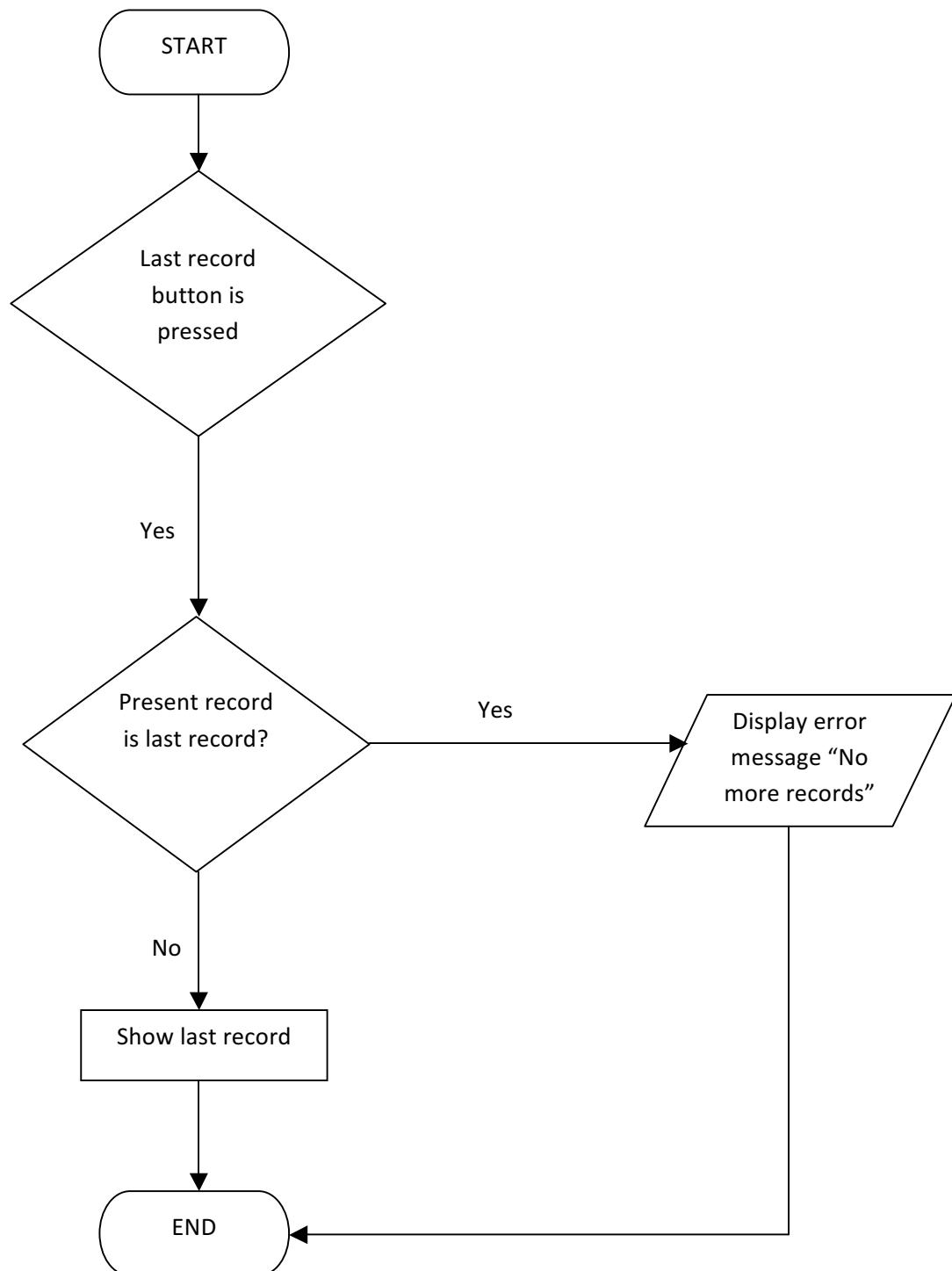
FLOWCHARTS:**Flowchart for login**

(Objective 14 will be fulfilled)

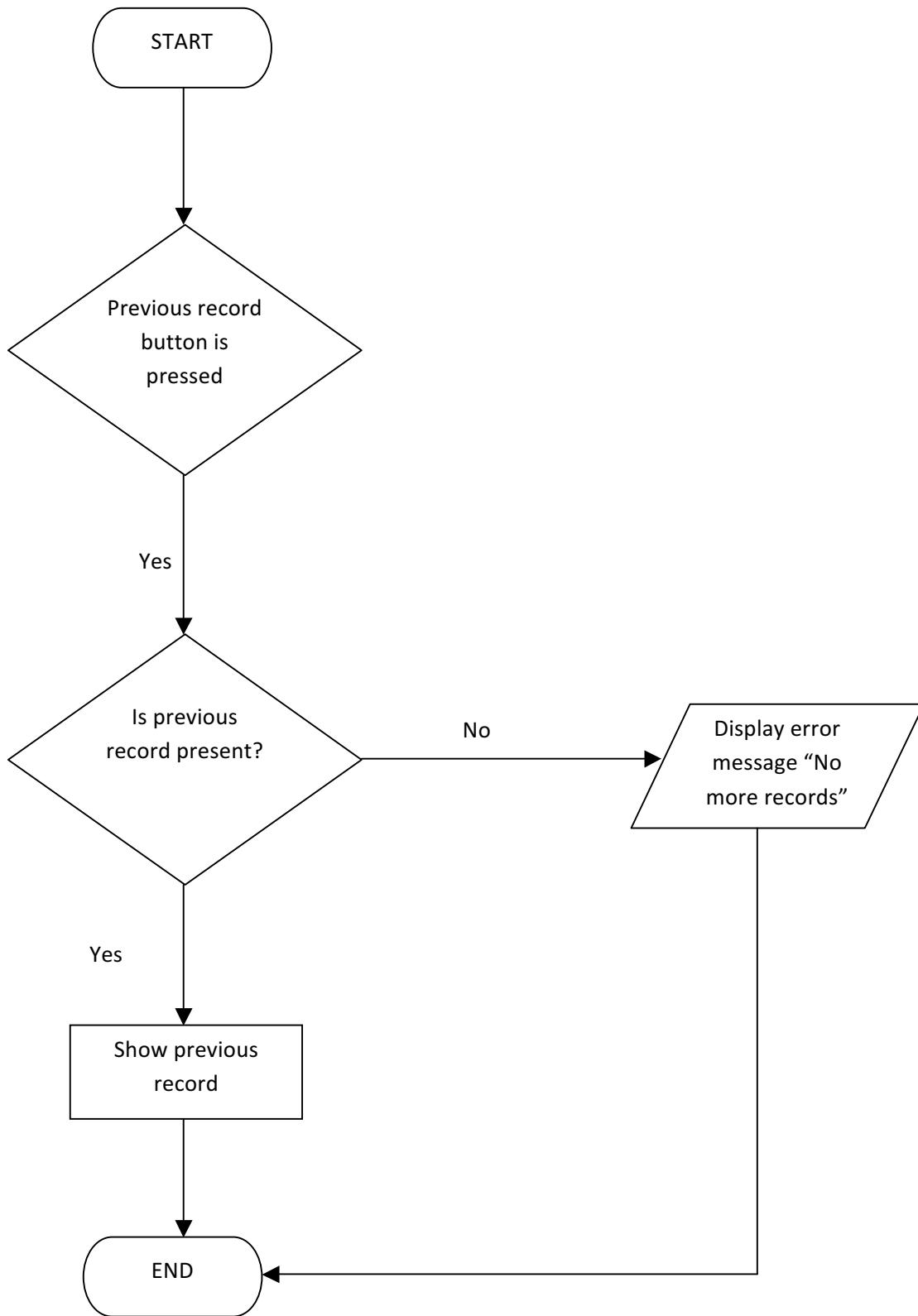
Flowchart for next record



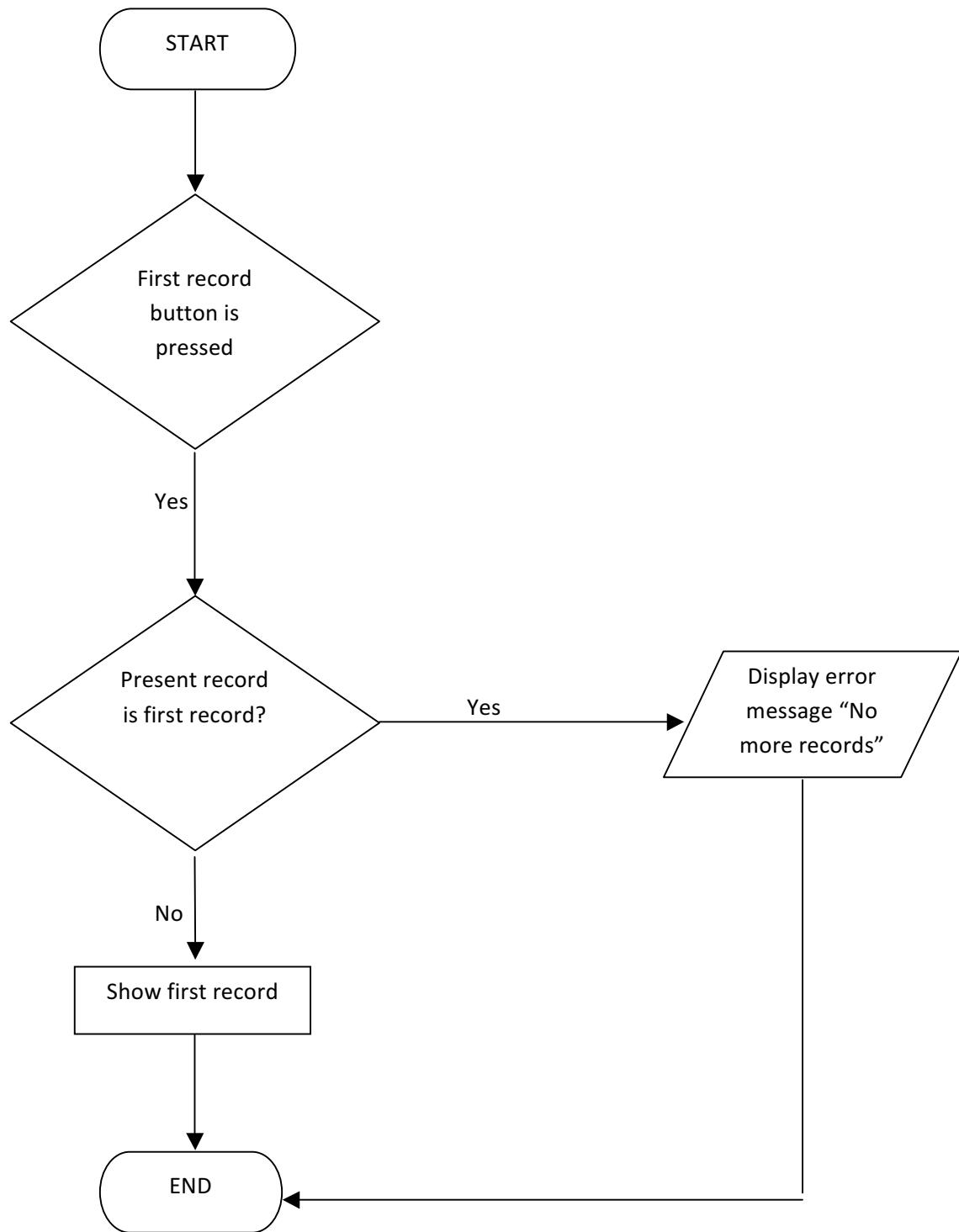
Flow chart for last record



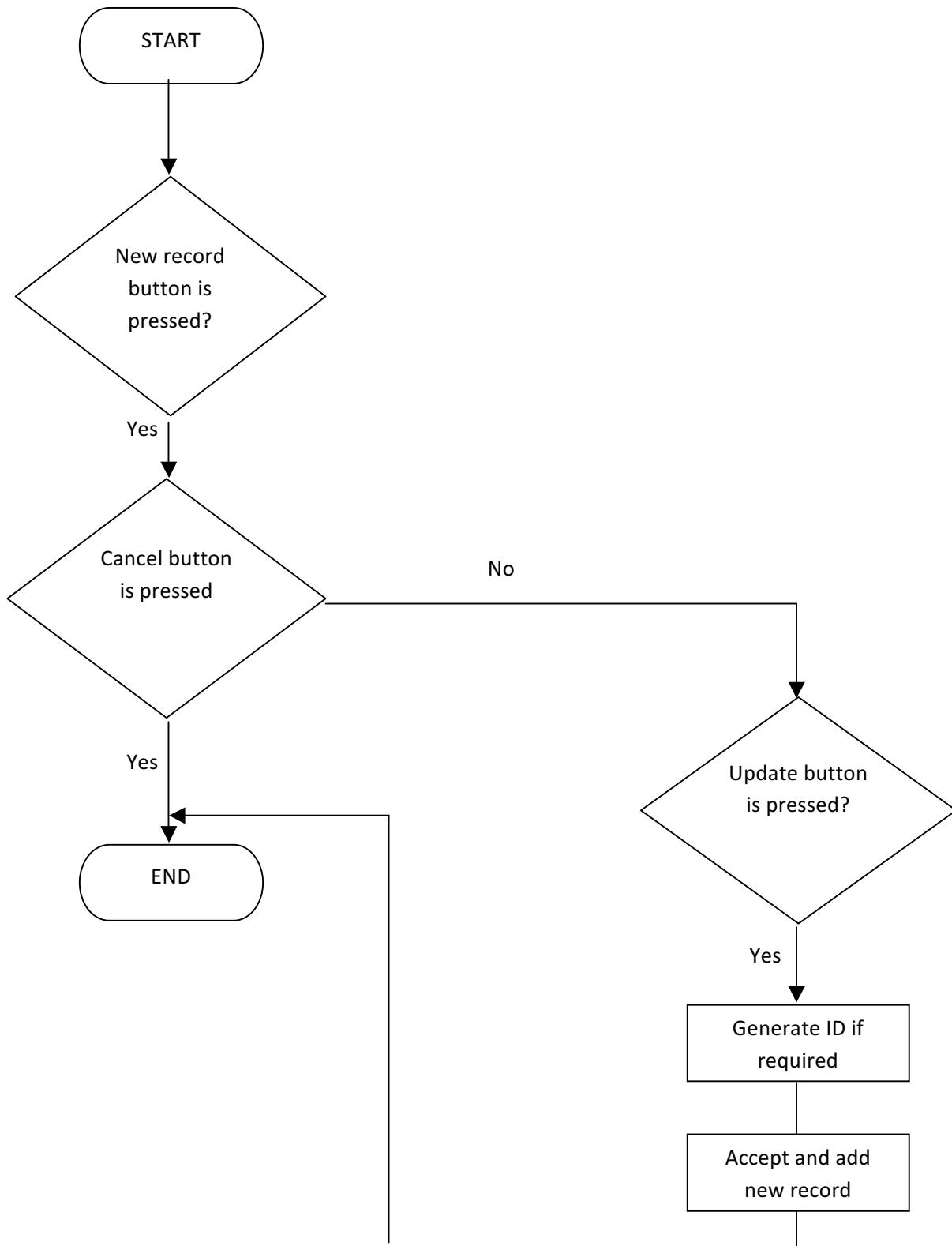
Flowchart for previous record:



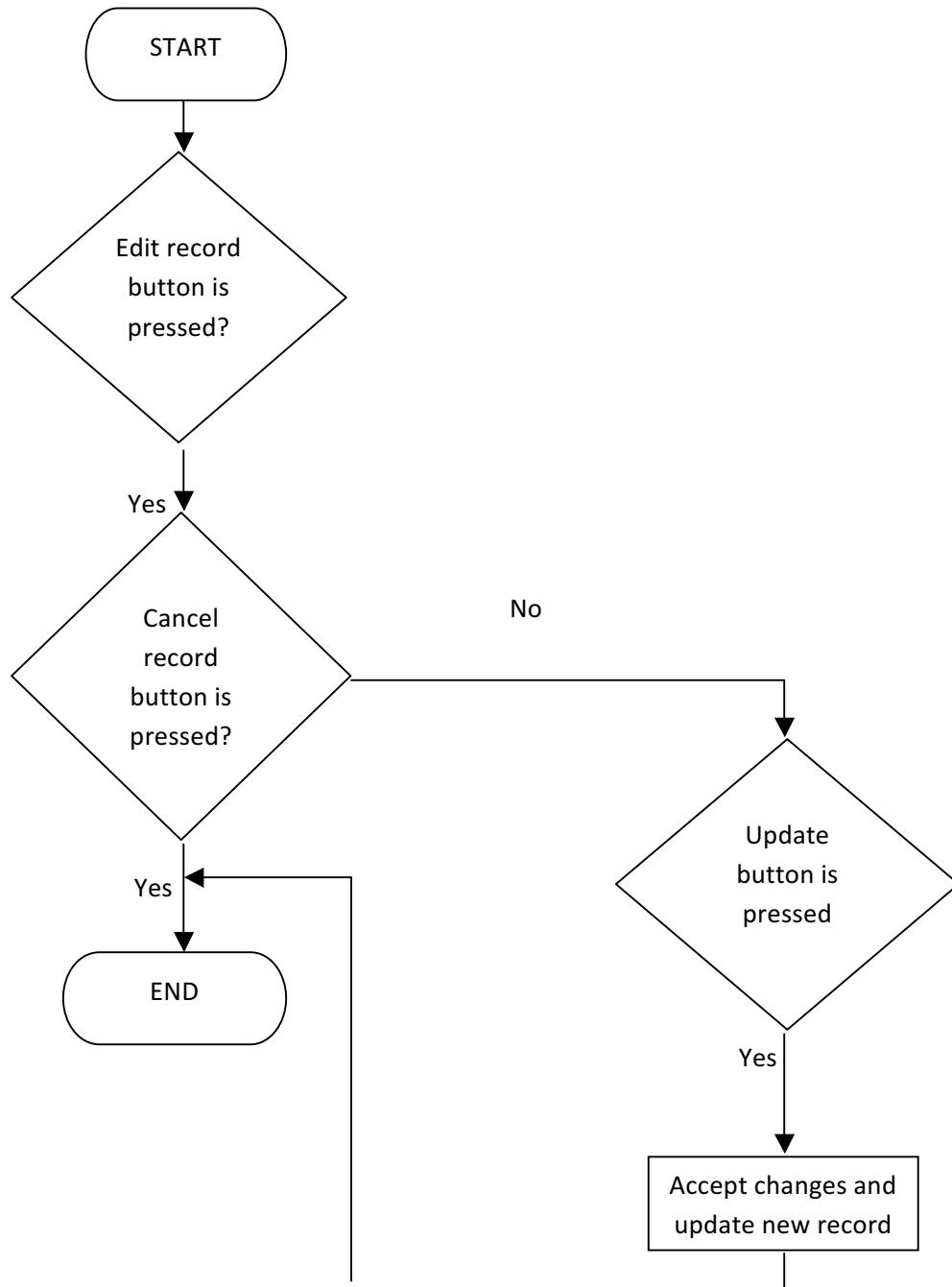
Flowchart for first button:



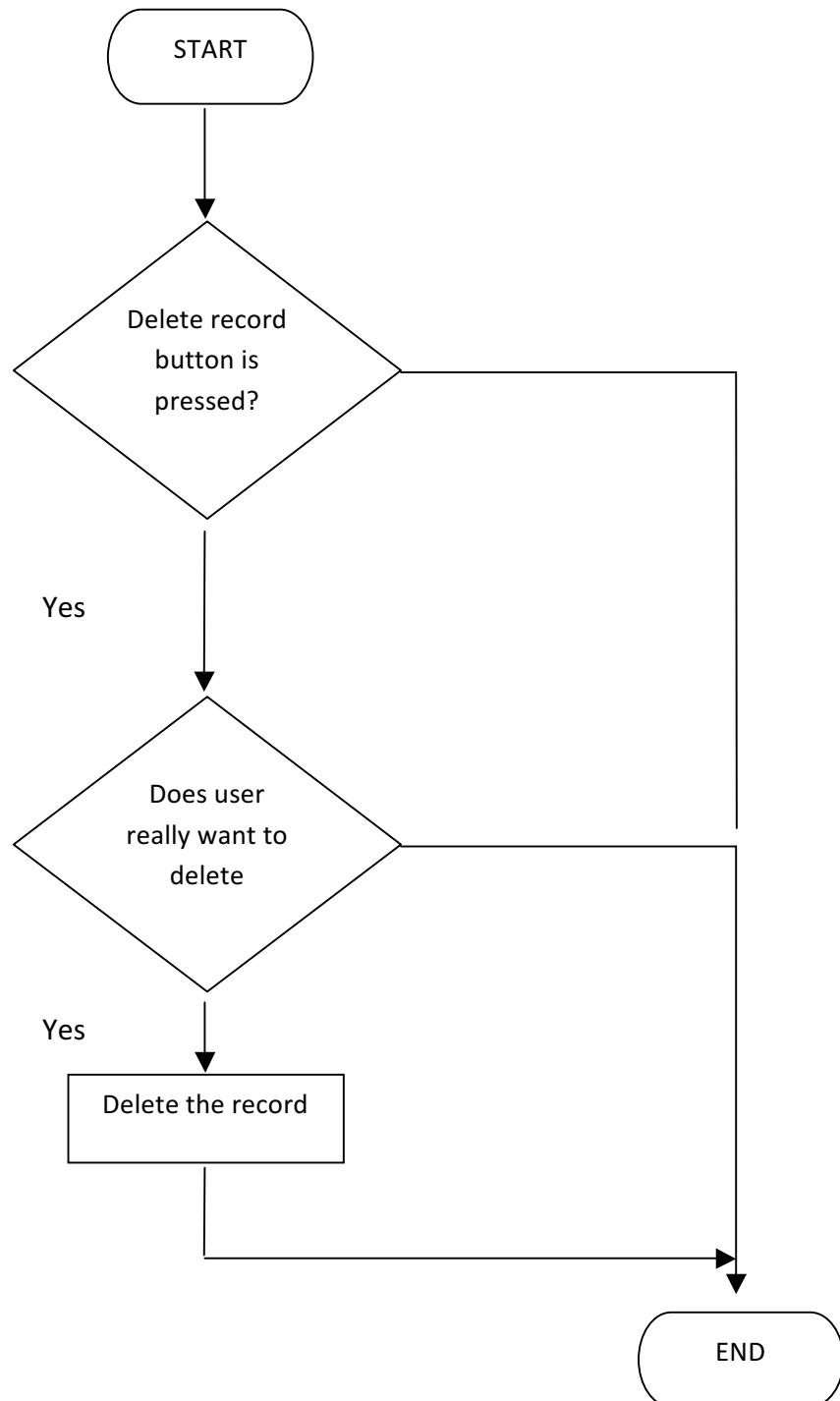
Flowchart for adding new record



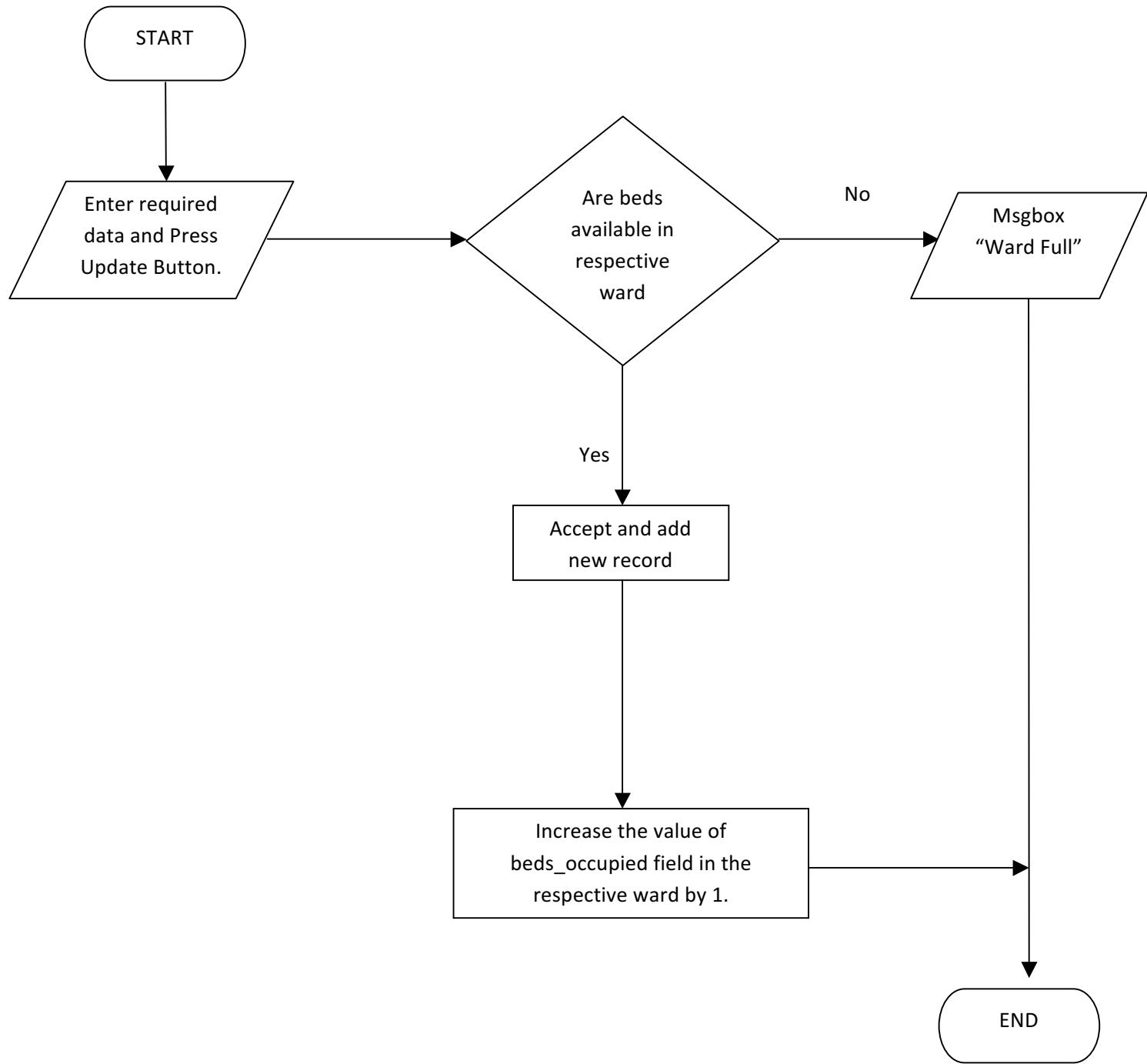
Flowchart for editing records:



Flowchart for deleting records:

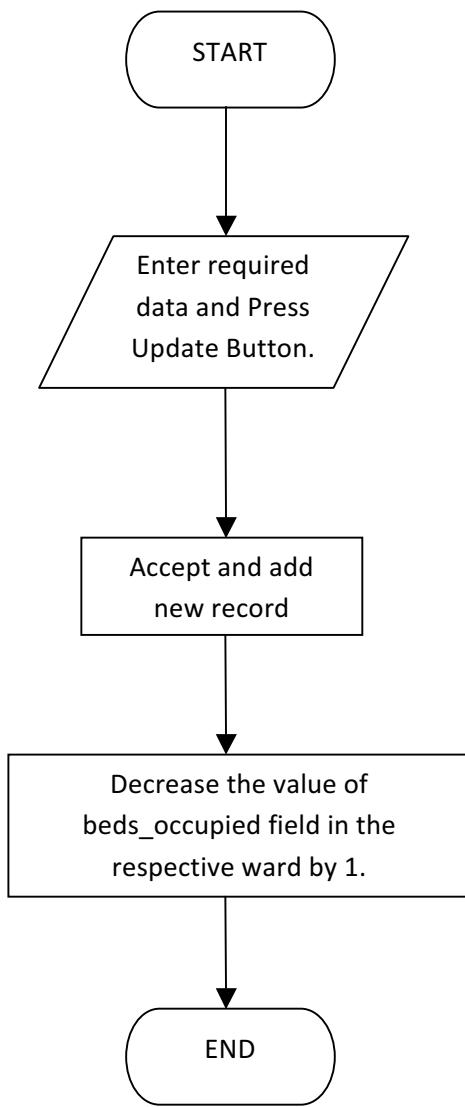


Flowchart for update in Patient Ward Admission Form:



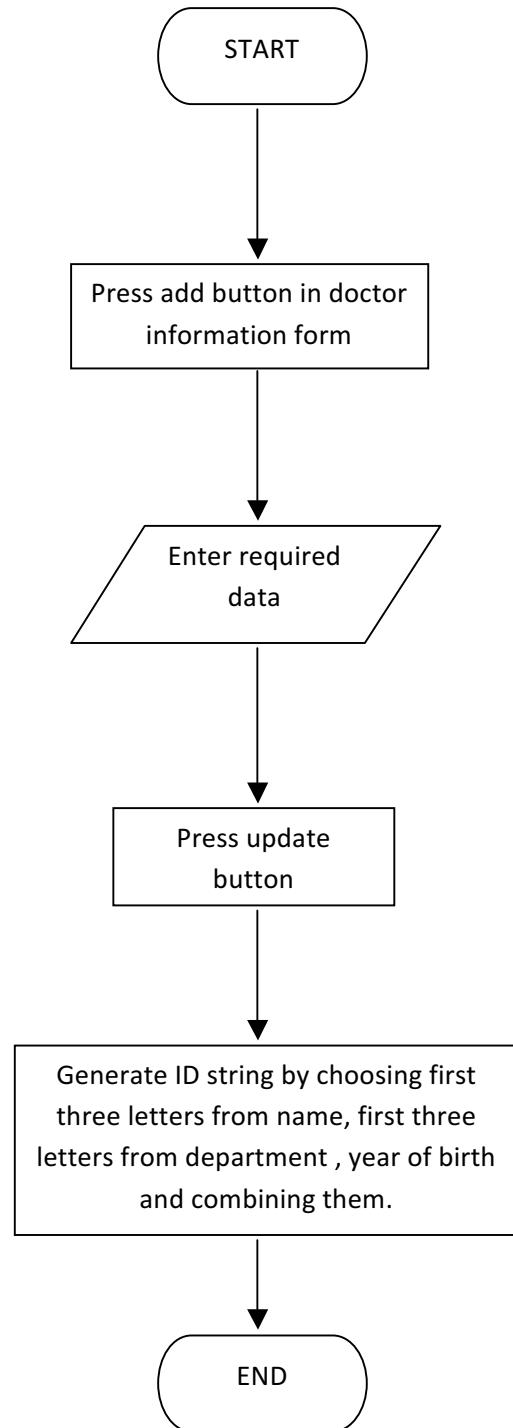
(Objective 9 will be fulfilled)

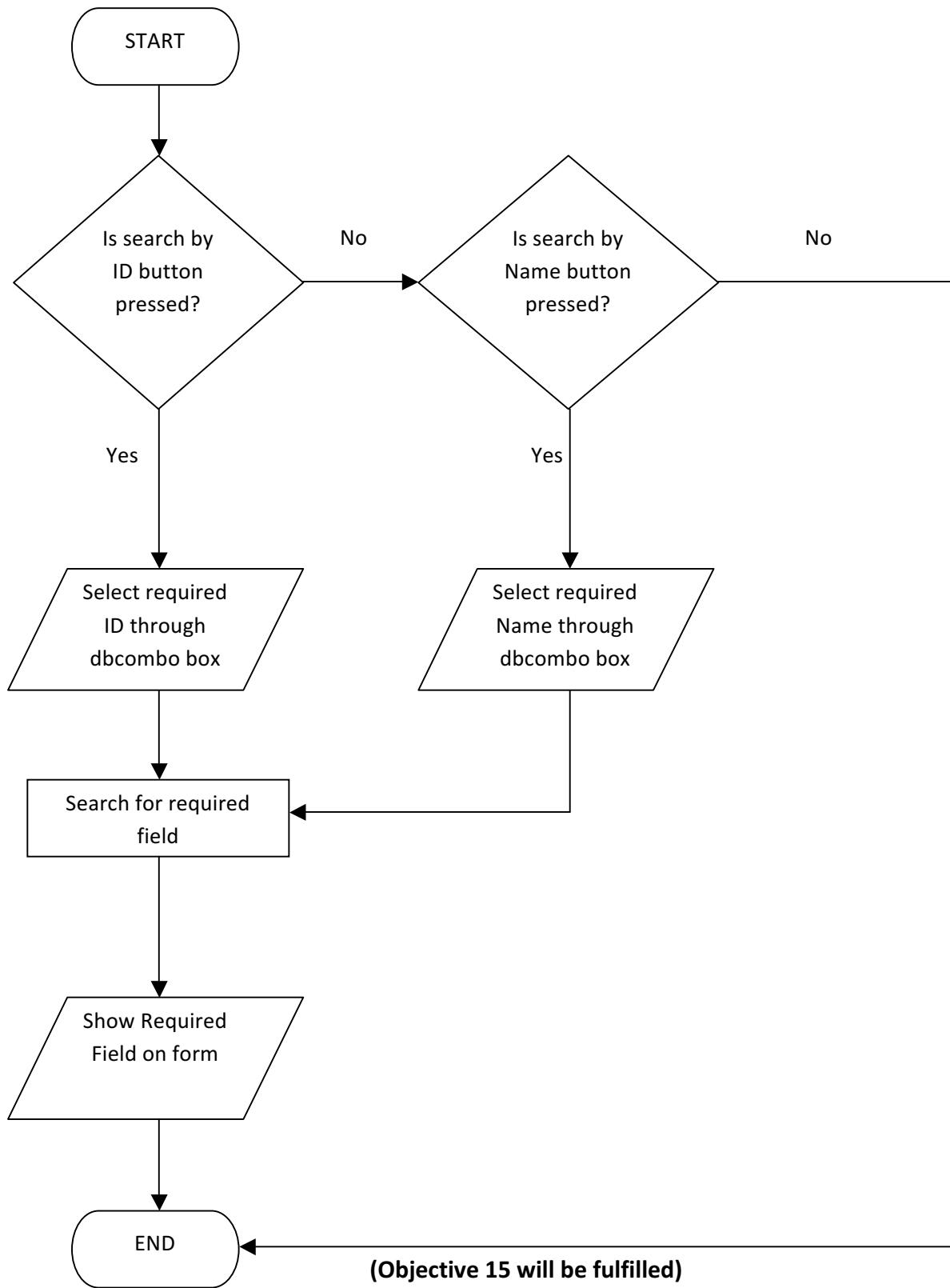
Flowchart for update in Patient Discharging Form:



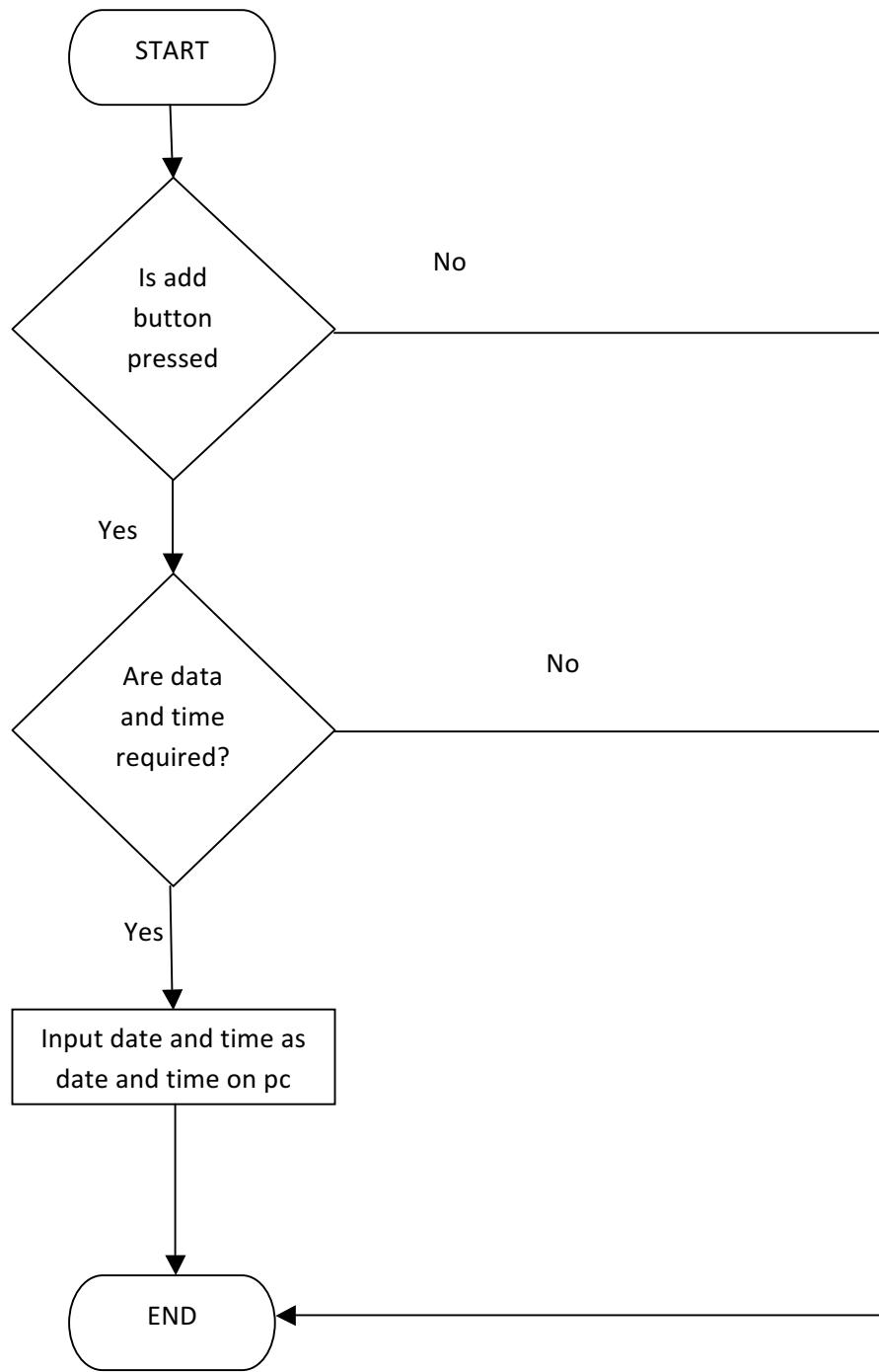
(Objective 9 will be fulfilled)

Flowchart for Generation of Doctor ID

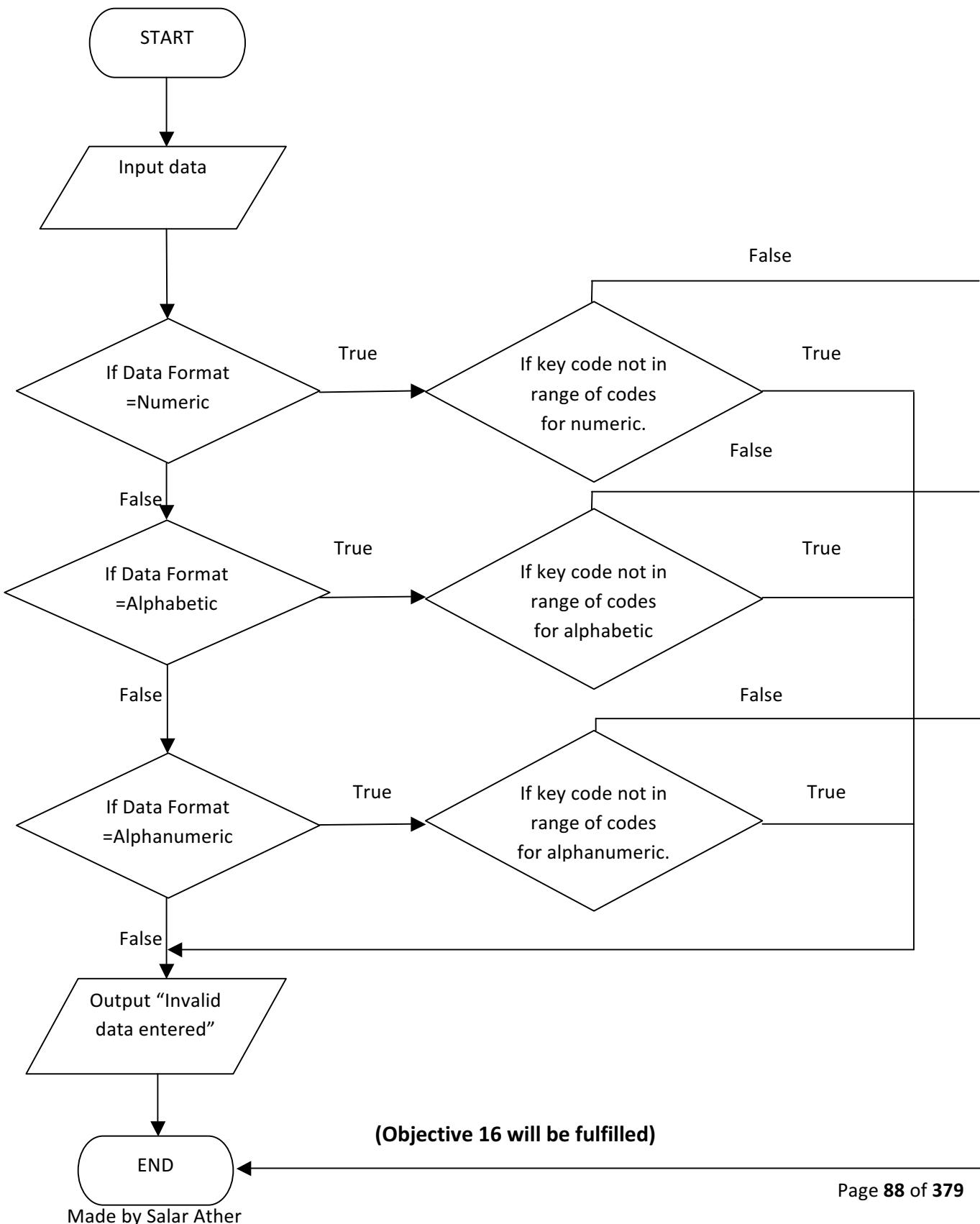


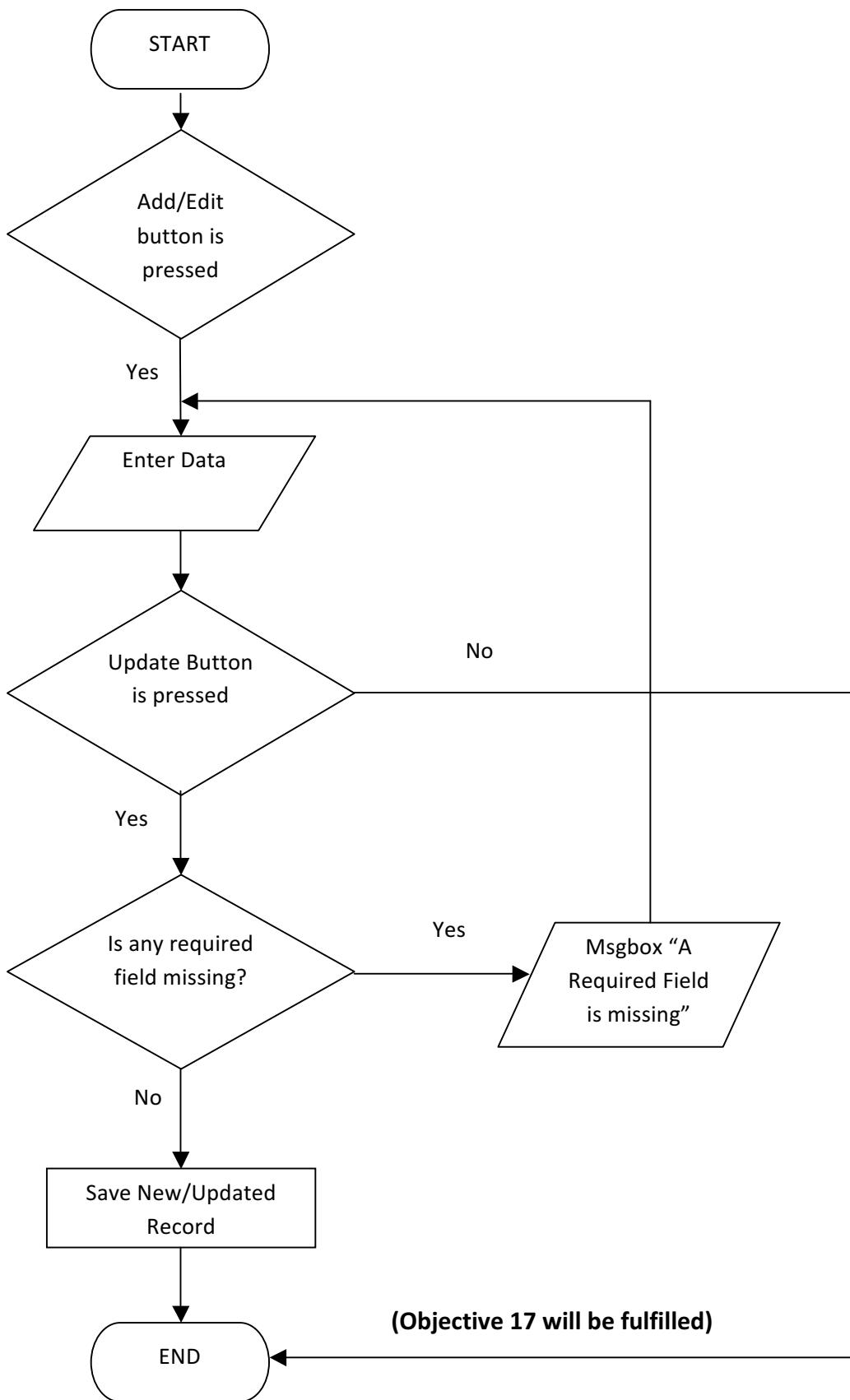
Flowchart for Searching

Flowchart for auto entry of date/time:

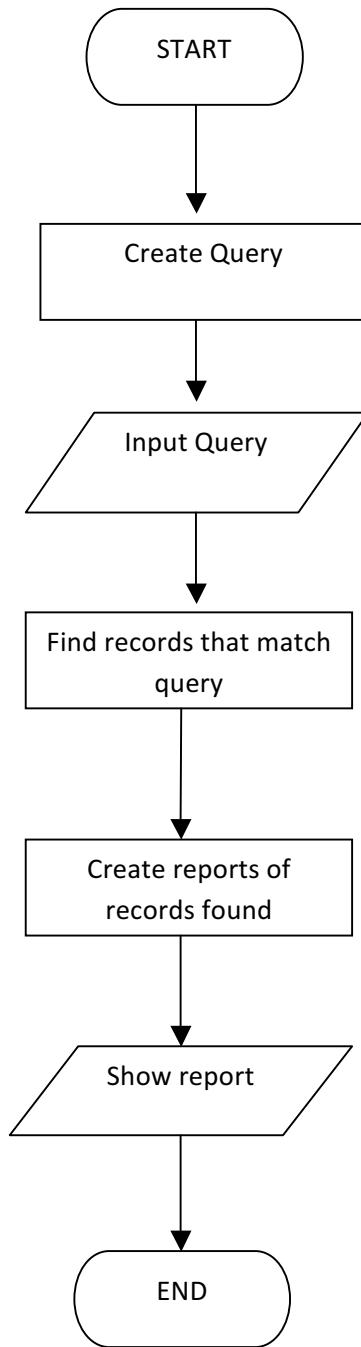


(Objective 11 will be fulfilled)

2.3.5 VALIDATION FLOWCHARTS:**Validating Data Type**

Validation for denying empty required field:

Flowchart for generation of reports through queries



(Objective 22 will be fulfilled)

2.1.9 TEST PLAN

My Test Strategy includes the following test data sets:

- **Normal Test Data with known outcomes to see if software is working properly**
- **Extreme test data to check validation rules like range checks and some other program codes.**
- **Abnormal test data which should produce error messages.**

THE TESTING STRATEGY IS ON THE NEXT PAGE

| Test No. | Testing Area | BEFORE TESTING | | AFTER TESTING | | Forms that will contain The Tested Area |
|----------|--|---|--|--|------------|--|
| | | Test Data | Expected Results | Actual Outcome | Proof Page | |
| 1. | User Login And Password (Objective 14 will be partially fulfilled) | Correct Password and Username entered Incorrect Password and/or username entered | Should open the Main Form Should display a message alerting about wrong password/username | Main form is displayed Error message is displayed | | Login Form |
| 2. | User Rights (Objective 14 will be fulfilled) | Logs in through doctors account Logs in through receptionists account | The user should have full rights The user should have view only rights in all Patient Treatment Sub Forms | The user has full rights. The user has limited rights. | | Login, CMO, Senior Medical Officer, Patient Tests, Ward Admissions, Ward Discharging, Patient Tests, Patient Visit Forms |
| 3. | Exiting the program | Goes to the Main Form and presses the Exit Button | A confirmation box should appear with 2 options Yes/No. If user presses Yes then program should exit If user presses No program shouldn't exit | Confirmation box appears Exits the program Does not exit the program | | Main Form |

| | | | | | | |
|----|--|--|---|---|--|--|
| 4. | Navigation Buttons (Objective 18 will be fulfilled) | First button pressed Next button pressed Last button pressed Previous button pressed | First record should be displayed Next record should be displayed Last record should be displayed Previous record should be displayed | First record is displayed Next record is displayed Last record is displayed Previous record is displayed | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |
| 5. | Adding a new record (Objectives 2-6 will be fulfilled) | Pressing add button in the patient information form and then pressing update after entering required fields. | A blank record should be displayed and after entering data and pressing update button the record should be saved in the database | A blank record is displayed which is saved after entering the required fields and pressing update button. | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |
| 6. | Updating an existing record | Pressing edit button in the patient information form and then pressing update after changing data in fields | The record should be updated and saved in the database | The record is updated | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |

| | | | | | | |
|----|---|---|---|--|--|---|
| 7. | Updating and showing the ward status (Objective 8 will be fulfilled) | Pressing edit button in the ward information form and then pressing update | Only the total beds in medicine/surgery fields should be enabled to edit and after change and pressing update the | Only the total beds in medicine/surgery field textboxes are enabled and after pressing update the ward status is changed | | Ward Information Form |
| 8. | Using the Cancel button | Pressing Cancel after pressing the Add or Update button in the Patient Information Form. | We should return to the previous/same record without any alteration. | No alterations were made | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions, Ward Information Form Forms. |
| 9. | Using the Search through Name button (Objective 15 will be fulfilled) | Pressing the Search by name button after selecting the name through dbcombo box in the Patient Information Form | The field with the required name should be displayed | The field with the required name is displayed | | Patient Information Form, Doctor Information Form. |

| | | | | | | |
|-----|---|---|---|--|--|--|
| 10. | Using the Search through ID button (Objective 15 will be fulfilled) | Pressing the Search by ID button after selecting the ID through dbcombo box in the Patient Information Form | The field with the required ID should be displayed | The field with the required ID is displayed | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |
| 11. | Using the Delete Button. | Pressing the Delete button to delete a record in the Patient Information Form. | A confirmation box should appear If user presses Yes then record should be deleted If user presses No then record should not be deleted | A confirmation box appears. When user presses Yes the record is deleted When user presses No the record is not deleted | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |
| 12. | Enabling of Cancel and Update Button when Add or Edit Button is pressed (Objective 7 will be fulfilled) | Pressing the Add or Edit button in the Patient Information Form. | The Cancel and Update button should be enabled | The Cancel and Update buttons are enabled. | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |

| | | | | | | |
|-----|---|---|---|---|--|--|
| 13. | Disabling of Cancel and Update Button when Cancel or Update Button is pressed (Objective 7 will be fulfilled) | Pressing the Cancel or Update button in the Patient Information Form. | The Cancel and Update button should be disabled | The Cancel and Update button are disabled | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |
| 14. | The Disabling of the Previous and First Button when the current record is the first record. (Objective 7 will be fulfilled) | Go to patient Information Form and navigate to first record | The First and the Previous Buttons should be Disabled | The First and Previous Buttons are disabled | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |
| 15. | The Disabling of the Next and Last Button when the current record is the Last record. (Objective 7 will be fulfilled) | Go to patient Information Form and navigate to last record | The First and the Previous Buttons should be Disabled | The First and Previous Buttons are disabled | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |

| | | | | | | |
|-----|---|---|---|---|--|---|
| 16. | Automatic Increase in Beds occupied in the respective ward in which patient is admitted (Objective 9 will be fulfilled) | Go to Ward Admission Form and Add a new record | The number of beds occupied in the respective ward should automatically increase by 1 | The number of beds occupied in the respective ward automatically increase by 1 | | Ward Information Form |
| 17. | Automatic Decrease in Beds occupied in the respective ward from which patient is discharged. (Objective 9 will be fulfilled) | Go to Discharging Patients Form and Add a new record | The number of beds occupied in the respective ward should automatically decrease by 1 | The number of beds occupied in the respective ward automatically decrease by 1 | | Discharging Patients Form |
| 18. | Checking validation checks. In this case, entering only numbers or hyphens in numeric fields (like Contact Number) (Objective 16 will be fulfilled) | Go to patient information and enter only numbers and hyphens in the contact number field Go to patient information and enter data other than numbers and hyphens in the contact number field | The program should accept the data The program should not accept the data and alert user through a message box | The program accepts the data The program does not accept the data and alerts user. | | Patient Information Form and Doctor Information Form. |

| | | | | | |
|-----|--|--|--|--|---|
| 19. | <p>Checking validation checks. In this case, only alphabets and spaces are allowed (Like in Patient Name field)</p> <p>(Objective 16 will be fulfilled)</p> | <p>Go to patient information and enter only alphabets in the name field</p> <p>Go to patient information and enter data other than alphabets in the name field</p> | <p>The program should accept the data</p> <p>The program should not accept the data and alert user through a message box</p> | <p>The program accepts the data</p> <p>The program does not accept the data and alerts user.</p> | |
| 20. | <p>Checking validation checks. In this case, only numbers are allowed (Like in Patient ID field)</p> <p>(Objective 16 will be fulfilled)</p> | <p>Go to CMO Form and enter only numeric data in patient ID field</p> <p>Go to CMO Form and enter data other than numeric in patient ID field</p> | <p>The program should accept the data</p> <p>The program should not accept the data and alert user through a message box</p> | <p>The program accepts the data</p> <p>The program does not accept the data and alerts user.</p> | <p>CMO, Senior Medical Officer, Patient Tests, Ward Admissions, Discharging Patient Forms</p> |

| | | | | | | |
|-----|--|--|--|--|--|--|
| 21 | <p>Checking Length (Range) Checks In contact number fields (Objective 17 will be partially fulfilled)</p> | <p>Go to Doctor Information record and enter data within the limit</p> <p>Go to Doctor Information record and enter data at its limit i.e. 12 characters</p> <p>Go to Doctor Information record and enter data outside the limit</p> | <p>The program should accept the data</p> <p>The program should accept the data</p> <p>The program should not accept the data and alert user through a message box</p> | <p>The program accepts the data</p> <p>The program accepts the data</p> <p>The program does not accept the data and alerts user.</p> | | <p>Patient Information Form and Doctor Information Form.</p> |
| 22. | <p>Checking Presence Checks (Objective 17 will be fully fulfilled)</p> | <p>Go to Doctor Information record and enter data in all required fields</p> <p>Go to Doctor Information record and do not enter data in all required fields</p> | <p>The program should accept the data</p> <p>The program should not accept the data and alert user through a message box</p> | <p>The program accepts the data</p> <p>The program does not accept the data and alerts user.</p> | | <p>Doctor Information, Patient Information Forms.</p> |
| 23. | <p>Automatic Generation of Patient ID (Objective 12 will be fulfilled)</p> | <p>Go to Patient Information Form and press Add button</p> | <p>A Unique Numeric ID should be generated</p> | <p>A Unique ID is generated</p> | | <p>Patient Information Form</p> |

| | | | | | | |
|-----|--|---|---|--|--|--|
| 24. | Automatic Generation of Patient Visit ID (Objective 12 will be fulfilled) | Go to Patient Visit Form and press Add button | A Unique Numeric ID should be generated | A Unique ID is generated | | Patient Visit Form |
| 25. | Automatic Generation of Doctor ID (Objective 24 will be fulfilled) | Go to Doctor Information Form, press Add button and then Update Button after entering all required fields | An ID for the doctor should automatically be generated | An ID for the Doctor is automatically generated | | Doctor Information Form |
| 26. | Automatic Entry of Date and Time on pressing Add button (Objective 11 will be fulfilled) | Go to Patient Visit Form and press Add button | The Date and Time should be automatically input. | The Date and Time are automatically input | | Patient Visit, CMO, Senior Medical Officer, Patient tests, Ward Admissions, Discharging Patients Forms |
| 27. | Viewing Patient Medical History (Objective 10 will be fulfilled) | Go to CMO form and press Patient Medical History button | The Patient's Medical History should be available to view | The Patient's Medical History is available to view | | CMO, Senior Medical Officer, Patient tests Forms |

| | | | | | | |
|-----|--|--|--|--|--|---------------------|
| | | | | | | |
| 28. | Acceptance of Patient Admission (Objective 13 will be fulfilled) | Go to Ward Admission Form and add a new record when there are beds available Go to Ward Admission Form and add a new record when there is only 1 bed available Go to Ward Admission Form and add a new record when there are no beds available | The program should accept the admission The program should accept the admission The program should not accept the admission and notify the user of the unavailability of beds in the ward. | The program accepts the admission The program accepts the admission The program does not accept the admission and notifies user with a message box | | Ward Admission Form |
| 29. | Generation of Visiting Patient Report (Objective 19 will be fulfilled) | Go to Reports Form and then press Visiting Patients Report button. | The Report should be generated | The Report is generated | | Reports Form |
| 30. | Generation of CMO Checkup Report (Objective 22 will be fulfilled) | Go to Reports Form and then press CMO Checkup Report button. | The Report should be generated | The Report is generated | | Reports Form |
| 31. | Generation of Doctor Contact Information Report (Objective 20 will be fulfilled) | Go to Reports Form and then press Doctor Contact Information Report button. | The Report should be generated | The Report is generated | | Reports Form |

| | | | | | | |
|-----|---|---|--------------------------------|-------------------------|--|--------------------|
| 32. | Generation of Ward Status Report (Objective 21 will be fulfilled) | Go to Reports Form and then press Ward Status Report button. | The Report should be generated | The Report is generated | | Reports Form |
| 33. | Generation of Performance Report (Objective 22 will be fulfilled) | Go to Reports Form and then press Performance Report button. | The Report should be generated | The Report is generated | | Reports Form |
| 34. | Generation of Individual Tests Reports (Objective 23 will be fulfilled) | Go to Reports Form and then press Tests Report button. Select the test from the new form. | The Report should be generated | The Report is generated | | Tests Reports Form |

2.2 INTENDED BENEFITS OF THE SYSTEM

The chosen system is a completely computerized and customized one; it was chosen because it gives the following benefits to the organization.

- All requirements of the organization will be met because the software is being specifically developed for the problem at hand.
- Record adding, manipulation and deletion is also very easy and information could be stored in a more organized manner.
- Searching is much faster than before and so patients will have to wait less amount of time.
- A unique ID for each patient will ensure that the patient doesn't have to wait long the next time he comes in.
- Security will be guaranteed as passwords and user rights will be assigned which will allow only the intended person to view/edit patient records.
- Reports will be generated everyday which will improve performance as there will always be a status of how good the performance is going.
- The medical history that will be linked to each person's unique patient ID will allow
- Validation checks will make sure that data is entered correctly and so reduce human typing errors.
- The increased speed and efficiency will mean that critical patients will need to wait for shorter periods of time which I believe is the biggest intended benefit as less waiting time for the patients is all that matters while they are in critical condition.

2.3 LIMITATIONS OF THE SCOPE OF THE SYSTEM

2.3.1 GENERAL LIMITATIONS:

- An initial investment has to be made to purchase the required software and hardware
- The system is strict and less flexible compared to the manual system so the employees might not accept this change very happily.
- The system will not have the ability to share information within all the computers of the organization in use of the doctors. This would have been an enormous benefit as it would have reduced time for doctors to look at stuff like patient test results as they would have automatically been sent to the doctor's computer.
- The new system will rely completely on computers and power supply and given the state of power supply in Pakistan there can be a lot of problems if an alternative power source is not used while the power is out.
- Since the system relies completely on computers

2.3.2 FILE SIZE LIMITATIONS:

- ❖ Beds Table: (Record size: 12 bytes)
 - Estimated Records: 1
 - Total Size: 12 bytes
- ❖ Patient Personal Information Table: (Record Size: 138 bytes)
 - Estimated Records: 75 per day (**Only for new patients**)
 - Total Size: 10,350 bytes
- ❖ Doctor Personal Information Table: (Record Size: 124)
 - Estimated Records: 25
 - Total Size: 3,100 bytes
- ❖ Patient Visit Table: (Record Size: 124 bytes)
 - Estimated Records: 150 per day
 - Total Size: 18,600 bytes
- ❖ CMO Table: (Record Size: 65,754 bytes)
 - Estimated Records: 150 per day
 - Total Size: 9,863,100 bytes
- ❖ Senior Medical Officer Table: (Record Size: 65,640 bytes)
 - Estimated Records: 80 per day
 - Total Size: 5,251,200 bytes
- ❖ Patient Tests Table: (Record Size: 64,713 bytes)
 - Estimated Records: 40 per day
 - Total Size: 2,588,520 bytes
- ❖ Ward Admission Table: (Record Size: 65,675 bytes)
 - Estimated Records: 20 per day
 - Total Size: 1,313,500 bytes
- ❖ Ward Discharging Table: (Record Size: 65,591 bytes)
 - Estimated Records: 20 per day
 - Total Size: 1,311,820 bytes

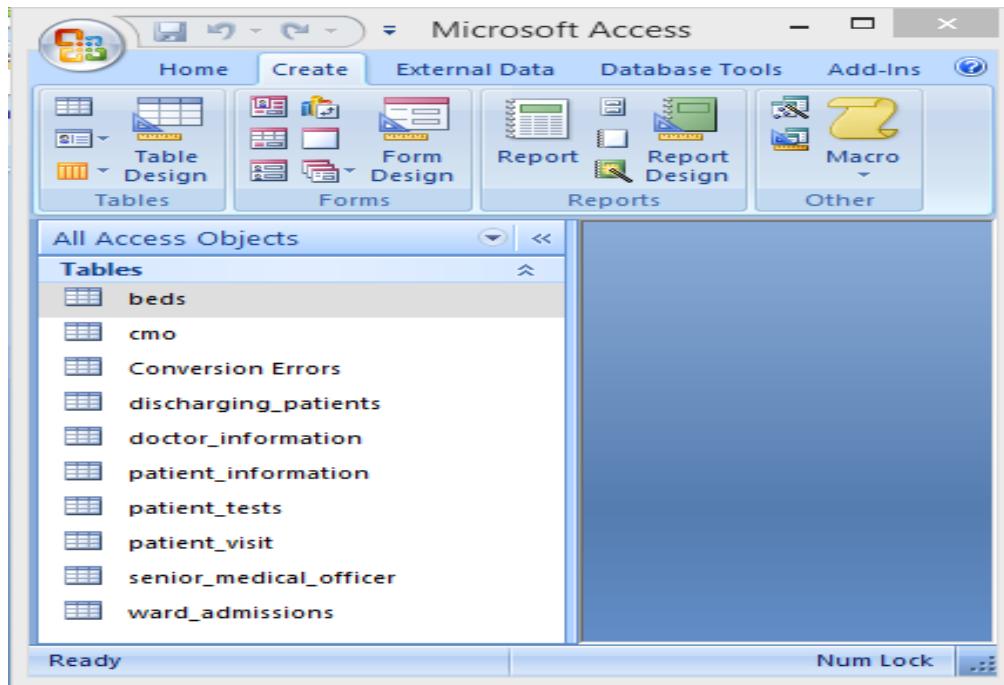
Therefore if we disregard the doctor information and beds table which will take up negligible space we are left with 20,357,090 bytes of data that needs to be stored each day. Multiply that with 365 and we get 7,430,337,850 bytes of data entered each year. This amounts to 7,256,189 kilobytes of data which equals to 7086 megabytes of data which equals to 6.92 gigabytes of data to be stored each year and with the recommended hardware there will be more than enough space to fit in all records.

3 SOFTWARE DEVELOPMENT, PROGRAMMING, TESTING AND INSTALLATION

3.1 SOFTWARE DEVELOPMENT

3.1.1 DEVELOPMENT OF TABLES:

I will develop the backend tables in MS Access. The tables and database will not be created directly from Access but I will use Visual Data Manager which is a built in database manager in Visual Basic. Below is a screenshot of the whole database:



(Objective 1 fulfilled)

The Screenshots of my tables in Design view are below:

THE BEDS TABLE:

The screenshot shows a software interface for managing a database table named "beds". The main window displays the table structure with four columns: "Field Name", "Data Type", and "Description" (which is currently empty). The first row, "beds_occupied_by_medicine", is highlighted in yellow. Below the table is a "Field Properties" section. On the left, there are two tabs: "General" (selected) and "Lookup". The "General" tab contains various configuration options for the field, such as "Field Size" (set to Integer), "Format" (set to Auto), and "Required" (set to No). To the right of the properties is a large text area containing a note about field names: "A field name can be up to 64 characters long, including spaces. Press F1 for help on field names."

| Field Name | Data Type | Description |
|---------------------------|-----------|-------------|
| beds_occupied_by_medicine | Number | |
| beds_occupied_by_surgery | Number | |
| total_beds_in_medicine | Number | |
| total_beds_in_surgery | Number | |

Field Properties

General **Lookup**

| | |
|-----------------|---------|
| Field Size | Integer |
| Format | |
| Decimal Places | Auto |
| Input Mask | |
| Caption | |
| Default Value | |
| Validation Rule | |
| Validation Text | |
| Required | No |
| Indexed | No |
| Smart Tags | |
| Text Align | General |

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

THE CMO TABLE

The screenshot shows the Microsoft Access 'Field Properties' dialog for the 'cmo' table. The main grid displays field names, data types, and descriptions. The 'diagnosis' field is selected and highlighted with an orange border. The 'Field Properties' dialog is open, showing the 'General' tab with various configuration options like 'Format', 'Caption', and 'Required'. A note in the bottom right corner of the properties window states: 'A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.'

| Field Name | Data Type | Description |
|----------------|-----------|-------------|
| patient_id | Number | |
| doctor_id | Text | |
| time_examined | Date/Time | |
| date_examined | Date/Time | |
| blood_pressure | Text | |
| temperature | Text | |
| problem | Text | |
| diagnosis | Memo | |
| process | Text | |

THE DISCHARGING PATIENTS TABLE:

The screenshot shows the Microsoft Access 'Field Properties' dialog for the 'discharging_patients' table. The main grid displays six fields: 'patient_id' (Number), 'visit_id' (Number), 'date_discharged' (Date/Time), 'description' (Memo, currently selected), 'notes_kept' (Text), and 'ward_name' (Text). Below the grid, the 'Field Properties' section is expanded, showing the 'General' tab settings. These include: Format (empty), Caption (empty), Default Value (empty), Validation Rule (empty), Validation Text (empty), Required (No), Allow Zero Length (No), Indexed (No), Unicode Compression (Yes), IME Mode (No Control), IME Sentence Mode (None), Smart Tags (empty), Text Format (Plain Text), and Text Align (General). A note in the properties pane states: 'A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.'

| Field Name | Data Type | Description |
|-----------------|-----------|-------------|
| patient_id | Number | |
| visit_id | Number | |
| date_discharged | Date/Time | |
| description | Memo | |
| notes_kept | Text | |
| ward_name | Text | |

Field Properties

General **Lookup**

Format
Caption
Default Value
Validation Rule
Validation Text
Required No
Allow Zero Length No
Indexed No
Unicode Compression Yes
IME Mode No Control
IME Sentence Mode None
Smart Tags
Text Format Plain Text
Text Align General

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

THE DOCTOR INFORMATION TABLE:

The screenshot shows the 'Field Properties' dialog for the 'doctor_id' field in the 'doctor_information' table. The 'Field Name' column is highlighted in yellow, and the 'Data Type' column shows 'Text'. The 'Description' column is empty. A red circle highlights the 'doctor_id' field name. A red arrow points from the bottom of the dialog down to a callout box.

| Field Name | Data Type | Description |
|----------------|-----------|-------------|
| doctor_id | Text | |
| name | Text | |
| gender | Text | |
| designation | Text | |
| department | Text | |
| contact_number | Text | |
| address | Text | |
| date_of_birth | Date/Time | |

Field Properties

General **Lookup**

| | |
|---------------------|------------|
| Field Size | 15 |
| Format | |
| Input Mask | |
| Caption | |
| Default Value | |
| Validation Rule | |
| Validation Text | |
| Required | No |
| Allow Zero Length | Yes |
| Indexed | No |
| Unicode Compression | Yes |
| IME Mode | No Control |
| IME Sentence Mode | None |
| Smart Tags | |

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

This field is the primary key

THE PATIENT INFORMATION TABLE:

| Field Name | Data Type | Description |
|----------------------------|-----------|-------------|
| patient_id | Number | |
| name | Text | |
| date_of_birth | Date/Time | |
| contact_number | Text | |
| address | Text | |
| diabetic | Text | |
| hypertensive | Text | |
| blood_group | Text | |
| serious_diseases_in_family | Text | |

Field Properties

General Lookup

Field Size: 30
Format:
Input Mask:
Caption:
Default Value:
Validation Rule:
Validation Text:
Required: No
Allow Zero Length: Yes
Indexed: No
Unicode Compression: Yes
IME Mode: No Control
IME Sentence Mode: None
Smart Tags:

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

This field is the primary key

THE PATIENT TESTS TABLE:

| Field Name | Data Type | Description |
|---------------------|-----------|-------------|
| patient_id | Number | |
| referring_doctor_id | Text | |
| date_of_test | Date/Time | |
| time_of_test | Date/Time | |
| xray | Text | |
| creatinine | Text | |
| haemoglobin | Text | |
| serum_calcium | Text | |
| tlc | Text | |
| alt | Text | |

Field Properties

General Lookup

| | |
|---------------------|------------|
| Field Size | 10 |
| Format | |
| Input Mask | |
| Caption | |
| Default Value | |
| Validation Rule | |
| Validation Text | |
| Required | No |
| Allow Zero Length | Yes |
| Indexed | No |
| Unicode Compression | Yes |
| IME Mode | No Control |
| IME Sentence Mode | None |
| Smart Tags | |

The maximum number of characters you can enter in the field. The largest maximum you can set is 255. Press F1 for help on field size.

THE PATIENT VISIT TABLE:

| | Field Name | Data Type | Description |
|---|--------------|-----------|-------------|
| 1 | visit_id | Number | |
| | patient_id | Number | |
| | date_visited | Date/Time | |
| | time_visited | Date/Time | |
| | problem | Text | |

Field Properties

| General | Lookup |
|-------------------|------------|
| Format | |
| Input Mask | |
| Caption | |
| Default Value | |
| Validation Rule | |
| Validation Text | |
| Required | No |
| Indexed | No |
| IME Mode | No Control |
| IME Sentence Mode | None |
| Smart Tags | |
| Text Align | General |
| Show Date Picker | For dates |

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

This field is the primary key

THE SENIOR MEDICAL OFFICER TABLE:

The screenshot shows the Microsoft Access 'Field Properties' dialog for the 'process' field in the 'senior_medical_officer' table. The main table view lists fields: patient_id (Number), doctor_id (Text), date_examined (Date/Time), time_examined (Date/Time), diagnosis (Memo), and process (Text). The 'process' field is selected and highlighted with an orange border. In the 'Field Properties' dialog, the 'General' tab is selected, showing properties like Field Size (75), Required (No), and Allow Zero Length (No). A note in the dialog states: 'A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.'

| Field Name | Data Type | Description |
|---------------|-----------|-------------|
| patient_id | Number | |
| doctor_id | Text | |
| date_examined | Date/Time | |
| time_examined | Date/Time | |
| diagnosis | Memo | |
| process | Text | |

Field Properties

General **Lookup**

| | |
|---------------------|----------|
| Field Size | 75 |
| Format | |
| Input Mask | |
| Caption | |
| Default Value | |
| Validation Rule | |
| Validation Text | |
| Required | No |
| Allow Zero Length | No |
| Indexed | No |
| Unicode Compression | Yes |
| IME Mode | No Contr |
| IME Sentence Mode | None |
| Smart Tags | |

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

THE WARD ADMISSIONS TABLE:

| ward_admissions | | | |
|-----------------|---------------------|-----------|-------------|
| | Field Name | Data Type | Description |
| | patient_id | Number | |
| | referring_doctor_id | Text | |
| | date_admitted | Date/Time | |
| | time_admitted | Date/Time | |
| | problem | Text | |
| | treatment | Memo | |
| | ward_name | Text | |

Field Properties

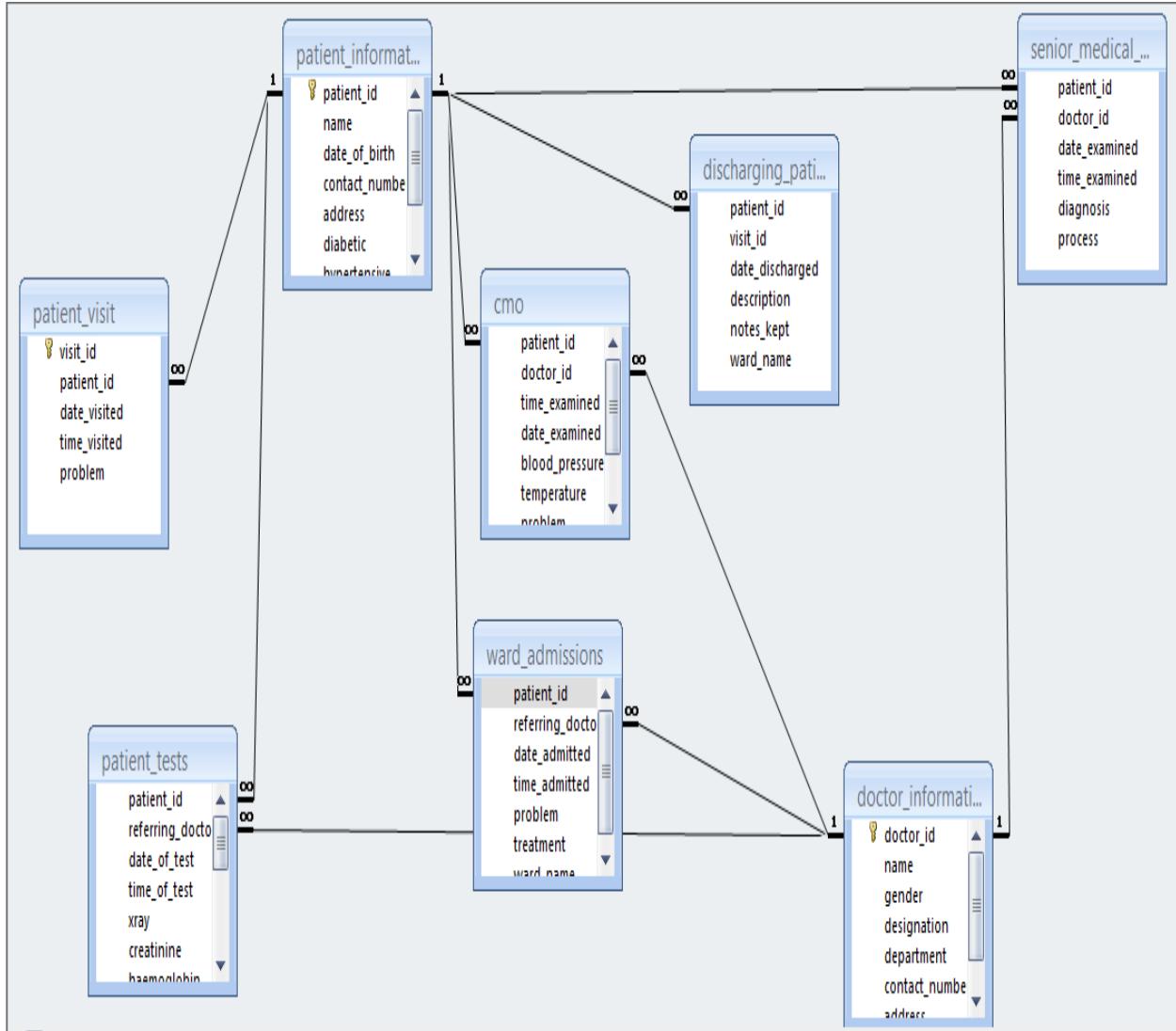
General Lookup

| | |
|---------------------|------------|
| Field Size | 10 |
| Format | |
| Input Mask | |
| Caption | |
| Default Value | |
| Validation Rule | |
| Validation Text | |
| Required | No |
| Allow Zero Length | Yes |
| Indexed | No |
| Unicode Compression | Yes |
| IME Mode | No Control |
| IME Sentence Mode | None |
| Smart Tags | |

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

APPLYNG PRIMARY KEYS AND RELATIONS:

Below is an overview of the relations between the tables. These relations had been created through MS Access



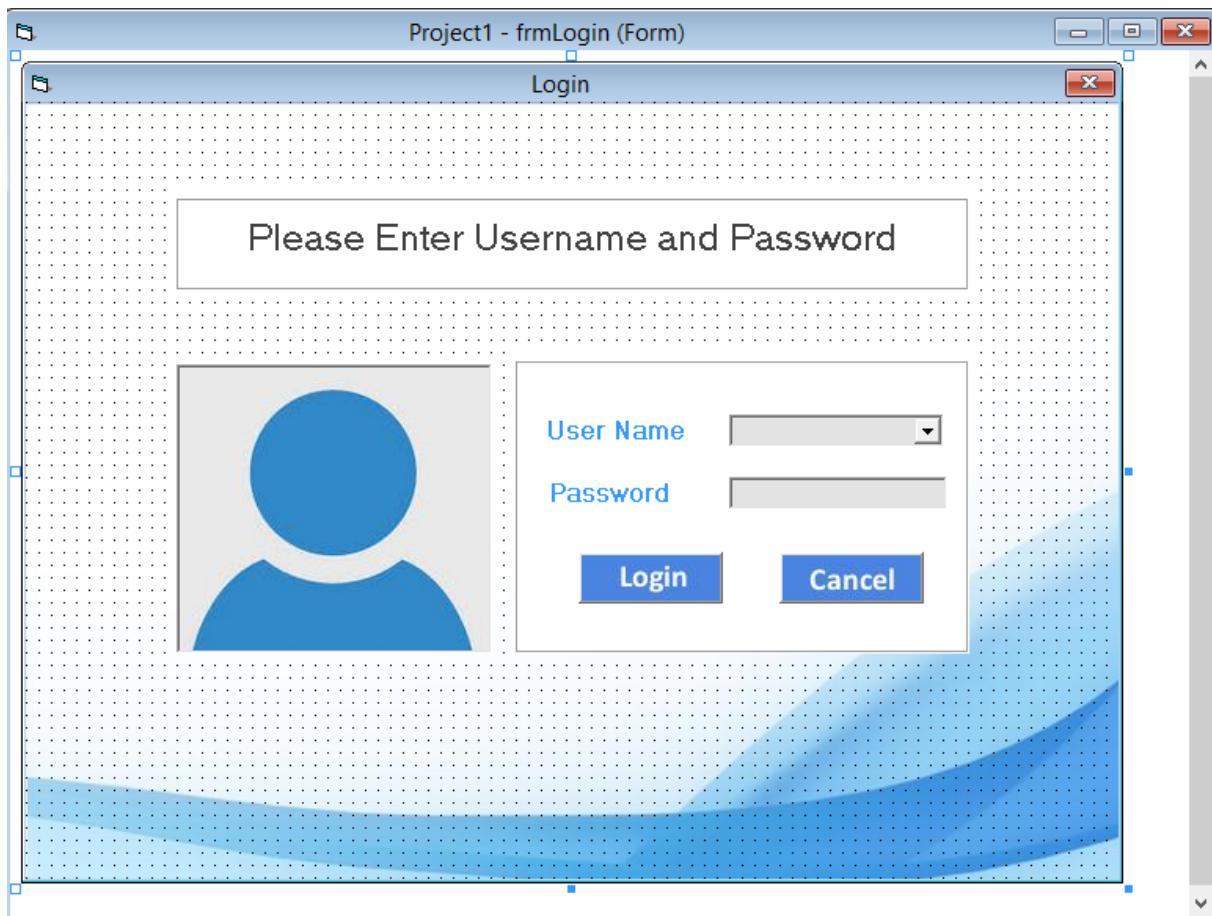
3.1.2 DESIGNING FRONTEND:

The forms:

Screen shots of all my forms are below, these forms show the entire system and I will prove the accuracy of the system by linking the forms to my objectives in Section 1 although they have been linked in the Action Plan in Section 2. **These forms have been designed using Visual Basic 6.0 to provide an easy to use interface (Objective 7 fulfilled).**

The Login Form

The login form used to log into the system. The user is required to enter the username and password. If the user logs in through the doctor's account then he has full access to all forms. If the user logs in through the receptionist's account then he rights are limited and he has see only rights in all forms except the patient information and patient visit forms.



(Objective 14 fulfilled)

Note: The description of what each button does has not been discussed here but has been discussed in Phase 4 Documentation > User Guide. For the description of what each button does refer to that Phase

Main Form:

The user can access the patient main form, the doctor information form, the reports form and the ward information form (availability of beds in wards). The user can also either logout or exit the program through the main form.



Patient Main Form:

The patient main form is used to access the patient visit form, the patient information form, the patient treatment form or go back to the Main form.



Patient Visit Form:

Used to enter the patient information required upon patient visit. The user can go back to the main form or the previous form.

The screenshot shows a Windows application window titled "Project1 - patient_visit (Form)". The main title bar has standard minimize, maximize, and close buttons. Below the title bar is a toolbar with icons for back (left arrow), search (magnifying glass), and home (house). The main content area is titled "Patient Visit". It contains a search section with a "Search by Patient ID" label, a dropdown menu, and a "Search" button. Below this is a "Patient Visit" section with fields for "Visit ID" and "Patient ID", and "Time" and "Date". There is also a "Problem" text input field. At the bottom are navigation buttons: "First", "Previous", "Next", and "Last". To the right of the "Patient Visit" section are five blue rectangular buttons labeled "Add", "Edit", "Delete", "Update", and "Cancel".

(Objective 4 fulfilled)

Patient Information form:

Used to enter detailed patient information when he/she visits for the first time and will be a permanent record of the patient. The patient ID field has been disabled and is generated automatically

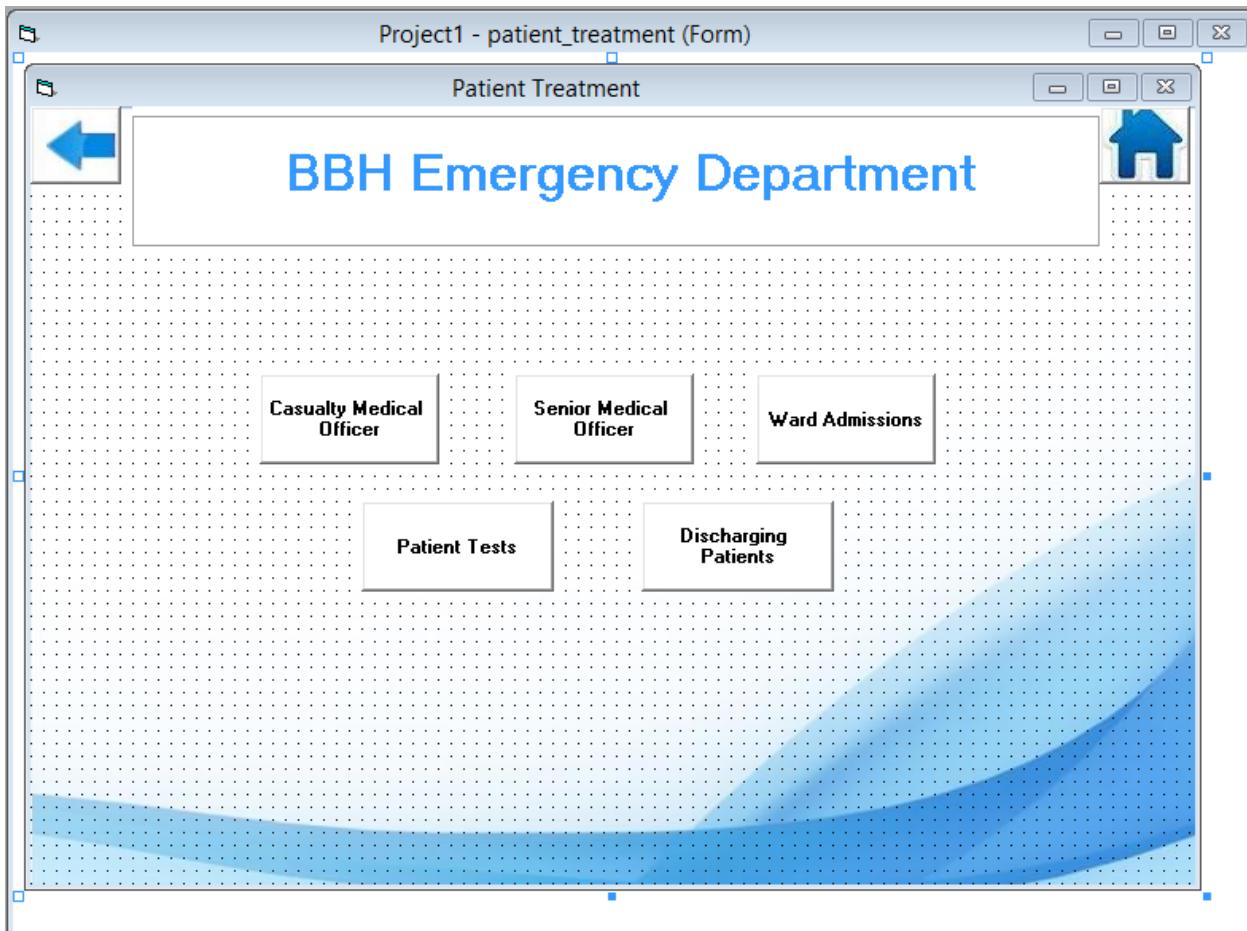
The screenshot shows a Windows application window titled "Project1 - patient_information (Form)". The main title bar is "Patient Information". The interface is divided into several sections:

- Search:** Two search boxes: "Search by ID" and "Search by Name", each with a dropdown arrow and a "Search" button.
- Icons:** A blue arrow icon on the left, a house icon with a letter "H" on the right, and a vertical scroll bar on the right side.
- Personal Information:** A group of five text input fields labeled "Patient ID", "Name", "Contact number", "Date Of Birth", and "Address".
- Basic Medical Information:** A group of five text input fields labeled "Diabetic?", "Hypertensive", "Blood Group", and "Any serious diseases in family?".
- Action Buttons:** A vertical column of buttons on the right labeled "Add", "Edit", "Delete", "Update", and "Cancel".
- Navigational Buttons:** At the bottom, there are "First", "Previous", "Next", and "Last" buttons.

(Objective 2 and 12 fulfilled)

Main Patient Treatment Form:

Used to access the CMO form, the Senior Medical Officer form, the Tests form, the Ward Admissions form and the Ward discharging form.



CMO Form:

Used to store information of patient checkup with CMO and view and store patient medical history with CMO. The date and time are automatically picked up from the computer in every form where they are required and have been purposely shown in this form as disabled to prove that they are automatically generated.

The screenshot shows a Windows application window titled "Project1 - cmo (Form)". The main title bar has standard minimize, maximize, and close buttons. The window itself is titled "CMO". In the top left corner is a blue arrow pointing left. In the top right corner is a blue house icon. Below the title bar is a search bar labeled "Search by Patient ID" with a dropdown arrow and a "Search" button. To the right of the search bar is a vertical column of five blue buttons labeled "Add", "Edit", "Delete", "Update", and "Cancel". On the left side of the main area, there is a section titled "CMO" containing several input fields: "Patient ID", "Doctor ID", "Time", "Date", "Blood", and "Temperature". Below these are four larger text input fields labeled "Problem", "Diagnosis", and "Process". At the bottom of the main area are four navigation buttons: "First", "Previous", "Next", and "Last". In the bottom right corner of the main area is a small button labeled "Show Patient Medical History with CMO". At the very bottom of the window is a horizontal toolbar with three buttons: one with an asterisk (*), one with a magnifying glass, and one with a cross (X).

(Objective 10 and 11 fulfilled)

Senior Medical Officer Form:

Used to store information of patient checkup with the Senior Medical Officer and view and store patient medical history with the Senior Medical Officer

The screenshot shows a Windows application window titled "Project1 - senior_medical_officer (Form)". The main title bar is "Senior Medical Officer". The interface includes a search bar labeled "Search by Patient ID" with a dropdown arrow and a "Search" button. To the right of the search bar is a blue house icon. On the left side, there is a blue arrow pointing left. In the center, there is a form titled "Senior Medical Officer" containing fields for "Patient ID", "Doctor ID", "Date", "Time", "Diagnosis", and "Process", each with its own input box. To the right of the form are five buttons: "Add", "Edit", "Delete", "Update", and "Cancel". Below the form are four navigation buttons: "First", "Previous", "Next", and "Last". At the bottom left, there is a small table with one row and two columns, the first column containing an asterisk (*). At the bottom right, there is a button labeled "Show Medical History with Senior Medical Officer".

Patient Tests Form

Used to store results of pathology/radiology tests conducted upon patient and the diagnosis and treatment process through analysis of the results. Also used to store and view patient past test results

The screenshot shows a Windows application window titled "Project1 - patient_tests (Form)". The main title bar is "Patient Tests". The interface includes:

- Search Bar:** "Search by Patient ID" with a dropdown and a "Search" button.
- Input Fields:** "Patient ID", "Referring Doctor ID", "Date", and "Time".
- Test Categories:** A section labeled "Tests" containing groups of input fields:
 - X-Ray, Blood Sugar Random, Bilirubin
 - Haemoglobin, Serum Calcium, Urea
 - Creatinine, TLC
 - ALT, Serum Amylase
- Action Buttons:** "Add", "Edit", "Delete", "Update", and "Cancel" on the right side.
- Navigation:** "First", "Previous", "Next", and "Last" buttons at the bottom.
- Information Labels:** "Show Past Test Results of Patient" and a small table with an asterisk (*) in the first cell.

Patient Ward Admissions Form:

Used to store information upon patient admission in the particular ward. The update button not only saves the new/edited record but automatically changes the status of the wards and notifies if there are no beds available in wards.

The screenshot shows a Windows application window titled "Project1 - ward_admissions (Form)". The main title bar has standard window controls (minimize, maximize, close). Below the title bar, the window title is "Ward Admissions".

The interface includes a search bar at the top left labeled "Search by Patient ID" with a dropdown menu and a "Search" button. To the right of the search bar is a blue house icon.

The main content area is titled "Ward Admissions". It contains several input fields and buttons:

- "Patient ID" with a dropdown arrow.
- "Referring Doctor ID" with a dropdown arrow.
- "Date of Admission" with a dropdown arrow.
- "Time of Admission" with a dropdown arrow.
- "Ward Name" with a dropdown arrow.
- "Problem" with a large text input field.
- "Treatment" with a large text input field.
- A vertical column of buttons on the right: "Add", "Edit", "Delete", "Update", and "Cancel".
- Navigation buttons at the bottom: "First", "Previous", "Next", and "Last".

Patient Ward Discharging Form:

Used to store patient information upon discharging and to automatically change the ward status upon any discharge.

The screenshot shows a Windows application window titled "Project1 - discharging_patients (Form)". The main title bar is "Discharging Patients". On the left, there is a blue arrow pointing left icon. In the center, there is a search bar labeled "Search by Patient ID" with a dropdown arrow and a "Search" button. To the right of the search bar is a blue house icon. Below these are four input fields: "Patient ID" (text box), "Date Of Discharge" (text box), "Ward Name" (dropdown menu), and "Description" (text box). To the right of these fields is a vertical stack of five blue buttons labeled "Add", "Edit", "Delete", "Update", and "Cancel". At the bottom of the form are four navigation buttons: "First", "Previous", "Next", and "Last".

(Through the previous 5 forms Objective 5 and 6 are fulfilled)

(Through the previous 2 forms Objectives 6 and 9 are fulfilled)

Doctor Information Form:

Used to store and view doctor personal information. The doctor ID is generated through his personal information using right and left funtions in coding.

Project1 - doctor_information (Form)

Doctor Information

Search by ID Search

Search by Name Search

Personal Information

Doctor ID

Gender

Name

Designation

Department

Contact number

Address

Date of Birth

Add

Edit

Delete

Update

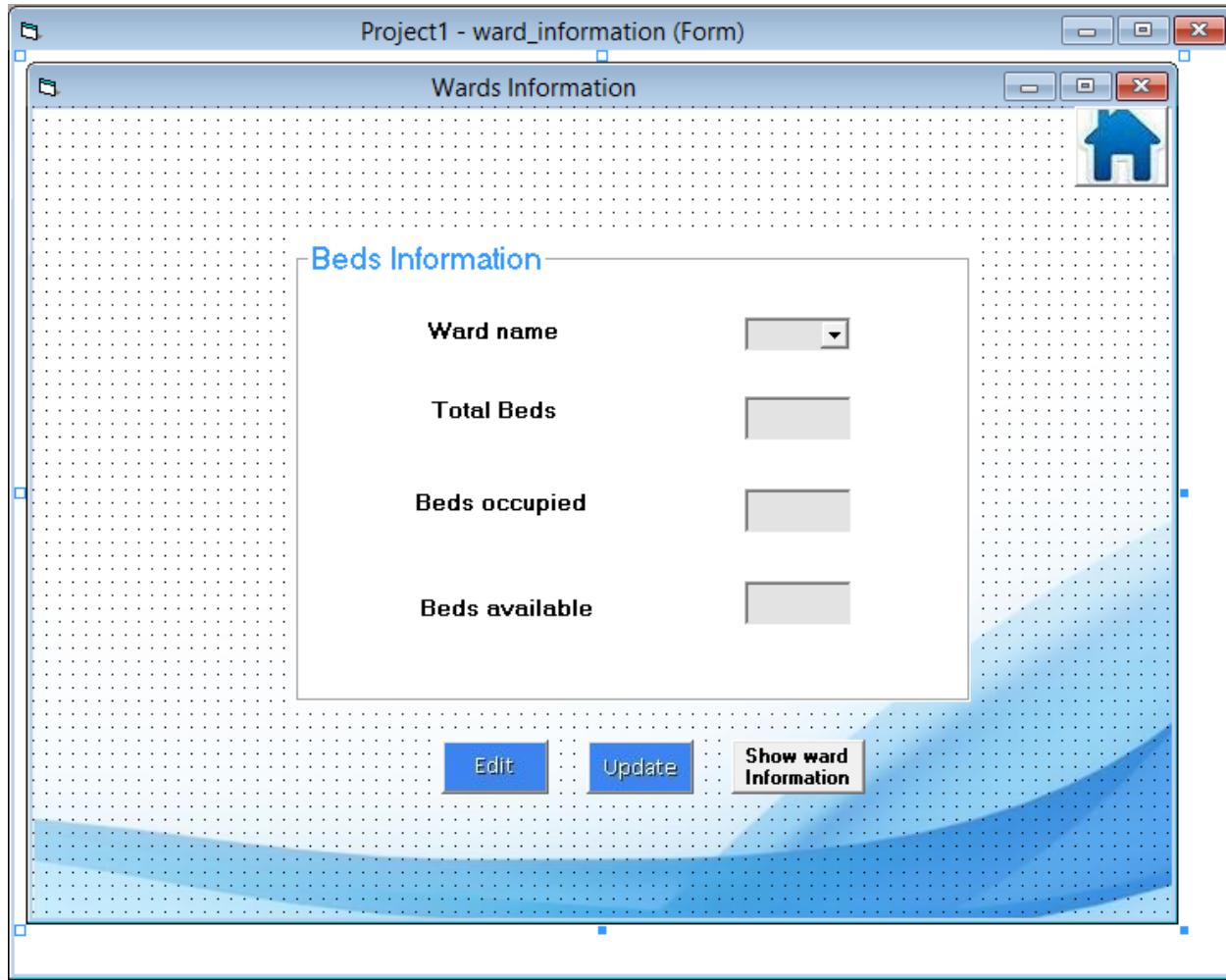
Cancel

First Previous Next Last

(Objective 3 and 24 fulfilled)

Wards Information Form:

Used to only view the status of the two wards of surgery and medicine in the department. The only editable fields are the total beds in surgery/medicine as they may change as the hospital expands.



(Objective 8 fulfilled)

Reports Main Form:

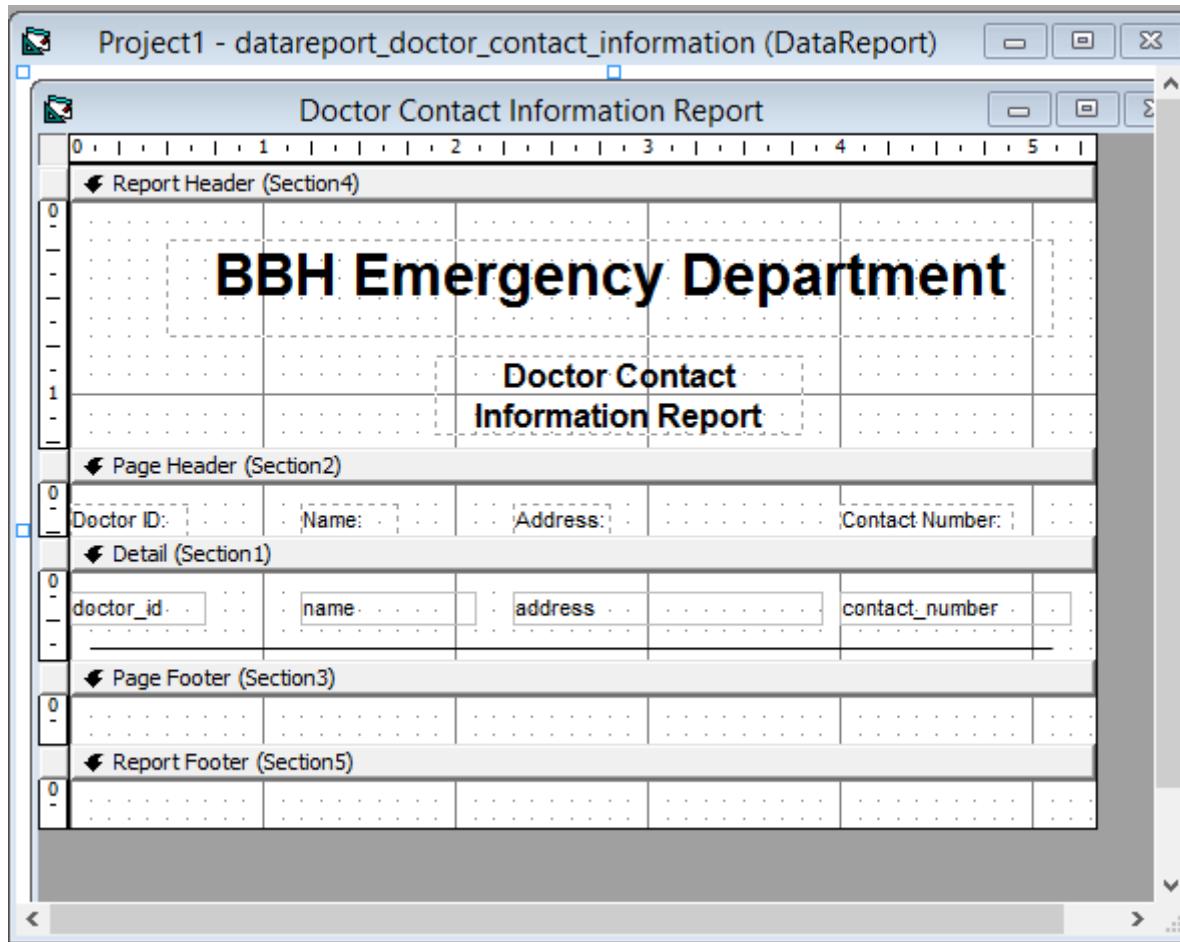
Shows all available reports to be generated except for tests reports for which there is another form.



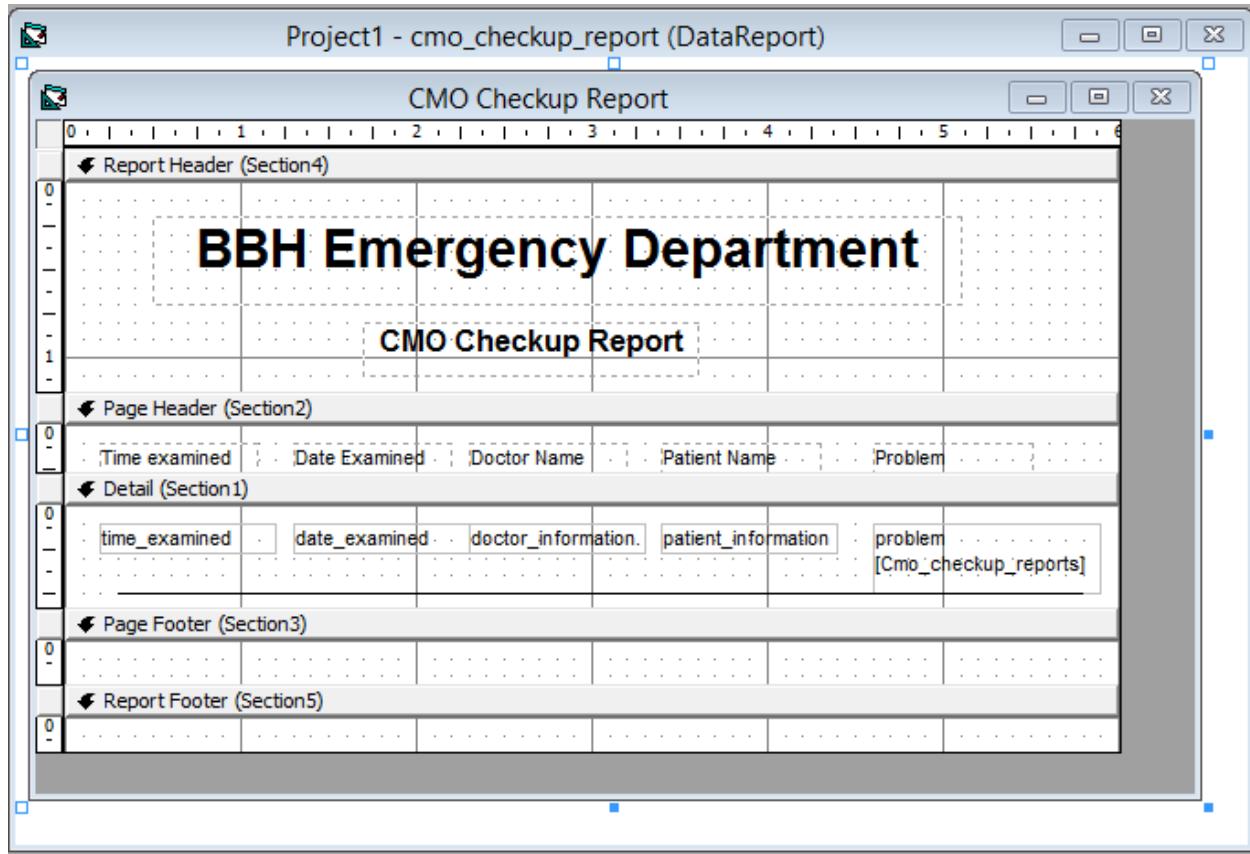
(Objectives 19-23 fulfilled)

3.1.3 REPORT DESIGN

Doctor Contact Information Report:



CMO Checkup Report:

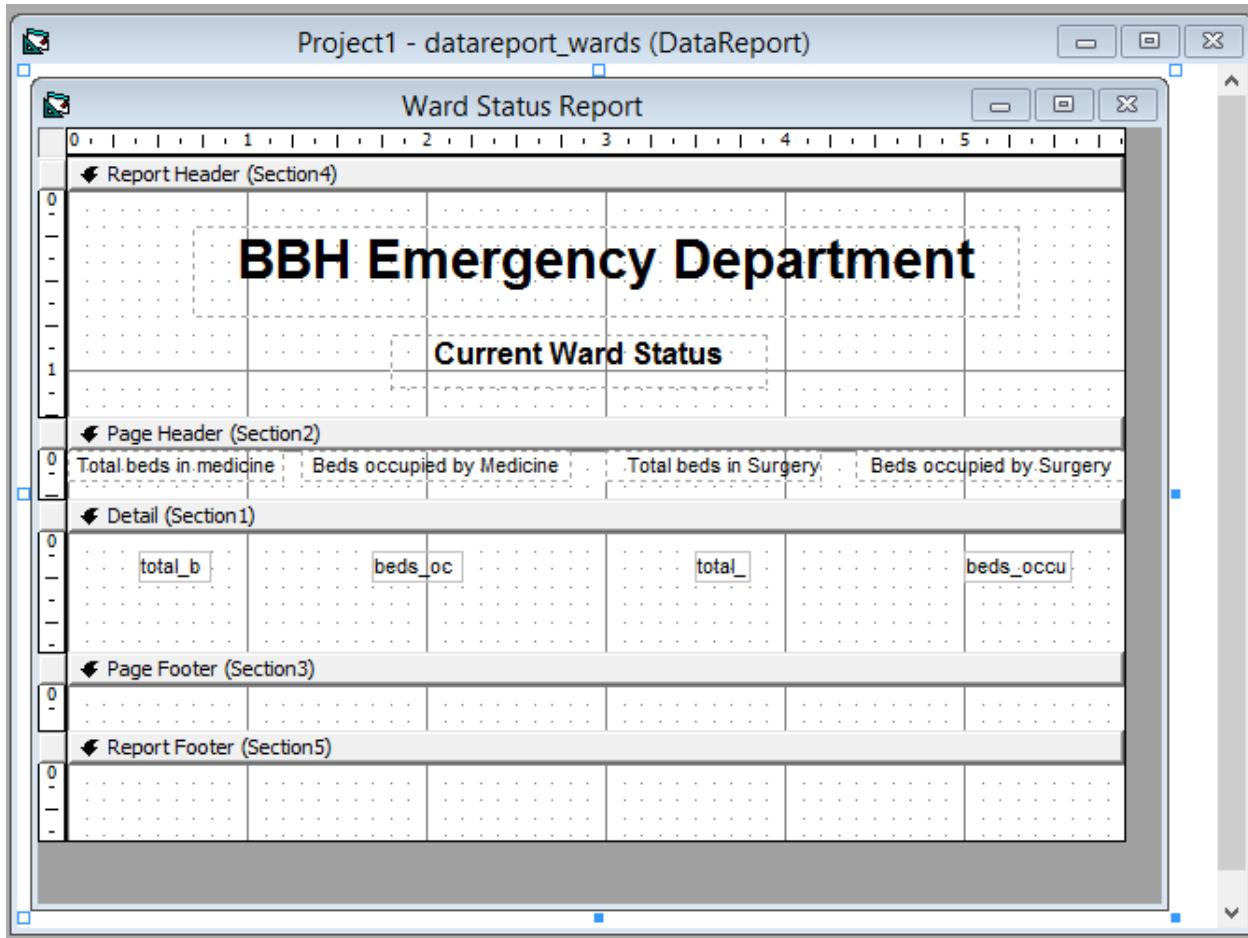


Performance Report:

The screenshot shows a report design interface with the title "Project1 - performance_reports (DataReport)". The main window is titled "Performance Reports". The report structure is defined by five sections:

- Report Header (Section4):** Contains the text "BBH Emergency Department" in large bold black font and "Performance Report" in smaller bold orange font.
- Page Header (Section2):** Contains fields for "Patient Name", "Date of visit", "Time of Visit", "Time examined by CMO", and "Time examined by Senior medical Officer".
- Detail (Section1):** Contains a table with columns for "name", "date_visited", "visit", "time_examined", and "medicalofficer".
- Page Footer (Section3):** Contains empty fields.
- Report Footer (Section5):** Contains empty fields.

Ward Status Report:



Tests Reports Form:

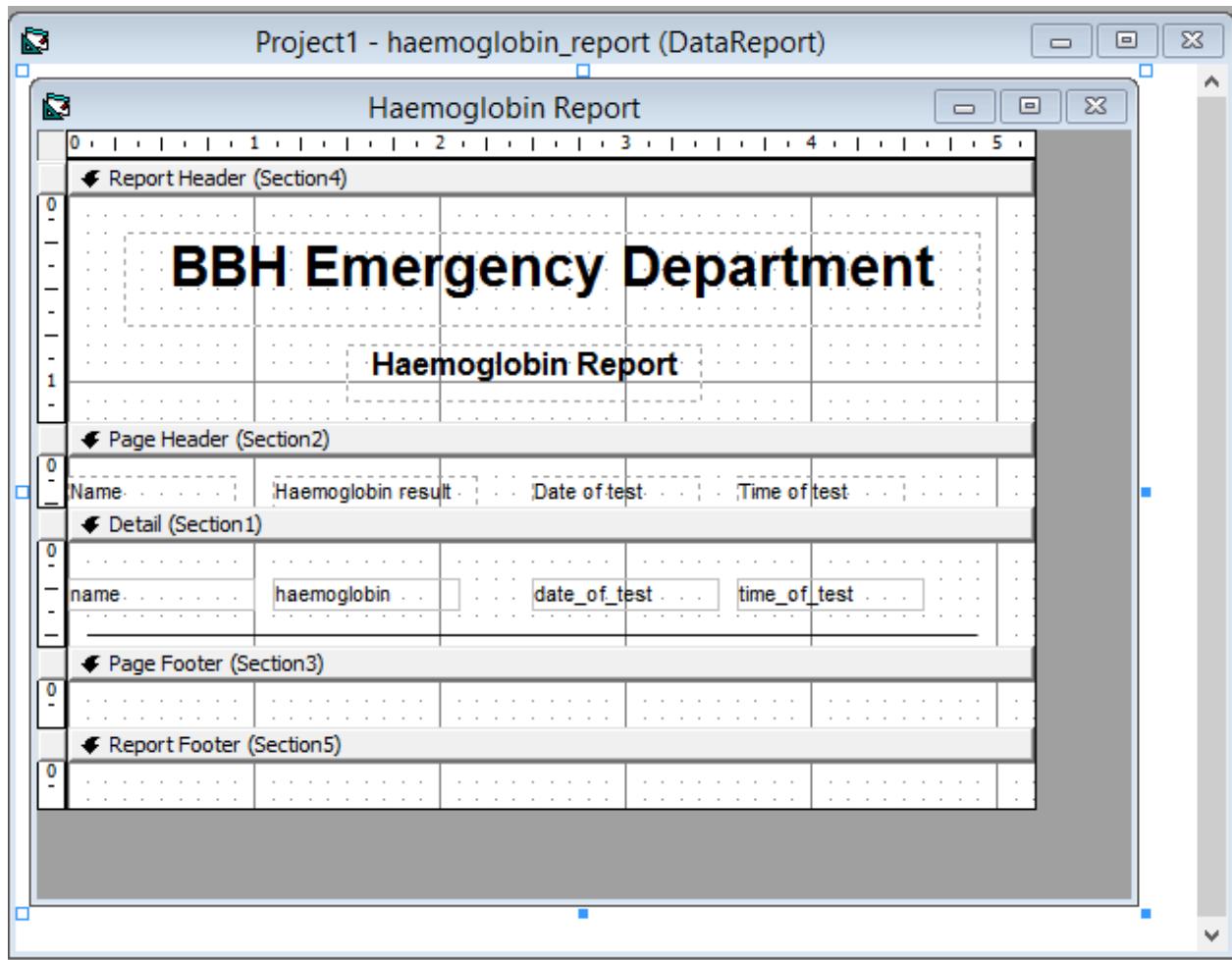
Used to generate reports on all individual tests for health analysis.



(Objective 8 fulfilled)

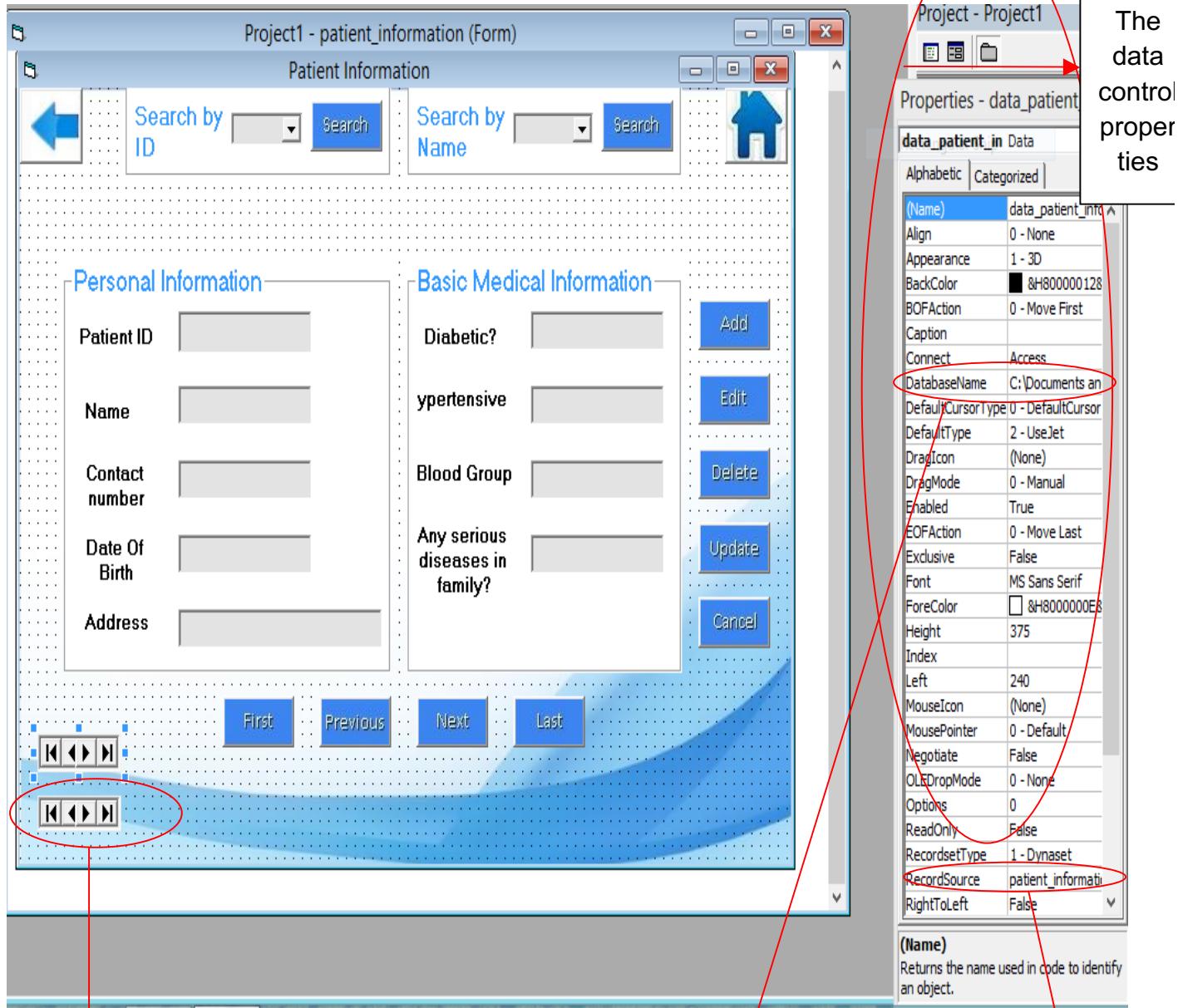
The screenshot of only one of my test reports has been given. However they all do work

Haemoglobin Report:



3.1.4 MAKING CONNECTION TO THE DATABASE

Here is a screenshot of a form that was linked to a backend table



This Data control was used to connect the frontend to the database and tables through properties

The database can be selected from this property however I have used coding to give path to the database

The table has been selected through this property

Giving Path to the Database:

A sample code has been given below which gives path to the database as the program runs.

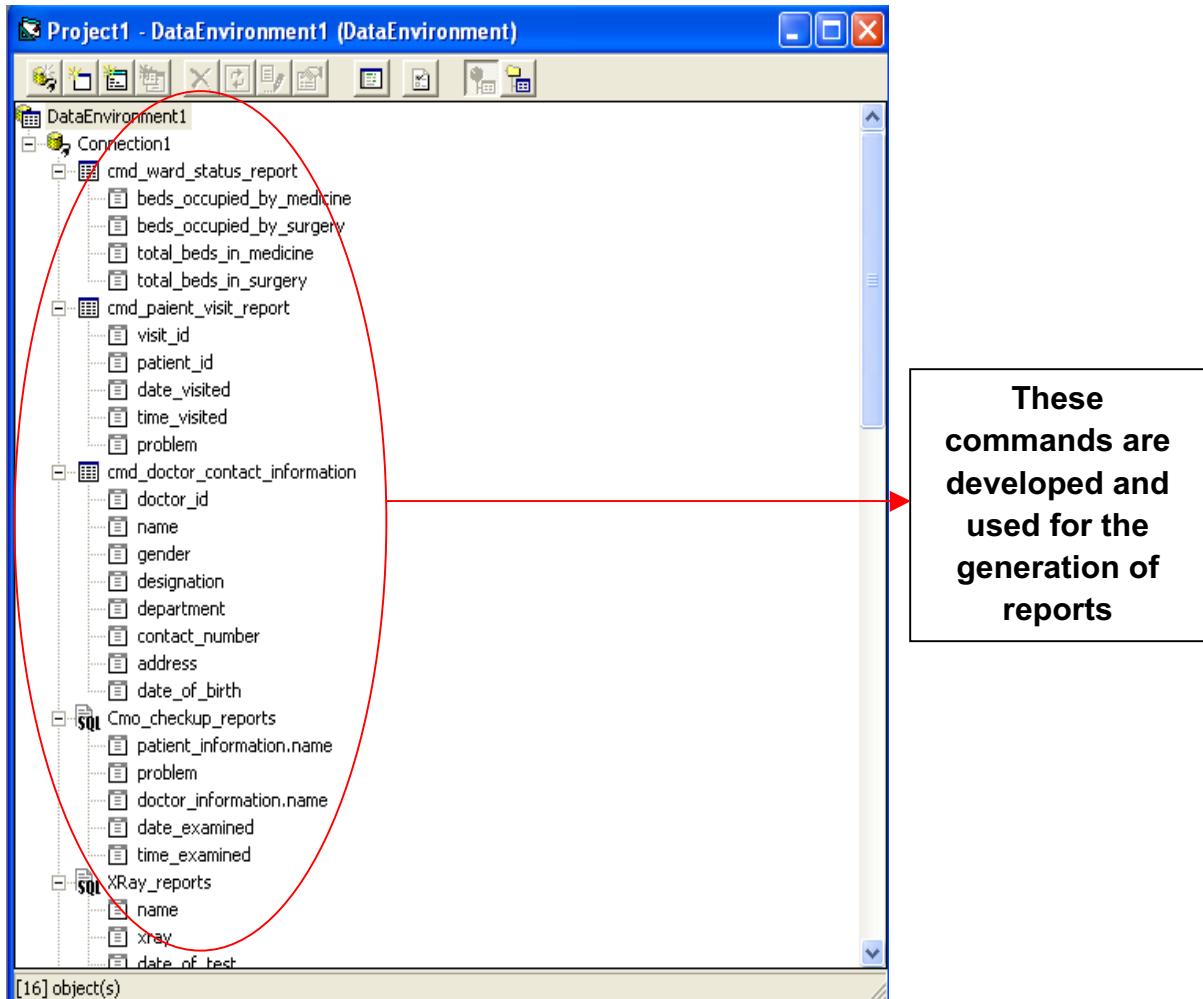
```
data_senior_medical_officer.DatabaseName = App.Path &  
"\BenazirBhuttoHospitalEmergency.mdb "
```

This code gives path to the Database. However the exe file must be in the same folder as the database for it to work. This is a bug in the software.

3.1.5 DESIGNING REPORTS

How reports were made:

The reports were made in Visual Basic 6.0 using Data Environment. Below is a screenshot of the Data Environment of my software



Below is the screenshot of one of my reports in design view:

The Data Report properties

These boxes are textboxes in which the data will appear

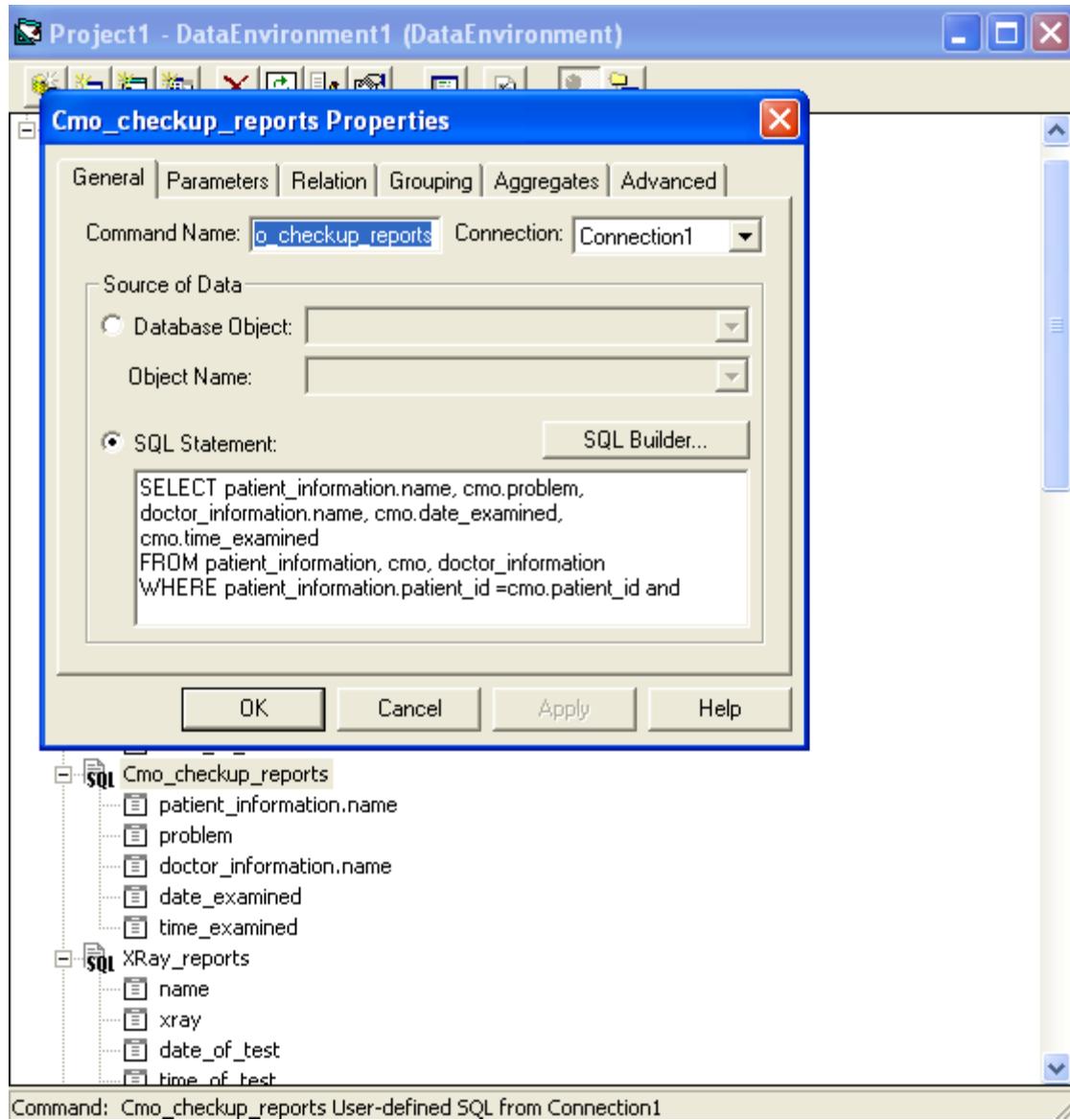
These boxes with dotted boundaries are labels

The Data Source and Data Member properties have to be set in order for the report to be properly linked and to work

| Name | Value |
|------------|--------------------|
| Caption | CMO Checkup Report |
| DataMember | Cmo_checkup_report |
| DataSource | DataEnvironment: |

3.1.6 CREATING QUERIES

My Queries were created through SQL Statements and implemented directly in VB instead of Access. Below is a screenshot of where SQL Statements were created in VB



Below are examples of two queries created through SQL Statements. All other reports created through SQL Statements were made in pretty much the same way.

CMO Checkup Report:

```
SELECT      patient_information.name,      cmo.problem,      doctor_information.name,  
cmo.date_examined, cmo.time_examined  
FROM patient_information, cmo, doctor_information  
WHERE patient_information.patient_id = cmo.patient_id and  
cmo.doctor_id = doctor_information.doctor_id;
```

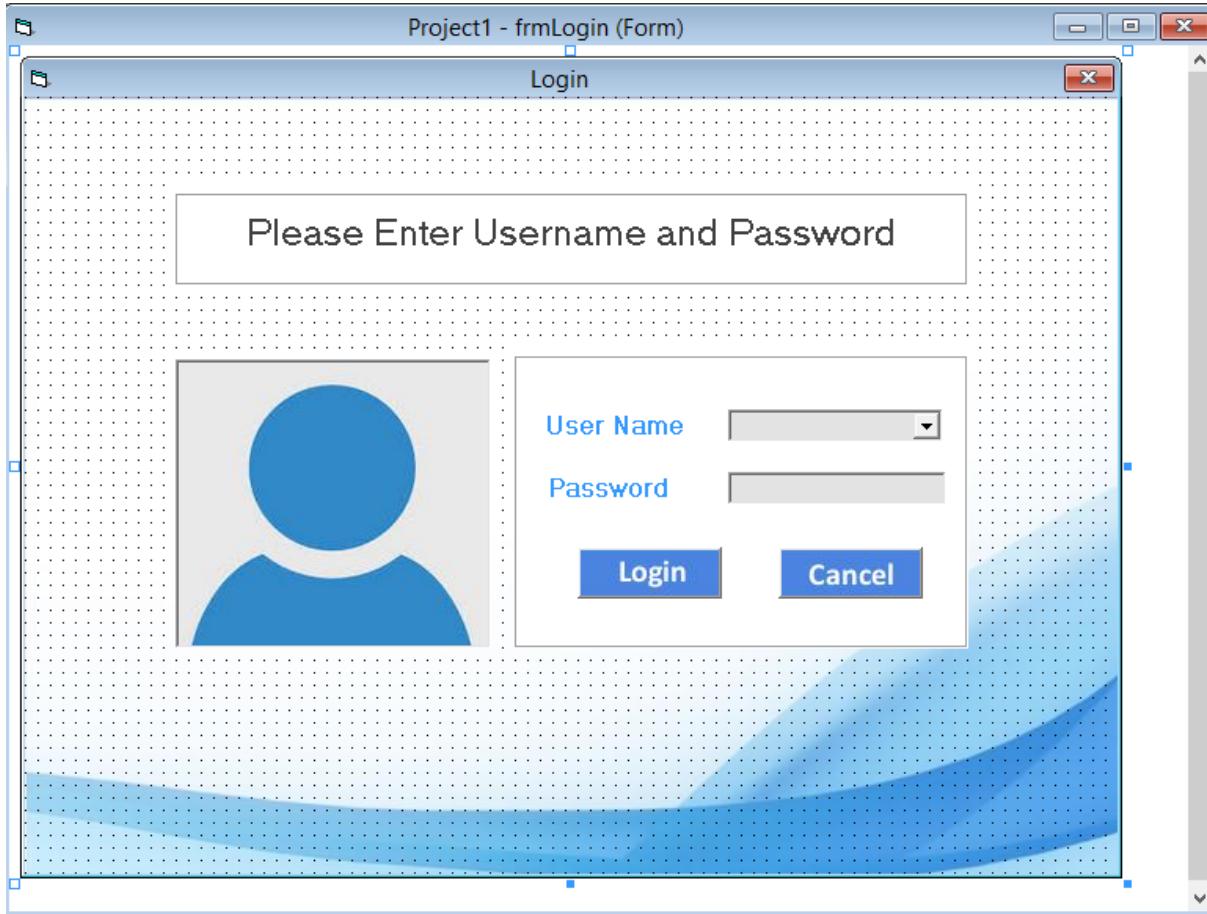
Performance Report:

```
SELECT patient_information.name, patient_visit.date_visited, patient_visit.time_visited AS  
visit, senior_medical_officer.time_examined AS medicalofficer, cmo.time_examined FROM  
patient_information, patient_visit, cmo, senior_medical_officer WHERE  
patient_information.patient_id = patient_visit.patient_id AND  
patient_information.patient_id = cmo.patient_id AND patient_information.patient_id =  
cmo.patient_id AND patient_information.patient_id = senior_medical_officer.patient_id
```

3.2 PROGRAMMING

The annotations for my button coding are in green colour to make the codes more clear. They themselves have no affect on the coding and are only used as comments. The start and end of the codes are in blue colour.

LOGIN FORM: (Objective 14 fulfilled)



```
Private Sub Form_Load()
```

```
'Two usernames will be given and the user can only log through them
```

```
txtUserName.Clear
```

```
txtUserName.AddItem "Doctor"
```

```
txtUserName.AddItem "Receptionist"
```

```
End Sub
```

'Used to verify whether the user is a member of the organization

'Also used to provide user rights

Private Sub cmdOK_Click()

'If the user logs in through Doctor Account then he has full rights

If txtPassword = "doctor" And txtUserName = "Doctor" Then

'Make the following command buttons available to the user

LoginSucceeded = True

cmo.cmd_delete.Visible = True

cmo.cmd_edit.Visible = True

cmo.cmd_add.Visible = True

cmo.cmd_cancel.Visible = True

cmo.cmd_update.Visible = True

discharging_patients.cmd_delete.Visible = True

discharging_patients.cmd_edit.Visible = True

discharging_patients.cmd_add.Visible = True

discharging_patients.cmd_cancel.Visible = True

discharging_patients.cmd_update.Visible = True

doctor_information.cmd_delete.Visible = True

doctor_information.cmd_edit.Visible = True

doctor_information.cmd_add.Visible = True

doctor_information.cmd_cancel.Visible = True

doctor_information.cmd_update.Visible = True

patient_tests.cmd_delete.Visible = True

patient_tests.cmd_edit.Visible = True

patient_tests.cmd_add.Visible = True

patient_tests.cmd_cancel.Visible = True

patient_tests.cmd_update.Visible = True

senior_medical_officer.cmd_delete.Visible = True

senior_medical_officer.cmd_edit.Visible = True

senior_medical_officer.cmd_add.Visible = True

senior_medical_officer.cmd_cancel.Visible = True

senior_medical_officer.cmd_update.Visible = True

ward_admissions.cmd_delete.Visible = True

ward_admissions.cmd_edit.Visible = True

ward_admissions.cmd_add.Visible = True

ward_admissions.cmd_cancel.Visible = True

ward_admissions.cmd_update.Visible = True

```
ward_information.cmd_edit.Visible = True  
ward_information.cmd_update.Visible = True  
main_form.Show  
Me.Hide  
Else  
'If the user logs in through Receptionist Account then he has see only rights in all forms except the patient_information and patient_visit form  
'Make the following unavailable to the user  
If txtPassword = "receptionist" And txtUserName = "Receptionist" Then  
LoginSucceeded = True  
cmo.cmd_delete.Visible = False  
cmo.cmd_edit.Visible = False  
cmo.cmd_add.Visible = False  
cmo.cmd_cancel.Visible = False  
cmo.cmd_update.Visible = False  
discharging_patients.cmd_delete.Visible = False  
discharging_patients.cmd_edit.Visible = False  
discharging_patients.cmd_add.Visible = False  
discharging_patients.cmd_cancel.Visible = False  
discharging_patients.cmd_update.Visible = False  
doctor_information.cmd_delete.Visible = False  
doctor_information.cmd_edit.Visible = False  
doctor_information.cmd_add.Visible = False  
doctor_information.cmd_cancel.Visible = False  
doctor_information.cmd_update.Visible = False  
patient_tests.cmd_delete.Visible = False  
patient_tests.cmd_edit.Visible = False  
patient_tests.cmd_add.Visible = False  
patient_tests.cmd_cancel.Visible = False  
patient_tests.cmd_update.Visible = False  
senior_medical_officer.cmd_delete.Visible = False  
senior_medical_officer.cmd_edit.Visible = False  
senior_medical_officer.cmd_add.Visible = False  
senior_medical_officer.cmd_cancel.Visible = False  
senior_medical_officer.cmd_update.Visible = False  
ward_admissions.cmd_delete.Visible = False  
ward_admissions.cmd_edit.Visible = False  
ward_admissions.cmd_add.Visible = False
```

```
ward_admissions.cmd_cancel.Visible = False
ward_admissions.cmd_update.Visible = False
ward_information.cmd_edit.Visible = False
ward_information.cmd_update.Visible = False
main_form.Show
Me.Hide

Else
    'Alert the user of wrong password and/or username
    MsgBox "Username or Password or both are incorrect!", vbExclamation,      "Login"
    txtPassword.SetFocus
    SendKeys "{Home}+{End}"

End If
End If
End Sub
```

MAIN FORM:



'This command serves to open the Ward Status Form

```
Private Sub cmd_beds_Click()
    ward_information.Show
    Me.Hide
End Sub
```

'This command serves to open the Doctor Personal Information Form

```
Private Sub cmd_doctor_information_Click()
    doctor_information.Show
    Me.Hide
End Sub
```

'This command serves to exit the program

Private Sub cmd_exit_Click()

'The user is given a confirmation box to ensure whether he wants to exit

```
ext = MsgBox("Are you sure you want to Exit?", vbYesNo + vbQuestion +  
vbDefaultButton2, App.Title)
```

```
If ext = vbYes Then
```

```
    End
```

```
End If
```

```
End Sub
```

'This command serves to Logout from the system

Private Sub cmd_logout_Click()

```
    frmLogin.Show
```

```
    Me.Hide
```

```
End Sub
```

'This command serves to open the Patient Main Form

Private Sub cmd_patient_Click()

```
    patient.Show
```

```
    Me.Hide
```

```
End Sub
```

'This command serves to open the Reports Main Form

Private Sub cmd_reports_Click()

```
    reports.Show
```

```
    Me.Hide
```

```
End Sub
```

PATIENT MAIN FORM:



'This command serves to open the Main Form

```
Private Sub cmd_main_form_Click()  
    main_form.Show  
    Me.Hide  
End Sub
```

'This command serves to open the Patient Personal Information Form

```
Private Sub cmd_patient_information_Click()  
    patient_information.Show  
    Me.Hide
```

End Sub

'This command serves to open the Patient Treatment Form

Private Sub cmd_patient_treatment_Click()

 patient_treatment.Show

 Me.Hide

End Sub

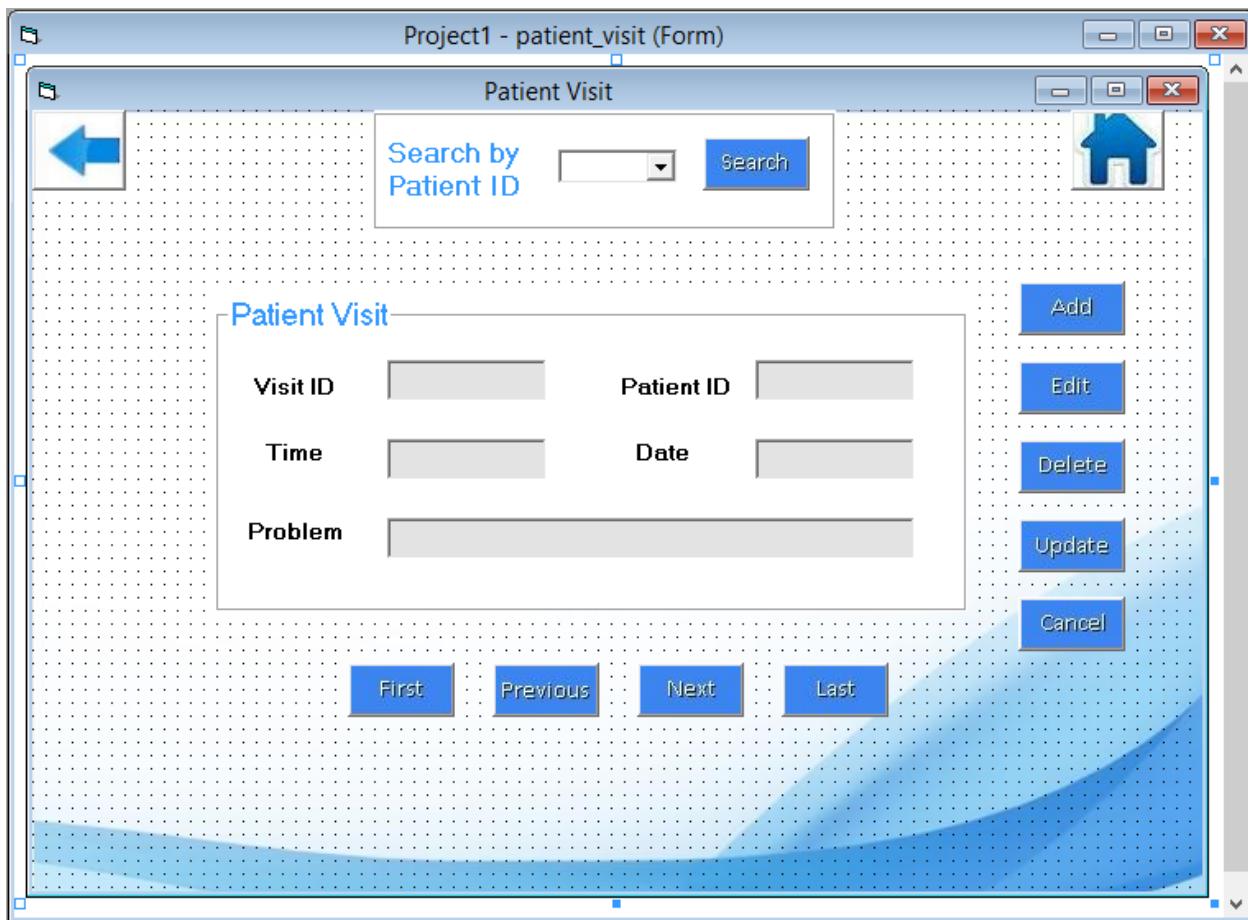
'This command serves to open the Patient Visit Form

Private Sub cmd_patient_visit_Click()

 patient_visit.Show

 Me.Hide

End Sub

PATIENT VISIT FORM:

'This command is used to add a new record to the database

```
Private Sub cmd_add_Click()
```

'The following 4 lines are used to generate the patient id

```
    data_patient_visit.Recordset.MoveLast
    id = txt_visit_id
    data_patient_visit.Recordset.AddNew
    txt_visit_id = id + 1  (Objective 12 fulfilled)
```

'The time and date are automatically input from the computers clock and calendar

```
    txt_time = Time
    txt_date = Date  (Objective 11 fulfilled)
```

'Enabling appropriate buttons

```
    cmd_update.Enabled = True
    cmd_cancel.Enabled = True
```

End Sub

'This command is used to go back to the previous form

Private Sub cmd_back_Click()

 patient.Show

 Me.Hide

End Sub

'This command is used to cancel changes made during adding /updating a record

Private Sub cmd_cancel_Click()

 data_patient_visit.Recordset.CancelUpdate

'Disabling inappropriate buttons

 cmd_cancel.Enabled = False

 cmd_update.Enabled = False

End Sub

'This command is used to delete an entire field

Private Sub cmd_delete_Click()

'Display a confirmation message and if user confirms deletion then delete

 del = MsgBox("Are you sure you want to delete this record?", vbYesNo + vbQuestion + vbDefaultButton2, App.Title)

 If del = vbYes Then

 data_patient_visit.Recordset.Delete

 data_patient_visit.Refresh

 data_dbcombo.Refresh

 If data_patient_visit.Recordset.EOF Then

 data_patient_visit.Recordset.MoveNext

 Else

 data_patient_visit.Recordset.MovePrevious

 End If

End If

'Disabling inappropriate buttons

 cmd_update.Enabled = False

```
cmd_cancel.Enabled = False  
End Sub
```

'This command is used to edit a current record

```
Private Sub cmd_edit_Click()  
    data_patient_visit.Recordset.Edit  
'Enabling appropriate buttons  
    cmd_cancel.Enabled = True  
    cmd_update.Enabled = True  
End Sub
```

'This command is used to go to the first record in the table

```
Private Sub cmd_first_Click()  
'Enabling appropriate buttons  
    cmd_next.Enabled = True  
    cmd_last.Enabled = True  
    data_patient_visit.Recordset.MoveFirst  
'Disabling inappropriate buttons  
    cmd_first.Enabled = False  
    cmd_previous.Enabled = False  
End Sub
```

'This command is used to go to the last record in the table

```
Private Sub cmd_last_Click()  
'Enabling appropriate buttons  
    cmd_previous.Enabled = True  
    cmd_first.Enabled = True  
    data_patient_visit.Recordset.MoveLast  
'Disabling inappropriate buttons
```

```
cmd_next.Enabled = False  
cmd_last.Enabled = False  
End Sub
```

'This command is used to go to the Main Form

```
Private Sub cmd_main_form_Click()  
    main_form.Show  
    Me.Hide  
End Sub
```

'This command is used to go to the next record in the table.

```
Private Sub cmd_next_Click()  
    'Enabling appropriate buttons  
    cmd_previous.Enabled = True  
    cmd_first.Enabled = True  
    data_patient_visit.Recordset.MoveNext
```

'If current record is last record then a message box pops out alerting the user about reaching the end of file and the next and last buttons are disabled

```
If data_patient_visit.Recordset.EOF Then  
    data_patient_visit.Recordset.MovePrevious  
    MsgBox "No more records", vbExclamation
```

'Disabling inappropriate buttons

```
    cmd_next.Enabled = False  
    cmd_last.Enabled = False  
End If
```

```
End Sub
```

'This command is used to go to the previous record in the table.

```
Private Sub cmd_previous_Click()
```

```
cmd_next.Enabled = True
cmd_last.Enabled = True
data_patient_visit.Recordset.MovePrevious

'If current record is first record then a message box pops out alerting the user about reaching
the end of file and the previous and first buttons are disabled
If data_patient_visit.Recordset.BOF Then
    data_patient_visit.Recordset.MoveNext
    MsgBox "No more records", vbExclamation

'Disabling inappropriate buttons
cmd_first.Enabled = False
cmd_previous.Enabled = False
End If
End Sub
```

'This command is used to search for the visit ID which is available in the table

```
Private Sub cmd_search_by_id_Click()
    data_patient_visit.Recordset.FindFirst "visit_id=" & dbcombo_visit_id & ""
End Sub (Objective 15 fulfilled)
```

'This command is used to save any changes made after addition or editing

```
Private Sub cmd_update_Click()
    data_patient_visit.Recordset.Update
    data_patient_visit.Refresh
    data_dbcombo.Refresh

'Disabling inappropriate buttons
cmd_update.Enabled = False
cmd_cancel.Enabled = False
End Sub
```

'This command is used as a validation check to make sure that only numeric data is entered
Private Sub txt_patient_id_KeyPress(KeyAscii As Integer)

'Compare the pressed key code with the standard Ascii code and alert user if wrong type of data is entered

If KeyAscii = 47 Or KeyAscii >= 58 Then

 KeyAscii = 0

 MsgBox ("Enter Digits Only"), vbExclamation

Else

 If KeyAscii = 34 Or KeyAscii = 59 Then

 KeyAscii = 0

 MsgBox "Enter Digits Only", vbExclamation

Else

 If KeyAscii = 45 Or KeyAscii = 43 Then

 KeyAscii = 0

 MsgBox "Enter Digits Only", vbExclamation

Else

 If KeyAscii = 44 Or KeyAscii = 46 Then

 KeyAscii = 0

 MsgBox "Enter Digits Only", vbExclamation

Else

 If KeyAscii = 33 Or KeyAscii = 35 Then

 KeyAscii = 0

 MsgBox "Enter Digits Only", vbExclamation

Else

 If KeyAscii = 36 Or KeyAscii = 37 Then

 KeyAscii = 0

 MsgBox "Enter Digits Only", vbExclamation

Else

 If KeyAscii = 38 Or KeyAscii = 42 Then

 KeyAscii = 0

 MsgBox "Enter Digits Only", vbExclamation

Else

 If KeyAscii = 40 Or KeyAscii = 41 Then

 KeyAscii = 0

 MsgBox "Enter Digits Only", vbExclamation

Else

 If KeyAscii = 39 Then

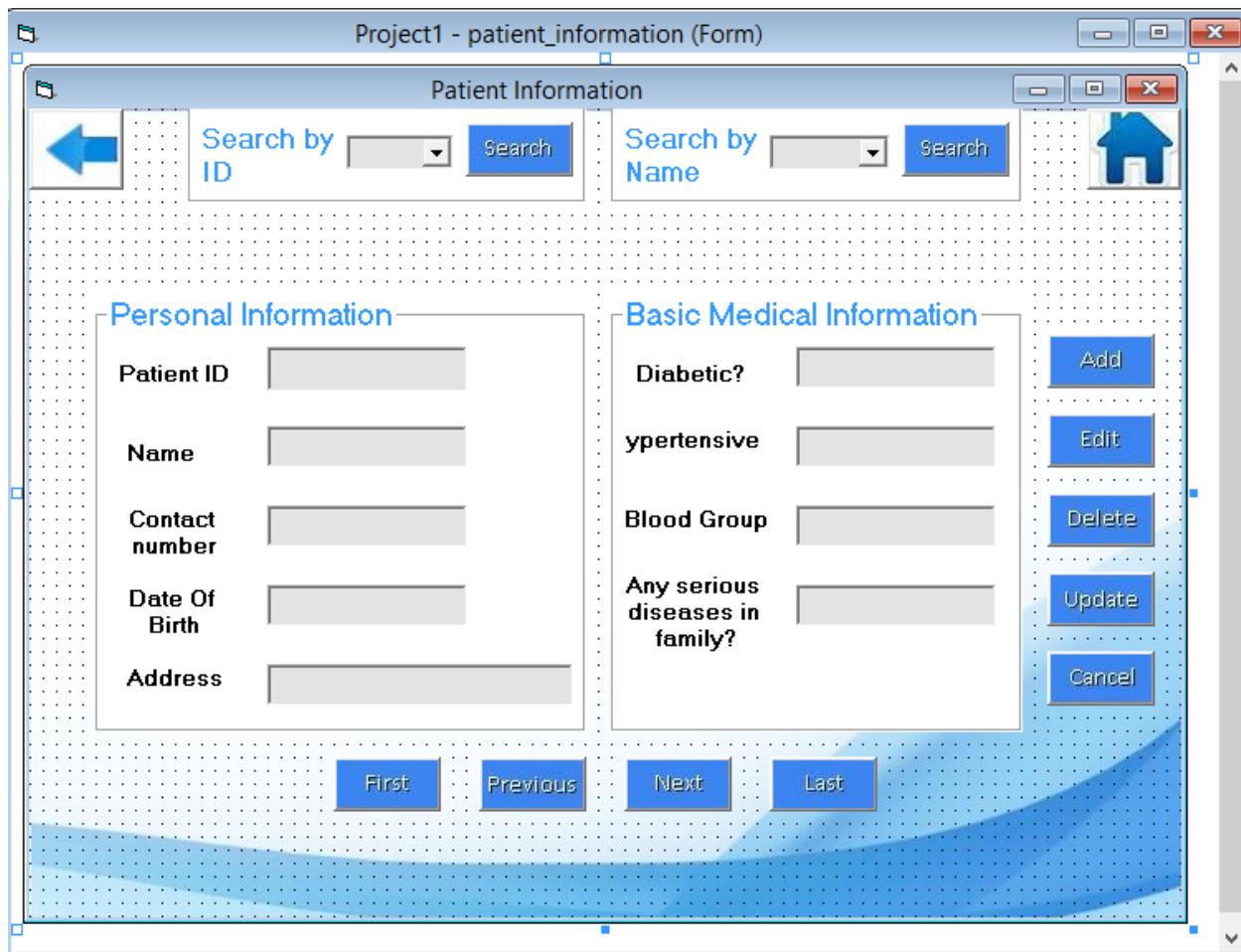
```
KeyAscii = 0
MsgBox "Enter Digits Only", vbExclamation
End If
End Sub
```

'This command is used as a validation check to make sure that only alphabetic data is entered
Private Sub txt_patient_name_KeyPress(KeyAscii As Integer)

'Compare the pressed key code with the standard Ascii code and alert user if wrong type of
data is entered

```
If KeyAscii >= 33 And KeyAscii <= 59 Then
    KeyAscii = 0
    MsgBox ("Enter Characters Only")
Else
    If KeyAscii >= 123 And KeyAscii <= 126 Then
        KeyAscii = 0
        MsgBox ("Enter Characters Only")
    Else
        If KeyAscii >= 60 And KeyAscii <= 63 Then
            KeyAscii = 0
            MsgBox ("Enter Characters Only")
        Else
            If KeyAscii >= 91 And KeyAscii <= 96 Then
                KeyAscii = 0
            End If
        End If
    End If
End If
```

```
    MsgBox ("Enter Characters Only")
Else
    If KeyAscii >= 60 And KeyAscii <= 64 Then
        KeyAscii = 0
        MsgBox ("Enter Characters Only")
    End If
End If
End If
End If
End If
End Sub
```

PATIENT INFORMATION FORM:

'This command is used to add a new record to the database

```
Private Sub cmd_add_Click()
```

'Generate the patient id

```
    data_patient_information.Recordset.MoveLast
    id = txt_patient_id.Text
    data_patient_information.Recordset.AddNew
    txt_patient_id.Text = id + 1  (Objective 12 fulfilled)
```

'Enabling appropriate buttons

```
    cmd_update.Enabled = True
    cmd_cancel.Enabled = True
```

End Sub

'Go back to previous form

Private Sub cmd_back_Click()

 patient.Show

 Me.Hide

End Sub

'This command is used to cancel changes made during adding /updating a record

Private Sub cmd_cancel_Click()

 data_patient_information.Recordset.CancelUpdate

'Disabling inappropriate buttons

 cmd_cancel.Enabled = False

 cmd_update.Enabled = False

End Sub

'This command is used to delete an entire field

Private Sub cmd_delete_Click()

'Display a confirmation message and if user confirms deletion then delete

 del = MsgBox("Are you sure you want to delete this record?", vbYesNo + vbQuestion + vbDefaultButton2, App.Title)

 If del = vbYes Then

 data_patient_information.Recordset.Delete

 If data_patient_information.Recordset.EOF Then

 data_patient_information.Recordset.MoveNext

 Else

 data_patient_information.Recordset.MovePrevious

 End If

 End If

 cmd_update.Enabled = False

 cmd_cancel.Enabled = False

End Sub

'This command is used to edit a current record

```
Private Sub cmd_edit_Click()
    data_patient_information.Recordset.Edit
    'Enabling appropriate buttons
    cmd_cancel.Enabled = True
    cmd_update.Enabled = True
End Sub
```

'This command is used to go to the first record in the table

```
Private Sub cmd_first_Click()
    cmd_next.Enabled = True
    cmd_last.Enabled = True
    data_patient_information.Recordset.MoveFirst
    'Disabling inappropriate buttons
    cmd_first.Enabled = False
    cmd_previous.Enabled = False
End Sub
```

'This command is used to go to the last record in the table

```
Private Sub cmd_last_Click()
    'Enabling appropriate buttons
    cmd_previous.Enabled = True
    cmd_first.Enabled = True
    data_patient_information.Recordset.MoveLast
    'Disabling inappropriate buttons
    cmd_next.Enabled = False
    cmd_last.Enabled = False
```

End Sub

'This command is used to go back to the main form

```
Private Sub cmd_main_form_Click()
```

```
    main_form.Show
```

```
    Me.Hide
```

End Sub

'This command is used to search for the field of a given name

```
Private Sub cmd_search_by_name_Click()
```

```
    data_patient_information.Recordset.FindFirst "name="" & dbcombo_patient_name &  
    """
```

End Sub

'This command is used to go to the next record in the table.

```
Private Sub cmd_next_Click()
```

```
    'Enabling appropriate buttons
```

```
    cmd_previous.Enabled = True
```

```
    cmd_first.Enabled = True
```

```
    data_patient_information.Recordset.MoveNext
```

'If current record is last record then a message box pops out alerting the user about reaching
the end of file and the next and last buttons are disabled

```
If data_patient_information.Recordset.EOF Then
```

```
    data_patient_information.Recordset.MovePrevious
```

```
    MsgBox "No more records", vbExclamation
```

```
    cmd_next.Enabled = False
```

```
    cmd_last.Enabled = False
```

```
End If
```

End Sub

'This command is used to view the patient medical history

```
Private Sub cmd_patient_medical_history_Click()
    patient_medical_history.Show
    Me.Hide
```

```
End Sub
```

'This command is used to go to the previous record in the table.

```
Private Sub cmd_previous_Click()
    'Enabling appropriate buttons
    cmd_next.Enabled = True
    cmd_last.Enabled = True
    data_patient_information.Recordset.MovePrevious
```

'If current record is first record then a message box pops out alerting the user about reaching the end of file and the previous and first buttons are disabled

```
If data_patient_information.Recordset.BOF Then
    data_patient_information.Recordset.MoveNext
    MsgBox "No more records", vbExclamation
    'Disabling inappropriate buttons
    cmd_first.Enabled = False
    cmd_previous.Enabled = False
```

```
End If
```

```
End Sub
```

'This command is used to search for a field with the given Patient ID

```
Private Sub cmd_search_by_id_Click()
    data_patient_information.Recordset.FindFirst "patient_id=" & dbcombo_patient_id & ""
End Sub
```

'This command is used to save any changes made after addition or editing

Private Sub cmd_update_Click()

'Presence checks are applied

If txt_name = "" Then

 MsgBox "A required field is missing", vbExclamation

 data_patient_information.Recordset.CancelUpdate

 'Disabling inappropriate buttons

 cmd_cancel.Enabled = False

 cmd_update.Enabled = False

Else

 If txt_date_of_birth = "" Then

 MsgBox "A required field is missing", vbExclamation

 data_patient_information.Recordset.CancelUpdate

 cmd_cancel.Enabled = False

 cmd_update.Enabled = False

Else

 If txt_address = "" Then

 MsgBox "A required field is missing", vbExclamation

 data_patient_information.Recordset.CancelUpdate

 cmd_cancel.Enabled = False

 cmd_update.Enabled = False

Else

 data_patient_information.Recordset.Update

 data_patient_information.Refresh

 'Disabling inappropriate buttons

 cmd_update.Enabled = False

 cmd_cancel.Enabled = False

End If

End If

End If

End Sub

'These commands are carried out when the form loads

Private Sub Form_Load()

'This command is used to give path to the database

```
    data_dbcombo.DatabaseName = App.Path & "\BenazirBhuttoHospitalEmergency.mdb"  
    data_patient_information.DatabaseName = App.Path &  
"\BenazirBhuttoHospitalEmergency.mdb"  
End Sub
```

'This command is used as a validation check to make sure that only numbers and dashes are used to enter contact numbers.

```
Private Sub txt_contact_number_KeyPress(KeyAscii As Integer)  
'Compare the pressed key code with the standard Ascii code and alert user if wrong type of  
data is entered  
If (KeyAscii < 48 And KeyAscii > 8 And KeyAscii > 45) Xor (KeyAscii > 57) Then  
    KeyAscii = 0  
    MsgBox "Please use only numbers and hyphens (-)", vbExclamation  
If Len(txt_contact_number) >= 12 Then  
    KeyAscii = 0  
    MsgBox "Limit Reached", vbExclamation  
End If  
End If  
End Sub
```

'This command is used as a validation check to make sure that only numbers and slashes are used to enter contact numbers.

```
Private Sub txt_date_of_birth_KeyPress(KeyAscii As Integer)  
'Compare the pressed key code with the standard Ascii code and alert user if wrong type of  
data is entered  
If (KeyAscii < 47 And KeyAscii > 8) Xor (KeyAscii > 57) Then  
    KeyAscii = 0
```

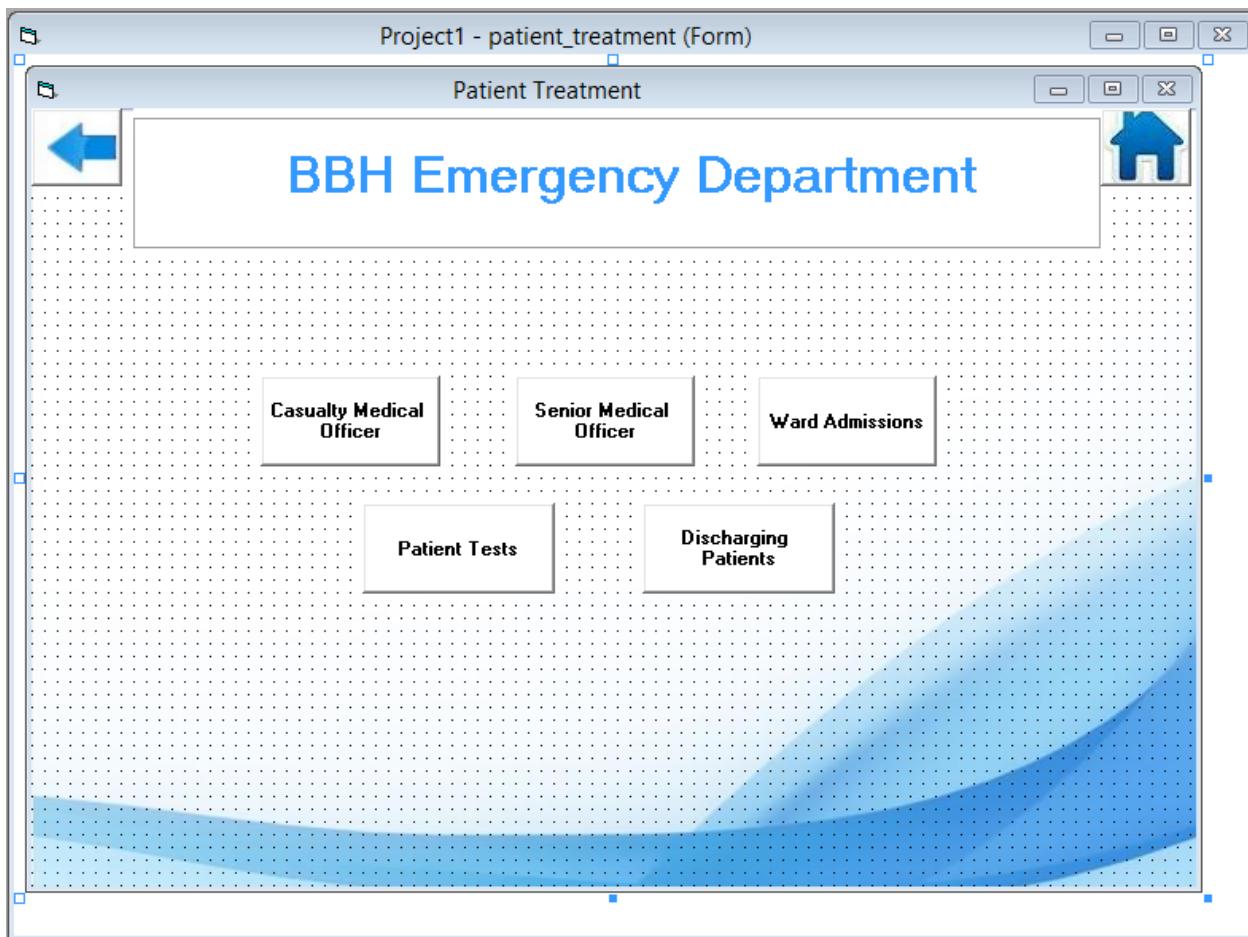
```
    MsgBox "Please use only numbers and slashes", vbExclamation
End If
End Sub
```

'This command is used as a validation check to make sure that only alphabetic data is entered

```
Private Sub txt_name_KeyPress(KeyAscii As Integer)
'Compare the pressed key code with the standard Ascii code and alert user if wrong type of
data is entered
```

```
If KeyAscii >= 33 And KeyAscii <= 59 Then
    KeyAscii = 0
    MsgBox ("Enter Characters Only"), vbExclamation
Else
    If KeyAscii >= 123 And KeyAscii <= 126 Then
        KeyAscii = 0
        MsgBox ("Enter Characters Only"), vbExclamation
    Else
        If KeyAscii >= 60 And KeyAscii <= 63 Then
            KeyAscii = 0
            MsgBox ("Enter Characters Only"), vbExclamation
        Else
            If KeyAscii >= 91 And KeyAscii <= 96 Then
                KeyAscii = 0
                MsgBox ("Enter Characters Only"), vbExclamation
            Else
                If KeyAscii >= 60 And KeyAscii <= 64 Then
                    KeyAscii = 0
                    MsgBox ("Enter Characters Only"), vbExclamation
                End If
                End If
                End If
                End If
                End If
End Sub
```

PATIENT TREATMENT MAIN FORM:



'This command is used to go to the patient discharging form

```
Private Sub cmd_discharging_patients_Click()  
    discharging_patients.Show  
    Me.Hide  
End Sub
```

'This command is used to go to the patient tests form

```
Private Sub cmd_patient_tests_Click()  
    patient_tests.Show  
    Me.Hide  
End Sub
```

'This command is used to go to the ward admissions form

```
Private Sub cmd_ward_admissions_Click()  
    ward_admissions.Show  
    Me.Hide  
End Sub
```

'This command is used to go to the CMO form

```
Private Sub cmd_cmo_Click()  
    cmo.Show  
    Me.Hide  
End Sub
```

'This command is used to go to the Senior Medical Officer form

```
Private Sub cmd_senior_medical_officer_Click()  
    senior_medical_officer.Show  
    Me.Hide  
End Sub
```

'This command is used to go to the patient discharging form

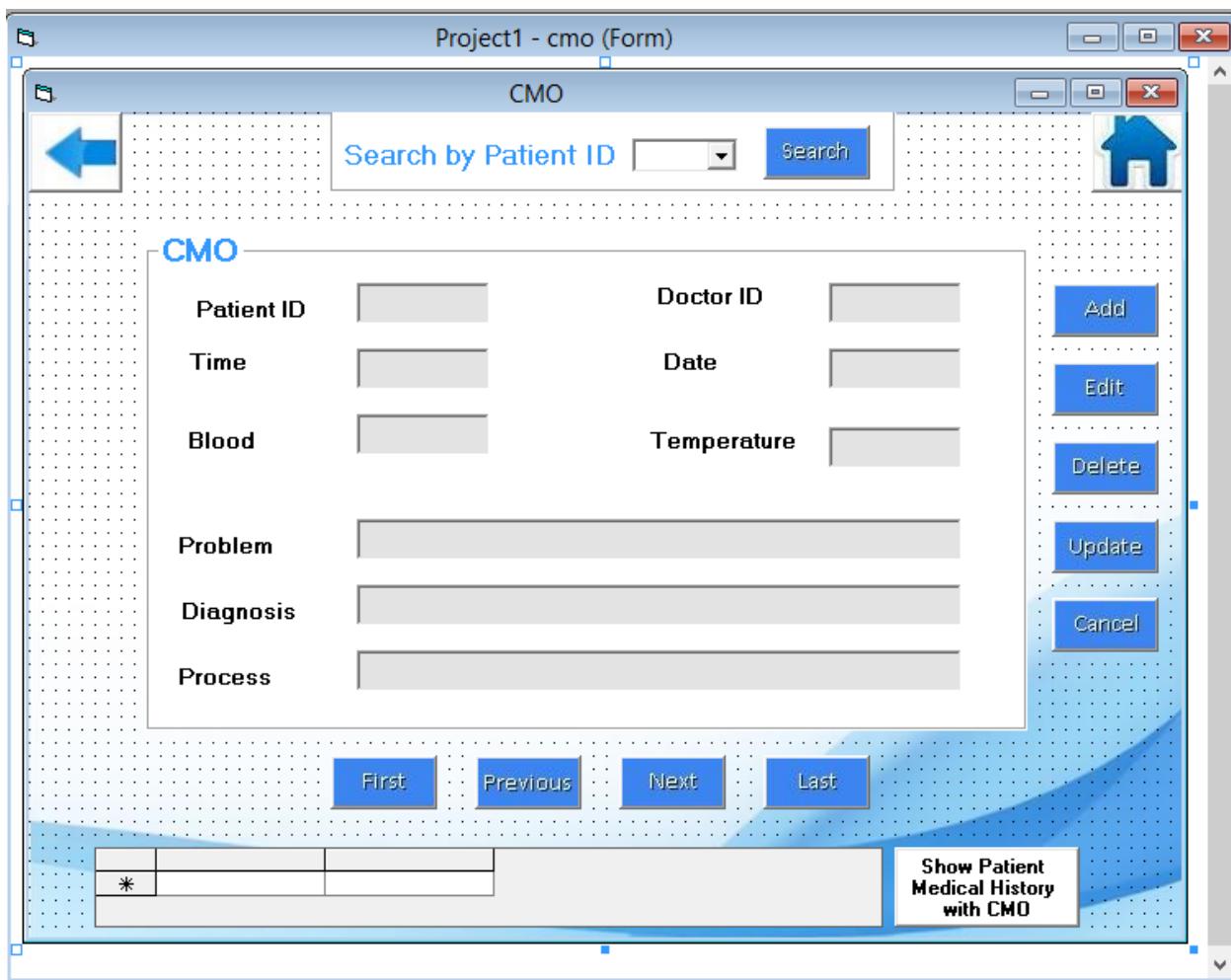
```
Private Sub cmd_back_Click()  
    patient.Show  
    Me.Hide  
End Sub
```

'This command is used to go to the patient discharging form

```
Private Sub cmd_main_Click()  
    main_form.Show  
    Me.Hide
```

End Sub

CMO FORM:



'This command is used to add a new record to the database

Private Sub cmd_add_Click()

 data_cmo.Recordset.AddNew

'The time and date are automatically input from the computers clock and calendar

 txt_date = Date

 txt_time = Time

'Enabling appropriate buttons

 cmd_update.Enabled = True

 cmd_cancel.Enabled = True

End Sub

'This command is used to go back to the previous form

```
Private Sub cmd_back_Click()
    patient_treatment.Show
    Me.Hide
End Sub
```

'This command is used to cancel changes made during adding /updating a record

```
Private Sub cmd_cancel_Click()
    data_cmo.Recordset.CancelUpdate
    'Disabling inappropriate buttons
    cmd_cancel.Enabled = False
    cmd_update.Enabled = False
End Sub
```

'This command is used to delete an entire field

```
Private Sub cmd_delete_Click()
    'Display a confirmation message and if user confirms deletion then delete
    del = MsgBox("Are you sure you want to delete this record?", vbYesNo + vbQuestion +
    vbDefaultButton2, App.Title)
    If del = vbYes Then
        data_cmo.Recordset.Delete
        If data_cmo.Recordset.EOF Then
            data_cmo.Recordset.MoveNext
    Else
        data_cmo.Recordset.MovePrevious
    End If
End If
```

'Disabling inappropriate buttons

cmd_update.Enabled = False

cmd_cancel.Enabled = False

End Sub

'This command is used to edit a current record

Private Sub cmd_edit_Click()

data_cmo.Recordset.Edit

'Enabling appropriate buttons

cmd_cancel.Enabled = True

cmd_update.Enabled = True

End Sub

'This command is used to go to the first record in the table

Private Sub cmd_first_Click()

'Enabling appropriate buttons

cmd_next.Enabled = True

cmd_last.Enabled = True

data_cmo.Recordset.MoveFirst

'Disabling inappropriate buttons

cmd_first.Enabled = False

cmd_previous.Enabled = False

End Sub

'This command is used to go to the last record in the table

Private Sub cmd_last_Click()

```
'Enabling appropriate buttons  
cmd_previous.Enabled = True  
cmd_first.Enabled = True  
data_cmo.Recordset.MoveLast  
'Disabling inappropriate buttons  
cmd_next.Enabled = False  
cmd_last.Enabled = False  
End Sub
```

"This command is used to go back to the Main Form.

```
Private Sub cmd_main_form_Click()  
    main_form.Show  
    Me.Hide  
End Sub
```

'This command is used to view the medical history of patient with CMO

```
Private Sub cmd_medical_history_Click()  
    dbgrid_cmo.Visible = True  
    data_medical_history.RecordSource = "select * from cmo where patient_id=" &  
    txt_patient_id  
    data_medical_history.Refresh  
    dbgrid_cmo.Refresh  
End Sub (Objective 10 fulfilled)
```

'This command is used to go to the next record in the table.

```
Private Sub cmd_next_Click()
```

```
'Enabling appropriate buttons
cmd_previous.Enabled = True
cmd_first.Enabled = True
data_cmo.Recordset.MoveNext

'If current record is last record then a message box pops out alerting the user about reaching
the end of file and the next and last buttons are disabled
If data_cmo.Recordset.EOF Then
    data_cmo.Recordset.MovePrevious
    MsgBox "No more records", vbExclamation
'Disabling inappropriate buttons
cmd_next.Enabled = False
cmd_last.Enabled = False
End If

End Sub
```

'This command is used to go to the previous record in the table.

```
Private Sub cmd_previous_Click()
    'Enabling appropriate buttons
    cmd_next.Enabled = True
    cmd_last.Enabled = True
    data_cmo.Recordset.MovePrevious

    'If current record is first record then a message box pops out alerting the user about reaching
    the end of file and the previous and first buttons are disabled
    If data_cmo.Recordset.BOF Then
        data_cmo.Recordset.MoveNext
        MsgBox "No more records", vbExclamation
        cmd_first.Enabled = False
        cmd_previous.Enabled = False
    End If

End Sub
```

'This command is used to search for the patient ID which is available in the table

```
Private Sub cmd_search_by_id_Click()
    data_cmo.Recordset.FindFirst "patient_id=" & dbcombo_patient_id & ""
End Sub

Private Sub cmd_update_Click()
    If txt_patient_id = "" Or txt_doctor_id = "" Then
        MsgBox "A required field is missing", vbExclamation
        data_cmo.Recordset.CancelUpdate
    Else
        data_cmo.Recordset.Update
        data_cmo.Refresh
        'Disabling inappropriate buttons
        cmd_update.Enabled = False
        cmd_cancel.Enabled = False
    End If
End Sub
```

'This command is carried out as the form loads

```
Private Sub Form_Load()
    'Give path to the database
    data_dbcombo.DatabaseName = App.Path & "\BenazirBhuttoHospitalEmergency.mdb"
    data_cmo.DatabaseName = App.Path & "\BenazirBhuttoHospitalEmergency.mdb"
    data_medical_history.DatabaseName = App.Path &
    "\BenazirBhuttoHospitalEmergency.mdb"
End Sub
```

'This command is used as a validation check to make sure that only numeric data is entered

'Compare the pressed key code with the standard Ascii code and alert user if wrong type of data is entered

```
Private Sub txt_patient_id_KeyPress(KeyAscii As Integer)
```

```
If KeyAscii = 47 Or KeyAscii >= 58 Then
    KeyAscii = 0
    MsgBox ("Enter Digits Only"), vbExclamation
Else
    If KeyAscii = 34 Or KeyAscii = 59 Then
        KeyAscii = 0
        MsgBox "Enter Digits Only", vbExclamation
    Else
        If KeyAscii = 45 Or KeyAscii = 43 Then
            KeyAscii = 0
            MsgBox "Enter Digits Only", vbExclamation
        Else
            If KeyAscii = 44 Or KeyAscii = 46 Then
                KeyAscii = 0
                MsgBox "Enter Digits Only", vbExclamation
            Else
                If KeyAscii = 33 Or KeyAscii = 35 Then
                    KeyAscii = 0
                    MsgBox "Enter Digits Only", vbExclamation
                Else
                    If KeyAscii = 36 Or KeyAscii = 37 Then
                        KeyAscii = 0
                        MsgBox "Enter Digits Only", vbExclamation
                    Else
                        If KeyAscii = 38 Or KeyAscii = 42 Then
                            KeyAscii = 0
                            MsgBox "Enter Digits Only", vbExclamation
                        Else
                            If KeyAscii = 40 Or KeyAscii = 41 Then
                                KeyAscii = 0
                                MsgBox "Enter Digits Only", vbExclamation
                            Else
                                If KeyAscii = 39 Then
                                    KeyAscii = 0
                                    MsgBox "Enter Digits Only", vbExclamation
                                End If
                            End If
                        End If
                    End If
                End If
            End If
        End If
    End If
End If
```

```
End If  
End If  
End If  
End If  
End If  
End If  
End Sub
```

SENIOR MEDICAL OFFICER FORM:

'This command is used to go back to the previous form

```
Private Sub cmd_back_Click()
```

```
    patient_treatment.Show
```

```
    Me.Hide
```

```
End Sub
```

'This command is used to go to the Main form

```
Private Sub cmd_main_form_Click()
```

```
    main_form.Show
```

```
    Me.Hide
```

```
End Sub
```

'This command is used to view the patient medical history

```
Private Sub cmd_patient_medical_history_Click()
    patient_medical_history.Show
    Me.Hide
End Sub
```

'This command is used to go to the first record in the table

```
Private Sub cmd_first_Click()
    'Enabling appropriate buttons
    cmd_next.Enabled = True
    cmd_last.Enabled = True
    data_senior_medical_officer.Recordset.MoveFirst
    'Disabling inappropriate buttons
    cmd_first.Enabled = False
    cmd_previous.Enabled = False
End Sub
```

'This command is used to go to the last record in the table

```
Private Sub cmd_last_Click()
    'Enabling appropriate buttons
    cmd_previous.Enabled = True
    cmd_first.Enabled = True
    data_senior_medical_officer.Recordset.MoveLast
    'Disabling inappropriate buttons
    cmd_next.Enabled = False
    cmd_last.Enabled = False
End Sub
```

'This command is used to go to the next record in the table.

```
Private Sub cmd_next_Click()
```

```
cmd_previous.Enabled = True
cmd_first.Enabled = True
data_senior_medical_officer.Recordset.MoveNext

'If current record is last record then a message box pops out alerting the user about reaching
the end of file and the next and last buttons are disabled
If data_senior_medical_officer.Recordset.EOF Then
    data_senior_medical_officer.Recordset.MovePrevious
    MsgBox "No more records", vbExclamation
    'Disabling inappropriate buttons
    cmd_next.Enabled = False
    cmd_last.Enabled = False
End If
End Sub
```

'This command is used to go to the previous record in the table

```
Private Sub cmd_previous_Click()
    'Enabling appropriate buttons
    cmd_next.Enabled = True
    cmd_last.Enabled = True
    data_senior_medical_officer.Recordset.MovePrevious

    'If current record is first record then a message box pops out alerting the user about reaching
    the end of file and the previous and first buttons are disabled
    If data_senior_medical_officer.Recordset.BOF Then
        data_senior_medical_officer.Recordset.MoveNext
        MsgBox "No more records", vbExclamation
        cmd_first.Enabled = False
        cmd_previous.Enabled = False
    End If
End Sub
```

'This command is used to search for the patient ID which is available in the table

```
Private Sub cmd_search_by_id_Click()
    data_senior_medical_officer.Recordset.FindFirst "patient_id=" & dbcombo_patient_id
    & ""
End Sub
```

'This command is used to save any changes made after addition or editing

```
Private Sub cmd_update_Click()
    data_senior_medical_officer.Recordset.Update
    data_senior_medical_officer.Refresh
    cmd_update.Enabled = False
    cmd_cancel.Enabled = False
End Sub
```

'This command is used to add a new record to the database

```
Private Sub cmd_add_Click()
    data_senior_medical_officer.Recordset.AddNew
    'The time and date are automatically input from the computers clock and calender
    txt_time = Time
    txt_date = Date
    'Enabling appropriate buttons
    cmd_update.Enabled = True
    cmd_cancel.Enabled = True
End Sub
```

'This command is used to cancel changes made during adding /updating a record

```
Private Sub cmd_cancel_Click()
    data_senior_medical_officer.Recordset.CancelUpdate
    cmd_cancel.Enabled = False
    cmd_update.Enabled = False
End Sub
```

'This command is used to delete an entire field

```
Private Sub cmd_delete_Click()
    'Display a confirmation message and if user confirms deletion then delete
    del = MsgBox("Are you sure you want to delete this record?", vbYesNo + vbQuestion +
    vbDefaultButton2, App.Title)
    If del = vbYes Then
        data_senior_medical_officer.Recordset.Delete
        If data_senior_medical_officer.Recordset.EOF Then
            data_senior_medical_officer.Recordset.MoveNext
    Else
        data_senior_medical_officer.Recordset.MovePrevious
    End If
    End If
    'Disabling inappropriate buttons
    cmd_update.Enabled = False
    cmd_cancel.Enabled = False
End Sub
```

'This command is used to edit a current record

```
Private Sub cmd_edit_Click()
    data_senior_medical_officer.Recordset.Edit
    'Enabling appropriate buttons
    cmd_cancel.Enabled = True
    cmd_update.Enabled = True
End Sub
```

'This command is used to view the patient medical history

```
Private Sub cmd_medical_history_Click()
    dbgrid_senior_medical_officer.Visible = True
    data_medical_history.RecordSource = "select * from senior_medical_officer
where patient_id=" & txt_patient_id
    data_medical_history.Refresh
    dbgrid_senior_medical_officer.Refresh
End Sub (Objective 10 fulfilled)
```

'This command is carried out as the form loads

```
Private Sub Form_Load()
'Give path to the database
    data_dbcombo.DatabaseName = App.Path & "\BenazirBhuttoHospitalEmergency.mdb "
    data_senior_medical_officer.DatabaseName = App.Path &
"\BenazirBhuttoHospitalEmergency.mdb "
    data_medical_history.DatabaseName = App.Path &
"\BenazirBhuttoHospitalEmergency.mdb "
End Sub
```

'This command is used as a validation check to make sure that only numeric data is entered

```
Private Sub txt_patient_id_KeyPress(KeyAscii As Integer)
'Compare the pressed key code with the standard Ascii code and alert user if wrong type of
data is entered
```

```
If KeyAscii = 47 Or KeyAscii >= 58 Then
    KeyAscii = 0
    MsgBox ("Enter Digits Only"), vbExclamation
Else
    If KeyAscii = 34 Or KeyAscii = 59 Then
        KeyAscii = 0
        MsgBox "Enter Digits Only", vbExclamation
Else
```

```
If KeyAscii = 45 Or KeyAscii = 43 Then
    KeyAscii = 0
    MsgBox "Enter Digits Only", vbExclamation
Else
    If KeyAscii = 44 Or KeyAscii = 46 Then
        KeyAscii = 0
        MsgBox "Enter Digits Only", vbExclamation
    Else
        If KeyAscii = 33 Or KeyAscii = 35 Then
            KeyAscii = 0
            MsgBox "Enter Digits Only", vbExclamation
        Else
            If KeyAscii = 36 Or KeyAscii = 37 Then
                KeyAscii = 0
                MsgBox "Enter Digits Only", vbExclamation
            Else
                If KeyAscii = 38 Or KeyAscii = 42 Then
                    KeyAscii = 0
                    MsgBox "Enter Digits Only", vbExclamation
                Else
                    If KeyAscii = 40 Or KeyAscii = 41 Then
                        KeyAscii = 0
                        MsgBox "Enter Digits Only", vbExclamation
                    Else
                        If KeyAscii = 39 Then
                            KeyAscii = 0
                            MsgBox "Enter Digits Only", vbExclamation
                        End If
                    End If
                End If
            End If
        End If
    End If
End Sub
```

PATIENT TESTS FORM:

The screenshot shows a Windows application window titled "Project1 - patient_tests (Form)". The main title bar has standard minimize, maximize, and close buttons. Below the title bar, the window is titled "Patient Tests". On the left side, there is a blue arrow pointing left and a blue house icon. In the center, there is a search bar labeled "Search by Patient ID" with a dropdown arrow and a "Search" button. Below the search bar are two sets of input fields: "Patient ID" and "Referring Doctor ID" each with a dropdown arrow, and "Date" and "Time" each with a dropdown arrow. To the right of these fields is a vertical column of five blue buttons: "Add", "Edit", "Delete", "Update", and "Cancel". Below these buttons is a text area containing the text "Show Past Test Results of Patient". In the middle-left area, there is a section titled "Tests" enclosed in a light gray border. This section contains eight input fields arranged in two rows of four. The first row contains "X-Ray", "Blood Sugar Random", "Bilirubin", and an empty input field. The second row contains "Haemoglobin", "Serum Calcium", "Urea", and an empty input field. Below the "Tests" section are two large text input fields: "Diagnosis" and "Process". At the bottom of the form are four blue buttons: "First", "Previous", "Next", and "Last". At the very bottom left is a small text area with an asterisk (*) and a blank input field.

'This command is used to add a new record to the database

```
Private Sub cmd_add_Click()
```

```
    data_patient_tests.Recordset.AddNew
```

'The time and date are automatically input from the computers clock and calendar

```
    txt_date = Date
```

```
    txt_time = Time
```

'Enabling appropriate buttons

```
    cmd_update.Enabled = True
```

```
    cmd_cancel.Enabled = True
```

```
End Sub
```

'Go back to previous form

```
Private Sub cmd_back_Click()
    patient_treatment.Show
    Me.Hide
End Sub
```

'This command is used to cancel changes made during adding /updating a record

```
Private Sub cmd_cancel_Click()
    data_patient_tests.Recordset.CancelUpdate
    'Disabling inappropriate buttons
    cmd_cancel.Enabled = False
    cmd_update.Enabled = False
End Sub
```

'This command is used to delete an entire field

```
Private Sub cmd_delete_Click()
    'Display a confirmation message and if user confirms deletion then delete
    del = MsgBox("Are you sure you want to delete this record?", vbYesNo + vbQuestion +
    vbDefaultButton2, App.Title)
    If del = vbYes Then
        data_patient_tests.Recordset.Delete
        If data_patient_tests.Recordset.EOF Then
            data_patient_tests.Recordset.MoveNext
    Else
        data_patient_tests.Recordset.MovePrevious
    End If
    End If
    'Disabling inappropriate buttons
    cmd_update.Enabled = False
```

```
cmd_cancel.Enabled = False  
End Sub
```

'This command is used to edit a current record

```
Private Sub cmd_edit_Click()  
    data_patient_tests.Recordset.Edit  
    'Enabling appropriate buttons  
    cmd_cancel.Enabled = True  
    cmd_update.Enabled = True  
End Sub
```

'This command is used to go to the first record in the table

```
Private Sub cmd_first_Click()  
    'Enabling appropriate buttons  
    cmd_next.Enabled = True  
    cmd_last.Enabled = True  
    data_patient_tests.Recordset.MoveFirst  
    cmd_first.Enabled = False  
    cmd_previous.Enabled = False  
End Sub
```

'This command is used to go to the last record in the table

```
Private Sub cmd_last_Click()
```

```
    cmd_previous.Enabled = True  
    cmd_first.Enabled = True  
    data_patient_tests.Recordset.MoveLast  
  
'Disabling inappropriate buttons  
    cmd_next.Enabled = False  
    cmd_last.Enabled = False
```

```
End Sub
```

'Go back to Main Form

```
Private Sub cmd_main_form_Click()
```

```
    main_form.Show  
    Me.Hide
```

```
End Sub
```

'This command is used to view the patient medical history

```
Private Sub cmd_medical_history_Click()
```

```
    dbgrid_patient_tests.Visible = True  
    data_medical_history.RecordSource = "select * from patient_tests where patient_id=" &  
    txt_patient_id  
    data_medical_history.Refresh  
    dbgrid_patient_tests.Refresh  
End Sub (Objective 10 fulfilled)
```

'This command is used to go to the next record in the table.

```
Private Sub cmd_next_Click()
```

```
    cmd_previous.Enabled = True  
    cmd_first.Enabled = True
```

```
    data_patient_tests.Recordset.MoveNext
```

'If current record is last record then a message box pops out alerting the user about reaching
the end of file and the next and last buttons are disabled

```
    If data_patient_tests.Recordset.EOF Then
```

```
        data_patient_tests.Recordset.MovePrevious
```

```
        MsgBox "No more records", vbExclamation
```

'Disabling inappropriate buttons

```
    cmd_next.Enabled = False  
    cmd_last.Enabled = False  
End If  
End Sub
```

'This command is used to go to the previous record in the table.

```
Private Sub cmd_previous_Click()  
    cmd_next.Enabled = True  
    cmd_last.Enabled = True  
    data_patient_tests.Recordset.MovePrevious  
  
'If current record is first record then a message box pops out alerting the user about reaching  
the end of file and the previous and first buttons are disabled  
    If data_patient_tests.Recordset.BOF Then  
        data_patient_tests.Recordset.MoveNext  
        MsgBox "No more records", vbExclamation  
        'Disabling inappropriate buttons  
        cmd_first.Enabled = False  
        cmd_previous.Enabled = False  
    End If  
End Sub
```

'This command is used to search for the patient ID which is available in the table

```
Private Sub cmd_search_by_id_Click()  
    data_patient_tests.Recordset.FindFirst "patient_id=" & dbcombo_patient_id & ""  
End Sub
```

'This command is used to save any changes made after addition or editing

```
Private Sub cmd_update_Click()
    data_patient_tests.Recordset.Update
    data_patient_tests.Refresh
    'Disabling inappropriate buttons
    cmd_update.Enabled = False
    cmd_cancel.Enabled = False
End Sub
```

'This command is carried out as the form loads

```
Private Sub Form_Load()
    'Give path to the database
    data_dbcombo.DatabaseName = App.Path & "\BenazirBhuttoHospitalEmergency.mdb "
    data_patient_tests.DatabaseName = App.Path &
    "\BenazirBhuttoHospitalEmergency.mdb "
    data_medical_history.DatabaseName = App.Path &
    "\BenazirBhuttoHospitalEmergency.mdb "
End Sub
```

'This command is used as a validation check to make sure that only numeric data is entered

```
Private Sub txt_patient_id_KeyPress(KeyAscii As Integer)
```

'Compare the pressed key code with the standard Ascii code and alert user if wrong type of
data is entered

```
If KeyAscii = 47 Or KeyAscii >= 58 Then
```

```
    KeyAscii = 0
    MsgBox ("Enter Digits Only"), vbExclamation
Else
    If KeyAscii = 34 Or KeyAscii = 59 Then
        KeyAscii = 0
        MsgBox "Enter Digits Only", vbExclamation
Else
    If KeyAscii = 45 Or KeyAscii = 43 Then
        KeyAscii = 0
        MsgBox "Enter Digits Only", vbExclamation
Else
    If KeyAscii = 44 Or KeyAscii = 46 Then
        KeyAscii = 0
        MsgBox "Enter Digits Only", vbExclamation
Else
    If KeyAscii = 33 Or KeyAscii = 35 Then
        KeyAscii = 0
        MsgBox "Enter Digits Only", vbExclamation
Else
    If KeyAscii = 36 Or KeyAscii = 37 Then
        KeyAscii = 0
        MsgBox "Enter Digits Only", vbExclamation
Else
    If KeyAscii = 38 Or KeyAscii = 42 Then
        KeyAscii = 0
        MsgBox "Enter Digits Only", vbExclamation
Else
    If KeyAscii = 40 Or KeyAscii = 41 Then
        KeyAscii = 0
        MsgBox "Enter Digits Only", vbExclamation
Else
    If KeyAscii = 39 Then
        KeyAscii = 0
        MsgBox "Enter Digits Only", vbExclamation
End If
End If
End If
End If
```

End If

End If

End If

End If

End If

End Sub

WARD ADMISSION FORM:

'Go back to previous form

```
Private Sub cmd_back_Click()
    patient_treatment.Show
    Me.Hide
End Sub
```

'Go back to Main form

```
Private Sub cmd_main_form_Click()
    main_form.Show
    Me.Hide
End Sub
```

'This command is used to add a new record to the database

Private Sub cmd_add_Click()

'Give the user 2 options for ward name

cbo_ward_name.Clear

cbo_ward_name.AddItem "Surgery"

cbo_ward_name.AddItem "Medicine"

'Disabling inappropriate buttons

txt_ward_name.Visible = False

cbo_ward_name.Visible = True

data_ward_admissions.Recordset.AddNew

'The time and date are automatically input from the computers clock and calendar

txt_date_of_admission = Date

txt_time_of_admission = Time

cmd_update.Enabled = True

cmd_cancel.Enabled = True

End Sub

'This command is used to cancel changes made during adding /updating a record

Private Sub cmd_cancel_Click()

data_ward_admissions.Recordset.CancelUpdate

cbo_ward_name.Visible = False

txt_ward_name.Visible = True

'Disabling inappropriate buttons

cmd_cancel.Enabled = False

cmd_update.Enabled = False

End Sub

'This command is used to delete an entire field

Private Sub cmd_delete_Click()

del = MsgBox("Are you sure you want to delete this record?", vbYesNo + vbQuestion + vbDefaultButton2, App.Title)

'Display a confirmation message and if user confirms deletion then delete

If del = vbYes Then

```
    data_ward_admissions.Recordset.Delete
    If data_ward_admissions.Recordset.BOF Then
        data_ward_admissions.Recordset.MovePrevious
    Else
        data_ward_admissions.Recordset.MoveNext
    End If
    End If

'If the deleted record was related to surgery ward then update the wards status
If txt_ward_name = "Surgery" Then
    ward_information.data_ward_information.Recordset.Edit
        ward_information.txt_beds_occupied_by_surgery =
            Val(ward_information.txt_beds_occupied_by_surgery) - 1
    ward_information.data_ward_information.Recordset.Update
    ward_information.data_ward_information.Refresh
        ward_information.txt_beds_available =
            Val(ward_information.txt_total_beds_in_surgery) -
            Val(ward_information.txt_beds_occupied_by_surgery)
    End If

'If the deleted record was related to medicine ward then update the wards status
If txt_ward_name = "Medicine" Then
    ward_information.data_ward_information.Recordset.Edit
        ward_information.txt_beds_occupied_by_medicine =
            Val(ward_information.txt_beds_occupied_by_medicine) - 1
    ward_information.data_ward_information.Recordset.Update
    ward_information.data_ward_information.Refresh
        ward_information.txt_beds_available =
            Val(ward_information.txt_total_beds_in_medicine) -
            Val(ward_information.txt_beds_occupied_by_medicine)
End If

End Sub
```

'This command is used to edit a current record

```
Private Sub cmd_edit_Click()
    cbo_ward_name.Clear
```

```
cbo_ward_name.AddItem "Surgery"  
cbo_ward_name.AddItem "Medicine"  
txt_ward_name.Visible = False  
cbo_ward_name.Visible = True  
data_ward_admissions.Recordset.Edit  
'Enabling appropriate buttons  
cmd_cancel.Enabled = True  
cmd_update.Enabled = True  
End Sub
```

'This command is used to go to the first record in the table

```
Private Sub cmd_first_Click()  
    cmd_next.Enabled = True  
    cmd_last.Enabled = True  
    data_ward_admissions.Recordset.MoveFirst  
'Disabling inappropriate buttons  
    cmd_first.Enabled = False  
    cmd_previous.Enabled = False  
End Sub
```

'This command is used to go to the last record in the table

```
Private Sub cmd_last_Click()  
    cmd_previous.Enabled = True  
    cmd_first.Enabled = True  
    data_ward_admissions.Recordset.MoveLast  
'Disabling inappropriate buttons  
    cmd_next.Enabled = False  
    cmd_last.Enabled = False  
End Sub
```

'This command is used to go to the next record in the table.

```
Private Sub cmd_next_Click()  
    cmd_previous.Enabled = True  
    cmd_first.Enabled = True  
    data_ward_admissions.Recordset.MoveNext
```

'If current record is last record then a message box pops out alerting the user about reaching the end of file and the next and last buttons are disabled

```
If data_ward_admissions.Recordset.EOF Then  
    data_ward_admissions.Recordset.MovePrevious  
    MsgBox "No more records", vbExclamation  
    'Disabling inappropriate buttons  
    cmd_next.Enabled = False  
    cmd_last.Enabled = False  
End If  
End Sub
```

'This command is used to go to the previous record in the table.

```
Private Sub cmd_previous_Click()  
    cmd_next.Enabled = True  
    cmd_last.Enabled = True  
    data_ward_admissions.Recordset.MovePrevious
```

'If current record is first record then a message box pops out alerting the user about reaching the end of file and the previous and first buttons are disabled

```
If data_ward_admissions.Recordset.BOF Then  
    data_ward_admissions.Recordset.MoveNext  
    MsgBox "No more records", vbExclamation  
    'Disabling inappropriate buttons  
    cmd_first.Enabled = False  
    cmd_previous.Enabled = False  
End If  
End Sub
```

'This command is used to search for the patient ID which is available in the table

```
Private Sub cmd_search_by_id_Click()  
    data_ward_admissions.Recordset.FindFirst "patient_id=" & dbcombo_patient_id & ""  
End Sub
```

'This command is used to save any changes made after addition or editing

Private Sub cmd_update_Click()

 txt_ward_name = cbo_ward_name

'If beds are not available then deny admission (Objective 13 fulfilled)

 If cbo_ward_name = "Surgery" Then

 If Val(ward_information.txt_beds_occupied_by_surgery) =

 Val(ward_information.txt_total_beds_in_surgery) Then

 MsgBox "WARD IS FULL", vbExclamation

 data_ward_admissions.Recordset.CancelUpdate

 Else

'Automatically change ward status

 If cbo_ward_name = "Surgery" Then

 ward_information.data_ward_information.Recordset.Edit

 ward_information.txt_beds_occupied_by_surgery =

 Val(ward_information.txt_beds_occupied_by_surgery) + 1

 ward_information.data_ward_information.Recordset.Update

 ward_information.data_ward_information.Refresh

 ward_information.txt_beds_available =

 Val(ward_information.txt_total_beds_in_surgery) -

 Val(ward_information.txt_beds_occupied_by_surgery)

 MsgBox "Patient Admitted", vbExclamation

 data_ward_admissions.Recordset.Update

 data_ward_admissions.Refresh

 cbo_ward_name.Visible = False

 txt_ward_name.Visible = True

 cmd_update.Enabled = False

 cmd_cancel.Enabled = False

 End If

End If

End If

 If cbo_ward_name = "Medicine" Then

 ward_information.data_ward_information.Recordset.Edit

 ward_information.txt_beds_occupied_by_medicine =

 Val(ward_information.txt_beds_occupied_by_medicine) + 1

 ward_information.data_ward_information.Recordset.Update

 ward_information.data_ward_information.Refresh

```
    ward_information.txt_beds_available =  
    Val(ward_information.txt_total_beds_in_medicine) -  
    Val(ward_information.txt_beds_occupied_by_medicine)  
    MsgBox "Patient Admitted", vbExclamation  
    data_ward_admissions.Recordset.Update  
    data_ward_admissions.Refresh  
    cbo_ward_name.Visible = False  
    txt_ward_name.Visible = True  
End Sub      (Objective 9 fulfilled)
```

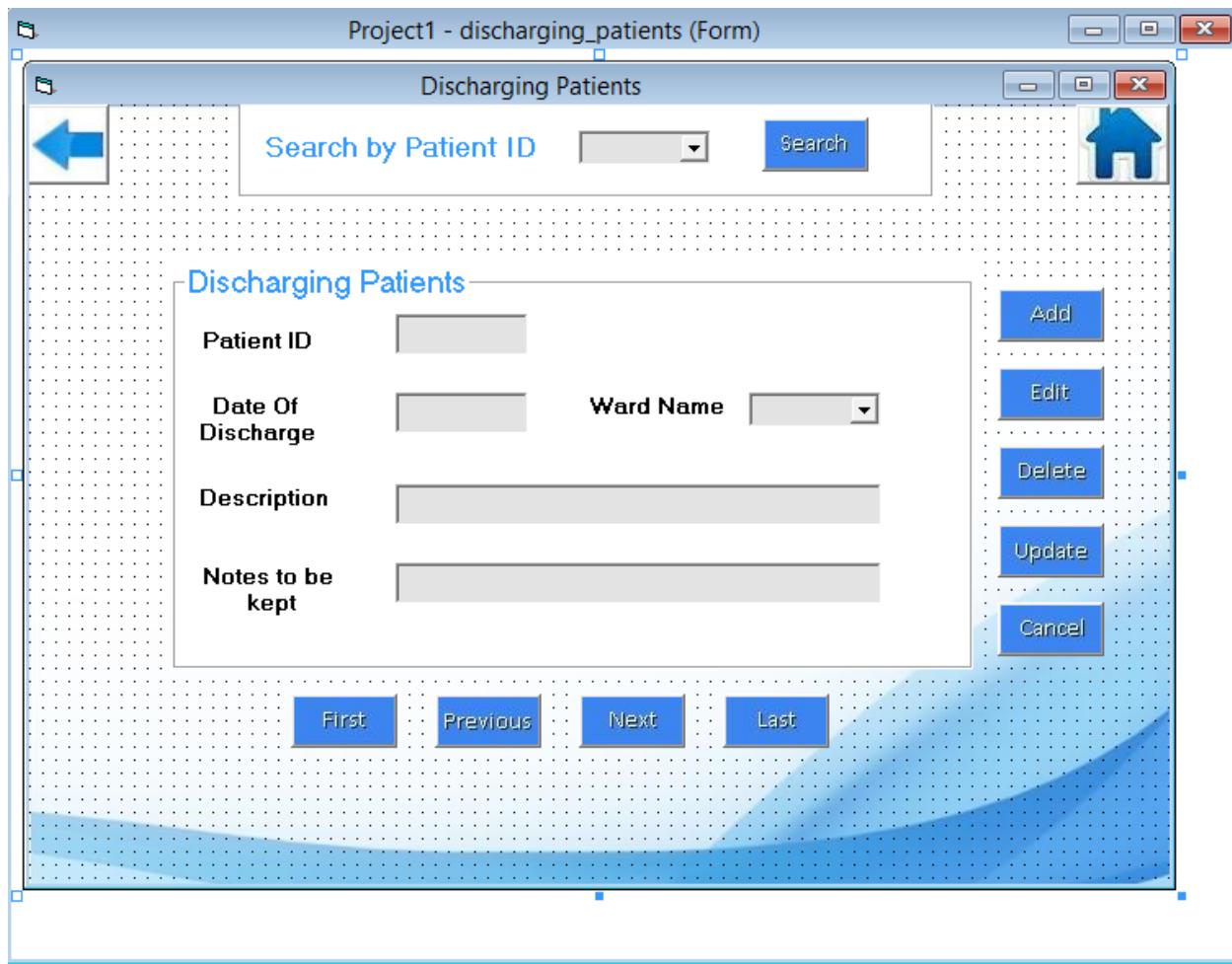
'This command is carried out as the form loads

```
Private Sub Form_Load()  
'Give path to the database  
    data_dbcombo.DatabaseName = App.Path & "\BenazirBhuttoHospitalEmergency.mdb "  
    data_ward_admissions.DatabaseName = App.Path &  
"\BenazirBhuttoHospitalEmergency.mdb "  
    cbo_ward_name.Clear  
    cbo_ward_name.AddItem "Surgery"  
    cbo_ward_name.AddItem "Medicine"  
End Sub
```

'This command is used as a validation check to make sure that only numeric data is entered

```
Private Sub txt_patient_id_KeyPress(KeyAscii As Integer)  
'Compare the pressed key code with the standard Ascii code and alert user if wrong type of  
data is entered  
    If KeyAscii = 47 Or KeyAscii >= 58 Then  
        KeyAscii = 0  
        MsgBox ("Enter Digits Only"), vbExclamation  
    Else  
        If KeyAscii = 34 Or KeyAscii = 59 Then  
            KeyAscii = 0  
            MsgBox "Enter Digits Only", vbExclamation
```

```
Else
    If KeyAscii = 45 Or KeyAscii = 43 Then
        KeyAscii = 0
        MsgBox "Enter Digits Only", vbExclamation
    Else
        If KeyAscii = 44 Or KeyAscii = 46 Then
            KeyAscii = 0
            MsgBox "Enter Digits Only", vbExclamation
        Else
            If KeyAscii = 33 Or KeyAscii = 35 Then
                KeyAscii = 0
                MsgBox "Enter Digits Only", vbExclamation
            Else
                If KeyAscii = 36 Or KeyAscii = 37 Then
                    KeyAscii = 0
                    MsgBox "Enter Digits Only", vbExclamation
                Else
                    If KeyAscii = 38 Or KeyAscii = 42 Then
                        KeyAscii = 0
                        MsgBox "Enter Digits Only", vbExclamation
                    Else
                        If KeyAscii = 40 Or KeyAscii = 41 Then
                            KeyAscii = 0
                            MsgBox "Enter Digits Only", vbExclamation
                        Else
                            If KeyAscii = 39 Then
                                KeyAscii = 0
                                MsgBox "Enter Digits Only", vbExclamation
                            End If
                            End If
End Sub
```

DISCHARGING PATIENT FORM:

'This command is used to add a new record to the database

```
Private Sub cmd_add_Click()
```

```
    cbo_ward_name.Clear
    cbo_ward_name.AddItem "Surgery"
    cbo_ward_name.AddItem "Medicine"
    txt_ward_name.Visible = False
    cbo_ward_name.Visible = True
    data_discharging_patients.Recordset.AddNew
```

'The time and date are automatically input from the computers clock and calender

```
    txt_date = txt_date_discharged
    cmd_delete.Enabled = False
    'Enabling appropriate buttons
    cmd_update.Enabled = True
    cmd_cancel.Enabled = True
```

End Sub

'Go back to previous form

```
Private Sub cmd_back_Click()
    patient_treatment.Show
    Me.Hide
End Sub
```

'This command is used to cancel changes made during adding /updating a record

```
Private Sub cmd_cancel_Click()
    data_discharging_patients.Recordset.CancelUpdate
    'Disabling inappropriate buttons
    cmd_cancel.Enabled = False
    cmd_update.Enabled = False
    'Enabling appropriate buttons
    cmd_delete.Enabled = True
End Sub
```

'This command is used to delete an entire field

```
Private Sub cmd_delete_Click()
    'Display a confirmation message and if user confirms deletion then delete
    del = MsgBox("Are you sure you want to delete this record?", vbYesNo + vbQuestion +
    vbDefaultButton2, App.Title)
    If del = vbYes Then
        data_discharging_patients.Recordset.Delete
        If data_discharging_patients.Recordset.EOF Then
            data_discharging_patients.Recordset.MoveNext
        Else
            data_discharging_patients.Recordset.MovePrevious
        End If
    End If
    'Disabling inappropriate buttons
    cmd_update.Enabled = False
    cmd_cancel.Enabled = False
End Sub
```

'This command is used to edit a current record

```
Private Sub cmd_edit_Click()
    cbo_ward_name.Clear
    cbo_ward_name.AddItem "Surgery"
    cbo_ward_name.AddItem "Medicine"
    txt_ward_name.Visible = False
    cbo_ward_name.Visible = True
    data_discharging_patients.Recordset.Edit
    cmd_cancel.Enabled = True
    cmd_update.Enabled = True
End Sub
```

'This command is used to go to the first record in the table

```
Private Sub cmd_first_Click()
    cmd_next.Enabled = True
    cmd_last.Enabled = True
    data_discharging_patients.Recordset.MoveFirst
    cmd_first.Enabled = False
    cmd_previous.Enabled = False
End Sub
```

'This command is used to go to the last record in the table

```
Private Sub cmd_last_Click()
    'Enabling appropriate buttons
    cmd_previous.Enabled = True
    cmd_first.Enabled = True
    data_discharging_patients.Recordset.MoveLast
    'Disabling inappropriate buttons
    cmd_next.Enabled = False
    cmd_last.Enabled = False
End Sub
```

'Go to Main Form

```
Private Sub cmd_main_form_Click()
    main_form.Show
    Me.Hide
End Sub
```

'This command is used to go to the next record in the table.

```
Private Sub cmd_next_Click()
    cmd_previous.Enabled = True
    cmd_first.Enabled = True
    data_discharging_patients.Recordset.MoveNext

    If data_discharging_patients.Recordset.EOF Then
        data_discharging_patients.Recordset.MovePrevious
        MsgBox "No more records", vbExclamation
        'Disabling inappropriate buttons
        cmd_next.Enabled = False
        cmd_last.Enabled = False
    End If
End Sub
```

'This command is used to go to the previous record in the table.

```
Private Sub cmd_previous_Click()
    cmd_next.Enabled = True
    cmd_last.Enabled = True
    data_discharging_patients.Recordset.MovePrevious

    If data_discharging_patients.Recordset.BOF Then
        data_discharging_patients.Recordset.MoveNext
        MsgBox "No more records", vbExclamation
    End If
End Sub
```

```
'Disabling inappropriate buttons  
cmd_first.Enabled = False  
cmd_previous.Enabled = False  
End If  
End Sub
```

'This command is used to search for the patient ID which is available in the table

```
Private Sub cmd_search_Click()  
    data_discharging_patients.Recordset.FindFirst "patient_id=" & dbcombo_patient_id &  
    ...  
End Sub
```

'This command is used to save any changes made after addition or editing

```
Private Sub cmd_update_Click()  
    txt_ward_name = cbo_ward_name  
    data_discharging_patients.Recordset.Update  
    data_discharging_patients.Refresh  
    cbo_ward_name.Visible = False  
    txt_ward_name.Visible = True  
    cmd_update.Enabled = False  
    cmd_cancel.Enabled = False  
    cmd_delete.Enabled = True
```

'Automatically change the respective ward status

```
If cbo_ward_name = "Surgery" Then  
    ward_information.data_ward_information.Recordset.Edit  
    ward_information.txt_beds_occupied_by_surgery =  
    Val(ward_information.txt_beds_occupied_by_surgery) - 1  
    ward_information.data_ward_information.Recordset.Update  
    ward_information.data_ward_information.Refresh  
    ward_information.txt_beds_available =  
    Val(ward_information.txt_total_beds_in_surgery) -  
    Val(ward_information.txt_beds_occupied_by_surgery)  
Else  
    If cbo_ward_name = "Medicine" Then  
        ward_information.data_ward_information.Recordset.Edit  
        ward_information.txt_beds_occupied_by_medicine =  
        Val(ward_information.txt_beds_occupied_by_medicine) - 1
```

```
ward_information.data_ward_information.Recordset.Update  
ward_information.data_ward_information.Refresh  
ward_information.txt_beds_available =  
Val(ward_information.txt_total_beds_in_medicine) -  
Val(ward_information.txt_beds_occupied_by_medicine)  
End If  
End If  
End Sub (Objective 9 fulfilled)
```

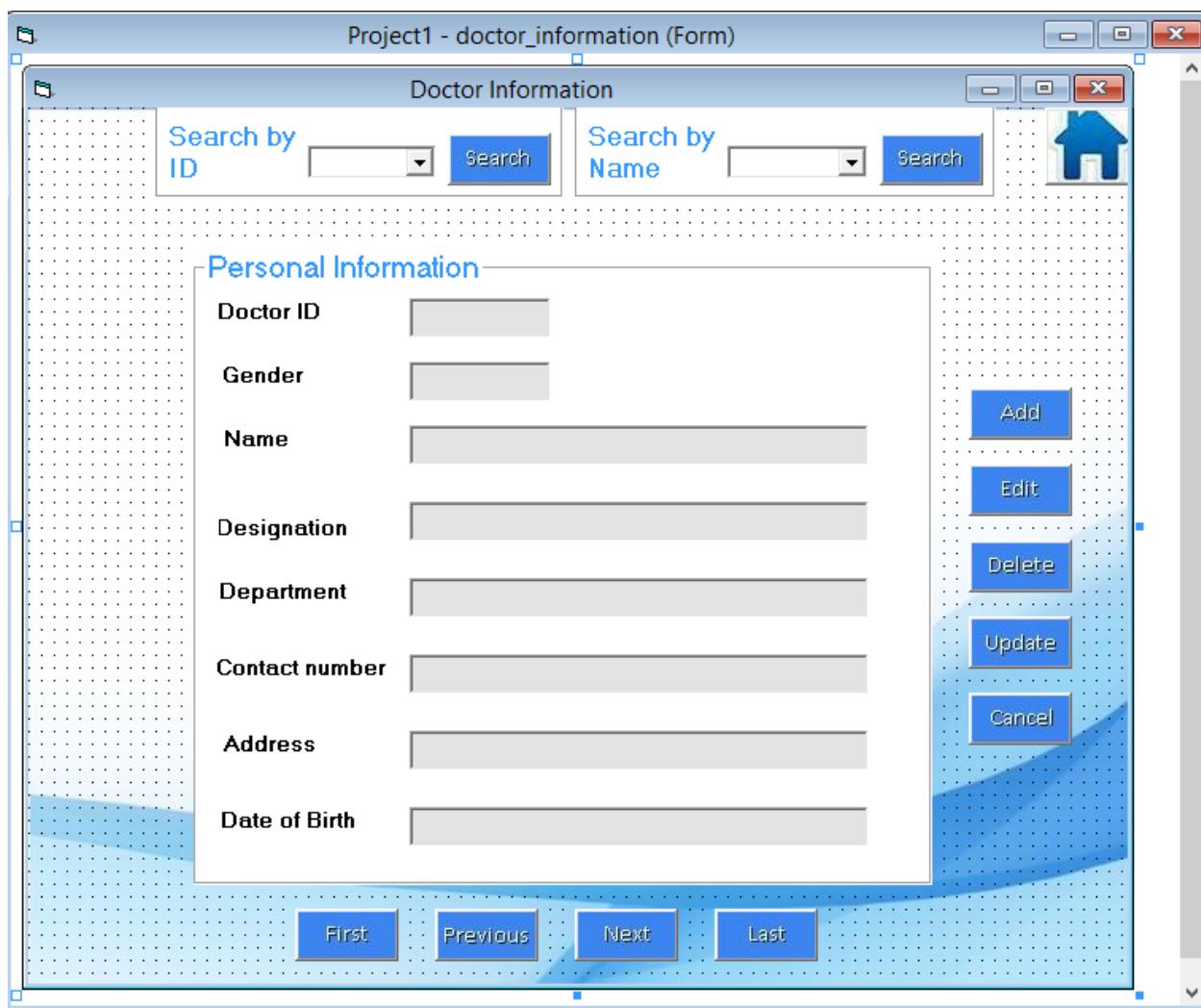
'This command is carried out as the form loads

```
Private Sub Form_Load()  
'Give path to the database  
    data_dbcombo.DatabaseName = App.Path & "\BenazirBhuttoHospitalEmergency.mdb "  
    data_discharging_patients.DatabaseName = App.Path &  
"\BenazirBhuttoHospitalEmergency.mdb "  
    cbo_ward_name.Clear  
    cbo_ward_name.AddItem "Surgery"  
    cbo_ward_name.AddItem "Medicine"  
End Sub
```

'This command is used as a validation check to make sure that only numeric data is entered

```
Private Sub txt_patient_id_KeyPress(KeyAscii As Integer)  
'Compare the pressed key code with the standard Ascii code and alert user if wrong type of  
data is entered  
If KeyAscii = 47 Or KeyAscii >= 58 Then  
    KeyAscii = 0  
    MsgBox ("Enter Digits Only"), vbExclamation  
Else  
    If KeyAscii = 34 Or KeyAscii = 59 Then  
        KeyAscii = 0  
        MsgBox "Enter Digits Only", vbExclamation  
    Else  
        If KeyAscii = 45 Or KeyAscii = 43 Then  
            KeyAscii = 0
```

```
    MsgBox "Enter Digits Only", vbExclamation
Else
    If KeyAscii = 44 Or KeyAscii = 46 Then
        KeyAscii = 0
        MsgBox "Enter Digits Only", vbExclamation
    Else
        If KeyAscii = 33 Or KeyAscii = 35 Then
            KeyAscii = 0
            MsgBox "Enter Digits Only", vbExclamation
        Else
            If KeyAscii = 36 Or KeyAscii = 37 Then
                KeyAscii = 0
                MsgBox "Enter Digits Only", vbExclamation
            Else
                If KeyAscii = 38 Or KeyAscii = 42 Then
                    KeyAscii = 0
                    MsgBox "Enter Digits Only", vbExclamation
                Else
                    If KeyAscii = 40 Or KeyAscii = 41 Then
                        KeyAscii = 0
                        MsgBox "Enter Digits Only", vbExclamation
                    Else
                        If KeyAscii = 39 Then
                            KeyAscii = 0
                            MsgBox "Enter Digits Only", vbExclamation
                        End If
                    End If
                End If
            End If
        End If
    End If
End Sub
```

DOCTOR INFORMATION FORM:

'This command is used to add a new record to the database

```
Private Sub cmd_add_Click()
```

```
    data_doctor_information.Recordset.AddNew
```

'Enabling appropriate buttons

```
    cmd_update.Enabled = True
```

```
    cmd_cancel.Enabled = True
```

End Sub

'This command is used to cancel changes made during adding /updating a record

```
Private Sub cmd_cancel_Click()
```

```
    data_doctor_information.Recordset.CancelUpdate
```

'Disabling inappropriate buttons

```
    cmd_cancel.Enabled = False
```

```
    cmd_update.Enabled = False
```

End Sub

'This command is used to delete an entire field

Private Sub cmd_delete_Click()

'Display a confirmation message and if user confirms deletion then delete

```
    del = MsgBox("Are you sure you want to delete this record?", vbYesNo + vbQuestion +  
    vbDefaultButton2, App.Title)
```

```
    If del = vbYes Then
```

```
        data_doctor_information.Recordset.Delete
```

```
        If data_doctor_information.Recordset.EOF Then
```

```
            data_doctor_information.Recordset.MoveNext
```

```
    Else
```

```
        data_doctor_information.Recordset.MovePrevious
```

```
    End If
```

```
End If
```

'Disabling inappropriate buttons

```
cmd_update.Enabled = False
```

```
cmd_cancel.Enabled = False
```

```
End Sub
```

'This command is used to edit a current record

Private Sub cmd_edit_Click()

```
    data_doctor_information.Recordset.Edit
```

```
    cmd_cancel.Enabled = True
```

```
    cmd_update.Enabled = True
```

```
End Sub
```

'This command is used to go to the first record in the table

Private Sub cmd_first_Click()

```
    cmd_next.Enabled = True
```

```
    cmd_last.Enabled = True
```

```
    data_doctor_information.Recordset.MoveFirst
```

'Disabling inappropriate buttons

```
    cmd_first.Enabled = False
```

```
    cmd_previous.Enabled = False
```

End Sub

'This command is used to go to the last record in the table

Private Sub cmd_last_Click()

 cmd_previous.Enabled = True

 cmd_first.Enabled = True

 data_doctor_information.Recordset.MoveLast

 'Disabling inappropriate buttons

 cmd_next.Enabled = False

 cmd_last.Enabled = False

End Sub

'Go to Main Form

Private Sub cmd_main_form_Click()

 main_form.Show

 Me.Hide

End Sub

'This command is used to go to the next record in the table.

Private Sub cmd_next_Click()

 cmd_previous.Enabled = True

 cmd_first.Enabled = True

 data_doctor_information.Recordset.MoveNext

'If current record is last record then a message box pops out alerting the user about reaching
the end of file and the next and last buttons are disabled

 If data_doctor_information.Recordset.EOF Then

 data_doctor_information.Recordset.MovePrevious

 MsgBox "No more records", vbExclamation

 'Disabling inappropriate buttons

 cmd_next.Enabled = False

 cmd_last.Enabled = False

 End If

End Sub

'This command is used to go to the previous record in the table.

```
Private Sub cmd_previous_Click()
```

```
    cmd_next.Enabled = True
```

```
    cmd_last.Enabled = True
```

```
    data_doctor_information.Recordset.MovePrevious
```

'If current record is first record then a message box pops out alerting the user about reaching the end of file and the previous and first buttons are disabled.

```
    If data_doctor_information.Recordset.BOF Then
```

```
        data_doctor_information.Recordset.MoveNext
```

```
        MsgBox "No more records", vbExclamation
```

'Disabling inappropriate buttons

```
        cmd_first.Enabled = False
```

```
        cmd_previous.Enabled = False
```

```
    End If
```

```
End Sub
```

'This command is used to search for the Doctor ID which is available in the table

```
Private Sub cmd_search_by_id_Click()
```

```
    data_doctor_information.Recordset.FindFirst "doctor_id="" & dbcombo_doctor_id & """
```

```
End Sub
```

This command is used to search for the Doctor Name which is available in the table

```
Private Sub cmd_search_by_name_Click()
```

```
    data_doctor_information.Recordset.FindFirst "name="" & dbcombo_doctor_name & """
```

```
End Sub
```

'This command is used to save any changes made after addition or editing

Private Sub cmd_update_Click()

'Presence checks are applied on 3 fields

If txt_name = "" Then

 MsgBox "A required field is missing", vbExclamation

 data_doctor_information.Recordset.CancelUpdate

Else

 If txt_department = "" Then

 MsgBox "A required field is missing", vbExclamation

 data_doctor_information.Recordset.CancelUpdate

Else

 If txt_date_of_birth = "" Then

 MsgBox "A required field is missing", vbExclamation

 data_doctor_information.Recordset.CancelUpdate

 'Disabling inappropriate buttons

 cmd_cancel.Enabled = False

 cmd_update.Enabled = False

Else

'Doctor ID is generated (Objective 24 fulfilled)

 txt_doctor_id = Left(txt_name, 3) & Left(txt_department, 3) &

 Right(txt_date_of_birth, 4)

 data_doctor_information.Recordset.Update

 data_doctor_information.Refresh

 'Disabling inappropriate buttons

 cmd_update.Enabled = False

 cmd_cancel.Enabled = False

 End If

End If

End If

End Sub

'This command is carried out as the form loads

Private Sub Form_Load()

'Give path to the database

 data_dbcombo.DatabaseName = App.Path & "\BenazirBhuttoHospitalEmergency.mdb "

 data_doctor_information.DatabaseName = App.Path &

 "\BenazirBhuttoHospitalEmergency.mdb "

End Sub

'This command is used as a validation check to make sure that only numbers and dashes are used to enter contact numbers.

```
Private Sub txt_contact_number_KeyPress(KeyAscii As Integer)
'Compare the pressed key code with the standard Ascii code and alert user if wrong type of
data is entered
```

```
If (KeyAscii < 48 And KeyAscii > 8 And KeyAscii > 45) Xor (KeyAscii > 57) Then
    KeyAscii = 0
    MsgBox "Please use only numbers and dashes", vbExclamation
End If
```

```
End Sub
```

'This command is used as a validation check to make sure that only alphabetic data is entered

```
Private Sub txt_name_KeyPress(KeyAscii As Integer)
'Compare the pressed key code with the standard Ascii code and alert user if wrong type of
data is entered
```

```
If KeyAscii >= 33 And KeyAscii <= 59 Then
    KeyAscii = 0
    MsgBox ("Enter Characters Only")
Else
    If KeyAscii >= 123 And KeyAscii <= 126 Then
        KeyAscii = 0
        MsgBox ("Enter Characters Only")
    Else
        If KeyAscii >= 60 And KeyAscii <= 63 Then
            KeyAscii = 0
            MsgBox ("Enter Characters Only")
        Else
            If KeyAscii >= 91 And KeyAscii <= 96 Then
                KeyAscii = 0
                MsgBox ("Enter Characters Only")
            Else
                If KeyAscii >= 60 And KeyAscii <= 64 Then
                    KeyAscii = 0
                    MsgBox ("Enter Characters Only")
```

End If

End If

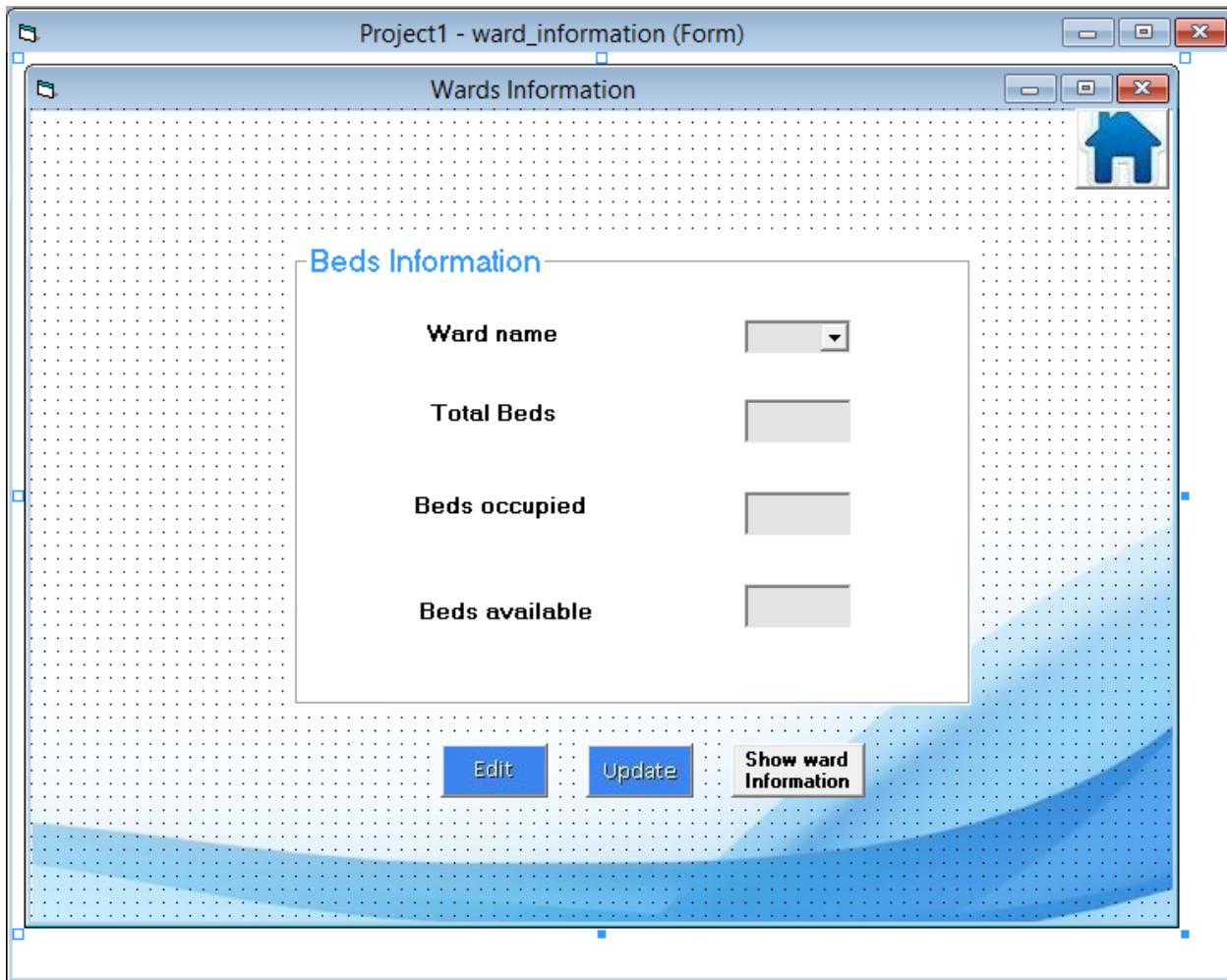
End If

End If

End If

End Sub

WARD STATUS FORM:



'This command is used to edit a current record

```
Private Sub cmd_edit_Click()
    data_ward_information.Recordset.Edit
    txt_total_beds_in_medicine.Enabled = True
    txt_total_beds_in_surgery.Enabled = True
End Sub
```

'Go to Main form

```
Private Sub cmd_main_form_Click()
    main_form.Show
    Me.Hide
End Sub
```

'View the status of the ward chosen through combo box

```
Private Sub cmd_show_ward_information_Click()
    lbl_total_beds.Visible = True
    lbl_beds_occupied.Visible = True
    lbl_beds_available.Visible = True
    If cbo_ward_name = "Surgery" Then
        txt_beds_occupied_by_surgery.Visible = True
        txt_beds_occupied_by_medicine.Visible = False
        txt_total_beds_in_surgery.Visible = True
        txt_total_beds_in_medicine.Visible = False
        txt_beds_available.Visible = True
        txt_beds_available = Val(txt_total_beds_in_surgery) -
        Val(txt_beds_occupied_by_surgery)
    Else
        If cbo_ward_name = "Medicine" Then
            txt_beds_occupied_by_medicine.Visible = True
            txt_beds_occupied_by_surgery.Visible = False
            txt_total_beds_in_surgery.Visible = False
            txt_total_beds_in_medicine.Visible = True
            txt_beds_available.Visible = True
            txt_beds_available = Val(txt_total_beds_in_medicine) -
            Val(txt_beds_occupied_by_medicine)
        End If
    End If
End Sub
```

(Objective 8 fulfilled)

'This command is used to save any changes made after addition or editing

Private Sub cmd_update_Click()

'Update the status of the ward

```
    data_ward_information.Recordset.Update
```

```
    If cbo_ward_name = "Surgery" Then
```

```
        txt_beds_available = Val(txt_total_beds_in_surgery) -
```

```
        Val(txt_beds_occupied_by_surgery)
```

```
    Else
```

```
        If cbo_ward_name = "Medicine" Then
```

```
            txt_beds_available = Val(txt_total_beds_in_medicine) -
```

```
            Val(txt_beds_occupied_by_medicine)
```

```
        End If
```

```
    End If
```

```
    txt_total_beds_in_medicine.Enabled = False
```

```
    txt_total_beds_in_surgery.Enabled = False
```

```
End Sub
```

'This command is carried out as the form loads

Private Sub Form_Load()

```
    data_ward_information.DatabaseName = App.Path &
```

```
    "\BenazirBhuttoHospitalEmergency.mdb "
```

```
    cbo_ward_name.Clear
```

```
    cbo_ward_name.AddItem "Surgery"
```

```
    cbo_ward_name.AddItem "Medicine"
```

```
    txt_total_beds_in_medicine.Enabled = False
```

```
    txt_total_beds_in_surgery.Enabled = False
```

```
    txt_beds_available.Enabled = False
```

```
    lbl_total_beds.Visible = False
```

```
    lbl_beds_occupied.Visible = False
```

```
    lbl_beds_available.Visible = False
```

```
End Sub
```

'This command is used as a validation check to make sure that only numeric data is entered

Private Sub txt_total_beds_in_medicine_Change()

'Compare the pressed key code with the standard Ascii code and alert user if wrong type of data is entered

```
If KeyAscii = 47 Or KeyAscii >= 58 Then  
    KeyAscii = 0  
    MsgBox ("Enter Digits Only"), vbExclamation  
Else  
    If KeyAscii = 34 Or KeyAscii = 59 Then  
        KeyAscii = 0  
        MsgBox "Enter Digits Only", vbExclamation  
    Else  
        If KeyAscii = 45 Or KeyAscii = 43 Then  
            KeyAscii = 0  
            MsgBox "Enter Digits Only", vbExclamation  
        Else  
            If KeyAscii = 44 Or KeyAscii = 46 Then  
                KeyAscii = 0  
                MsgBox "Enter Digits Only", vbExclamation  
            Else  
                If KeyAscii = 33 Or KeyAscii = 35 Then  
                    KeyAscii = 0  
                    MsgBox "Enter Digits Only", vbExclamation  
                Else  
                    If KeyAscii = 36 Or KeyAscii = 37 Then  
                        KeyAscii = 0  
                        MsgBox "Enter Digits Only", vbExclamation  
                    Else  
                        If KeyAscii = 38 Or KeyAscii = 42 Then  
                            KeyAscii = 0  
                            MsgBox "Enter Digits Only", vbExclamation  
                        Else  
                            If KeyAscii = 40 Or KeyAscii = 41 Then  
                                KeyAscii = 0  
                                MsgBox "Enter Digits Only", vbExclamation  
                            Else  
                                If KeyAscii = 39 Then  
                                    KeyAscii = 0  
                                    MsgBox "Enter Digits Only", vbExclamation  
                                End If
```

```
End If  
End Sub
```

'This command is used as a validation check to make sure that only numeric data is entered
Private Sub txt_total_beds_in_surgery_Change()

'Compare the pressed key code with the standard Ascii code and alert user if wrong type of
data is entered

```
If KeyAscii = 47 Or KeyAscii >= 58 Then  
    KeyAscii = 0  
    MsgBox ("Enter Digits Only"), vbExclamation  
Else  
    If KeyAscii = 34 Or KeyAscii = 59 Then  
        KeyAscii = 0  
        MsgBox "Enter Digits Only", vbExclamation  
    Else  
        If KeyAscii = 45 Or KeyAscii = 43 Then  
            KeyAscii = 0  
            MsgBox "Enter Digits Only", vbExclamation  
        Else  
            If KeyAscii = 44 Or KeyAscii = 46 Then  
                KeyAscii = 0  
                MsgBox "Enter Digits Only", vbExclamation  
            Else  
                If KeyAscii = 33 Or KeyAscii = 35 Then  
                    KeyAscii = 0  
                    MsgBox "Enter Digits Only", vbExclamation  
                Else
```

```
If KeyAscii = 36 Or KeyAscii = 37 Then
    KeyAscii = 0
    MsgBox "Enter Digits Only", vbExclamation
Else
    If KeyAscii = 38 Or KeyAscii = 42 Then
        KeyAscii = 0
        MsgBox "Enter Digits Only", vbExclamation
    Else
        If KeyAscii = 40 Or KeyAscii = 41 Then
            KeyAscii = 0
            MsgBox "Enter Digits Only", vbExclamation
        Else
            If KeyAscii = 39 Then
                KeyAscii = 0
                MsgBox "Enter Digits Only", vbExclamation
            End If
        End If
    End If
End If
End If
End If
End If
End If
End If
End If
End If
End If
End Sub
```

REPORTS MAIN FORM:



'Show the CMO Checkup report

```
Private Sub cmd_cmo_checkup_report_Click()
    cmo_checkup_report.Show
End Sub
```

'Show the Doctor Contact Info report

```
Private Sub cmd_doctor_contact_information_report_Click()
    datareport_doctor_contact_information.Show
End Sub
```

'Show the Patient Visit report

```
Private Sub cmd_patient_visit_report_Click()
    datareport_patient_visit.Show
End Sub
```

'Show the Performance report

```
Private Sub cmd_performance_report_Click()
    performance_reports.Show
End Sub
```

'Go to Patient Tests Reports form

```
Private Sub cmd_test_reports_Click()
    frmtests_reports.Show
Me.Hide
End Sub
```

'Show the Ward Status report

```
Private Sub cmd_ward_report_Click()
    datareport_wards.Show
End Sub
```

'Go back to Main form

```
Private Sub cmd_main_Click()
    main_form.Show
Me.Hide
End Sub
```

TESTS REPORTS FORM:



'Show the Ward ALT report

```
Private Sub cmd_alt_report_Click()
    alt_report.Show
End Sub
```

'Show the Ward Bilirubin report

```
Private Sub cmd_bilirubin_report_Click()
    bilirubin_report.Show
End Sub
```

Show the Sugar report

```
Private Sub cmd_blood_sugar_report_Click()
    bilirubin_report.Show
End Sub
```

'Show the Creatinine report

```
Private Sub cmd_creatinine_report_Click()
    creatine_report.Show
End Sub
```

'Show the Haemoglobin report

```
Private Sub cmd_haemoglobin_report_Click()
    haemoglobin_report.Show
End Sub
```

'Show the Serum Amylase report

```
Private Sub cmd_serum_amylase_report_Click()
    serum_amylase_report.Show
End Sub
```

'Show the Serum Calcium report

```
Private Sub cmd_serum_calcium_report_Click()
    Serum_calcium_report.Show
End Sub
```

'Show the TLC report

```
Private Sub cmd_tlc_report_Click()  
    tlc_report.Show  
End Sub
```

'Show the Urea report

```
Private Sub cmd_urea_report_Click()  
    urea_report.Show  
End Sub
```

'Show the X-Ray report

```
Private Sub cmd_xray_report_Click()  
    xray_report.Show  
End Sub
```

'Go back to previous form

```
Private Sub cmd_back_Click()  
    reports.Show  
    Me.Hide  
End Sub
```

Through my coding objectives 2-6 and 8-17 have been successfully fulfilled

VALIDATION CODING:

This has been merged with the program coding however below are the samples of validations used in my coding

Validation for entering only numeric data:

If KeyAscii = 47 Or KeyAscii >= 58 Then

 KeyAscii = 0

 MsgBox ("Enter Digits Only"), vbExclamation

Else

 If KeyAscii = 34 Or KeyAscii = 59 Then

 KeyAscii = 0

 MsgBox "Enter Digits Only", vbExclamation

Else

 If KeyAscii = 45 Or KeyAscii = 43 Then

 KeyAscii = 0

 MsgBox "Enter Digits Only", vbExclamation

Else

 If KeyAscii = 44 Or KeyAscii = 46 Then

 KeyAscii = 0

 MsgBox "Enter Digits Only", vbExclamation

Else

 If KeyAscii = 33 Or KeyAscii = 35 Then

 KeyAscii = 0

 MsgBox "Enter Digits Only", vbExclamation

Else

 If KeyAscii = 36 Or KeyAscii = 37 Then

 KeyAscii = 0

 MsgBox "Enter Digits Only", vbExclamation

Else

 If KeyAscii = 38 Or KeyAscii = 42 Then

```
KeyAscii = 0
MsgBox "Enter Digits Only", vbExclamation
Else
If KeyAscii = 40 Or KeyAscii = 41 Then
    KeyAscii = 0
    MsgBox "Enter Digits Only", vbExclamation
Else
If KeyAscii = 39 Then
    KeyAscii = 0
    MsgBox "Enter Digits Only", vbExclamation
End If
End
```

Validation for entering only Alphabets:

```
If KeyAscii >= 33 And KeyAscii <= 59 Then
    KeyAscii = 0
    MsgBox ("Enter Characters Only")
Else
If KeyAscii >= 123 And KeyAscii <= 126 Then
    KeyAscii = 0
```

```
    MsgBox ("Enter Characters Only")
Else
    If KeyAscii >= 60 And KeyAscii <= 63 Then
        KeyAscii = 0
        MsgBox ("Enter Characters Only")
    Else
        If KeyAscii >= 91 And KeyAscii <= 96 Then
            KeyAscii = 0
            MsgBox ("Enter Characters Only")
        Else
            If KeyAscii >= 60 And KeyAscii <= 64 Then
                KeyAscii = 0
                MsgBox ("Enter Characters Only")
            End If
        End If
    End If
End If
End Sub
```

Validation for entering only numbers and hyphens (dashes) (-):

```
If (KeyAscii < 48 And KeyAscii > 8 And KeyAscii > 45) Xor (KeyAscii > 57) Then
    KeyAscii = 0
    MsgBox "Please use only numbers and hyphens (-)", vbExclamation
End If
End Sub
```

Presence Checks:

```
If txt_name = "" Then
    MsgBox "A required field is missing", vbExclamation
    data_doctor_information.Recordset.CancelUpdate
Else
    If txt_department = "" Then
        MsgBox "A required field is missing", vbExclamation
        data_doctor_information.Recordset.CancelUpdate
    Else
        If txt_date_of_birth = "" Then
            MsgBox "A required field is missing", vbExclamation
            data_doctor_information.Recordset.CancelUpdate
            cmd_cancel.Enabled = False
            cmd_update.Enabled = False
```

Length Checks:

```
If Len(txt_contact_number) >= 12 Then
    KeyAscii = 0
    MsgBox "Limit Reached", vbExclamation
End If
(Objectives 16 and 17 fulfilled)
```

3.3 TEST RESULTS

FOR ALL NUMBERED TEST RESULTS REFER TO THE CORRESPONDING TESTING PLAN IN THE DESIGN PHASE

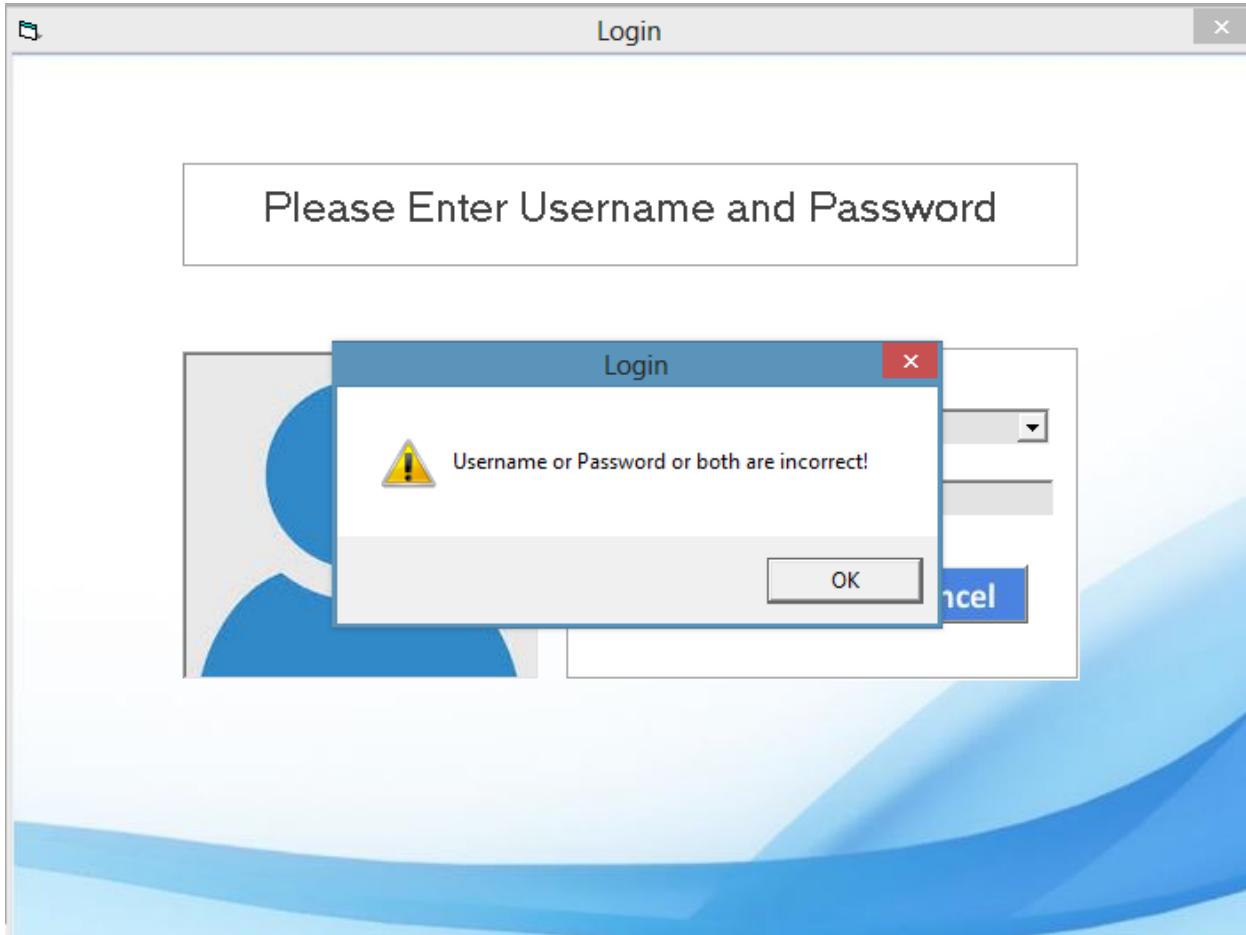
TEST 1:

USERNAME AND PASSWORD

- Correct Username and Password (NORMAL DATA):
In this case the Main Form is displayed:



- Incorrect Username and/or Password (ABNORMAL DATA)



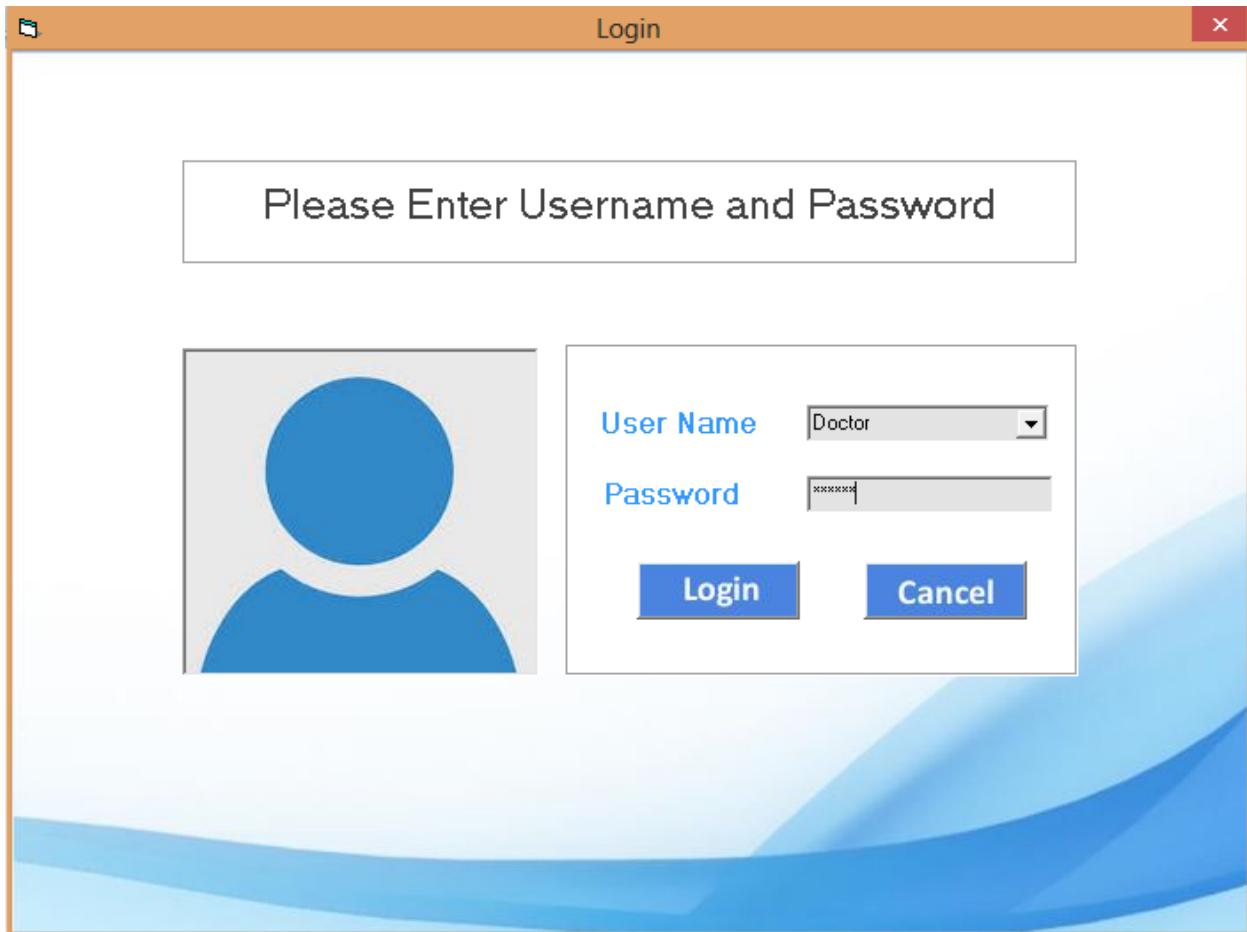
TEST 2:

For the following test screenshots of only two forms have been taken to prove that the user rights actually work. For knowing the forms on which this is applicable refer to Test 2 in the Test Strategy Section.

USER RIGHTS:

- Logs in through Doctors Account: (NORMAL DATA)

Should have full Rights in all forms



The User has full Rights in the Patient Sub Forms like Patient Information shown below

Patient Information

Search by ID Search Search by Name Search

Personal Information

Patient ID: 1

Name: Salar

Contact number: 03339585235

Date Of Birth: 7/1/1995

Address: 22C RMC Colony Rawal Road R

Basic Medical Information

Diabetic? Yes

Hypertensive? No

Blood Group: O+ve

Any serious diseases in family? none

Add Edit Delete

First Previous Next Last

The user has full rights in patient Treatment Sub Forms like Senior Medical Officer shown below

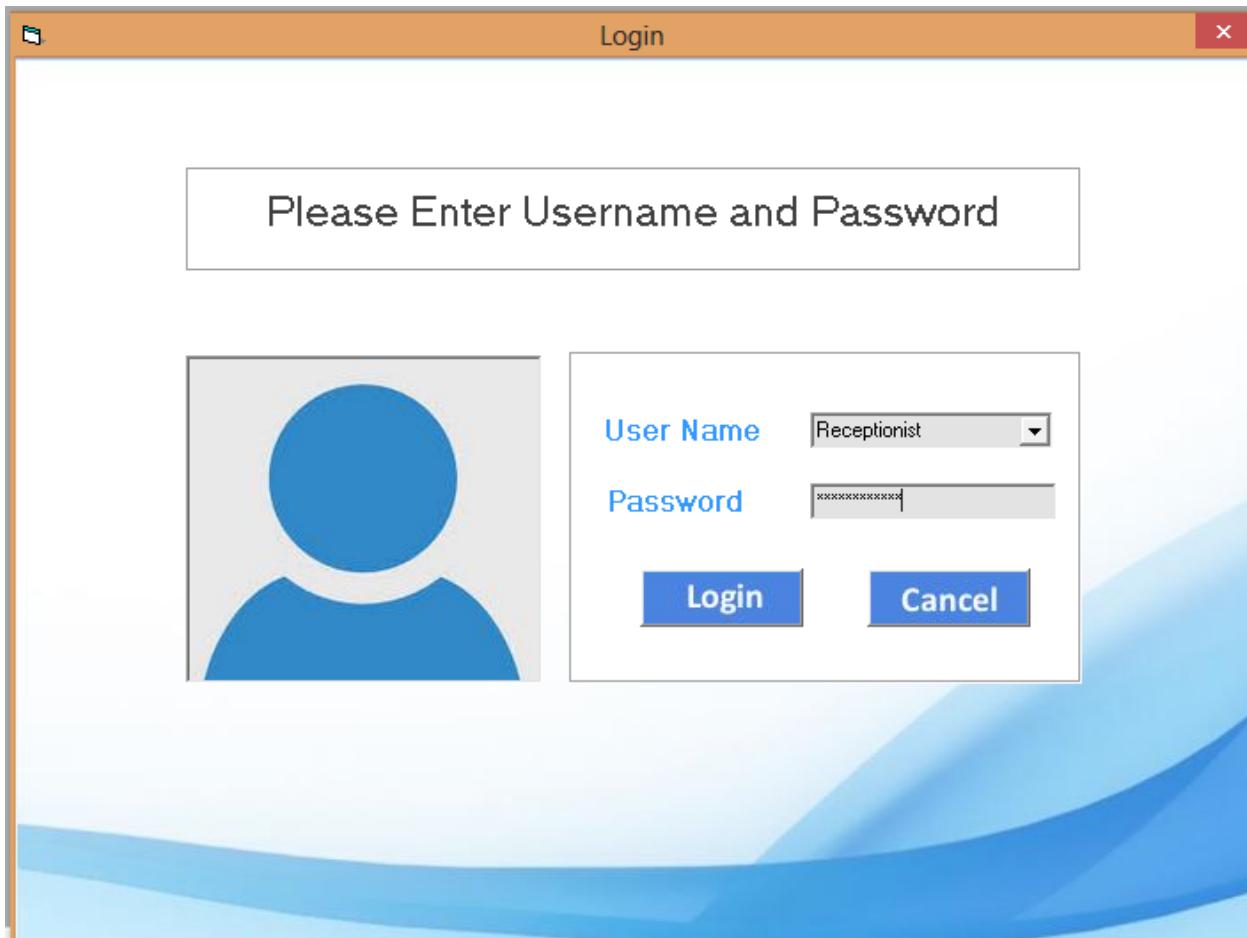
The screenshot shows a Windows application window titled "CMO". At the top left is a back arrow icon. In the center is a search bar labeled "Search by Patient ID" with a dropdown arrow and a "Search" button. At the top right are standard window control buttons (minimize, maximize, close). On the right side of the window, there is a vertical toolbar with four buttons: "Add", "Edit", "Delete", and two empty placeholder boxes. A red oval highlights the "Edit" button.

CMO

| | | | |
|------------|-------------------------------|-------------|------------|
| Patient ID | 1 | Doctor ID | AftMed1978 |
| Time | 4:35:40 PM | Date | 3/10/2012 |
| Blood | 160/100 | Temperature | 101°F |
| Problem | Severe headache | | |
| Diagnosis | Extremely High Blood Pressure | | |
| Process | given Medicines | | |

At the bottom left are navigation buttons: "First", "Previous", "Next", and "Last". A red oval highlights this row of buttons. At the bottom right is a button labeled "Show Patient Medical History with CMO".

- Logs in through Receptionists Account: (NORMAL DATA)
Should have limited rights in all forms except Rights in all forms



The User has full Rights in the Patient Sub Forms like Patient Information shown below but limited rights in all other form

Patient Information

| Personal Information | | Basic Medical Information | |
|----------------------|-----------------------------|---------------------------------|------|
| Patient ID | 1 | Diabetic? | Yes |
| Name | Salar | Hypertensive? | No |
| Contact number | 03339585235 | Blood Group | O+ve |
| Date Of Birth | 7/1/1995 | Any serious diseases in family? | none |
| Address | 22C RMC Colony Rawal Road R | | |

First Previous Next Last

Add Edit Delete

The User has limited Rights in all other forms like Senior Medical Officer Form which is a Patient Treatment Sub Form as shown bel

CMO

Search by Patient ID Search

CMO

| | | | |
|------------|-------------------------------|-------------|------------|
| Patient ID | 1 | Doctor ID | AftMed1978 |
| Time | 4:35:40 PM | Date | 3/10/2012 |
| Blood | 160/100 | Temperature | 101°F |
| Problem | Severe headache | | |
| Diagnosis | Extremely High Blood Pressure | | |
| Process | given Medicines | | |

First Previous Next Last

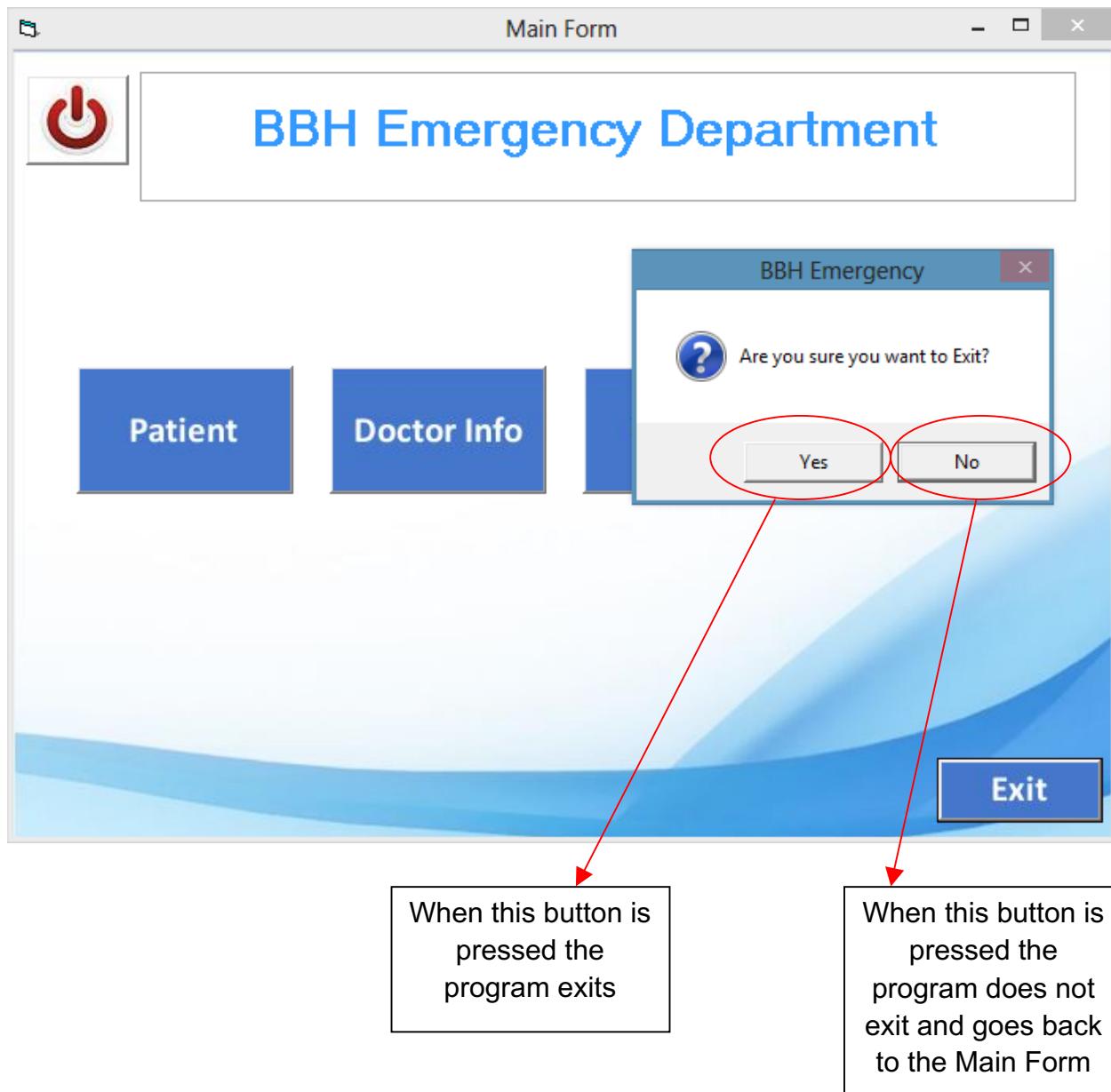
Show Patient Medical History with CMO

The Editing Buttons are unavailable to the user as he has 'see only' rights

Test 3:

Exiting the program:

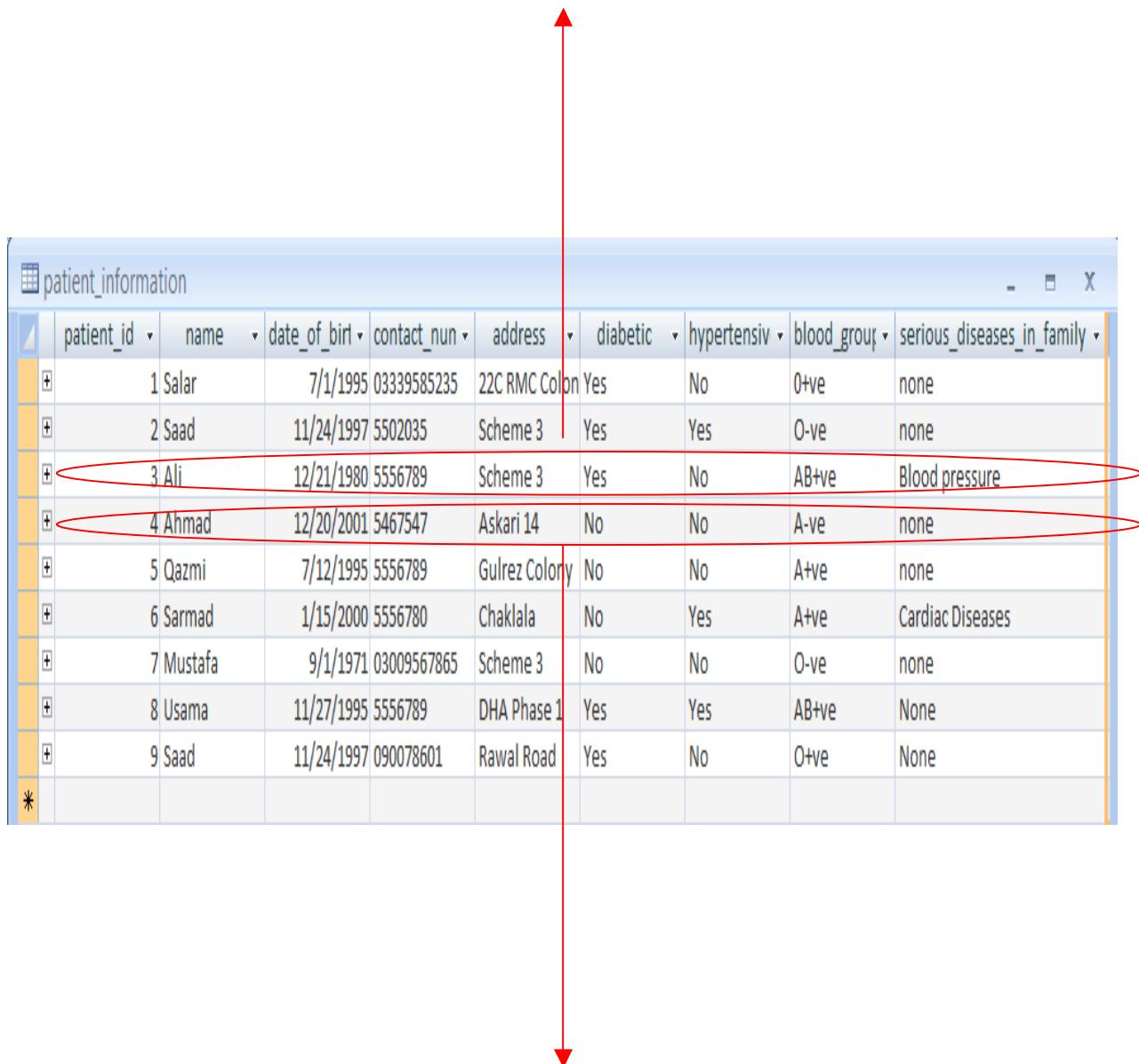
A confirmation box appears and user selects whether to exit or not (NORMAL DATA)



Test 4**Navigation Buttons****Next Button:**

- After clicking this button the next record in the database is displayed (

Current Record in Backend:



| | patient_id | name | date_of_birth | contact_number | address | diabetic | hypertensive | blood_group | serious_diseases_in_family |
|---|------------|------|---------------|----------------|----------------|----------|--------------|-------------|----------------------------|
| 1 | 1 Salar | | 7/1/1995 | 03339585235 | 22C RMC Colony | Yes | No | O+ve | none |
| 2 | 2 Saad | | 11/24/1997 | 5502035 | Scheme 3 | Yes | Yes | O-ve | none |
| 3 | 3 Ali | | 12/21/1980 | 5556789 | Scheme 3 | Yes | No | AB+ve | Blood pressure |
| 4 | 4 Ahmad | | 12/20/2001 | 5467547 | Askari 14 | No | No | A-ve | none |
| 5 | 5 Qazmi | | 7/12/1995 | 5556789 | Gulrez Colony | No | No | A+ve | none |
| 6 | 6 Sarmad | | 1/15/2000 | 5556780 | Chaklala | No | Yes | A+ve | Cardiac Diseases |
| 7 | 7 Mustafa | | 9/1/1971 | 03009567865 | Scheme 3 | No | No | O-ve | none |
| 8 | 8 Usama | | 11/27/1995 | 5556789 | DHA Phase 1 | Yes | Yes | AB+ve | None |
| 9 | 9 Saad | | 11/24/1997 | 090078601 | Rawal Road | Yes | No | O+ve | None |
| * | | | | | | | | | |

Next Record in the Backend

Current record in the Front End

Patient Information

| Personal Information | | Basic Medical Information | |
|----------------------|------------|---------------------------------|----------------|
| Patient ID | 3 | Diabetic? | Yes |
| Name | Ali | Hypertensive? | No |
| Contact number | 5556789 | Blood Group | AB+ve |
| Date Of Birth | 12/21/1980 | Any serious diseases in family? | Blood pressure |
| Address | Scheme 3 | | |

First Previous Next Last

Add Edit Delete

Frontend after pressing Next button:

The screenshot shows the 'Patient Information' window with an orange border. At the top, there are two search fields: 'Search by ID' and 'Search by Name', each with a dropdown arrow and a 'Search' button. To the right is a blue house icon. Below the search fields, the window is divided into two main sections: 'Personal Information' on the left and 'Basic Medical Information' on the right.

Personal Information:

- Patient ID: 4
- Name: Ahmad
- Contact number: 5467547
- Date Of Birth: 12/20/2001
- Address: Askari 14

Basic Medical Information:

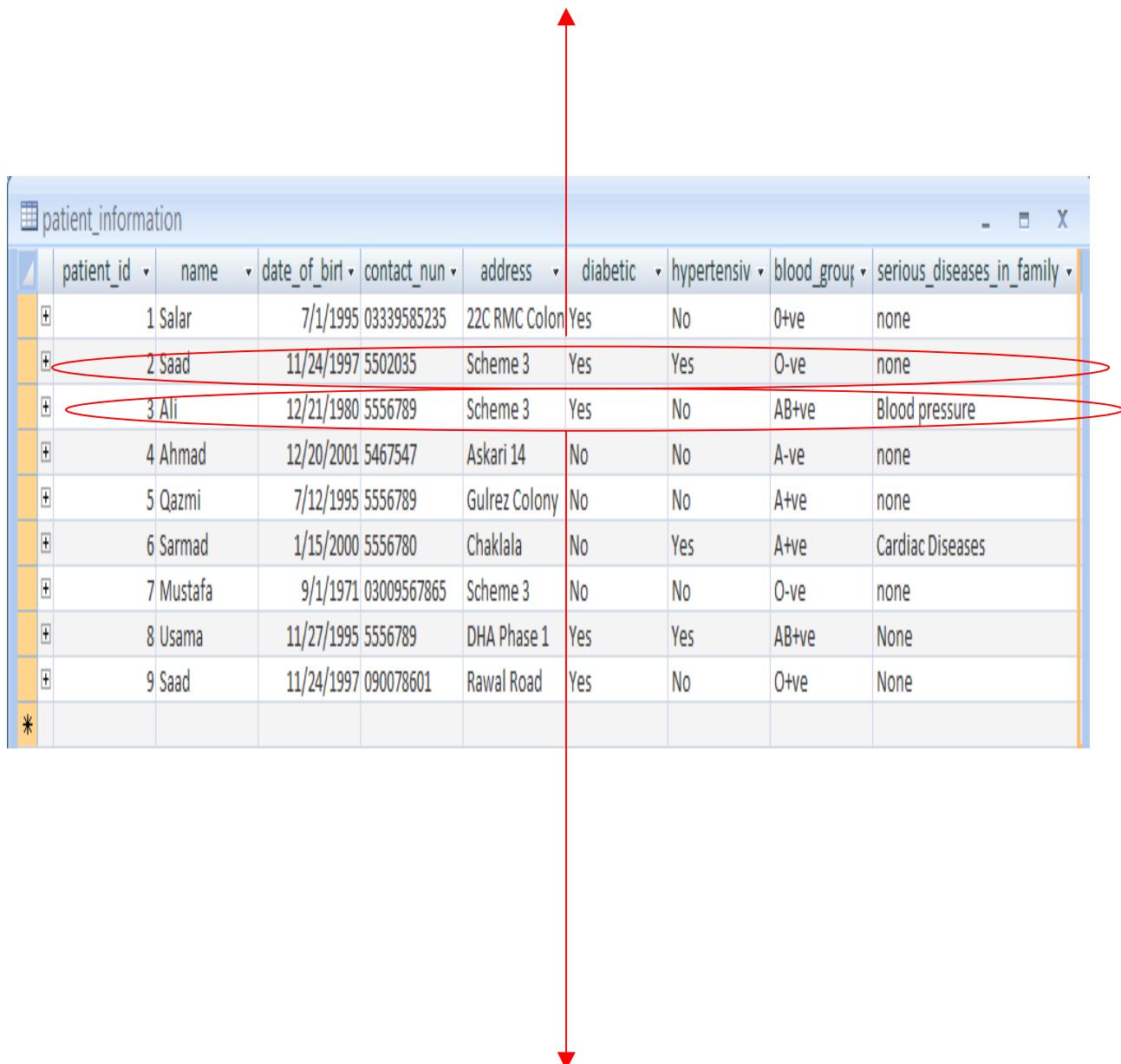
- Diabetic?: No
- Hypertensive: No
- Blood Group: A-ve
- Any serious diseases in family?: none

On the right side of the window, there are four blue buttons: 'Add', 'Edit', 'Delete', and two empty boxes. At the bottom, there are four navigation buttons: 'First', 'Previous', 'Next', and 'Last'. A red curved arrow highlights the entire content area of the window.

This is the next record as shown in the backend

Previous button:**After pressing this button the previous record is displayed**

Previous Record in Backend:



| patient_id | name | date_of_birth | contact_number | address | diabetic | hypertensive | blood_group | serious_diseases_in_family |
|------------|---------|---------------|----------------|----------------|----------|--------------|-------------|----------------------------|
| 1 | Salar | 7/1/1995 | 03339585235 | 22C RMC Colony | Yes | No | O+ve | none |
| 2 | Saad | 11/24/1997 | 5502035 | Scheme 3 | Yes | Yes | O-ve | none |
| 3 | Ali | 12/21/1980 | 5556789 | Scheme 3 | Yes | No | AB+ve | Blood pressure |
| 4 | Ahmad | 12/20/2001 | 5467547 | Askari 14 | No | No | A-ve | none |
| 5 | Qazmi | 7/12/1995 | 5556789 | Gulrez Colony | No | No | A+ve | none |
| 6 | Sarmad | 1/15/2000 | 5556780 | Chaklala | No | Yes | A+ve | Cardiac Diseases |
| 7 | Mustafa | 9/1/1971 | 03009567865 | Scheme 3 | No | No | O-ve | none |
| 8 | Usama | 11/27/1995 | 5556789 | DHA Phase 1 | Yes | Yes | AB+ve | None |
| 9 | Saad | 11/24/1997 | 090078601 | Rawal Road | Yes | No | O+ve | None |
| * | | | | | | | | |

Current Record in the Backend

Current record in the Front End

Patient Information

| Personal Information | | Basic Medical Information | |
|----------------------|------------|---------------------------------|----------------|
| Patient ID | 3 | Diabetic? | Yes |
| Name | Ali | Hypertensive? | No |
| Contact number | 5556789 | Blood Group | AB+ve |
| Date Of Birth | 12/21/1980 | Any serious diseases in family? | Blood pressure |
| Address | Scheme 3 | | |

First Previous Next Last

Add Edit Delete

Frontend after pressing Previous button:

The screenshot shows the 'Patient Information' window with the following details:

Personal Information

- Patient ID: 2
- Name: Saad
- Contact number: 5502035
- Date Of Birth: 11/24/1997
- Address: Scheme 3

Basic Medical Information

- Diabetic?: Yes
- Hypertensive: Yes
- Blood Group: O-ve
- Any serious diseases in family?: none

Buttons at the bottom: First, Previous, Next, Last.

This is the previous record as shown in the backend

First button:**After pressing this button the previous first is displayed**

First Record in Backend:

| | patient_id | name | date_of_birth | contact_number | address | diabetic | hypertensive | blood_group | serious_diseases_in_family |
|---|------------|------|---------------|----------------|---------------|----------|--------------|-------------|----------------------------|
| 1 | 1 Salar | | 7/1/1995 | 03339585235 | 22C RMC Colon | Yes | No | O+ve | none |
| 2 | 2 Saad | | 11/24/1997 | 5502035 | Scheme 3 | Yes | Yes | O-ve | none |
| 3 | 3 Ali | | 12/21/1980 | 5556789 | Scheme 3 | Yes | No | AB+ve | Blood pressure |
| 4 | 4 Ahmad | | 12/20/2001 | 5467547 | Askari 14 | No | No | A-ve | none |
| 5 | 5 Qazmi | | 7/12/1995 | 5556789 | Gulrez Colony | No | No | A+ve | none |
| 6 | 6 Sarmad | | 1/15/2000 | 5556780 | Chaklala | No | Yes | A+ve | Cardiac Diseases |
| 7 | 7 Mustafa | | 9/1/1971 | 03009567865 | Scheme 3 | No | No | O-ve | none |
| 8 | 8 Usama | | 11/27/1995 | 5556789 | DHA Phase 1 | Yes | Yes | AB+ve | None |
| 9 | 9 Saad | | 11/24/1997 | 090078601 | Rawal Road | Yes | No | O+ve | None |
| * | | | | | | | | | |



Current Record in the Backend

Current record in the Front End

Patient Information

| Personal Information | | Basic Medical Information | |
|----------------------|------------|---------------------------------|----------------|
| Patient ID | 3 | Diabetic? | Yes |
| Name | Ali | Hypertensive? | No |
| Contact number | 5556789 | Blood Group | AB+ve |
| Date Of Birth | 12/21/1980 | Any serious diseases in family? | Blood pressure |
| Address | Scheme 3 | | |

First Previous Next Last

Add Edit Delete

Frontend after pressing First button:

The screenshot shows a Windows-style application titled "Patient Information". The interface is divided into two main sections: "Personal Information" on the left and "Basic Medical Information" on the right. At the top, there are search fields for "Search by ID" and "Search by Name", each with a dropdown arrow and a "Search" button. To the right of these is a blue house icon.

Personal Information:

- Patient ID: 1
- Name: Salar
- Contact number: 03339585235
- Date Of Birth: 7/1/1995
- Address: 22C RMC Colony Rawal Road R

Basic Medical Information:

- Diabetic?: Yes
- Hypertensive: No
- Blood Group: O+ve
- Any serious diseases in family?: none

On the right side of the medical information section, there are four buttons: "Add", "Edit", "Delete", and two empty boxes. Below the medical information section are navigation buttons: "First", "Previous", "Next", and "Last".

A red curved arrow highlights the entire "Personal Information" and "Basic Medical Information" sections. A red arrow points downwards from the bottom center of the window to a text box at the bottom.

This is the first record as shown in the backend

Last button:**After pressing this button the last record is displayed**

Current Record in Backend:

| | patient_id | name | date_of_birth | contact_number | address | diabetic | hypertensive | blood_group | serious_diseases_in_family |
|---|------------|---------|---------------|----------------|----------------|----------|--------------|-------------|----------------------------|
| * | 1 | Salar | 7/1/1995 | 03339585235 | 22C RMC Colony | Yes | No | O+ve | none |
| * | 2 | Saad | 11/24/1997 | 5502035 | Scheme 3 | Yes | Yes | O-ve | none |
| * | 3 | Ali | 12/21/1980 | 5556789 | Scheme 3 | Yes | No | AB+ve | Blood pressure |
| * | 4 | Ahmad | 12/20/2001 | 5467547 | Askari 14 | No | No | A-ve | none |
| * | 5 | Qazmi | 7/12/1995 | 5556789 | Gulrez Colony | No | No | A+ve | none |
| * | 6 | Sarmad | 1/15/2000 | 5556780 | Chaklala | No | Yes | A+ve | Cardiac Diseases |
| * | 7 | Mustafa | 9/1/1971 | 03009567865 | Scheme 3 | No | No | O-ve | none |
| * | 8 | Usama | 11/27/1995 | 5556789 | DHA Phase 1 | Yes | Yes | AB+ve | None |
| * | 9 | Saad | 11/24/1997 | 090078601 | Rawal Road | Yes | No | O+ve | None |



Last Record in the Backend

Current record in the Front End

Patient Information

| Personal Information | | Basic Medical Information | |
|----------------------|------------|---------------------------------|----------------|
| Patient ID | 3 | Diabetic? | Yes |
| Name | Ali | Hypertensive? | No |
| Contact number | 5556789 | Blood Group | AB+ve |
| Date Of Birth | 12/21/1980 | Any serious diseases in family? | Blood pressure |
| Address | Scheme 3 | | |

First Previous Next Last

Add Edit Delete

Frontend after pressing Last button:

Patient Information

The screenshot shows the 'Patient Information' window with two main sections: 'Personal Information' on the left and 'Basic Medical Information' on the right. A red circle highlights the entire form area. A red arrow points downwards from the bottom right of the form area to the explanatory text below.

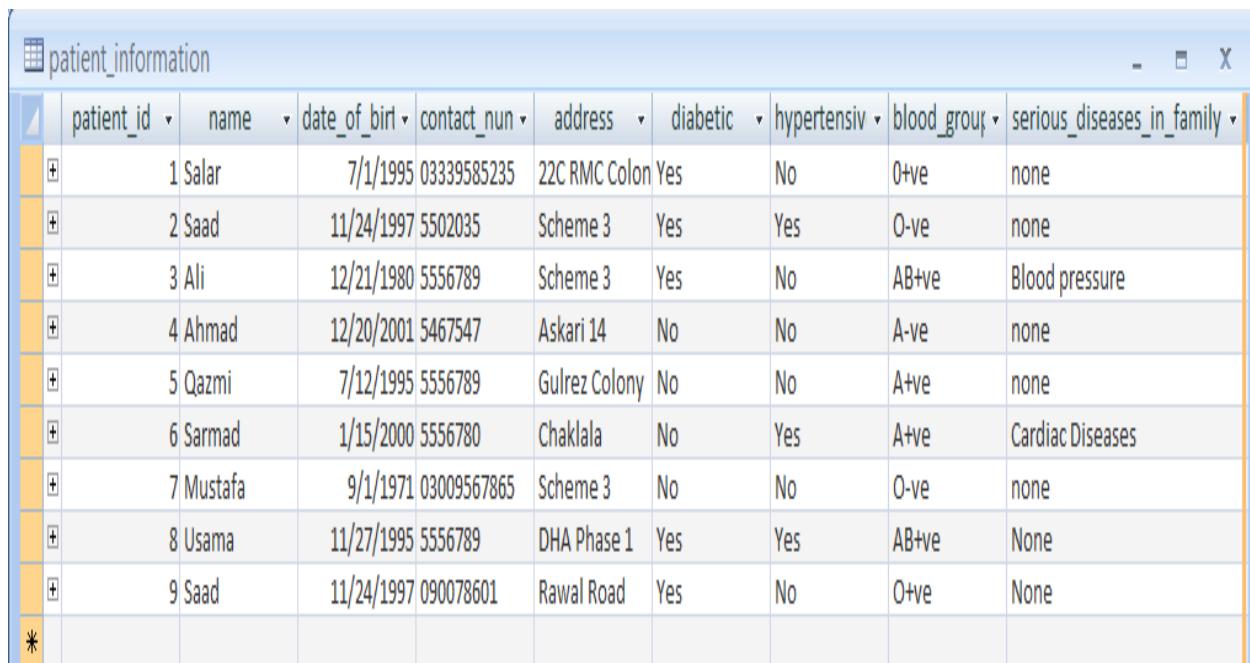
| Personal Information | | Basic Medical Information | |
|----------------------|------------|---------------------------------|------|
| Patient ID | 9 | Diabetic? | Yes |
| Name | Saad | Hypertensive | No |
| Contact number | 090078601 | Blood Group | O+ve |
| Date Of Birth | 11/24/1997 | Any serious diseases in family? | None |
| Address | Rawal Road | | |

Buttons at the bottom include: First, Previous, Next, Last, Add, Edit, Delete.

This is the last record as shown in the backend

Test 5:**Adding a new record:**

Backend before adding a new record:



The screenshot shows a Microsoft Excel spreadsheet titled "patient_information". The table has 11 columns with the following headers: patient_id, name, date_of_birth, contact_number, address, diabetic, hypertensive, blood_group, and serious_diseases_in_family. There are 10 rows of data, each with a unique patient ID and details such as name, birth date, contact number, address, medical history, and blood group. The last row is marked with an asterisk (*) and is currently selected.

| patient_id | name | date_of_birth | contact_number | address | diabetic | hypertensive | blood_group | serious_diseases_in_family |
|------------|---------|---------------|----------------|---------------|----------|--------------|-------------|----------------------------|
| 1 | Salar | 7/1/1995 | 03339585235 | 22C RMC Colon | Yes | No | O+ve | none |
| 2 | Saad | 11/24/1997 | 5502035 | Scheme 3 | Yes | Yes | O-ve | none |
| 3 | Ali | 12/21/1980 | 5556789 | Scheme 3 | Yes | No | AB+ve | Blood pressure |
| 4 | Ahmad | 12/20/2001 | 5467547 | Askari 14 | No | No | A-ve | none |
| 5 | Qazmi | 7/12/1995 | 5556789 | Gulrez Colony | No | No | A+ve | none |
| 6 | Sarmad | 1/15/2000 | 5556780 | Chaklala | No | Yes | A+ve | Cardiac Diseases |
| 7 | Mustafa | 9/1/1971 | 03009567865 | Scheme 3 | No | No | O-ve | none |
| 8 | Usama | 11/27/1995 | 5556789 | DHA Phase 1 | Yes | Yes | AB+ve | None |
| 9 | Saad | 11/24/1997 | 090078601 | Rawal Road | Yes | No | O+ve | None |
| * | | | | | | | | |

The Add button is pressed and the data entered in fields and the Update button is pressed.
After updating the Frontend looks like this.

Patient Information

This screenshot shows the 'Patient Information' window after data has been added and updated. The window has a blue header bar with a back arrow, search by ID and Name buttons, and a home icon. Below the header are two main sections: 'Personal Information' and 'Basic Medical Information'. In the 'Personal Information' section, the Patient ID is 10, Name is Sandhani, Contact number is 03325164659, Date Of Birth is 1/7/1971, and Address is Panipat Road Rawalpindi. In the 'Basic Medical Information' section, the Diabetic? field is Yes, Hypertensive? is No, Blood Group is O-ive, and Any serious diseases in family? is No. To the right of these sections are four blue buttons: Add, Edit, Delete, and two empty buttons. At the bottom are navigation buttons: First, Previous, Next, and Last.

| Personal Information | | Basic Medical Information | |
|----------------------|-------------------------|---------------------------------|-------|
| Patient ID | 10 | Diabetic? | Yes |
| Name | Sandhani | Hypertensive? | No |
| Contact number | 03325164659 | Blood Group | O-ive |
| Date Of Birth | 1/7/1971 | Any serious diseases in family? | No |
| Address | Panipat Road Rawalpindi | | |

First Previous Next Last

Backend after adding a new record:

| patient_id | name | date_of_birth | contact_number | address | diabetic | hypertensive | blood_group | serious_disease | Add New Field |
|------------|----------|---------------|----------------|----------------|----------|--------------|-------------|-----------------|---------------|
| 1 | Salar | 7/1/1995 | 03339585235 | 22C RMC Colon | Yes | No | O+ve | none | |
| 2 | Saad | 11/24/1997 | 5502035 | Scheme 3 | Yes | Yes | O-ve | none | |
| 3 | Ali | 12/21/1980 | 5556789 | Scheme 3 | Yes | No | AB+ve | Blood pressure | |
| 4 | Ahmad | 12/20/2001 | 5467547 | Askari 14 | No | No | A-ve | none | |
| 5 | Qazmi | 7/12/1995 | 5556789 | Gulrez Colony | No | No | A+ve | none | |
| 6 | Sarmad | 1/15/2000 | 5556780 | Chaklala | No | Yes | A+ve | Cardiac Disease | |
| 7 | Mustafa | 9/1/1971 | 03009567865 | Scheme 3 | No | No | O-ve | none | |
| 8 | Usama | 11/27/1995 | 5556789 | DHA Phase 1 | Yes | Yes | AB+ve | None | |
| 9 | Saad | 11/24/1997 | 090078601 | Rawal Road | Yes | No | O+ve | None | |
| 10 | Samdhani | 1/7/1971 | 03325164659 | Panipat Road R | Yes | No | O-ive | No | |



The new record has been saved in the backend

Test 6:**Updating a Record:**

Backend before Editing:

| | patient_id | name | date_of_birth | contact_num | address | diabetic | hypertensiv | blood_group | serious_dise | Add New Field | |
|----|-------------|------|---------------|-------------|----------------|----------|-------------|-------------|-----------------|---------------|--|
| 1 | 1 Salar | | 7/1/1995 | 03339585235 | 22C RMC Colon | Yes | No | O+ve | none | | |
| 2 | 2 Saad | | 11/24/1997 | 5502035 | Scheme 3 | Yes | Yes | O-ve | none | | |
| 3 | 3 Ali | | 12/21/1980 | 5556789 | Scheme 3 | Yes | No | AB+ve | Blood pressure | | |
| 4 | 4 Ahmad | | 12/20/2001 | 5467547 | Askari 14 | No | No | A-ve | none | | |
| 5 | 5 Qazmi | | 7/12/1995 | 5556789 | Gulrez Colony | No | No | A+ve | none | | |
| 6 | 6 Sarmad | | 1/15/2000 | 5556780 | Chaklala | No | Yes | A+ve | Cardiac Disease | | |
| 7 | 7 Mustafa | | 9/1/1971 | 03009567865 | Scheme 3 | No | No | O-ve | none | | |
| 8 | 8 Usama | | 11/27/1995 | 5556789 | DHA Phase 1 | Yes | Yes | AB+ve | None | | |
| 9 | 9 Saad | | 11/24/1997 | 090078601 | Rawal Road | Yes | No | O+ve | None | | |
| 10 | 10 Samdhani | | 1/7/1971 | 03325164659 | Panipat Road R | Yes | No | O-ive | No | | |
| * | | | | | | | | | | | |

The edited field

Backend after Editing

| | patient_id | name | date_of_birth | contact_number | address | diabetic | hypertensive | blood_group | serious_disease | Add New Field |
|---|------------|----------|---------------|----------------|---------------|----------|--------------|-------------|-----------------|---------------|
| | 1 | Salar | 7/1/1995 | 03339585235 | 22C RMC Colon | Yes | No | O+ve | none | |
| | 2 | Saad | 11/24/1997 | 5502035 | Scheme 3 | Yes | Yes | O-ve | none | |
| | 3 | Ali | 12/21/1980 | 5556789 | Scheme 3 | Yes | No | AB+ve | Blood pressure | |
| | 4 | Ahmad | 12/20/2001 | 5467547 | Askari 14 | No | No | A-ve | none | |
| | 5 | Qazmi | 7/12/1995 | 5556789 | Gulrez Colony | No | No | A+ve | none | |
| | 6 | Sarmad | 1/15/2000 | 5556780 | Chaklala | No | Yes | A+ve | Cardiac Disease | |
| | 7 | Mustafa | 9/1/1971 | 03009567865 | Scheme 3 | No | No | O-ve | none | |
| | 8 | Usama | 11/27/1895 | 5513132 | DHA Phase 1 | Yes | Yes | AB+ve | None | |
| | 9 | Saad | 11/24/1997 | 090078601 | Rawal Road | Yes | No | O+ve | None | |
| | 10 | Samdhani | 1/7/1971 | 03325164659 | Panipat Road | Yes | No | O-ive | No | |
| * | | | | | | | | | | |

Frontend before editing:

The screenshot shows a Windows application window titled "Patient Information". At the top left is a back arrow icon. To its right are two search fields: "Search by ID" with a dropdown and "Search" button, and "Search by Name" with a dropdown and "Search" button. On the top right are standard window control buttons (minimize, maximize, close) and a home icon.

Personal Information

| | |
|----------------|-------------|
| Patient ID | 8 |
| Name | Usama |
| Contact number | 5556789 |
| Date Of Birth | 11/27/1995 |
| Address | DHA Phase 1 |

Basic Medical Information

| | |
|---------------------------------|-------|
| Diabetic? | Yes |
| Hypertensive | Yes |
| Blood Group | AB+ve |
| Any serious diseases in family? | None |

On the right side of the window, there are four blue rectangular buttons labeled "Add", "Edit", "Delete", and two empty boxes. Below the medical information table are navigation buttons: "First", "Previous", "Next", and "Last".

Frontend after Editing:

The screenshot shows the 'Patient Information' window with two main sections: 'Personal Information' and 'Basic Medical Information'. In the 'Personal Information' section, fields include Patient ID (8), Name (Usama, highlighted with a red oval), Contact number (5513132), Date Of Birth (11/27/1995), and Address (DHA Phase 1). In the 'Basic Medical Information' section, fields include Diabetic? (Yes), Hypertensive (Yes), Blood Group (AB+ve), and Any serious diseases in family? (None). Navigation buttons at the bottom include First, Previous, Next, and Last. On the right side, there are Add, Edit, Delete, and other unlabelled buttons.

The edited field as
seen on the
frontend

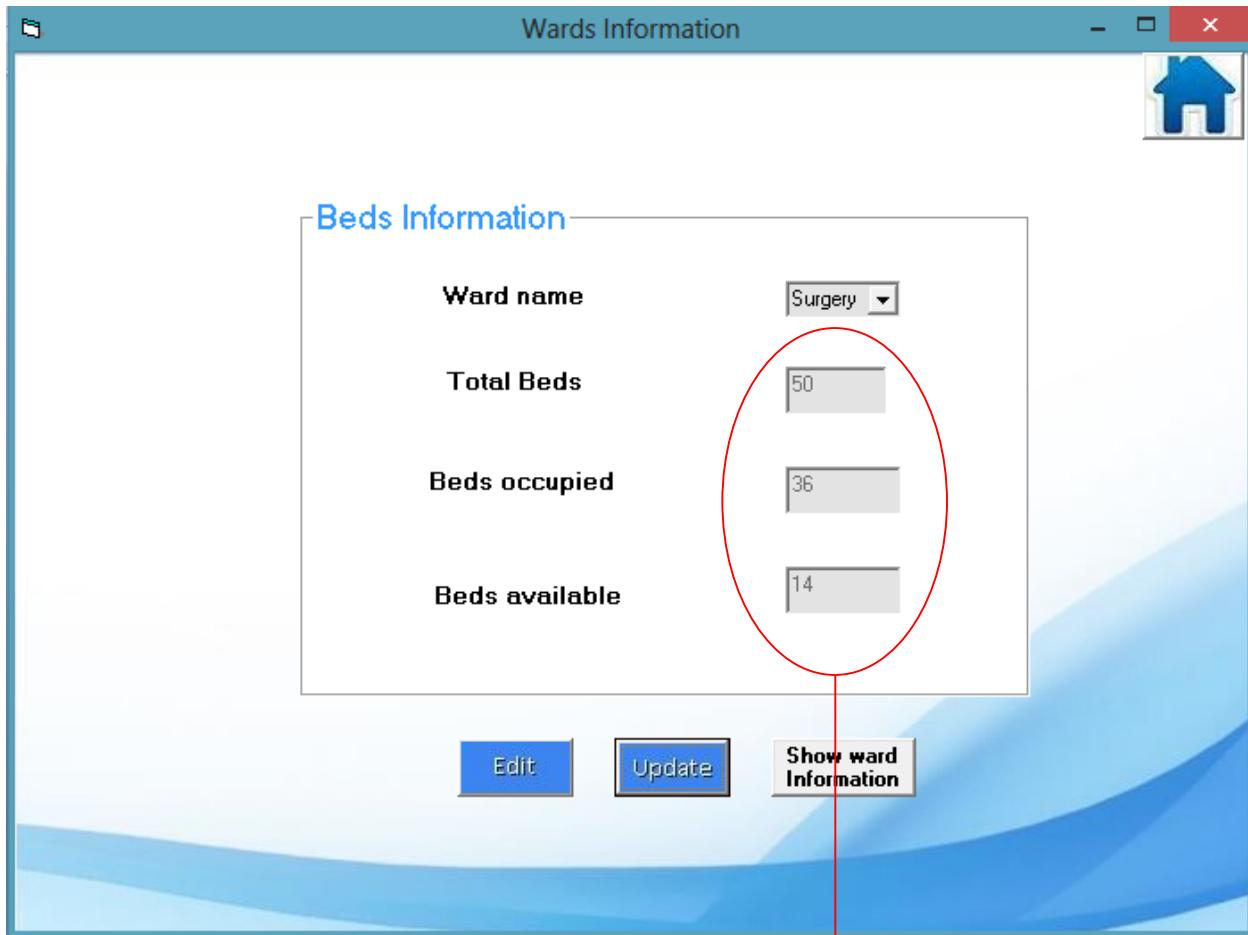
Test 7:

Editing the total beds available field in Wards Information form.

Frontend after pressing the Edit button

The screenshot shows a Windows application window titled "Wards Information". Inside, there's a sub-form titled "Beds Information". It contains four fields: "Ward name" (dropdown set to "Surgery"), "Total Beds" (text input field containing "45", which is circled in red), "Beds occupied" (text input field containing "36"), and "Beds available" (text input field containing "9"). Below these fields are three buttons: "Edit" (highlighted with a blue border), "Update", and "Show ward Information". A red arrow points from the "Total Beds" field down to a callout box.

Only the total beds field is available to edit, the other fields change automatically and will be discussed in later tests



All three fields are updated

Test 8:
Using the Cancel button

Frontend after pressing Edit button

The screenshot shows the 'Patient Information' application window. At the top, there are two search bars: 'Search by ID' and 'Search by Name', each with a dropdown menu and a 'Search' button. On the far right is a blue house icon. The main area is divided into two sections: 'Personal Information' on the left and 'Basic Medical Information' on the right. In the 'Personal Information' section, fields include 'Patient ID' (1), 'Name' (Salar), 'Contact number' (03345577899, circled in red), 'Date Of Birth' (7/1/1995), and 'Address' (22C RMC Colony Rawal Road R). In the 'Basic Medical Information' section, fields include 'Diabetic?' (Yes), 'Hypertensive' (No), 'Blood Group' (O+ve), and 'Any serious diseases in family?' (none). To the right of these sections are five blue buttons: 'Add', 'Edit', 'Delete', 'Update', and 'Cancel'. Below the sections are four navigation buttons: 'First', 'Previous', 'Next', and 'Last'. A red arrow points from the circled 'Contact number' field down to a callout box at the bottom.

This highlighted field was
edited but the cancel button
was pressed

After Pressing Cancel Button:

Screenshot of the Patient Information window showing personal and medical details.

Personal Information

- Patient ID: 1
- Name: Salar
- Contact number: 03339585235 (highlighted with a red oval)
- Date Of Birth: 7/1/1995
- Address: 22C RMC Colony Rawal Road R

Basic Medical Information

- Diabetic?: Yes
- Hypertensive: No
- Blood Group: O+ve
- Any serious diseases in family?: none

Buttons on the right: Add, Edit, Delete, and two empty boxes.

Navigation buttons at the bottom: First, Previous, Next, Last.



No alterations were made to the field

Test 9:

Using the search through Name button:

Frontend before pressing search through name button was pressed:

The screenshot shows the 'Patient Information' application window. At the top, there are two search buttons: 'Search by ID' and 'Search by Name'. The 'Search by ID' button is highlighted with a yellow border. Below the search buttons, there are two main sections: 'Personal Information' on the left and 'Basic Medical Information' on the right.

Personal Information:

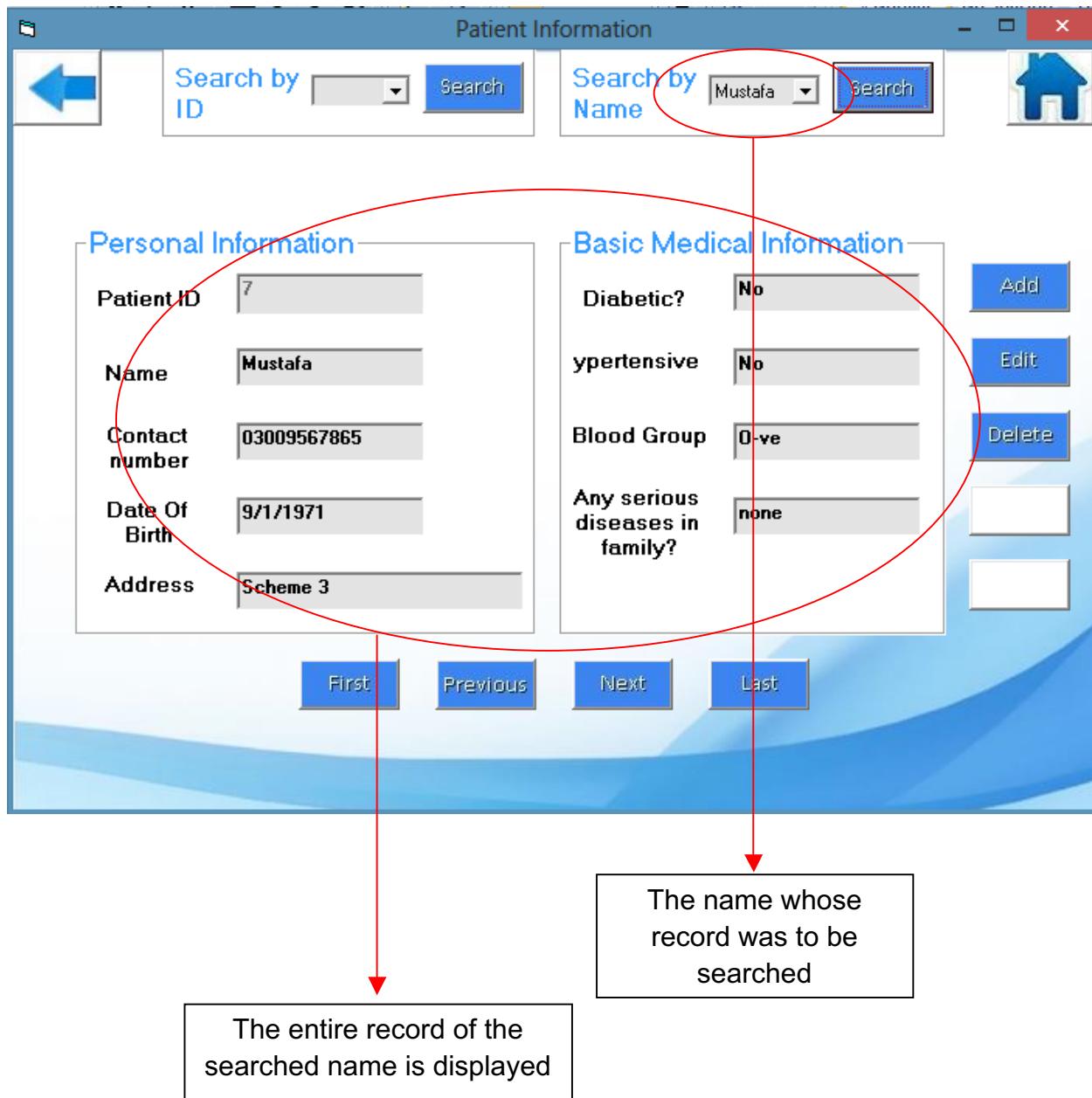
- Patient ID: 1
- Name: Salar
- Contact number: 03339585235
- Date Of Birth: 7/1/1995
- Address: 22C RMC Colony Rawal Road R

Basic Medical Information:

- Diabetic?: Yes
- Hypertensive: No
- Blood Group: O+ve
- Any serious diseases in family?: none

On the right side of the interface, there are four blue buttons: 'Add', 'Edit', 'Delete', and two empty buttons. At the bottom, there are navigation buttons: 'First', 'Previous', 'Next', and 'Last'.

Frontend after pressing the Search through Name button.



Test 10:

Using the Search through ID button

The field with the required ID is shown (NORMAL)

Frontend before pressing the Search through ID button.

Patient Information

The screenshot shows a Windows-style application window titled "Patient Information". At the top, there are two search buttons: "Search by ID" and "Search by Name", each with a dropdown menu and a "Search" button. A blue house icon is in the top right corner. Below the search buttons, there are two main sections: "Personal Information" and "Basic Medical Information".

Personal Information:

- Patient ID: 1
- Name: Salar
- Contact number: 03339585235
- Date Of Birth: 7/1/1995
- Address: 22C RMC Colony Rawal Road R

Basic Medical Information:

- Diabetic?: Yes
- Hypertensive: No
- Blood Group: O+ve
- Any serious diseases in family?: none

On the right side of the window, there are four blue buttons: "Add", "Edit", "Delete", and two empty boxes. At the bottom, there are navigation buttons: "First", "Previous", "Next", and "Last".

Frontend after pressing Search by ID button:

The screenshot shows the 'Patient Information' application window. At the top, there are two search buttons: 'Search by ID' (with a dropdown menu showing '4') and 'Search by Name'. A red circle highlights the 'Search by ID' button and its dropdown. Below the search area, there are two main sections: 'Personal Information' on the left and 'Basic Medical Information' on the right. In the 'Personal Information' section, the 'Patient ID' field contains '4', which is also highlighted with a red circle. The 'Name' field contains 'Ahmad', 'Contact number' contains '5467547', 'Date Of Birth' contains '12/20/2001', and 'Address' contains 'Askari 14'. In the 'Basic Medical Information' section, fields include 'Diabetic?' (No), 'Hypertensive?' (No), 'Blood Group' (A-ve), and 'Any serious diseases in family?' (none). To the right of these sections are three buttons: 'Add', 'Edit', and 'Delete'. At the bottom, there are navigation buttons: 'First', 'Previous', 'Next', and 'Last'. Two red arrows point downwards from the 'Patient ID' field and the 'Basic Medical Information' section to two callout boxes at the bottom.

The ID whose record was to be searched

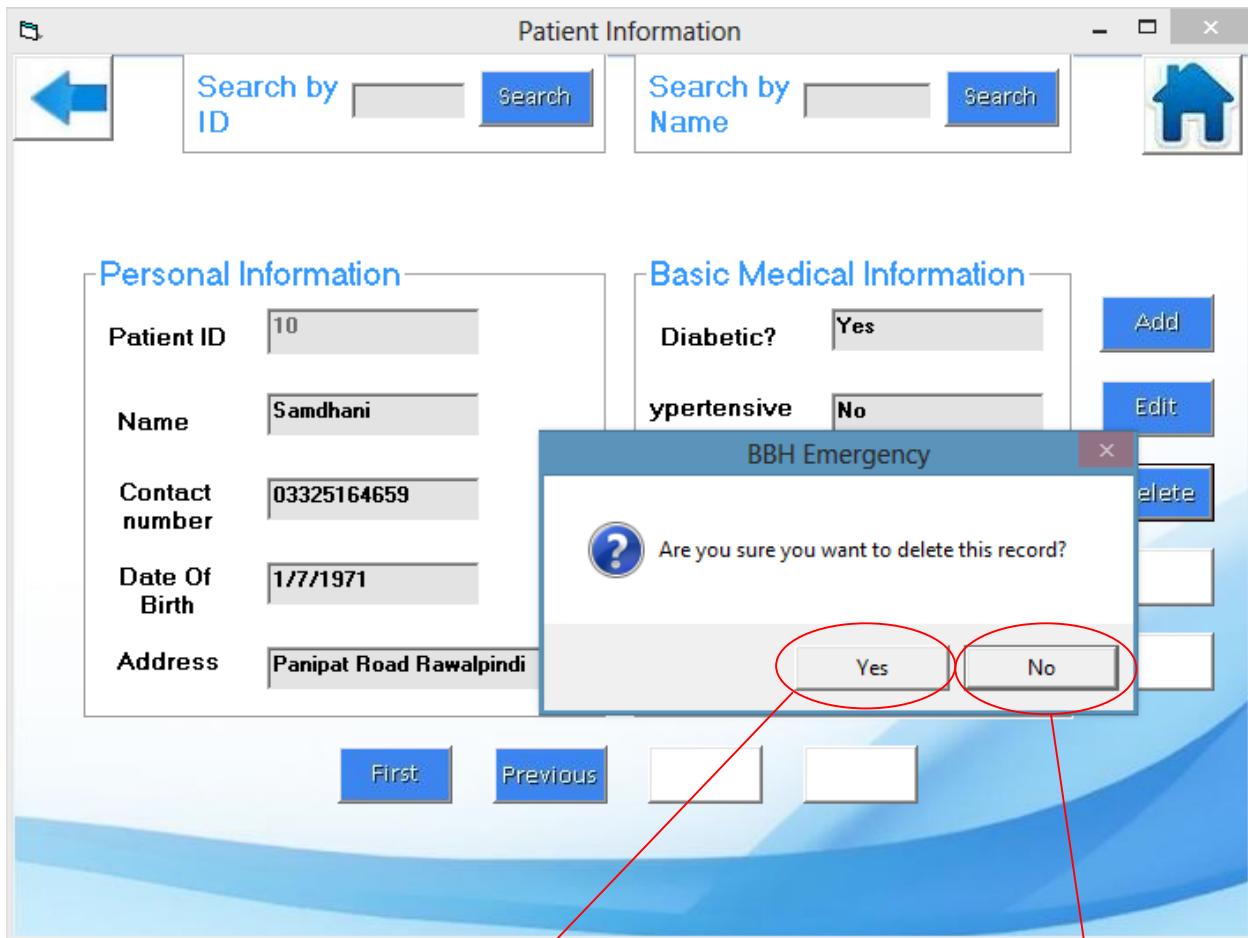
The entire record of the searched ID is displayed

Test 11:

Using the Delete button:

The field is deleted after confirmation:

A confirmation box appears asking if the user really wants to delete

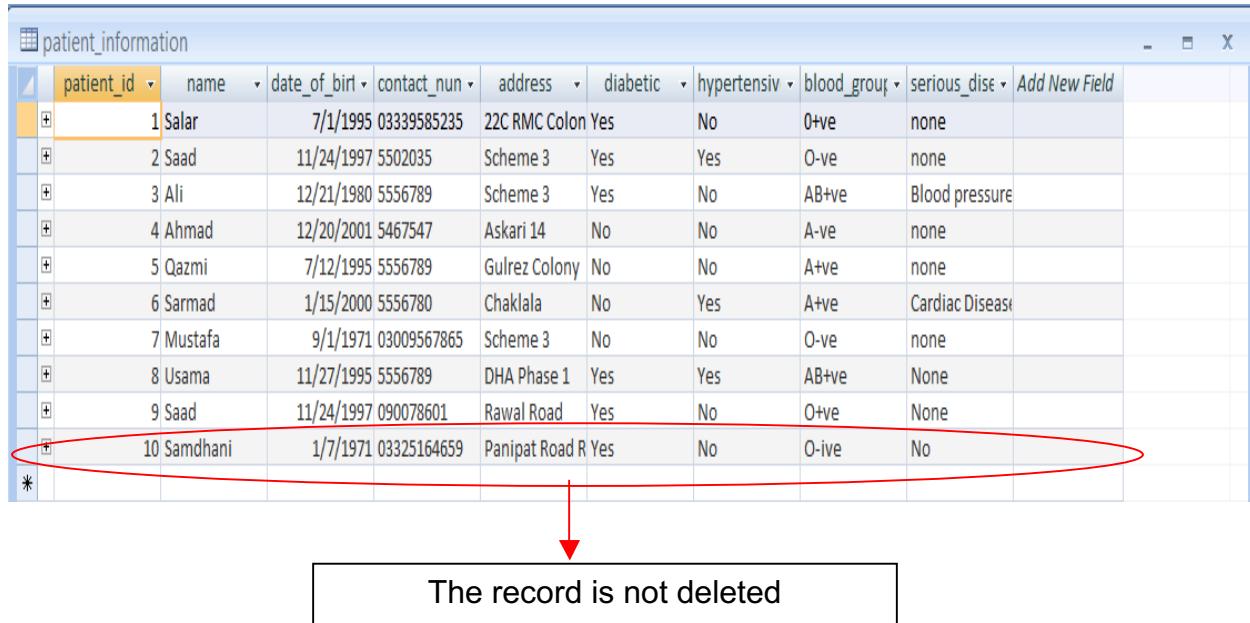


Clicking on this button will
delete the record

Clicking on this button will
not delete the record

When No is pressed the Record is not deleted

Backend after pressing No



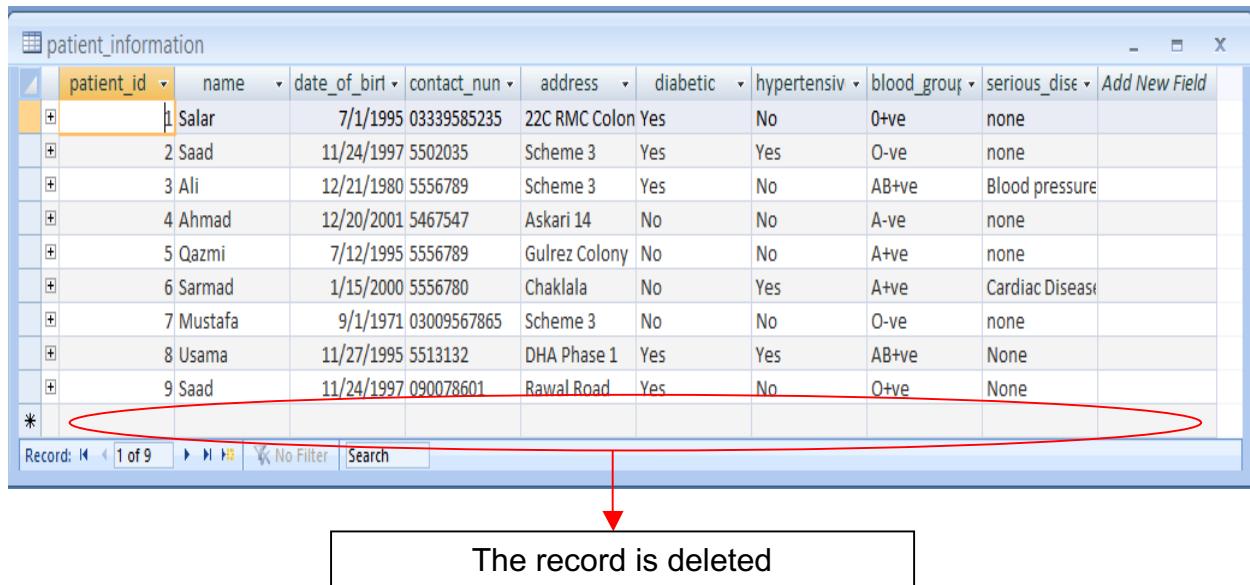
patient_information

| patient_id | name | date_of_birth | contact_number | address | diabetic | hypertensive | blood_group | serious_disease | Add New Field |
|------------|----------|---------------|----------------|----------------|----------|--------------|-------------|-----------------|---------------|
| 1 | Salar | 7/1/1995 | 03339585235 | 22C RMC Colon | Yes | No | O+ve | none | |
| 2 | Saad | 11/24/1997 | 5502035 | Scheme 3 | Yes | Yes | O-ve | none | |
| 3 | Ali | 12/21/1980 | 5556789 | Scheme 3 | Yes | No | AB+ve | Blood pressure | |
| 4 | Ahmad | 12/20/2001 | 5467547 | Askari 14 | No | No | A-ve | none | |
| 5 | Qazmi | 7/12/1995 | 5556789 | Gulrez Colony | No | No | A+ve | none | |
| 6 | Sarmad | 1/15/2000 | 5556780 | Chaklala | No | Yes | A+ve | Cardiac Disease | |
| 7 | Mustafa | 9/1/1971 | 03009567865 | Scheme 3 | No | No | O-ve | none | |
| 8 | Usama | 11/27/1995 | 5556789 | DHA Phase 1 | Yes | Yes | AB+ve | None | |
| 9 | Saad | 11/24/1997 | 090078601 | Rawal Road | Yes | No | O+ve | None | |
| 10 | Samdhani | 1/7/1971 | 03325164659 | Panipat Road R | Yes | No | O-ive | No | |

The record is not deleted

When Yes is pressed the record is deleted

Backend after pressing Yes



patient_information

| patient_id | name | date_of_birth | contact_number | address | diabetic | hypertensive | blood_group | serious_disease | Add New Field |
|------------|---------|---------------|----------------|---------------|----------|--------------|-------------|-----------------|---------------|
| 1 | Salar | 7/1/1995 | 03339585235 | 22C RMC Colon | Yes | No | O+ve | none | |
| 2 | Saad | 11/24/1997 | 5502035 | Scheme 3 | Yes | Yes | O-ve | none | |
| 3 | Ali | 12/21/1980 | 5556789 | Scheme 3 | Yes | No | AB+ve | Blood pressure | |
| 4 | Ahmad | 12/20/2001 | 5467547 | Askari 14 | No | No | A-ve | none | |
| 5 | Qazmi | 7/12/1995 | 5556789 | Gulrez Colony | No | No | A+ve | none | |
| 6 | Sarmad | 1/15/2000 | 5556780 | Chaklala | No | Yes | A+ve | Cardiac Disease | |
| 7 | Mustafa | 9/1/1971 | 03009567865 | Scheme 3 | No | No | O-ve | none | |
| 8 | Usama | 11/27/1995 | 5513132 | DHA Phase 1 | Yes | Yes | AB+ve | None | |
| 9 | Saad | 11/24/1997 | 090078601 | Rawal Road | Yes | No | O+ve | None | |
| * | | | | | | | | | |

The record is deleted

Test 12:

Enabling of Cancel and Update Button when Add or Edit button is pressed

They are enabled when Add or Edit button is pressed

Frontend before pressing Add or Edit

The screenshot shows the 'Patient Information' application window. At the top, there are two search bars: 'Search by ID' and 'Search by Name', each with a dropdown arrow and a 'Search' button. To the right of these is a blue house icon. On the left, there's a back arrow icon. The main area is divided into two sections: 'Personal Information' and 'Basic Medical Information'. In 'Personal Information', fields include Patient ID (9), Name (Saad), Contact number (090078601), Date Of Birth (11/24/1997), and Address (Rawal Road). In 'Basic Medical Information', fields include Diabetic? (Yes), Hypertensive? (No), Blood Group (O+ve), and Any serious diseases in family? (None). To the right of these sections are four buttons: 'Add' (blue), 'Edit' (blue), 'Delete' (blue), and two empty white boxes. At the bottom, there are navigation buttons: 'First', 'Previous', and two empty white boxes.

Frontend after pressing Add or Edit button

The screenshot shows the 'Patient Information' window with two main sections: 'Personal Information' and 'Basic Medical Information'. In the 'Personal Information' section, fields include Patient ID (10), Name, Contact number, Date Of Birth, and Address. In the 'Basic Medical Information' section, fields include Diabetic?, Hypertensive, Blood Group, and Any serious diseases in family?. On the right side, there are five buttons: Add, Edit, Delete, Update (which is circled in red), and Cancel. Below the sections are navigation buttons: First, Previous, Next, and Last.

The buttons have been enabled

Test 13:

Disabling of Cancel and Update Button when Cancel or Update Button is pressed:

Frontend before cancel or update button is pressed:

The screenshot shows a Windows application titled "Patient Information". The interface is divided into two main sections: "Personal Information" on the left and "Basic Medical Information" on the right. In the "Personal Information" section, there are five input fields: "Patient ID" (value: 10), "Name" (value: Khalil), "Contact number" (empty), "Date Of Birth" (empty), and "Address" (empty). In the "Basic Medical Information" section, there are four input fields: "Diabetic?" (empty), "Hypertensive" (empty), "Blood Group" (empty), and "Any serious diseases in family?" (empty). To the right of these fields are five buttons: "Add", "Edit", "Delete", "Update", and "Cancel". At the bottom of the window are navigation buttons: "First", "Previous", and two empty boxes. The window has standard Windows-style controls (minimize, maximize, close) at the top right.

Frontend after cancel or update button is pressed:

The screenshot shows the 'Patient Information' window with two main sections: 'Personal Information' and 'Basic Medical Information'. In the 'Personal Information' section, fields include Patient ID (9), Name (Saad), Contact number (090078601), Date Of Birth (11/24/1997), and Address (Rawal Road). In the 'Basic Medical Information' section, fields include Diabetic? (Yes), Hypertensive? (No), Blood Group (O+ve), and Any serious diseases in family? (None). On the right side, there are three buttons: 'Add', 'Edit', and 'Delete'. A red circle highlights the 'Edit' button, and a red arrow points from it to a callout box at the bottom right.

| Personal Information | | Basic Medical Information | |
|----------------------|------------|---------------------------------|------|
| Patient ID | 9 | Diabetic? | Yes |
| Name | Saad | Hypertensive? | No |
| Contact number | 090078601 | Blood Group | O+ve |
| Date Of Birth | 11/24/1997 | Any serious diseases in family? | None |
| Address | Rawal Road | | |

First Previous

The buttons have been disabled

Test 14:**The disabling of the Previous and First Buttons when the current record is the first record.**

The First and Previous buttons are disabled when the current record is the first record

The first record in the backend

| patient_information | | | | | | | | | | | Add New Field |
|---------------------|------------|---------|---------------|----------------|---------------|----------|--------------|-------------|-----------------|--|---------------|
| | patient_id | name | date_of_birth | contact_number | address | diabetic | hypertensive | blood_group | serious_disease | | |
| * | 1 | Salar | 7/1/1995 | 03339585235 | 22C RMC Colon | Yes | No | O+ve | none | | |
| * | 2 | Saad | 11/24/1997 | 5502035 | Scheme 3 | Yes | Yes | O-ve | none | | |
| * | 3 | Ali | 12/21/1980 | 5556789 | Scheme 3 | Yes | No | AB+ve | Blood pressure | | |
| * | 4 | Ahmad | 12/20/2001 | 5467547 | Askari 14 | No | No | A-ve | none | | |
| * | 5 | Qazmi | 7/12/1995 | 5556789 | Gulrez Colony | No | No | A+ve | none | | |
| * | 6 | Sarmad | 1/15/2000 | 5556780 | Chaklala | No | Yes | A+ve | Cardiac Disease | | |
| * | 7 | Mustafa | 9/1/1971 | 03009567865 | Scheme 3 | No | No | O-ve | none | | |
| * | 8 | Usama | 11/27/1995 | 5513132 | DHA Phase 1 | Yes | Yes | AB+ve | None | | |
| * | 9 | Saad | 11/24/1997 | 090078601 | Rawal Road | Yes | No | O+ve | None | | |

The first record in the Frontend

Patient Information

The screenshot shows a Windows application titled "Patient Information". At the top, there are two search fields: "Search by ID" and "Search by Name", each with a dropdown menu and a "Search" button. A blue house icon is in the top right corner. Below the search fields, there are two main sections: "Personal Information" and "Basic Medical Information".

Personal Information:

- Patient ID: 1
- Name: Salar
- Contact number: 03339585235
- Date Of Birth: 7/1/1995
- Address: 22C RMC Colony Rawal Road F

Basic Medical Information:

- Diabetic?: Yes
- Hypertensive: No
- Blood Group: O+ve
- Any serious diseases in family?: none

On the right side of the window, there are four buttons: "Add", "Edit", "Delete", and two empty boxes. At the bottom, there are two small empty boxes circled in red, followed by "Next" and "Last" buttons.



The buttons have been disabled

Test 15:

The disabling of the Next and Last Button when the current record is the last record.

The Next and Last buttons are disabled when the current record is the last record

The last record in the backend

| | patient_id | name | date_of_birth | contact_number | address | diabetic | hypertensive | blood_group | serious_disease | Add New Field |
|---|------------|---------|---------------|----------------|---------------|----------|--------------|-------------|-----------------|---------------|
| + | 1 | Salar | 7/1/1995 | 03339585235 | 22C RMC Colon | Yes | No | O+ve | none | |
| + | 2 | Saad | 11/24/1997 | 5502035 | Scheme 3 | Yes | Yes | O-ve | none | |
| + | 3 | Ali | 12/21/1980 | 5556789 | Scheme 3 | Yes | No | AB+ve | Blood pressure | |
| + | 4 | Ahmad | 12/20/2001 | 5467547 | Askari 14 | No | No | A-ve | none | |
| + | 5 | Qazmi | 7/12/1995 | 5556789 | Gulrez Colony | No | No | A+ve | none | |
| + | 6 | Sarmad | 1/15/2000 | 5556780 | Chaklala | No | Yes | A+ve | Cardiac Disease | |
| + | 7 | Mustafa | 9/1/1971 | 03009567865 | Scheme 3 | No | No | O-ve | none | |
| + | 8 | Usama | 11/27/1995 | 5513132 | DHA Phase 1 | Yes | Yes | AB+ve | None | |
| + | 9 | Saad | 11/24/1997 | 090078601 | Rawal Road | Yes | No | O+ve | None | |
| * | | | | | | | | | | |

The last record in the Frontend

The screenshot shows the 'Patient Information' window with the following details:

Personal Information:

- Patient ID: 9
- Name: Saad
- Contact number: 090078601
- Date Of Birth: 11/24/1997
- Address: Rawal Road

Basic Medical Information:

- Diabetic?: Yes
- Hypertensive: No
- Blood Group: O+ve
- Any serious diseases in family?: None

On the right side, there are three buttons: Add, Edit, and Delete. Below the medical information section, there are two small empty boxes. A red circle highlights these two boxes, and a red arrow points from this circle down to a text box at the bottom.

The buttons have been disabled

Test 16:

Automatic Increase in Beds occupied in the respective ward in which patient is admitted

The ward status automatically changes. (NORMAL DATA)

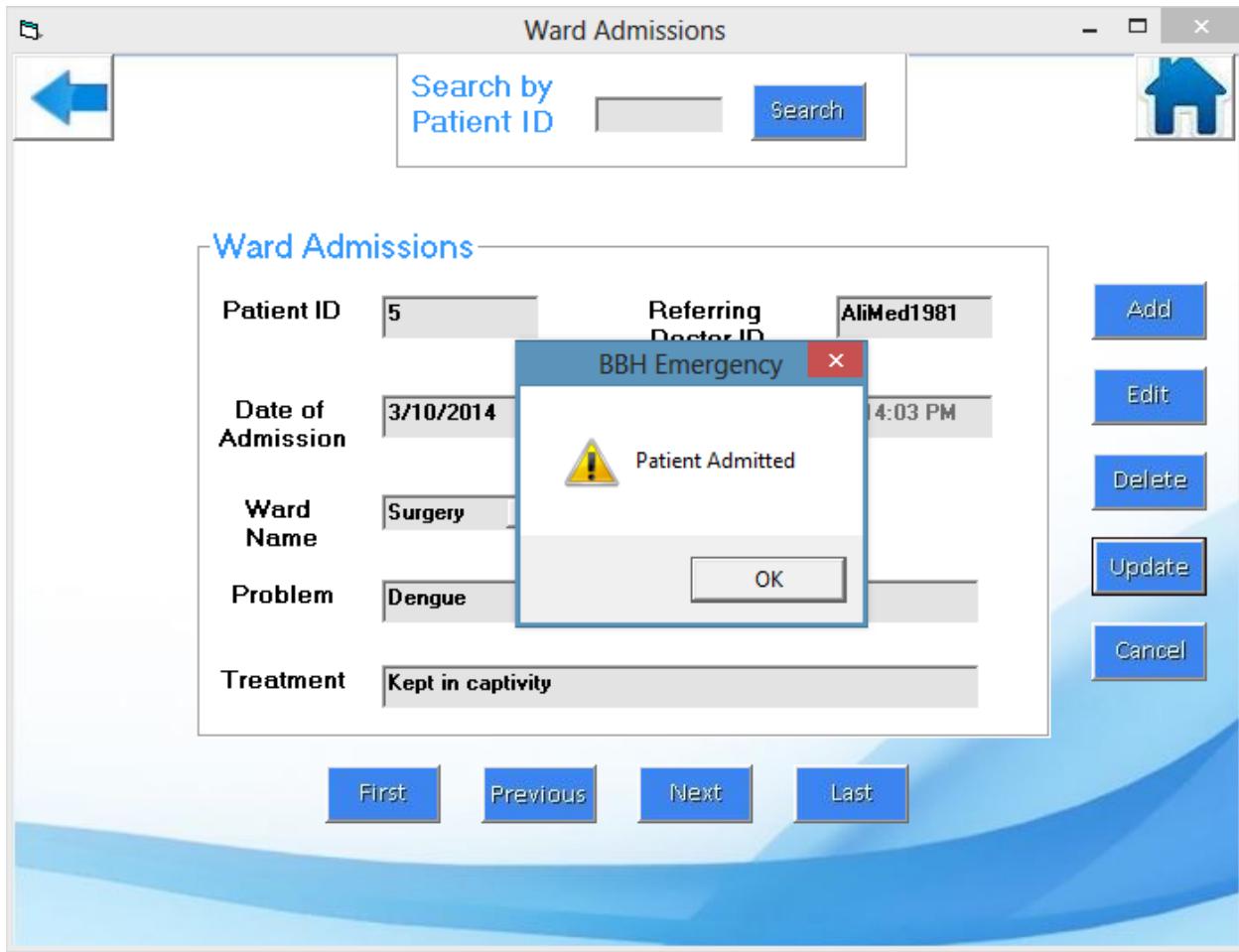
Ward Status before adding a record in the Ward Admissions Form:

The screenshot shows a Windows application window titled "Wards Information". Inside, a sub-section titled "Beds Information" displays the following data:

| Ward name | Surgery |
|----------------|---------|
| Total Beds | 50 |
| Beds occupied | 36 |
| Beds available | 14 |

At the bottom of the "Beds Information" panel are three buttons: "Edit", "Update", and "Show ward Information".

Adding a record in the Ward Admission Form:



After entering all required fields press Update button.

After Addition in the Ward Admission Form the Ward Status would look like this:

The screenshot shows a Windows application window titled "Wards Information". Inside, under the heading "Beds Information", there are four fields:

- Ward name:** Surgery (dropdown menu)
- Total Beds:** 50
- Beds occupied:** 37 (this field is circled in red)
- Beds available:** 13

Below the form are three buttons: "Edit" (circled in red), "Update", and "Show ward Information".

This edit button is used only to edit the total beds field as was shown in
Test 7

There has been an increase of 1 in this field automatically

Test 17:

Automatic Decrease in Beds occupied in the respective ward from which patient is discharged.

The Ward Status automatically changes. (NORMAL DATA)

Ward status before discharging Patient

The screenshot shows a software window titled "Wards Information". Inside, a sub-section titled "Beds Information" displays the following data:

| Ward name | Surgery |
|----------------|---------|
| Total Beds | 50 |
| Beds occupied | 37 |
| Beds available | 13 |

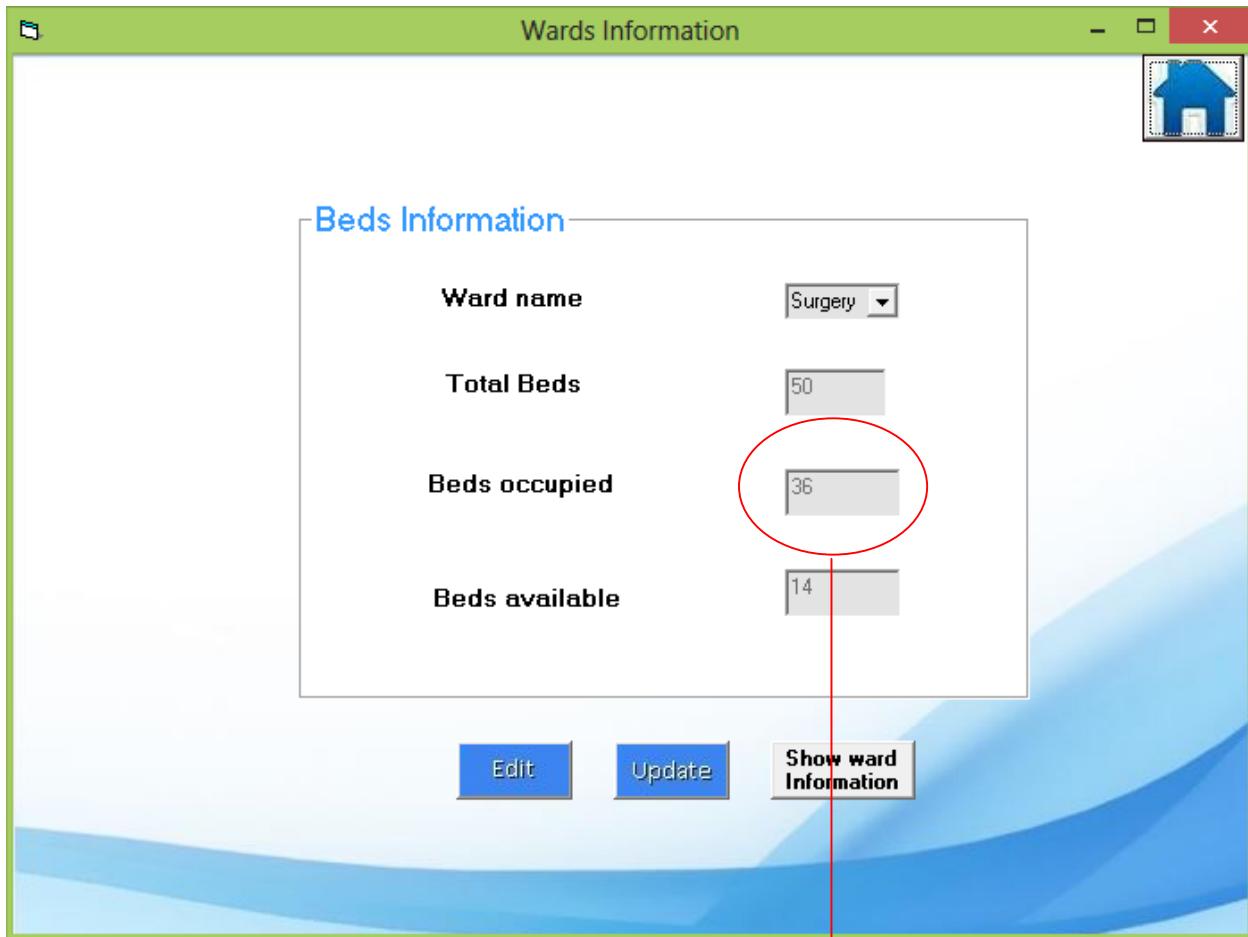
At the bottom of the "Beds Information" panel are three buttons: "Edit", "Update", and "Show ward Information".

Add a record in the Patient Discharging Form

The screenshot shows a Windows application window titled "Discharging Patients". At the top left is a blue arrow icon pointing left. To its right is a search bar labeled "Search by Patient ID" with a dropdown arrow and a "Search" button. On the far right of the title bar is a blue house icon. The main area is titled "Discharging Patients". It contains four input fields: "Patient ID" with value "3", "Date Of Discharge" with value "3/12/2014", "Ward Name" with value "Surgery" in a dropdown menu, and "Description" with value "Treated". Below these is another field "Notes to be kept" with value "None". To the right of the input fields are five buttons: "Add", "Edit", a blank button, "Update", and "Cancel". At the bottom are four navigation buttons: "First", "Previous", "Next", and "Last".

After adding the record press update.

Ward status after Discharging:



There has been a
decrease of 1 in
this field
automatically

Test 18:

Checking validation checks. In this case, entering only numbers or hyphens (-) in numeric fields (like Contact Number)

- Entering only Numbers and Hyphens (NORMAL DATA)

The program accepts the data

The screenshot shows a Windows application window titled "Patient Information". At the top, there are two search bars: "Search by ID" and "Search by Name", each with a dropdown arrow and a "Search" button. To the right of these is a blue house icon. On the left, there is a blue back arrow icon. The main area is divided into two sections: "Personal Information" on the left and "Basic Medical Information" on the right.

Personal Information

- Patient ID: 10
- Name: Andrew
- Contact number: 03339585457
- Date Of Birth: (empty input field)
- Address: (empty input field)

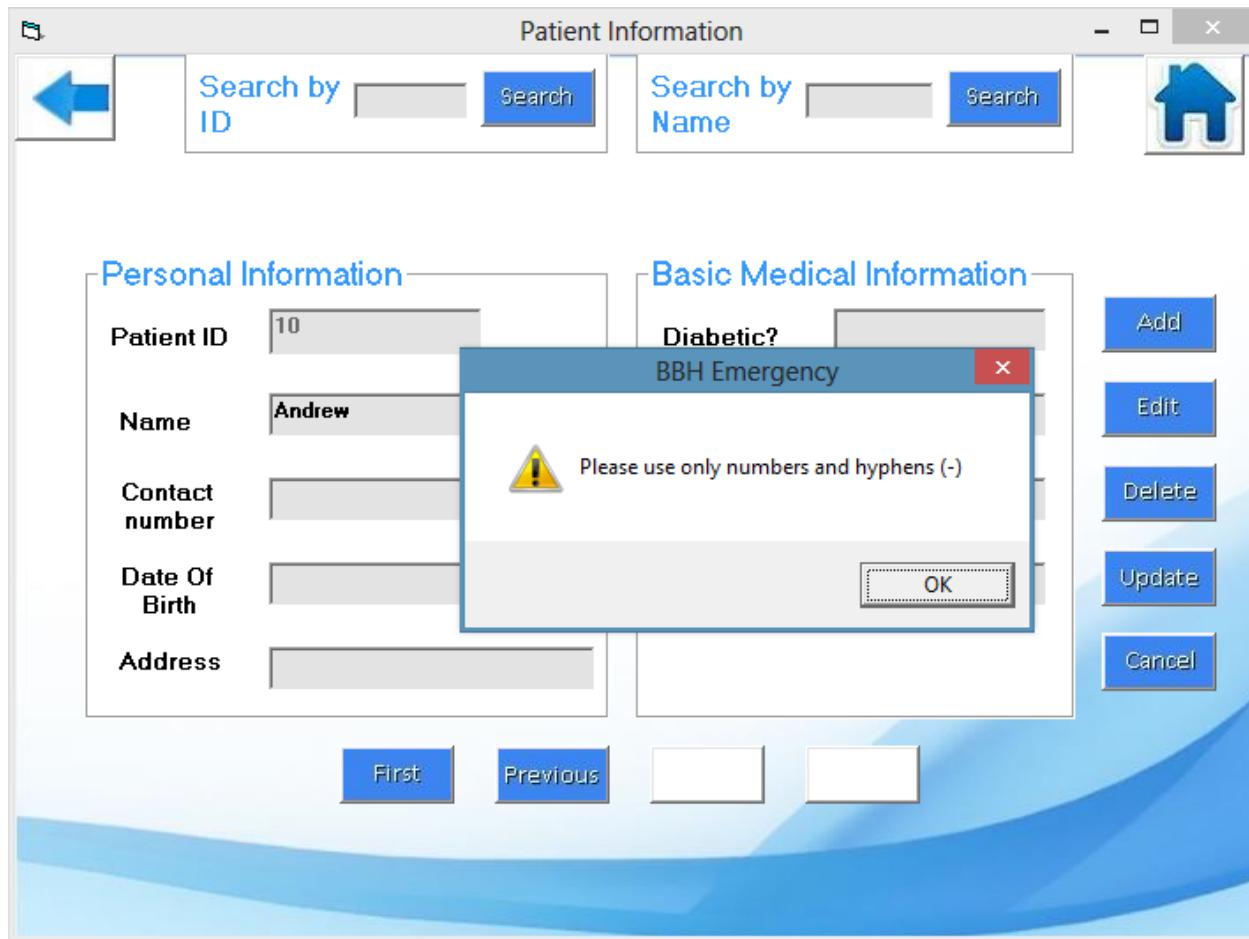
Basic Medical Information

- Diabetic?: (empty input field)
- Hypertensive: (empty input field)
- Blood Group: (empty input field)
- Any serious diseases in family?: (empty input field)

On the right side of the "Basic Medical Information" section, there are five blue buttons: "Add", "Edit", "Delete", "Update", and "Cancel". At the bottom of the window, there are four navigation buttons: "First", "Previous", "Next", and "Last".

- Entering data other than numbers or hyphens (ABNORMAL DATA)

The program does not accept the data and alerts the user



Test 19:

Checking validation checks. In this case, only alphabets and spaces are allowed (Like in Patient Name field)

- Entering only Alphabets and spaces (NORMAL DATA)

The program accepts the data

The screenshot shows the "Patient Information" application window. At the top, there are search options: "Search by ID" and "Search by Name", each with a text input field and a "Search" button. There are also a back arrow icon, a home icon, and standard window control buttons.

The main area is divided into two sections: "Personal Information" on the left and "Basic Medical Information" on the right.

Personal Information:

- Patient ID: 10
- Name: Andrew
- Contact number: (empty)
- Date Of Birth: (empty)
- Address: (empty)

Basic Medical Information:

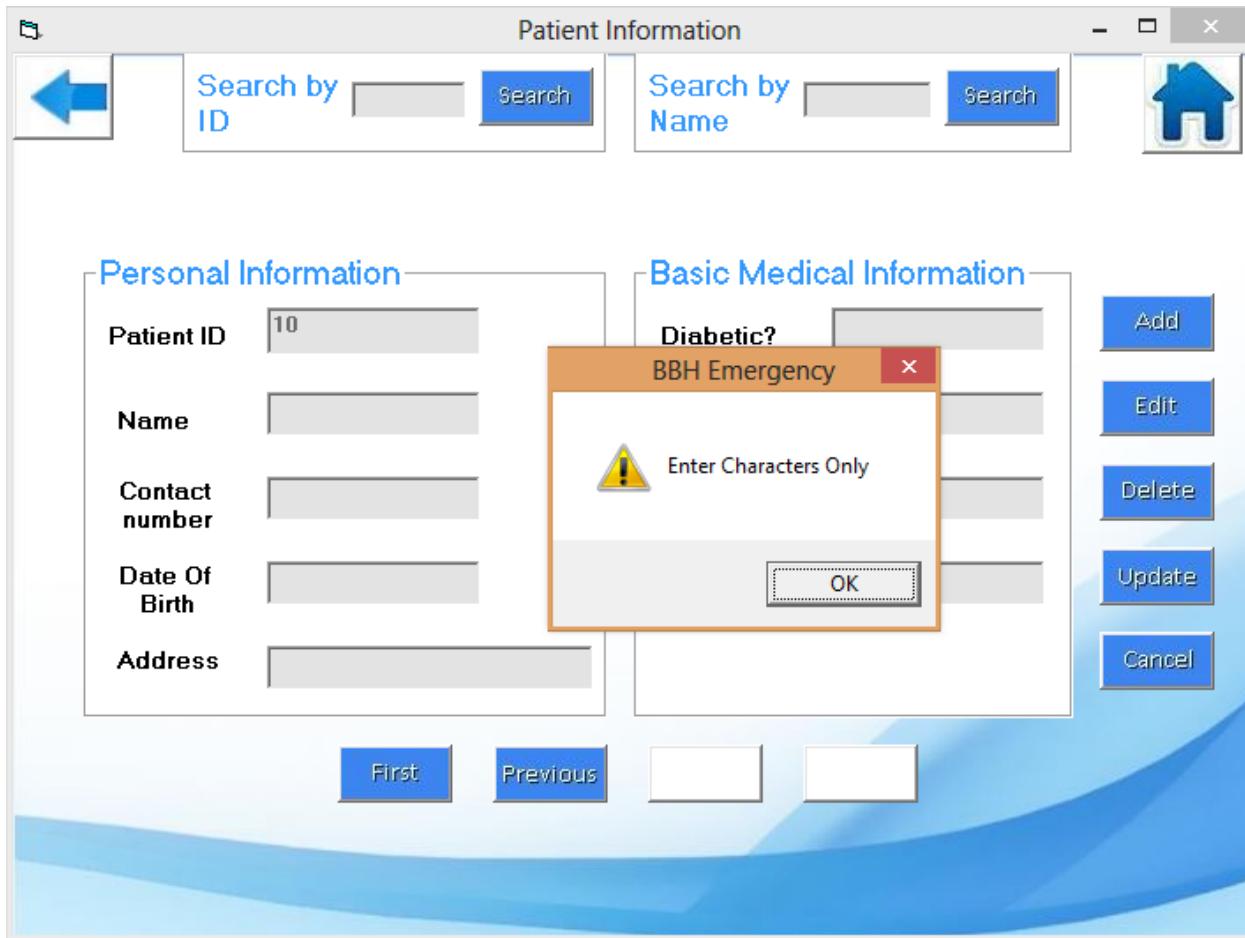
- Diabetic?: (empty)
- Hypertensive: (empty)
- Blood Group: (empty)
- Any serious diseases in family?: (empty)

On the right side of the medical information section, there are five buttons: "Add", "Edit", "Delete", "Update", and "Cancel".

At the bottom, there are navigation buttons: "First", "Previous", and two empty boxes.

- Entering data other than alphabets or spaces for example numbers: (ABNORMAL DATA)

The program does not accept the data and



Test 20:

Checking validation checks. In this case, only numbers are allowed (Like in Patient ID field)

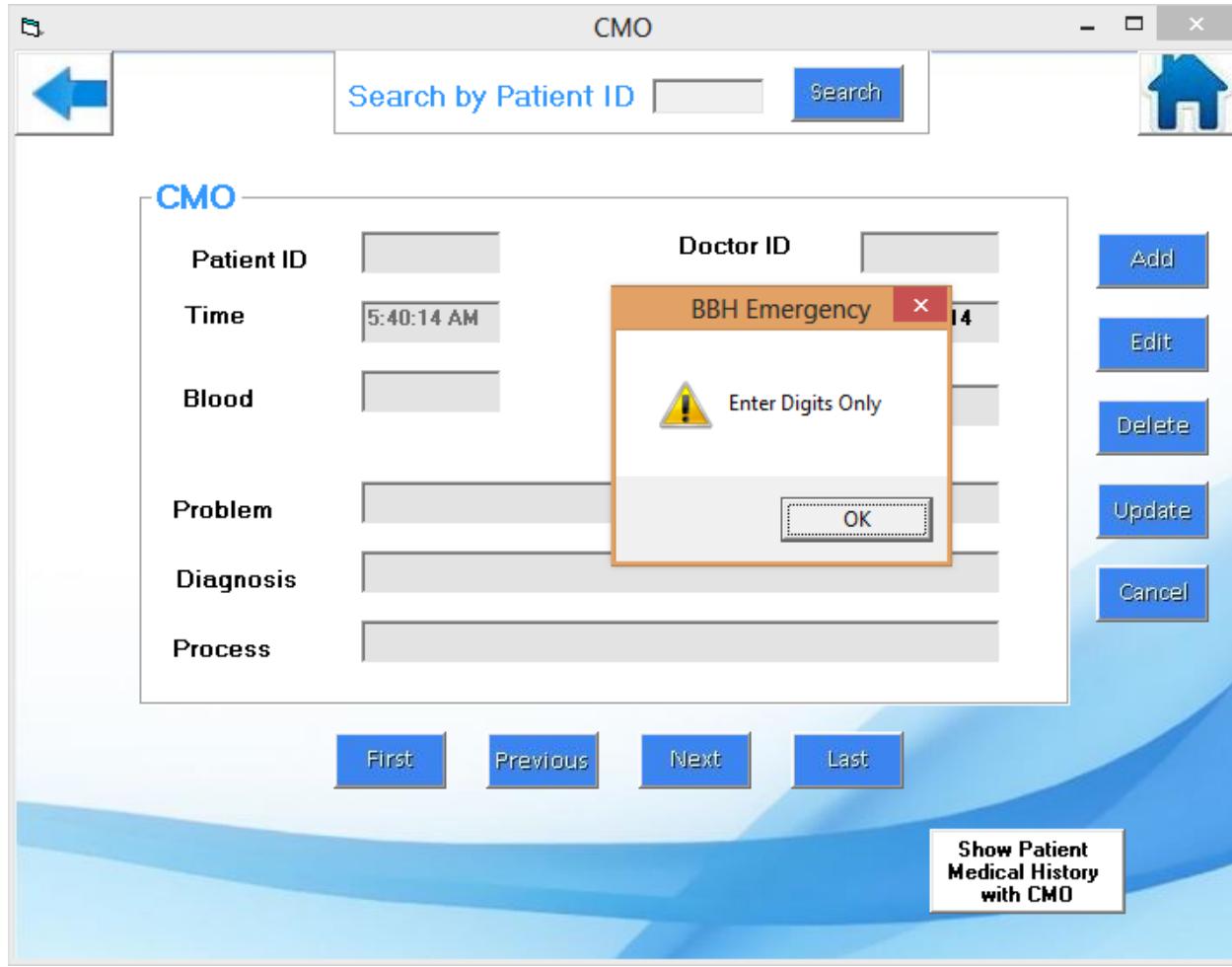
- Only numbers are entered (NORMAL DATA)

The program accepts the data

The screenshot shows a Windows application window titled "CMO". The interface is designed for inputting patient medical information. At the top, there is a search bar labeled "Search by Patient ID" with a "Search" button. To the left of the search bar is a blue arrow icon pointing left, and to the right is a house icon. On the right side of the window, there is a vertical column of five blue buttons labeled "Add", "Edit", "Delete", "Update", and "Cancel". Below these buttons is a tooltip box containing the text "Show Patient Medical History with CMO". The main input area is divided into several sections: "Patient ID" (containing the value "5"), "Doctor ID" (empty), "Time" (containing "5:40:14 AM"), "Date" (containing "3/18/2014"), "Blood" (empty), "Temperature" (empty), "Problem" (empty), "Diagnosis" (empty), and "Process" (empty). At the bottom of the input area, there are four blue buttons labeled "First", "Previous", "Next", and "Last".

- Data other than numbers are entered: (ABNORMAL DATA)

The program does not accept the data



Test 21:

Checking Length Checks in contact number fields:

- Enter data within the range. (NORMAL DATA)

The program accepts the data.

Doctor Information

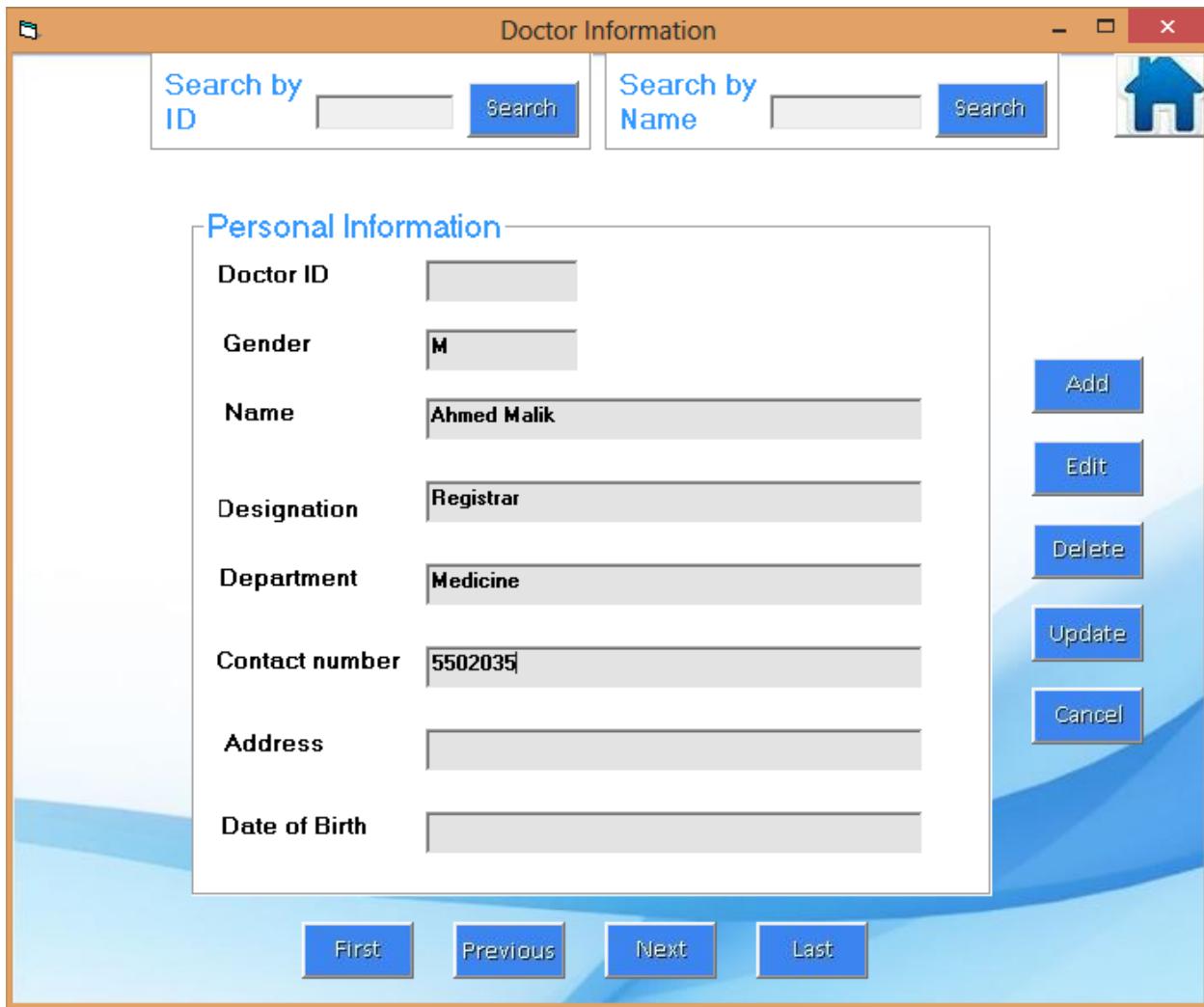
Search by ID Search | Search by Name Search | Home

Personal Information

| | |
|----------------|--|
| Doctor ID | <input type="text"/> |
| Gender | <input type="text" value="M"/> |
| Name | <input type="text" value="Ahmed Malik"/> |
| Designation | <input type="text" value="Registrar"/> |
| Department | <input type="text" value="Medicine"/> |
| Contact number | <input type="text" value="5502035"/> |
| Address | <input type="text"/> |
| Date of Birth | <input type="text"/> |

Add | Edit | Delete | Update | Cancel

First | Previous | Next | Last



- Entering data at its limit i.e. 12 characters (EXTREME DATA)

The program still accepts the data

The screenshot shows a Windows application window titled "Doctor Information". At the top, there are two search fields: "Search by ID" and "Search by Name", each with a "Search" button. A house icon is also present in the top right corner.

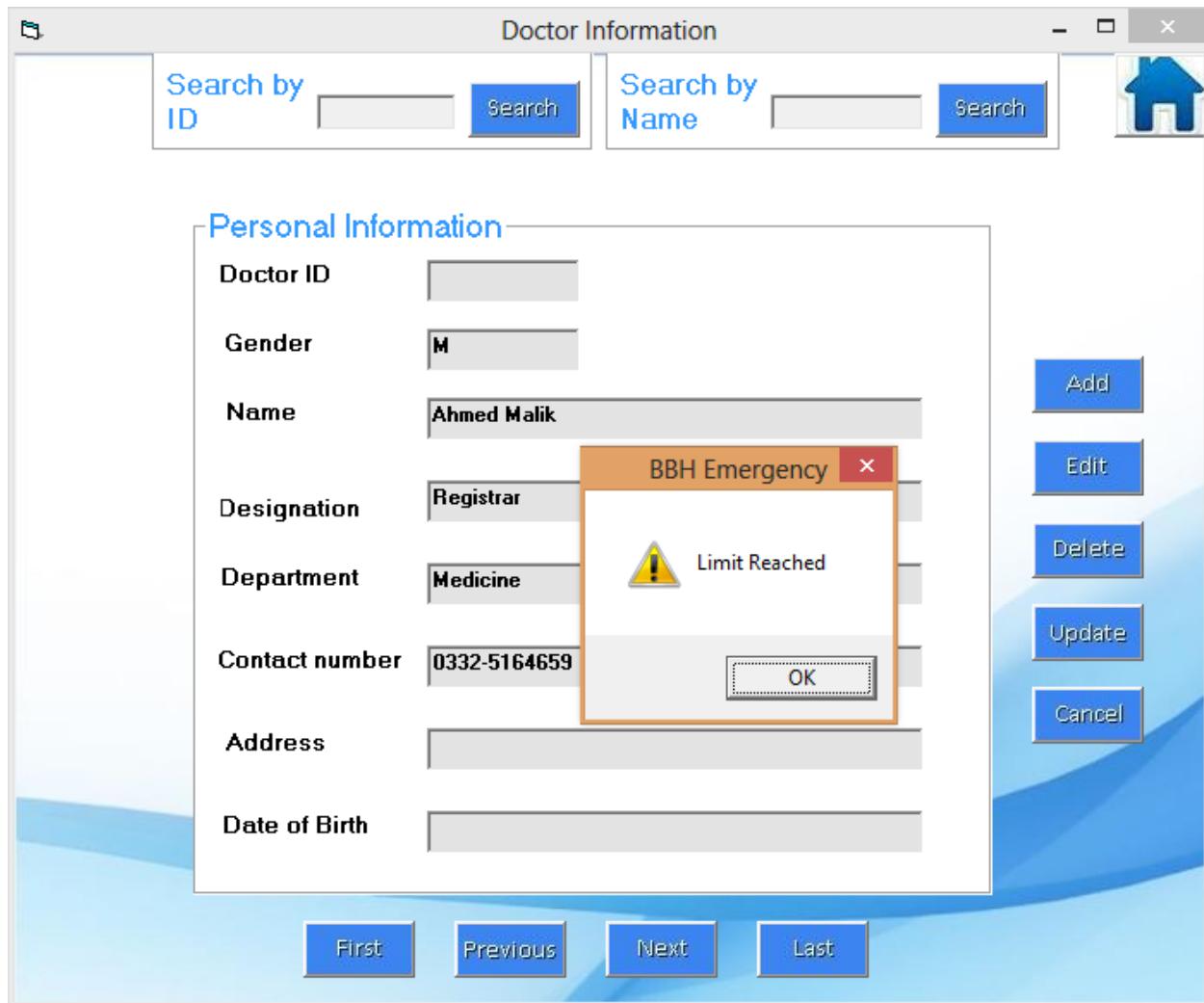
The main area is titled "Personal Information" and contains the following fields:

- Doctor ID: [empty input field]
- Gender: M
- Name: Ahmed Malik
- Designation: Registrar
- Department: Medicine
- Contact number: 0332-5164659
- Address: [empty input field]
- Date of Birth: [empty input field]

On the right side of the form, there are five blue buttons labeled "Add", "Edit", "Delete", "Update", and "Cancel". At the bottom, there are four navigation buttons: "First", "Previous", "Next", and "Last".

- Entering Data Exceeding the character range limit (ABNORMAL DATA)

The program does not accept the data



Test 22**Checking Presence Checks**

- Enter data in all required fields (NORMAL DATA)

Press the Add button and enter all required fields

Doctor Information

Search by ID Search | Search by Name Search | Home

Personal Information

| | |
|----------------|-----------------|
| Doctor ID | TalMed1990 |
| Gender | M |
| Name | Talha |
| Designation | Medical Officer |
| Department | Medicine |
| Contact number | 5556789 |
| Address | DHA Phase 1 |
| Date of Birth | 11/12/1990 |

Add | Edit | Delete | |

First | Previous | Next | Last

After that press Update button the data is accepted and the record is added to the table.

| doctor_information | | | | | | | | | |
|--------------------|------------|-------------|--------|------------------|------------|--------------|----------------|-------------|---------------|
| | doctor_id | name | gender | designation | department | contact_nun | address | date_of_bir | Add New Field |
| + | AftMed1978 | Aftab | M | Chest Specialis | Medicine | 0333-5554678 | Askari 12 | 11/15/1978 | |
| + | AhmMed1981 | Ahmed Malik | M | Registrar | Medicine | 0332-5164659 | Lalkurti | 1/5/1981 | |
| + | AkaSur2001 | Akash | M | Officer | Surgery | 0333-5316133 | Chaklala | 12/21/2001 | |
| + | AkhMed1996 | Akhtar | M | Medical Office | Medicine | 5558769 | Lalkurti | 7/1/1996 | |
| + | AliMed1981 | Ali | M | Senior Registrat | Medicine | 0333-9585235 | Gulrez 3 | 12/21/1981 | |
| + | AmbSur1971 | Ambrin | F | Medical Office | Surgery | 0333-5315588 | 22C, RMC Color | 8/2/1971 | |
| + | BusMed1960 | Bushra | F | Senior Registrat | Medicine | 051-5556754 | Gulrez 3 | 9/9/1960 | |
| + | FehSur1988 | Fehmida | F | Registrar | Surgery | 051-5506789 | Faizabad Rawa | 11/27/1988 | |
| + | IsmMed1967 | Ismail | M | Professor | Medicine | 0300-9876543 | Askari 14 | 2/2/1967 | |
| + | MunMed1995 | Muneeb | M | Medical Office | Medicine | 090078601 | Murree Road R | 8/2/1995 | |
| + | SalSur1995 | Salar | M | Medical Office | Surgery | 051-220182 | Scheme 3 | 7/1/1995 | |
| + | SauSur1990 | Saud | M | Senior Registrat | Surgery | 2220182 | Lalazar | 8/12/1990 | |
| + | TalMed1990 | Talha | M | Medical Office | Medicine | 5556789 | DHA Phase 1 | 11/12/1990 | |
| * | | | | | | | | | |

- Do not enter data in all required fields. (ABNORMAL DATA)

The program does not accept the data

The screenshot shows a Windows application window titled "Doctor Information". At the top, there are two search boxes: "Search by ID" and "Search by Name", each with a "Search" button. To the right of these is a blue house icon. On the right side of the window, there are five buttons: "Add", "Edit", "Delete", "Update", and "Cancel". Below these buttons is a set of navigation buttons: "First", "Previous", "Next", and "Last". The main area is titled "Personal Information" and contains fields for "Doctor ID" (empty), "Gender" (F), "Name" (Fatima), "Designation" (empty), "Department" (empty), "Contact number" (empty), "Address" (empty), and "Date of Birth" (empty). A modal dialog box titled "BBH Emergency" is displayed in the center. It contains a yellow warning icon, the message "A required field is missing", and an "OK" button. The entire application window has a light blue gradient background.

Test 23:

Automatic Generation of Patient ID

When the Add button is pressed the ID is automatically generated:

The screenshot shows a Windows application titled "Patient Information". The interface is divided into two main sections: "Personal Information" on the left and "Basic Medical Information" on the right. At the top, there are search functions ("Search by ID" and "Search by Name") and a home icon. On the right side, there are five blue buttons labeled "Add", "Edit", "Delete", "Update", and "Cancel".

Personal Information

- Patient ID: A text input field containing "10", which is circled in red.
- Name: A text input field.
- Contact number: A text input field.
- Date Of Birth: A text input field.
- Address: A text input field.

Basic Medical Information

- Diabetic?: A text input field.
- Hypertensive: A text input field.
- Blood Group: A text input field.
- Any serious diseases in family?: A text input field.

At the bottom, there are navigation buttons: "First", "Previous", "Next", and "Last".

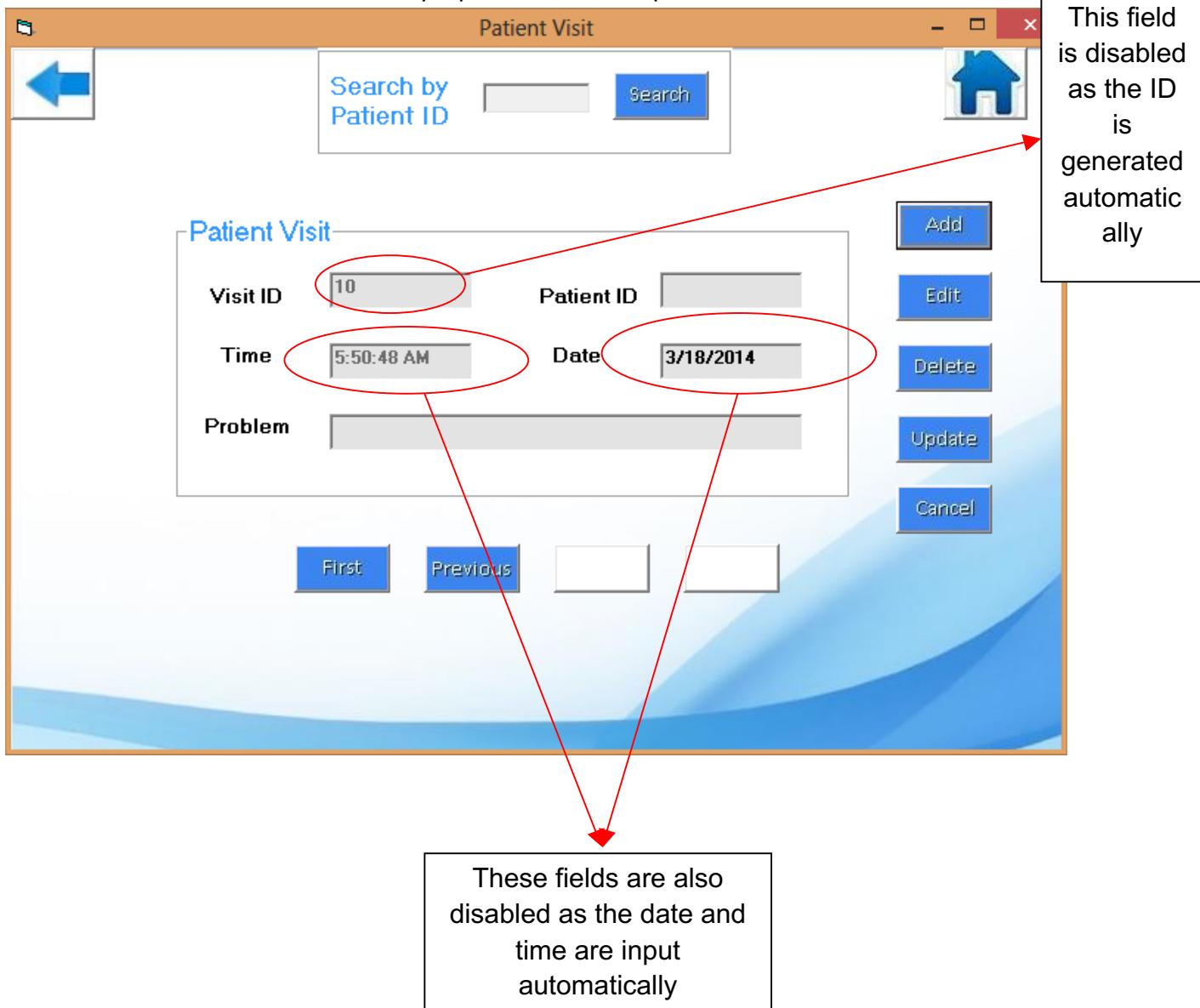
A red arrow points from the "Patient ID" field down to a callout box containing the following text:

This field is disabled as
the ID is generated
automatically

Test 24 and 26:

The Automatic Generation of Patient Visit ID and Automatic entry of Date/Time:

When the Add button is pressed the Patient Visit ID is automatically generated and the Date and Time are automatically input from the computers calender and clock



Test 25:

The Automatic Generation of Doctor ID:

Press Add button and enter all required fields as below

The screenshot shows a Windows application window titled "Doctor Information". At the top, there are two search boxes: "Search by ID" and "Search by Name", each with a dropdown menu and a "Search" button. To the right of these is a blue house icon. On the right side of the window, there is a vertical column of five blue buttons with white text: "Add", "Edit", "Delete", "Update", and "Cancel". The main area is titled "Personal Information" and contains the following fields:

| | |
|----------------|------------------|
| Doctor ID | [Empty Text Box] |
| Gender | M |
| Name | Zahoor |
| Designation | Sultan |
| Department | Medicine |
| Contact number | 03325164659 |
| Address | Lalkurti |
| Date of Birth | 01/08/1989 |

At the bottom of the main area, there are four navigation buttons: "First", "Previous", "Next", and "Last".

The doctor ID is automatically generated as soon as the Update button is pressed.

The screenshot shows a Windows application titled "Doctor Information". At the top, there are two search boxes: "Search by ID" and "Search by Name", each with a dropdown arrow and a "Search" button. To the right of these is a small house icon. On the right side of the window, there are four blue buttons labeled "Add", "Edit", "Delete", and two empty boxes. Below these buttons is a red vertical bar with a downward-pointing arrow pointing towards a callout box at the bottom.

| Personal Information | |
|----------------------|-------------|
| Doctor ID | ZahMed1989 |
| Gender | M |
| Name | Zahoor |
| Designation | Sultan |
| Department | Medicine |
| Contact number | 03325164659 |
| Address | Lalkuri |
| Date of Birth | 1/8/1989 |

At the bottom left are navigation buttons: "First", "Previous", and two empty boxes. A red circle highlights the "Doctor ID" field, which contains the value "ZahMed1989".

The ID is automatically generated after the Update button is pressed and therefore the textbox is kept disabled

Test 27:**Viewing Patient Medical History:**

When the Patient Medical History button is pressed the past medical history is available to view.

The screenshot shows the CMO application window. At the top, there is a search bar labeled "Search by Patient ID" with a dropdown arrow and a "Search" button. To the left is a blue arrow icon, and to the right is a house icon. On the right side of the window, there are four buttons: "Add", "Edit", "Delete", and two empty boxes. The main area is titled "CMO" and contains the following data:

| | | | |
|------------|-------------------------------|-------------|------------|
| Patient ID | 1 | Doctor ID | AftMed1978 |
| Time | 4:35:40 PM | Date | 3/10/2012 |
| Blood | 160/100 | Temperature | 101°F |
| Problem | Severe headache | | |
| Diagnosis | Extremely High Blood Pressure | | |
| Process | given Medicines | | |

Below this is a table with the following data:

| | patient_id | doctor_id | time_examined | date_examined | blood_pressure |
|---|------------|------------|---------------|---------------|----------------|
| ▶ | 1 | AftMed1978 | 4:35:40 PM | 3/10/2012 | 160/100 |
| ◀ | 1 | MunMed1995 | 4:41:33 PM | 3/10/2012 | 150/100 |
| ◀ | 1 | SalSur1995 | 5:21:51 AM | 3/12/2014 | 120/80 |

At the bottom right of the table, a button labeled "Show Patient Medical History with CMO" is highlighted with a red oval and a red arrow points from it to a callout box.

The past patient medical history is available for the doctor to view

Test 28:

Acceptance of Patient Admission:

- Go to Ward Admission form and admit a new patient when beds are available in the ward (NORMAL DATA)

The ward status before the admission:

The screenshot shows a Windows application window titled "Wards Information". Inside, a sub-section titled "Beds Information" displays the following data:

| Ward name | Medicine |
|----------------|----------|
| Total Beds | 30 |
| Beds occupied | 12 |
| Beds available | 18 |

At the bottom of the "Beds Information" panel are three buttons: "Edit", "Update", and "Show ward Information".

The program accepts the admission



- Go to Ward Admission form and admit patient when only 1 bed is available in the respective ward. (EXTREME DATA)

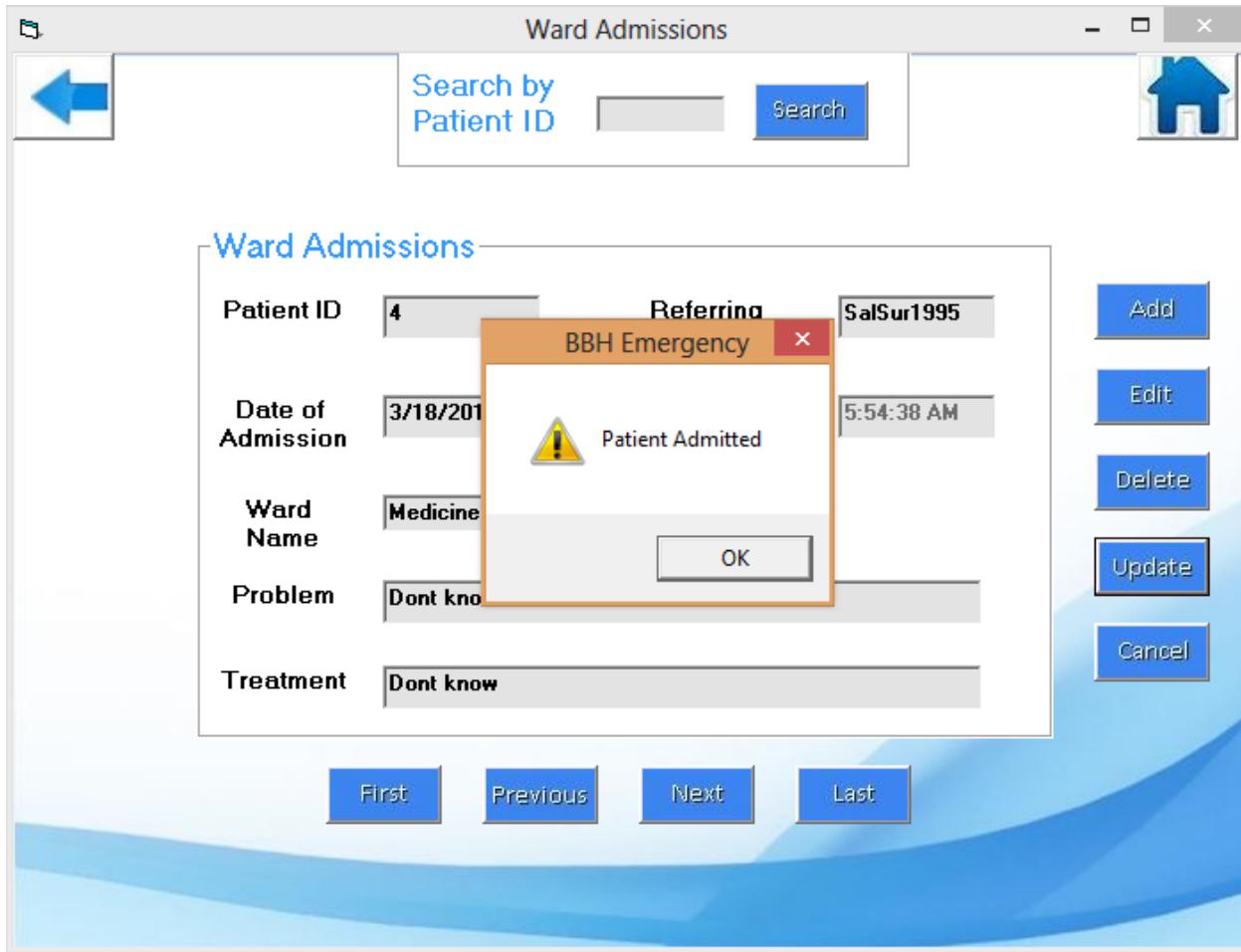
The Ward Status before the admission:

The screenshot shows a Windows application window titled "Wards Information". Inside, there's a panel titled "Beds Information" containing the following data:

| Ward name | Medicine |
|----------------|----------|
| Total Beds | 30 |
| Beds occupied | 29 |
| Beds available | 1 |

At the bottom of the panel are three buttons: "Edit", "Update", and "Show ward Information".

The program accepts the admission:



- Go to Ward Admission form and attempt to admit patient when there are no beds available in the respective ward. (ABNORMAL DATA)

The ward status before the attempt to admit:

The screenshot shows a Windows application window titled "Wards Information". Inside, a section titled "Beds Information" displays the following data:

| Ward name | Medicine |
|----------------|----------|
| Total Beds | 30 |
| Beds occupied | 30 |
| Beds available | 0 |

At the bottom of the window are three buttons: "Edit", "Update", and "Show ward Information".

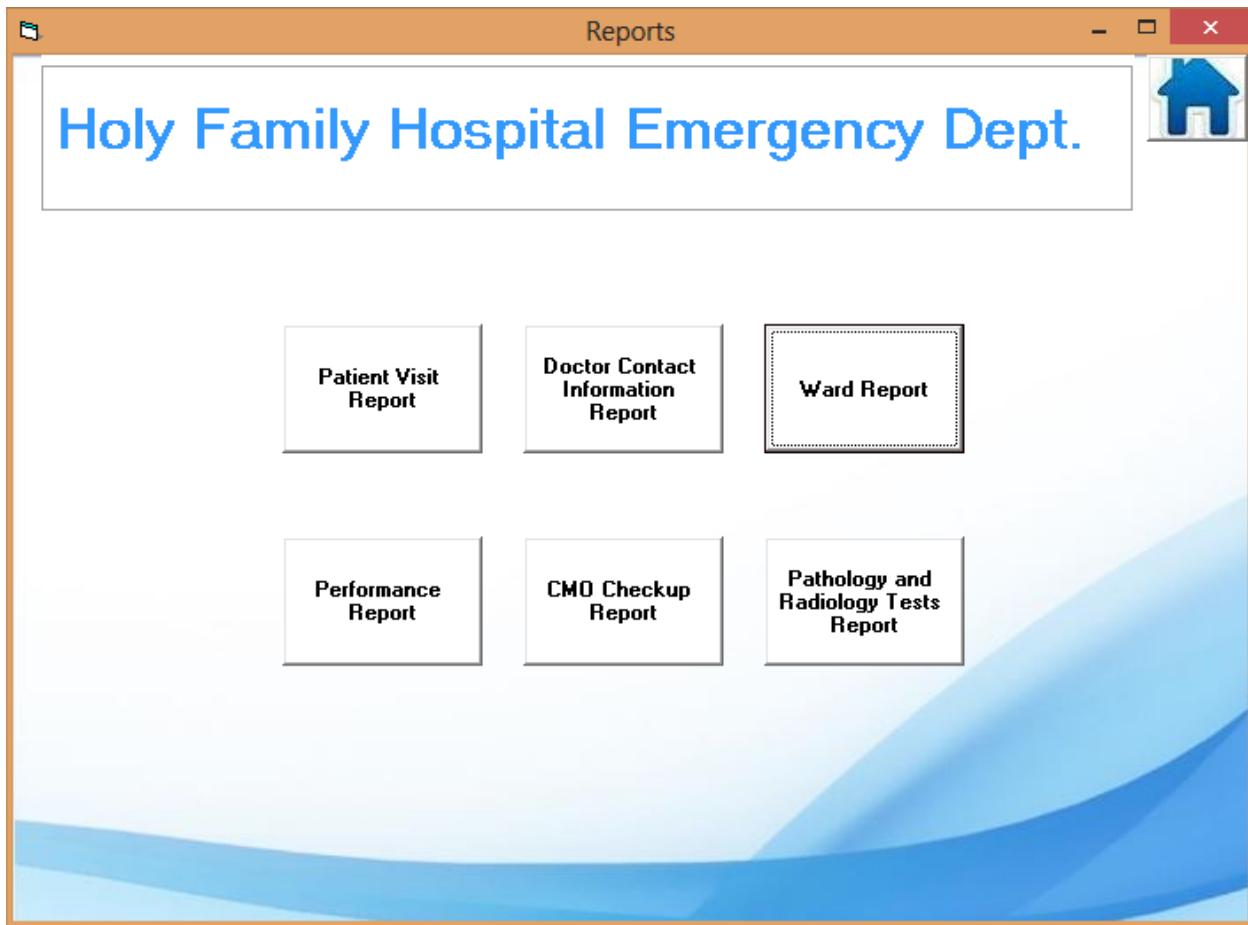
The program does not accept the admission and notifies by a message box, the unavailability of beds in the ward.



Test 29:

Generation of Patient Visit Report:

The Reports Form



Note: The data used to generate these reports are dummy records and bear no resemblance to actual data that will be entered after the organization implements this software. These reports therefore may sometimes seem inaccurate or impossible to consider.

The Visiting Patients Report is generated when the Patient Visit Report button is pressed:

Report on Visiting Patients

BBH Emergency Department

| Patient ID | Date of Visit | Problem |
|------------|---------------|------------------|
| 1 | 9/12/2014 | Acute Chest Pain |
| 2 | 3/10/2014 | High fever |
| 8 | 3/10/2014 | Heart Attack |
| 4 | 3/10/2014 | Extreme Headache |
| 9 | 3/10/2014 | Blood vomiting |
| 3 | 3/10/2012 | Broken Arm |
| 7 | 3/10/2014 | Faintness |
| 5 | 3/11/2014 | Abdominal Pain |

Pages: |◀| 1 |▶| ▶|

Test 30:**Generation of CMO Checkup Report:**

The CMO Checkup report is generated when the CMO Checkup Report button is pressed on the Reports form.

The screenshot shows a computer application window titled "CMO Checkup Report". The window has a toolbar at the top with icons for file operations and a zoom control set to 100%. The main area displays a report titled "BBH Emergency Department" followed by "CMO Checkup Report". The report lists seven patient entries, each with a timestamp, date, doctor name, patient name, and problem description. The entries are as follows:

| Time examined | Date Examined | Doctor Name | Patient Name | Problem |
|---------------|---------------|-------------|--------------|---------------------------|
| 3:14:49 AM | 3/7/2014 | Ali | Saad | High fever with shivering |
| 4:35:40 PM | 3/10/2014 | Aftab | Salar | Severe headache |
| 4:41:33 PM | 3/10/2014 | Muneeb | Salar | Abdominal Pain |
| 4:43:07 PM | 3/10/2014 | Talha | Qazmi | Feeling Weakness |
| 4:46:38 PM | 3/10/2014 | Bushra | Usama | Pain in the elbow |
| 4:49:02 PM | 3/10/2014 | Ali | Ahmad | Fainted |
| 5:21:51 AM | 3/12/2014 | Salar | Salar | Headache |

At the bottom of the window, there is a page navigation bar labeled "Pages: [◀] [1] [▶] [▶]".

Test 31:**Generation of Doctor Contact Information Report:**

The Doctor Contact Information Report is generated when the Doctor Contact Information Report button is pressed on the Reports form.

The screenshot shows a Windows application window titled "Doctor Contact Information Report". The window has a toolbar with icons for file operations and a zoom control set to 100%. The main area contains a title "BBH Emergency Department" and a section header "Doctor Contact Information Report". Below this is a table with 10 rows, each representing a doctor's record. The columns are "Doctor ID", "Name", "Address", and "Contact Number".

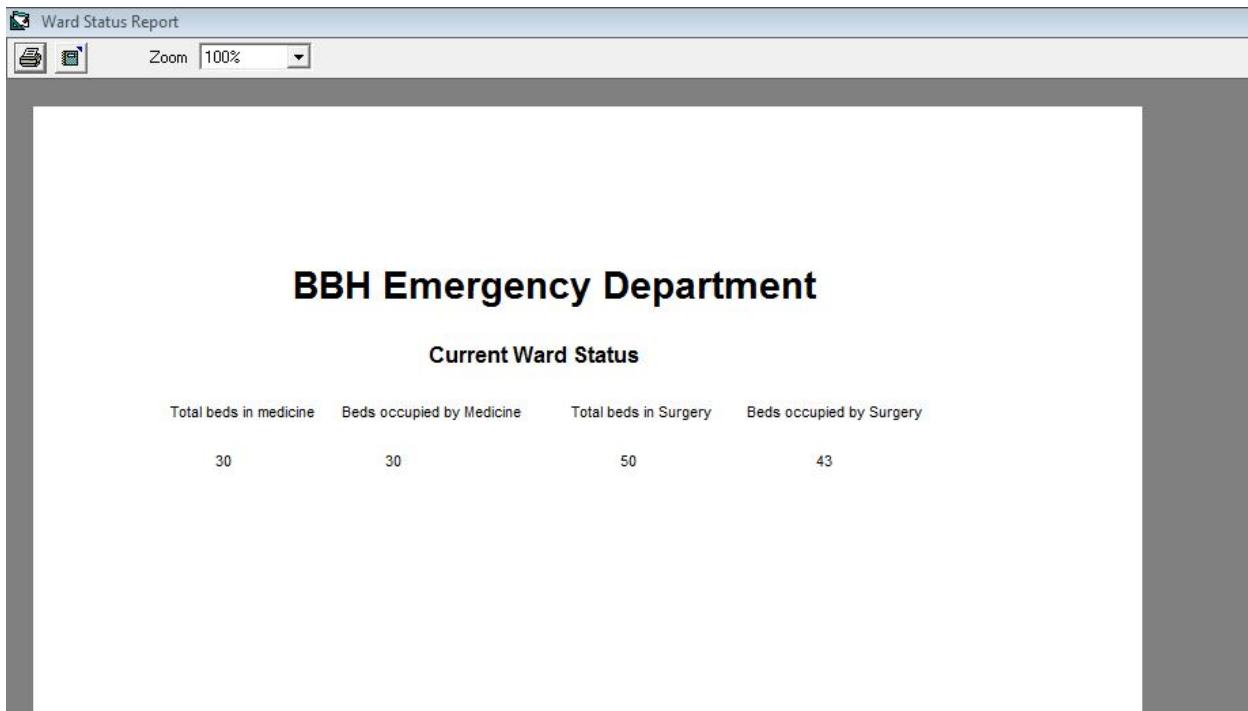
| Doctor ID: | Name: | Address: | Contact Number: |
|------------|---------|------------------------|-----------------|
| AliMed1981 | Ali | Gulrez 3 | 0333-9585235 |
| SalSur1995 | Salar | Scheme 3 | 051-220182 |
| BusMed1960 | Bushra | Gulrez 3 | 051-5556754 |
| AftMed1978 | Aftab | Askari 12 | 0333-5554678 |
| FehSur1988 | Fehmida | Faizabad Rawalpindi | 051-5506789 |
| TalMed1990 | Talha | DHA Phase 1 | 5556789 |
| MunMed1995 | Muneeb | Murree Road Rawalpindi | 090078601 |
| SauSur1990 | Saud | Lalazar | 2220182 |
| IsmMed1987 | Ismail | Askari 14 | 0300-9876543 |
| AkaSur2001 | Akash | Chaklala | 0333-5316133 |
| AkhMed1996 | Akhtar | Lalkurti | 5558769 |

Pages:

Test 32:

Generation of Ward Status Report:

The Ward Status Report is generated when the Ward Report button is pressed on the Reports form.



Test 33:

Generation of Performance Report:

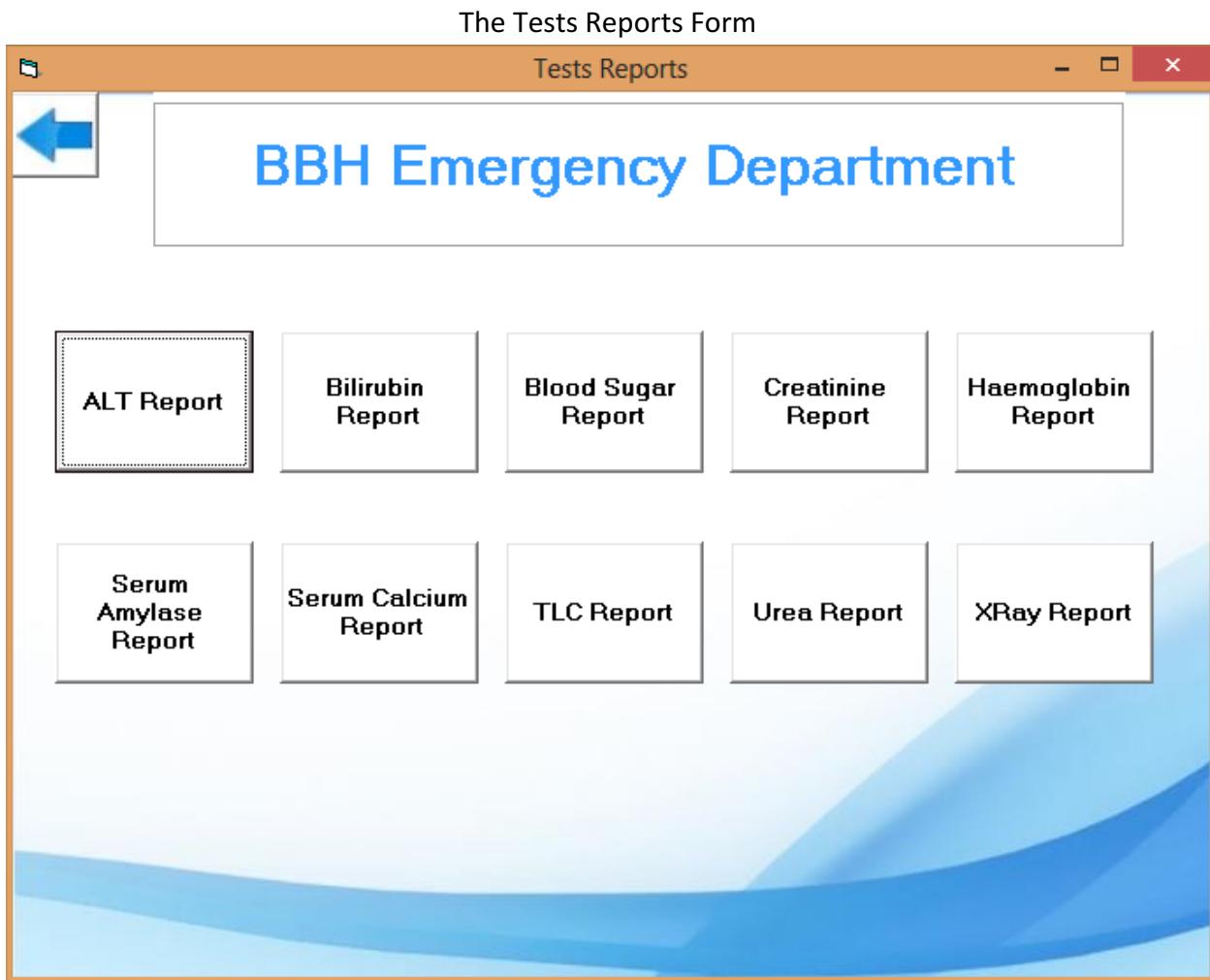
The Performance Report is generated when the Performance Report button is pressed on the Reports form.

| Patient Name | Date of visit | Time of Visit | Time examined by | Time examined by Senior medical Officer |
|--------------|---------------|---------------|------------------|---|
| Salar | 9/12/2014 | 3:00:00 | 4:35:40 PM | 7:00:00 PM |
| Salar | 9/12/2014 | 3:00:00 | 4:41:33 PM | 7:00:00 PM |
| Salar | 9/12/2014 | 3:00:00 | 5:21:51 AM | 7:00:00 PM |
| Saad | 3/10/2014 | 2:09:31 | 3:14:49 AM | 12:10:00 PM |
| Ahmad | 3/10/2014 | 2:10:07 | 4:49:02 PM | 4:58:59 PM |
| Usama | 3/10/2014 | 2:09:44 | 4:46:38 PM | 9:03:08 PM |
| Usama | 3/10/2014 | 2:09:44 | 4:46:38 PM | 9:08:05 PM |

Pages: |◀| 1 |▶| □

Test 34:

The Individual Test reports:



ALT Test Report

The screenshot shows a Windows application window titled "ALT Report". The window has a toolbar at the top with icons for file operations and a "Zoom 100%" button. The main content area displays a table of ALT test results. The table has four columns: "Name", "ALT Result", "Date of Test", and "Time of test". The data is as follows:

| Name | ALT Result | Date of Test | Time of test |
|--------|------------|--------------|--------------|
| Salar | 450 | 2/12/2014 | 9:50:00 AM |
| Saad | 45 | 9/12/2014 | 9:15:00 PM |
| Saad | 40 | 12/12/2014 | 12:20:00 PM |
| Sarmad | 56 | 3/10/2014 | 9:29:05 PM |

Bilirubin Test Report

| BBH Emergency Department | | | |
|---------------------------------|------------------|--------------|--------------|
| Bilirubin Report | | | |
| Name | Bilirubin Result | Date of Test | Time of test |
| Salar | 12 | 2/12/2014 | 9:50:00 AM |
| Saad | 11.8 | 9/12/2014 | 9:15:00 PM |
| Saad | 12 | 12/12/2014 | 12:20:00 PM |
| Sarmad | 12.9 | 3/10/2014 | 9:29:05 PM |

Blood Sugar Test Report

| BBH Emergency Department | | | |
|---------------------------------|-------------|--------------|--------------|
| Sugar Report | | | |
| Name | Test Result | Date of Test | Time of Test |
| Salar | 120 | 2/12/2014 | 9:50:00 AM |
| Saad | 89 | 9/12/2014 | 9:15:00 PM |
| Saad | 90 | 12/12/2014 | 12:20:00 PM |
| Sarmad | 77 | 3/10/2014 | 9:29:05 PM |

Creatinine Test Report

The screenshot shows a software application window titled "Creatinine Reports". The main content area displays the title "BBH Emergency Department" and "Creatinine Report". Below this, there is a table with four columns: "Name", "Creatinine Result", "Date of Test", and "Time of Test". The table contains four rows of data:

| Name | Creatinine Result | Date of Test | Time of Test |
|--------|-------------------|--------------|--------------|
| Salar | 54 | 2/12/2014 | 9:50:00 AM |
| Saad | 5 | 9/12/2014 | 9:15:00 PM |
| Saad | 12 | 12/12/2014 | 12:20:00 PM |
| Sarmad | 11.87 | 3/10/2014 | 9:29:05 PM |

Haemoglobin Test Report

| BBH Emergency Department | | | |
|--------------------------|--------------------|--------------|--------------|
| Haemoglobin Report | | | |
| Name | Haemoglobin result | Date of test | Time of test |
| Salar | 12.5 | 2/12/2014 | 9:50:00 AM |
| Saad | 12.5 | 9/12/2014 | 9:15:00 PM |
| Saad | 12.9 | 12/12/2014 | 12:20:00 PM |
| Sarmad | 12.6 | 3/10/2014 | 9:29:05 PM |

Serum Amylase Test Report

| BBH Emergency Department | | | |
|--------------------------|----------------------|--------------|--------------|
| Serum Amylase Report | | | |
| Name | Serum Amylase result | Date of test | Time of test |
| Salar | 144 | 2/12/2014 | 9:50:00 AM |
| Saad | 12.9 | 9/12/2014 | 9:15:00 PM |
| Saad | 55 | 12/12/2014 | 12:20:00 PM |
| Sarmad | 11 | 3/10/2014 | 9:29:05 PM |

Serum Calcium Test Report

| BBH Emergency Department | | | |
|--------------------------|---------------|--------------|--------------|
| Serum Calcium Report | | | |
| Name | Serum Calcium | Date of Test | Time of test |
| Salar | 12 | 2/12/2014 | 9:50:00 AM |
| Saad | 12 | 9/12/2014 | 9:15:00 PM |
| Saad | 11 | 12/12/2014 | 12:20:00 PM |
| Sarmad | 11 | 3/10/2014 | 9:29:05 PM |

TLC Test Report

| BBH Emergency Department | | | |
|--------------------------|------------|--------------|--------------|
| TLC Report | | | |
| Name | TLC Result | Date of test | Time of test |
| Salar | 10000 | 2/12/2014 | 9:50:00 AM |
| Saad | 500 | 9/12/2014 | 9:15:00 PM |
| Saad | 11 | 12/12/2014 | 12:20:00 PM |
| Sarmad | 50 | 3/10/2014 | 9:29:05 PM |

Urea Test Report

The screenshot shows a software application window titled "Urea Report". At the top, there are icons for file operations and a zoom control set at 100%. The main content area is titled "BBH Emergency Department" and "Urea Report". Below this, a table displays the following data:

| Name | Urea test result | Date of test | Time of test |
|--------|------------------|--------------|--------------|
| Salar | 11.5 | 2/12/2014 | 9:50:00 AM |
| Saad | 90 | 9/12/2014 | 9:15:00 PM |
| Saad | 11 | 12/12/2014 | 12:20:00 PM |
| Sarmad | 70 | 3/10/2014 | 9:29:05 PM |

At the bottom left, there is a page navigation bar labeled "Pages: 1" with arrows for navigating through multiple pages.

X-Ray Test Report

DataReport1

Zoom 100%

BBH Emergency Department

XRay Report

| Name | XRay Result | Date of test | Time of test |
|--------|--------------|--------------|--------------|
| Salar | normal | 2/12/2014 | 9:50:00 AM |
| Saad | broken arm | 9/12/2014 | 9:15:00 PM |
| Saad | normal | 12/12/2014 | 12:20:00 PM |
| Sarmad | Broken Elbow | 3/10/2014 | 9:29:05 PM |

Pages: 1

3.4 PLANNING FOR INSTALLATION

After the solution was developed and the testing carried out it was time to implement the system. A plan was developed for implementation to be carried out.

Below are the three points that are to be followed for the implementation.

- User Training
- User Testing (Beta Testing)
- Chnageover

3.4.1 USER TRAINING:

This phase involved the users of the software being given an overview of how the system works and giving them proper training of using the system. I went to the hospital and met with the staff at the reception of the emergency department and also met with a few doctors. I asked them to take out some time and they agreed to meet me 2 days later and that was when I walked the staff with every step of the software and taught them how to use the software. The training lasted for about 1 week.

3.4.2 USER TESTING (BETA TESTING):

The same test plan was carried out with the user testing. Below is the same test plan and scanned documented proof that the tests were run by members of the organization and the extent to which the organization was satisfied.

| Test No. | Testing Area | BEFORE TESTING | | AFTER TESTING | | Forms that will contain The Tested Area |
|----------|-------------------------|---|--|--|------------|--|
| | | Test Data | Expected Results | Actual Outcome | Proof Page | |
| 1. | User Login And Password | Correct Password and Username entered Incorrect Password and/or username entered | Should open the Main Form Should display a message alerting about wrong password/username | Main form is displayed Error message is displayed | | Login Form |
| 2. | User Rights | Logs in through doctors account Logs in through receptionists account | The user should have full rights The user should have view only rights in all Patient Treatment Sub Forms | The user has full rights. The user has limited rights. | | Login, CMO, Senior Medical Officer, Patient Tests, Ward Admissions, Ward Discharging, Patient Tests, Patient Visit Forms |
| 3. | Exiting the program | Goes to the Main Form and presses the Exit Button | A confirmation box should appear with 2 options Yes/No. If user presses Yes then program should exit If user presses No program shouldn't exit | Confirmation box appears Exits the program Does not exit the program | | Main Form |

| | | | | | | |
|----|-----------------------------|--|---|---|--|--|
| 4. | Navigation Buttons | First button pressed Next button pressed Last button pressed Previous button pressed | First record should be displayed Next record should be displayed Last record should be displayed Previous record should be displayed | First record is displayed Next record is displayed Last record is displayed Previous record is displayed | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |
| 5. | Adding a new record | Pressing add button in the patient information form and then pressing update after entering required fields. | A blank record should be displayed and after entering data and pressing update button the record should be saved in the database | A blank record is displayed which is saved after entering the required fields and pressing update button. | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |
| 6. | Updating an existing record | Pressing edit button in the patient information form and then pressing update after changing data in fields | The record should be updated and saved in the database | The record is updated | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |

| | | | | | | |
|----|--------------------------------------|---|---|--|--|---|
| 7. | Updating and showing the ward status | Pressing edit button in the ward information form and then pressing update | Only the total beds in medicine/surgery fields should be enabled to edit and after change and pressing update the | Only the total beds in medicine/surgery field textboxes are enabled and after pressing update the ward status is changed | | Ward Information Form |
| 8. | Using the Cancel button | Pressing Cancel after pressing the Add or Update button in the Patient Information Form. | We should return to the previous/same record without any alteration. | No alterations were made | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions, Ward Information Form Forms. |
| 9. | Using the Search through Name button | Pressing the Search by name button after selecting the name through dbcombo box in the Patient Information Form | The field with the required name should be displayed | The field with the required name is displayed | | Patient Information Form, Doctor Information Form. |

| | | | | | | |
|-----|---|---|---|--|--|--|
| 10. | Using the Search through ID button | Pressing the Search by ID button after selecting the ID through dbcombo box in the Patient Information Form | The field with the required ID should be displayed | The field with the required ID is displayed | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |
| 11. | Using the Delete Button. | Pressing the Delete button to delete a record in the Patient Information Form. | A confirmation box should appear If user presses Yes then record should be deleted If user presses No then record should not be deleted | A confirmation box appears. When user presses Yes the record is deleted When user presses No the record is not deleted | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |
| 12. | Enabling of Cancel and Update Button when Add or Edit Button is pressed | Pressing the Add or Edit button in the Patient Information Form. | The Cancel and Update button should be enabled | The Cancel and Update buttons are enabled. | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |

| | | | | | | |
|-----|---|---|---|---|--|--|
| 13. | Disabling of Cancel and Update Button when Cancel or Update Button is pressed | Pressing the Cancel or Update button in the Patient Information Form. | The Cancel and Update button should be disabled | The Cancel and Update button are disabled | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |
| 14. | The Disabling of the Previous and First Button when the current record is the first record. | Go to patient Information Form and navigate to first record | The First and the Previous Buttons should be Disabled | The First and Previous Buttons are disabled | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |
| 15. | The Disabling of the Next and Last Button when the current record is the Last record. | Go to patient Information Form and navigate to last record | The First and the Previous Buttons should be Disabled | The First and Previous Buttons are disabled | | CMO, Discharging patients, Doctor Information, Patient Information, Patient Tests Senior Medical Officer, Ward Admissions Forms. |

| | | | | | | |
|-----|--|---|---|---|--|---|
| 16. | Automatic Increase in Beds occupied in the respective ward in which patient is admitted | Go to Ward Admission Form and Add a new record | The number of beds occupied in the respective ward should automatically increase by 1 | The number of beds occupied in the respective ward automatically increase by 1 | | Ward Information Form |
| 17. | Automatic Decrease in Beds occupied in the respective ward from which patient is discharged. | Go to Discharging Patients Form and Add a new record | The number of beds occupied in the respective ward should automatically decrease by 1 | The number of beds occupied in the respective ward automatically decrease by 1 | | Discharging Patients Form |
| 18. | Checking validation checks. In this case, entering only numbers or hyphens in numeric fields (like Contact Number) | Go to patient information and enter only numbers and hyphens in the contact number field Go to patient information and enter data other than numbers and hyphens in the contact number field | The program should accept the data The program should not accept the data and alert user through a message box | The program accepts the data The program does not accept the data and alerts user. | | Patient Information Form and Doctor Information Form. |

| | | | | | | |
|-----|---|--|--|--|--|---|
| 19. | <p>Checking validation checks. In this case, only alphabets and spaces are allowed (Like in Patient Name field)</p> | <p>Go to patient information and enter only alphabets in the name field</p> <p>Go to patient information and enter data other than alphabets in the name field</p> | <p>The program should accept the data</p> <p>The program should not accept the data and alert user through a message box</p> | <p>The program accepts the data</p> <p>The program does not accept the data and alerts user.</p> | | <p>Patient Information Form and Doctor Information Form.</p> |
| 20. | <p>Checking validation checks. In this case, only numbers are allowed (Like in Patient ID field)</p> | <p>Go to CMO Form and enter only numeric data in patient ID field</p> <p>Go to CMO Form and enter data other than numeric in patient ID field</p> | <p>The program should accept the data</p> <p>The program should not accept the data and alert user through a message box</p> | <p>The program accepts the data</p> <p>The program does not accept the data and alerts user.</p> | | <p>CMO, Senior Medical Officer, Patient Tests, Ward Admissions, Discharging Patient Forms</p> |

| | | | | | | |
|-----|---|--|--|--|--|---|
| 21 | Checking Length (Range) Checks In contact number fields | <p>Go to Doctor Information record and enter data within the limit</p> <p>Go to Doctor Information record and enter data at its limit i.e. 12 characters</p> <p>Go to Doctor Information record and enter data outside the limit</p> | <p>The program should accept the data</p> <p>The program should accept the data</p> <p>The program should not accept the data and alert user through a message box</p> | <p>The program accepts the data</p> <p>The program accepts the data</p> <p>The program does not accept the data and alerts user.</p> | | Patient Information Form and Doctor Information Form. |
| 22. | Checking Presence Checks | <p>Go to Doctor Information record and enter data in all required fields</p> <p>Go to Doctor Information record and do not enter data in all required fields</p> | <p>The program should accept the data</p> <p>The program should not accept the data and alert user through a message box</p> | <p>The program accepts the data</p> <p>The program does not accept the data and alerts user.</p> | | Doctor Information, Patient Information Forms. |
| 23. | Automatic Generation of Patient ID | Go to Patient Information Form and press Add button | A Unique Numeric ID should be generated | A Unique ID is generated | | Patient Information Form |

| | | | | | | |
|-----|---|---|---|--|--|--|
| 24. | Automatic Generation of Patient Visit ID | Go to Patient Visit Form and press Add button | A Unique Numeric ID should be generated | A Unique ID is generated | | Patient Visit Form |
| 25. | Automatic Generation of Doctor ID | Go to Doctor Information Form, press Add button and then Update Button after entering all required fields | An ID for the doctor should automatically be generated | An ID for the Doctor is automatically generated | | Doctor Information Form |
| 26. | Automatic Entry of Date and Time on pressing Add button | Go to Patient Visit Form and press Add button | The Date and Time should be automatically input. | The Date and Time are automatically input | | Patient Visit, CMO, Senior Medical Officer, Patient tests, Ward Admissions, Discharging Patients Forms |
| 27. | Viewing Patient Medical History | Go to CMO form and press Patient Medical History button | The Patient's Medical History should be available to view | The Patient's Medical History is available to view | | CMO, Senior Medical Officer, Patient tests Forms |

| | | | | | | |
|-----|---|---|---|---|--|---------------------|
| | | | | | | |
| 28. | Acceptance of Patient Admission | <p>Go to Ward Admission Form and add a new record when there are beds available</p> <p>Go to Ward Admission Form and add a new record when there is only 1 bed available</p> <p>Go to Ward Admission Form and add a new record when there are no beds available</p> | <p>The program should accept the admission</p> <p>The program should accept the admission</p> <p>The program should not accept the admission and notify the user of the unavailability of beds in the ward.</p> | <p>The program accepts the admission</p> <p>The program accepts the admission</p> <p>The program does not accept the admission and notifies user with a message box</p> | | Ward Admission Form |
| 29. | Generation of Visiting Patient Report | Go to Reports Form and then press Visiting Patients Report button. | The Report should be generated | The Report is generated | | Reports Form |
| 30. | Generation of CMO Checkup Report | Go to Reports Form and then press CMO Checkup Report button. | The Report should be generated | The Report is generated | | Reports Form |
| 31. | Generation of Doctor Contact Information Report | Go to Reports Form and then press Doctor Contact Information Report button. | The Report should be generated | The Report is generated | | Reports Form |

| | | | | | | |
|-----|--|---|--------------------------------|-------------------------|--|--------------------|
| 32. | Generation of Ward Status Report | Go to Reports Form and then press Ward Status Report button. | The Report should be generated | The Report is generated | | Reports Form |
| 33. | Generation of Performance Report | Go to Reports Form and then press Performance Report button. | The Report should be generated | The Report is generated | | Reports Form |
| 34. | Generation of Individual Tests Reports | Go to Reports Form and then press Tests Report button. Select the test from the new form. | The Report should be generated | The Report is generated | | Tests Reports Form |

BETA TESTING EVALUATION:

Below is the signed evaluation by the AMS about the Beta testing.

BBH EMERGENCY AUTOMATION EVALUATION

CLIENT EVALUATION

EVALUATION OF BETA TESTING

For the test plan provided please provide a detailed feedback below including any anomalies encountered. Do indicate whether the software achieves all the expected output as indicated on the test plan and fulfills the requirement specification.

Everything went perfectly fine. There were no anomalies and all the expected outcomes had been achieved. Although I would have liked a little more security, all of the requirements specifications have been fulfilled. Good work. We are very satisfied.

[Signature]
Additional Medical
Superintendent
Benazir Bhutto Hospital

3.4.3 CHANGEOVER:

Three methods were proposed for the changeover to the new system and they have been described and evaluated

Parallel Running:

Until the old system can be considered fault free, the new system and the old system will be run simultaneously. This allows users to get used to the system and compare it to the old system at the same time.

Benefits:

- Direct comparison available.
- Fallback in case of system failure
- Simultaneous staff training

Drawbacks:

- Time consuming
- Labour intensive
- Patients will have to wait in long queues delaying patient treatment.
- Is very expensive
- More staff will probably need to be hired to cater to the increased time consumption.

Phased Implementation:

With this, only part of the new system will be introduced. For example we can start off with the test reports or the ward status so even if the new system fails, it won't be very disastrous as it will initially only be introduced into parts of the organization where the failure doesn't prove very fatal.

Benefits:

- If the latest part fails, only need to go back in the system to the point of failure; hence a failure isn't disastrous
- Less expensive than parallel.
- Can ensure that the system works before expanding.
- Failure isn't very disastrous.
- Patients will not have to wait too long as was in parallel running.

Drawbacks

- Some parts of the system that rely on other parts will not work until the entire system is replaced.
- More expensive than direct changeover

Direct Changeover:

The old system is removed and the new system replaces it completely and immediately

Benefits:

- Quick change
- Less laborious
- Inexpensive

Drawbacks:

- No alternative in case of failure
- Risky
- No comparison available
- Very risky for patients because if the new system fails they will have to wait for indefinite periods of time before they might get some medical attention.

Proposed Method:

The phased implementation is the proposed method because although all the benefits of the new system might not be available immediately, the lives of critical patients are much more important and no matter what this implementation will ensure that patients are getting medical attention as soon as it is available to them.

I sent an email with an attached pdf file to the DMS of the Emergency department and he was willing to go with the plan. Below is the email and the response.

The screenshot shows an email inbox with two messages. The first message is from 'Salar Ather <salar.ather@gmail.com> to Doctor' at 1:25 AM (21 hours ago). It contains a text message and an attachment named 'W CHANGEOVER.docx'. The attachment preview shows a document page with headings like 'INTRODUCTION', 'What methods were evaluated for the transition to the new system and why have been discounted', and 'The following table summarizes the pros and cons of each method and the reasons for its rejection'. The second message is from 'Doctor Rafiq to me' at 10:10 PM (1 hour ago). It contains a text message: 'Salar I have read everything and assure you that we are content with changeover method and are ready for the changeover.' Below this message is a link: 'Click here to Reply or Forward'.

4. DOCUMENTATION:

4.1 TECHNICAL DOCUMENTATION:

All of the technical documentation has been completed as a by product of the design and development phases. It was only feasible not to include all that stuff in the technical documentation again to reduce the volume of the project. However rest assured that BBH did receive the technical documentation as a separate booklet. Refer to these phases for the technical documentation.

- For **Data Structures** go to Section 2.1.4 on Pg 30
- For **Data Dictionary** Go to Pg 31
- For **Data Flow Diagrams** Go to Section 1.3.2 on Pg 13
- For **Programming** Go to Section 3.2 on Pg 138
- For **Algorithms and Flowcharts** Go to Section 2.1.8 on Pg 49
- For **Hardware Requirements** Go to Section 1.4.1 on Pg 21
- For **Software Requirements** Go to Section 1.4.2 on Pg 25
- For **Designing Reports** Go to Section 3.1.5 on Pg 134
- For **Designing Frontend** Go to Section 3.1.2 on Pg 112

4.2 USER GUIDE:

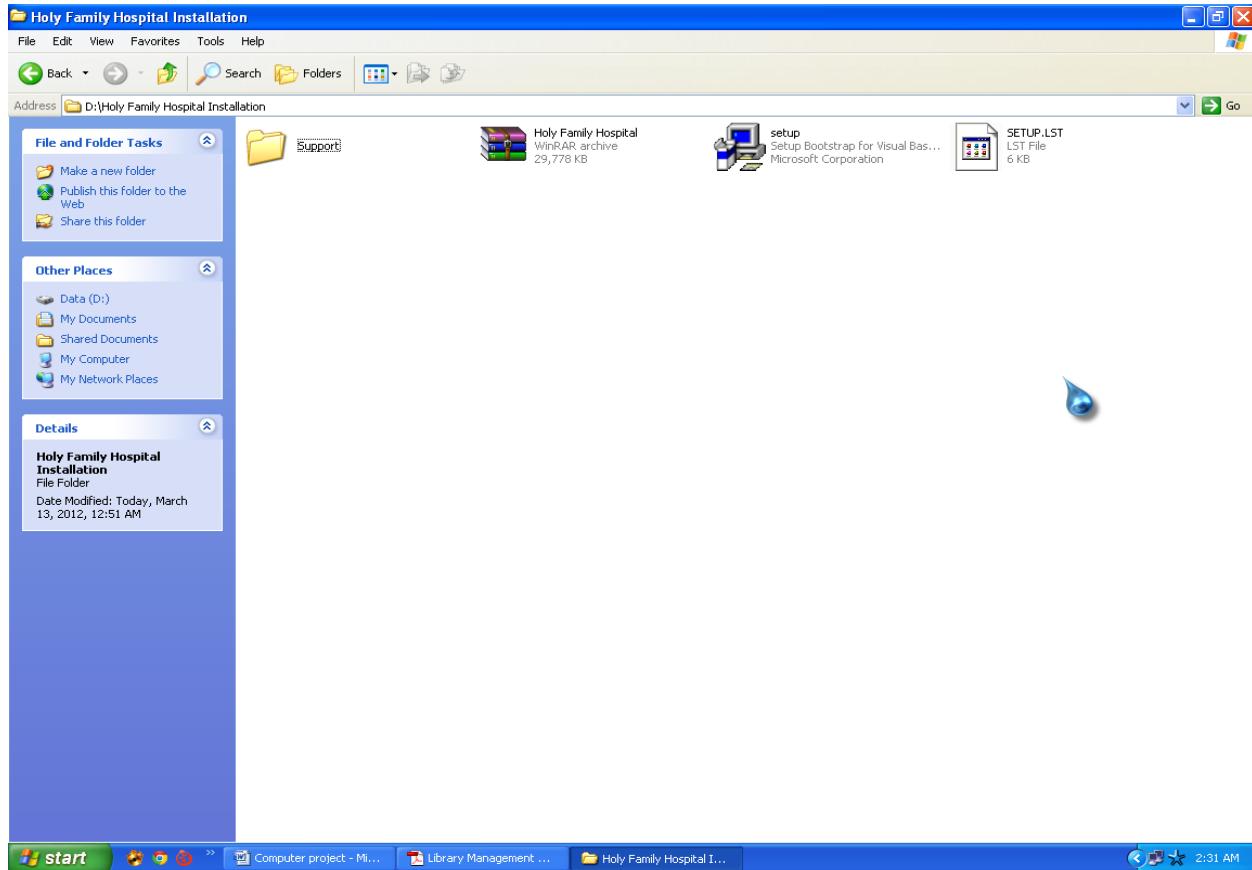
4.2.1 PRE-INSTALLATION GUIDE:

Before installation, make sure that your system is compatible to run the software. To check your system capabilities open the run applet present in the start menu. Type dxdiag and press OK. A window will open. Press the System tab and check your processor, OS and memory and make sure that they fulfill the requirements. If the system fulfills the requirements, you are ready for installation.

4.2.2 INSTALLING THE SOFTWARE:

Go to the drive and find the folder with the Installation file:

Double click on the Setup application.



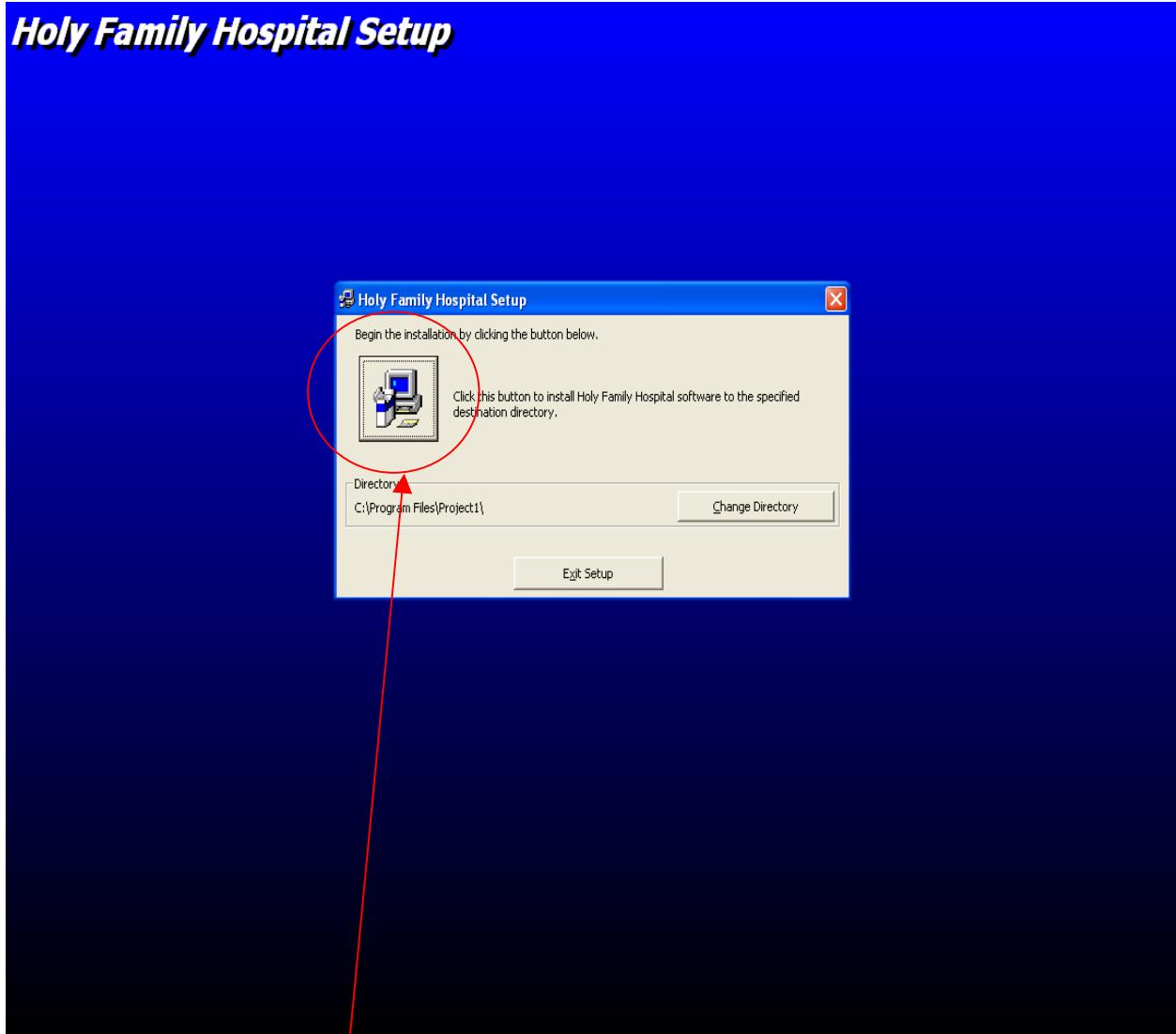
The following screen will open

Holy Family Hospital Setup



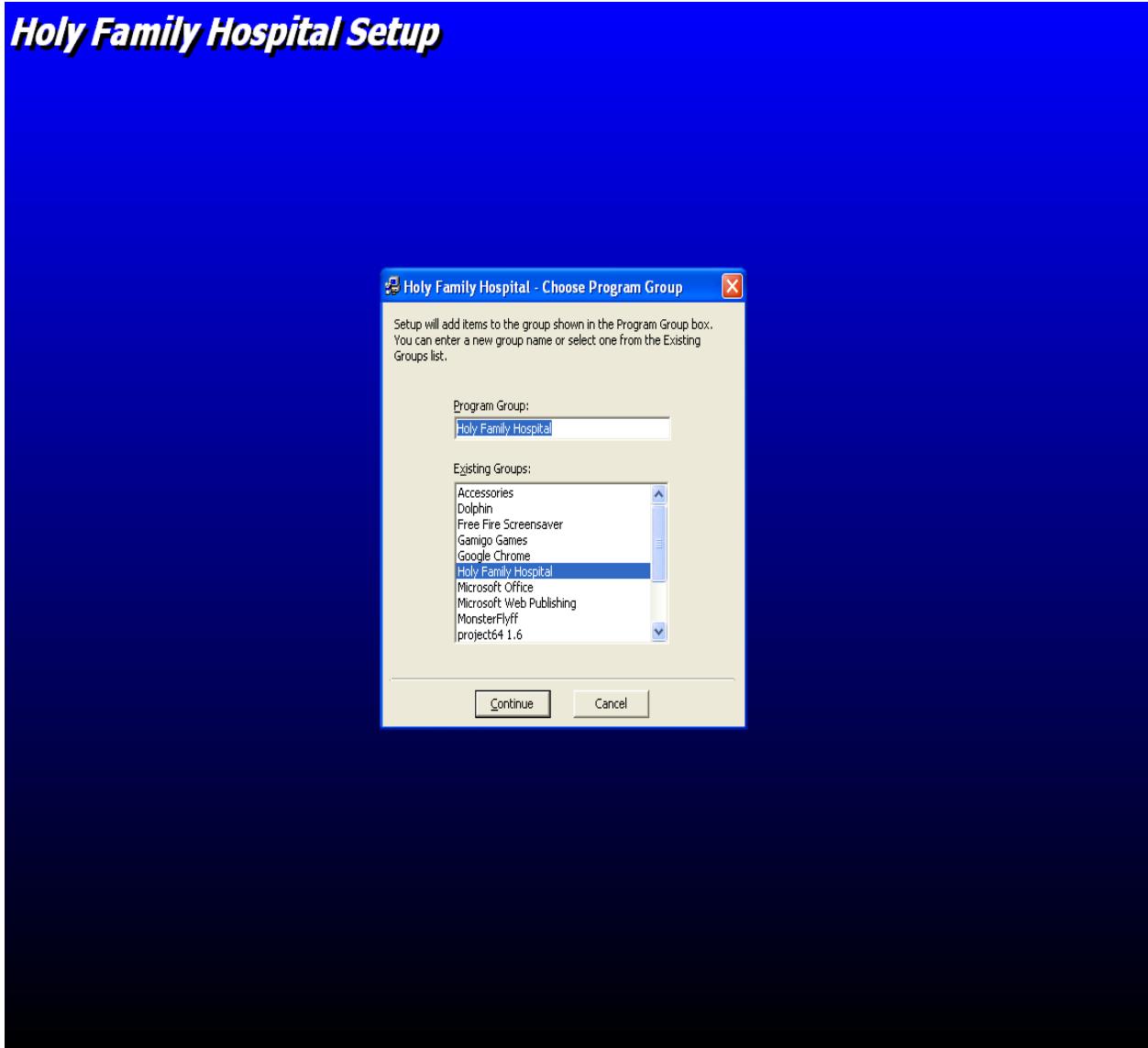
It's advised that you close all running programs before Installation. After that press OK to install or Exit Setup to exit and cancel the installation.

After you press OK the following screen will be displayed:



The Setup will ask you to choose where to install the software. After choosing the installation directory press this button.

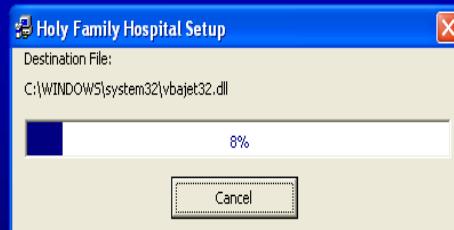
This is the Next Screen in the installation



Choose which group box you want to add the items to in Start > Programs:

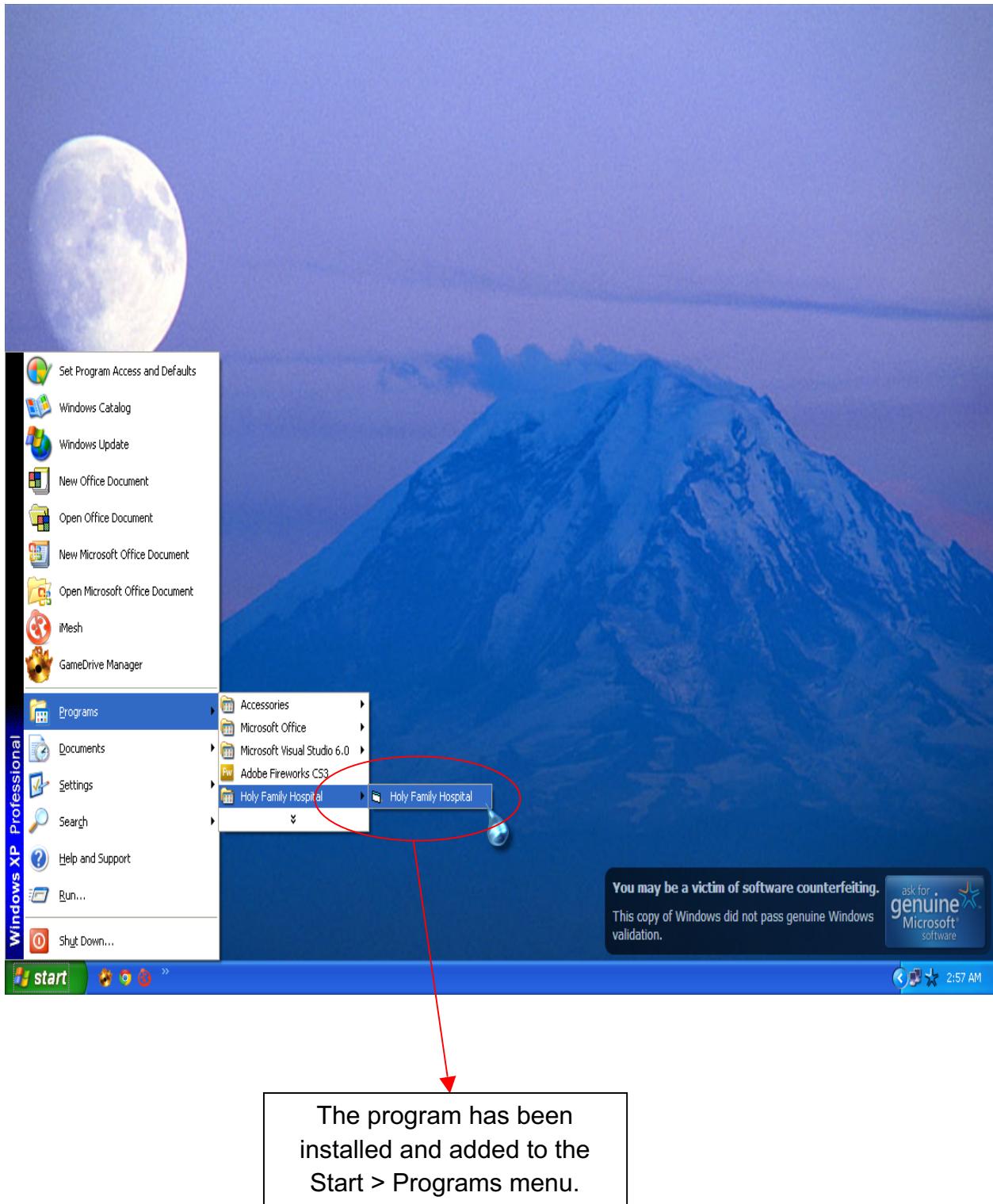
The Setup will then Install the software to the prescribed Destination.

Holy Family Hospital Setup



4.2.3 RUNNING THE PROGRAM:

The software will be added to Start > Programs menu as prescribed in the installation.



THE HYPERLINKS AND EXPLANATION:

First

The first button: When pressed moves to the first record. The Previous and First buttons will be disabled.

Previous

The previous button: When pressed moves to the previous record.

Next

The next button: When pressed moves to the next record

Last

The last button: When pressed moves to the last record. The Next and Last buttons will be disabled.

Add

The add button: When pressed adds a new record to the table. The Update and Cancel buttons will be enabled

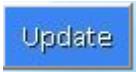
Edit

The edit button: Used to edit an existing record. The Update and Cancel buttons will be enabled



Delete

The delete button: Used to delete an existing record.



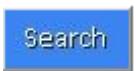
Update

The update button: Used to update any changes after the edit button was pressed or save a new record created after pressing add button.



Cancel

The cancel button: Used to cancel the ongoing task. For example when the user is adding or updating a record



Search

The search button: Finds record according to the given criteria

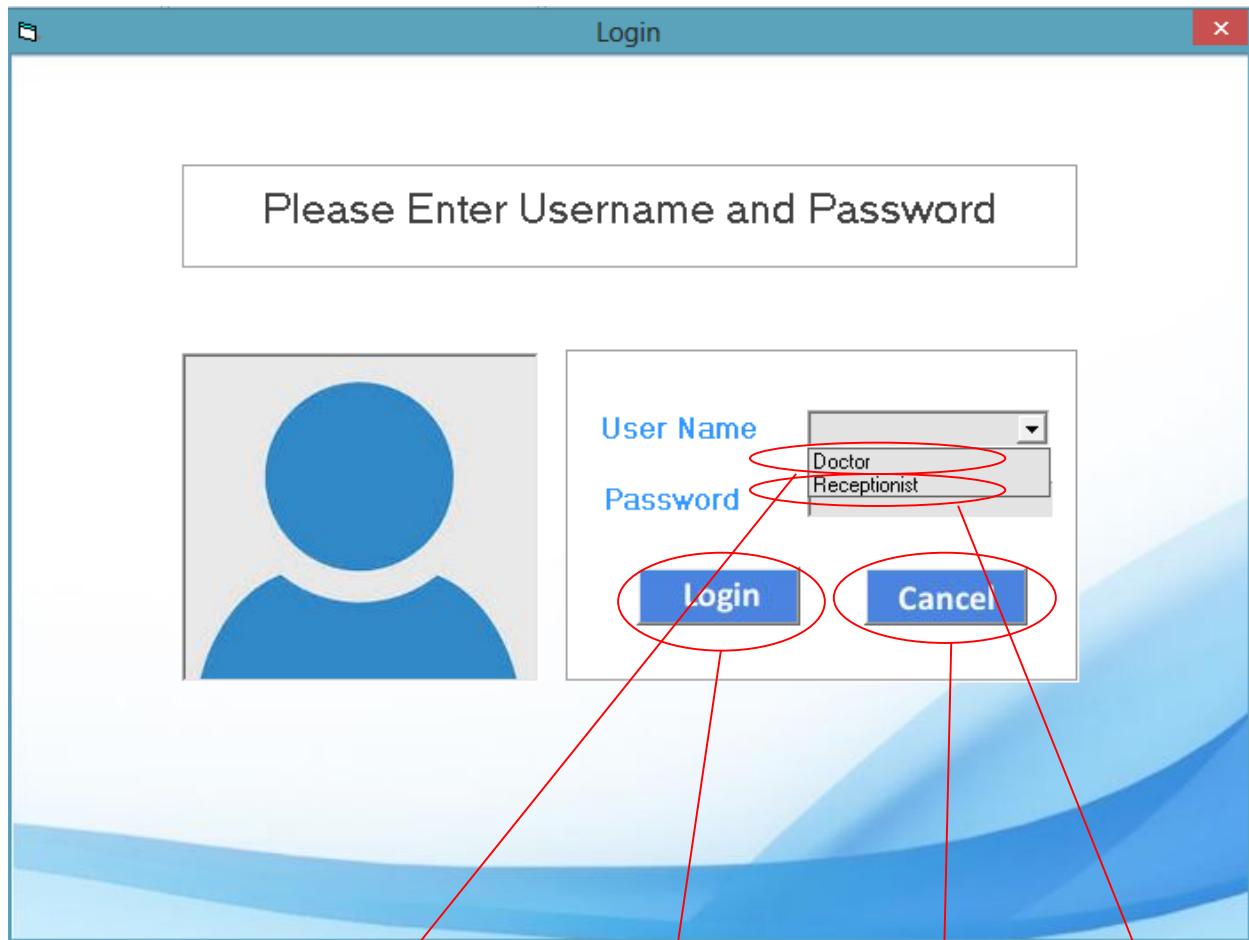


The Back Button: Used to go back to the previous form.



The Main Form Button: Used to go back to the Main Form

The Login Form:



If the user logs in through this username and correct password he has full rights

After entering username and password, press this button to login.

If the user logs in through this username and correct password he has limited rights

Press this button to exit the program

The Main Form:

This form is mainly used to navigate to other forms or just logout or exit.



The Patient Button: Press this button to go to the Patient Main Form.



The Doctor Information Button: Press this button to go to the Doctor Information Form.



Reports

The Reports Button: Press this button to go to the reports Main Form



Beds

The beds button: Press this button to view the status of wards or change the total number of beds in wards if the ward is expanded in future.



The Logout Button: Press this button to logout and go back to the Login Form. The Username and Password will have to be entered again.



Exit

The Exit Button: Press this button to exit the program.

The Patient Main Form:



Patient Visit

The Patient Visit Button: Press this button to go to Patient Visit Form.



Patient
Information

The Patient Information Button: Press this button to go to Patient Information Form.



The Patient Treatment Button: Press this button to go to the Patient Treatment Main Form



The Main Form Button: Press this button to go back to the Main Form

The Patient Visit Form:

The screenshot shows a Windows application window titled "Patient Visit". In the top left corner is a blue arrow pointing left. To its right is a search bar with the placeholder text "Search by Patient ID" and a "Search" button. In the top right corner is a small icon of a hospital building. The main area contains a form titled "Patient Visit" with fields for "Visit ID" (containing "10"), "Patient ID" (empty), "Time" (containing "5:50:48 AM"), "Date" (containing "3/18/2014"), and "Problem" (empty). To the right of the form are five buttons: "Add", "Edit", "Delete", "Update", and "Cancel". Below the form are navigation buttons: "First", "Previous", and two empty boxes.

This form is used to Add, Edit, Delete, Search and Navigate through Visiting Patient Records.

Note: The following buttons apply the same to all forms except for the Update button which works a bit differently in the Ward Admissions and Discharging Forms. The Update button will be described there however in all other forms where the following buttons are used, their function is the same. Hence I am only going to describe them once

The Patient Information Form:

The screenshot shows a Windows application window titled "Patient Information". The window has a blue header bar with standard window controls (minimize, maximize, close) and a blue footer bar. In the top left corner is a blue arrow pointing left. On the right side of the header are two search fields: "Search by ID" with a search button and "Search by Name" with a search button. To the right of these is a blue house icon.

Personal Information

| | |
|----------------|-----------------------------|
| Patient ID | 1 |
| Name | Salar |
| Contact number | 03339585235 |
| Date Of Birth | 7/1/1995 |
| Address | 22C RMC Colony Rawal Road R |

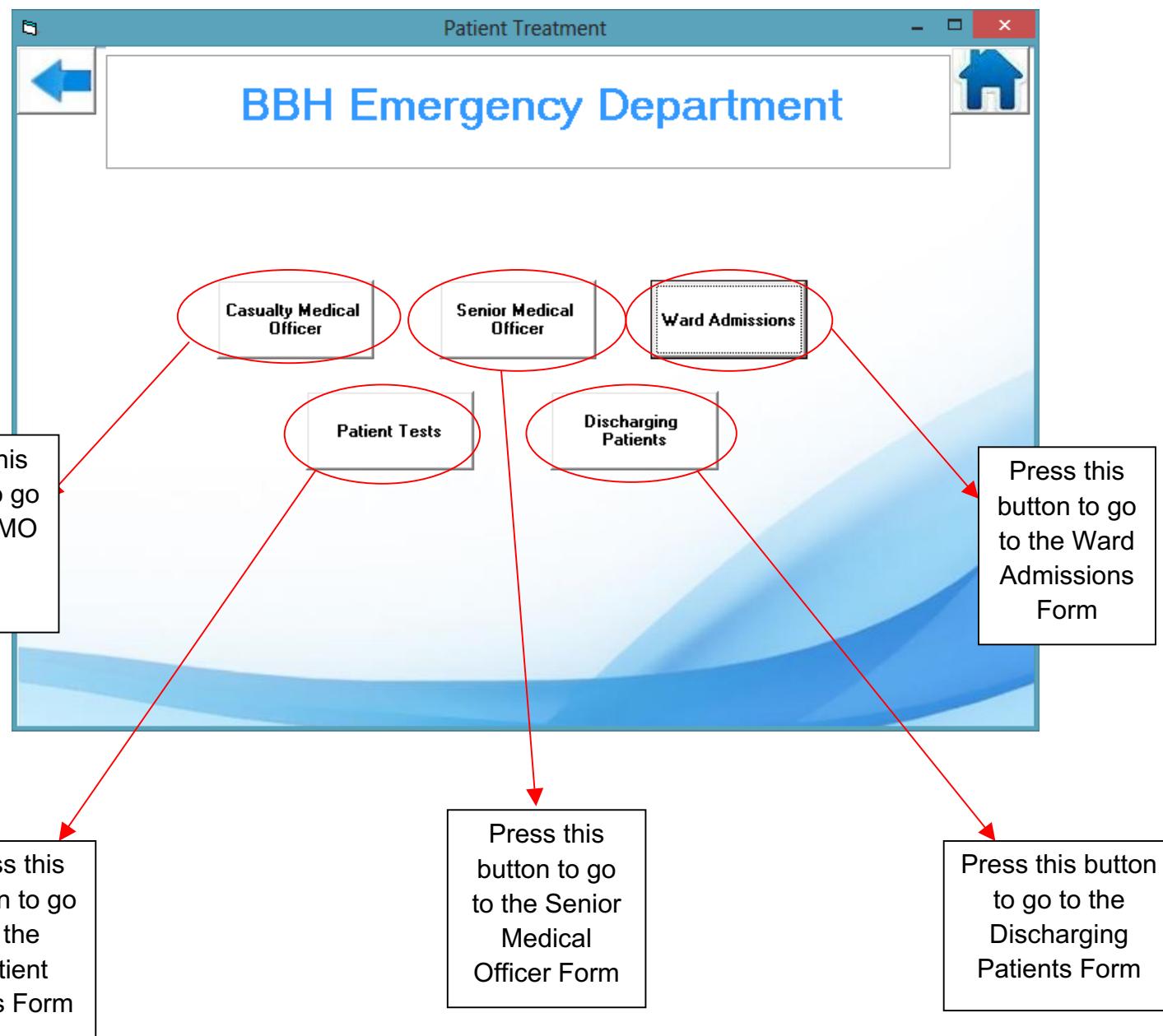
Basic Medical Information

| | |
|---------------------------------|------|
| Diabetic? | Yes |
| Hypertensive | No |
| Blood Group | O+ve |
| Any serious diseases in family? | none |

On the right side of the main form area, there are four blue buttons: "Add", "Edit", "Delete", and two empty white boxes. Below the main form area are four navigation buttons: "First", "Previous", "Next", and "Last".

This form is used to Add, Edit, Delete, Search and Navigate through Patient Information Records.

The Patient Treatment Main Form:



CMO Form:

| | patient_id | doctor_id | time_examined | date_examined | blood_pressure |
|---|------------|------------|---------------|---------------|----------------|
| ▶ | 1 | AftMed1978 | 4:35:40 PM | 3/10/2014 | 160/100 |
| | 1 | MunMed1995 | 4:41:33 PM | 3/10/2014 | 150/100 |
| | 1 | SalSur1995 | 5:21:51 AM | 3/12/2014 | 120/80 |

This form is used to Add, Edit, Delete, Search and Navigate and through Patient Treatment with CMO information and to view Patient medical History.

Show Patient Medical History with CMO

Press this button to view patient medical history with CMO

Senior Medical Officer Form:

Senior Medical Officer

Search by Patient ID

| Patient ID | 8 | Doctor ID | SauSur1990 |
|------------|------------------------------|-----------|------------|
| Date | 3/10/2014 | Time | 9:03:08 PM |
| Diagnosis | Broken Arm | | |
| Process | Sent for X Ray for assurance | | |

Add **Edit** **Delete**

First **Previous** **Next** **Last**

| | patient_id | doctor_id | date_examined | time_examined | diagnosis |
|---|------------|------------|---------------|---------------|--------------|
| ▶ | 8 | SauSur1990 | 3/10/2014 | 9:03:08 PM | Broken Arm |
| | 8 | SalSur1995 | 3/10/2014 | 9:08:05 PM | Stone in Kid |

Show Medical History with Senior Medical Officer

This form is used to Add, Edit, Delete, Search and Navigate and through Patient Treatment with Senior Medical Officer Information and to view Patient medical History.

Show Medical History with Senior Medical Officer

Press this button to view Patient Medical History with Senior Medical Officer.

Patient Tests Form:

Patient Tests

Search by Patient ID **Search**

| | | | |
|------------|------------|---------------------|-------------|
| Patient ID | 2 | Referring Doctor ID | MunMed1995 |
| Date | 12/12/2014 | Time | 12:20:00 PM |

Tests

| | | | |
|-------------|--------|--------------------|----|
| X-Ray | normal | Blood Sugar Random | 90 |
| Haemoglobin | 12.9 | Serum Calcium | 11 |
| Creatinine | 12 | TLC | 11 |
| ALT | 40 | Serum Amylase | 55 |

Add
Edit
Delete

Diagnosis:

Process:

First Previous Next Last

| | patient_id | referring_doctor_id | date_of_test | time_of_test | xray | creatinine |
|---|------------|---------------------|--------------|--------------|------------|------------|
| ▶ | 2 | TalMed1990 | 9/12/2014 | 9:15:00 PM | broken arm | 5 |
| | 2 | MunMed1995 | 12/12/2014 | 12:20:00 PM | normal | 12 |

Show Past Test Results of Patient

This form is used to Add, Edit, Delete, Search and Navigate and through Patient Tests Information and to view past results of patient tests.

Show Past Test Results of Patient

Press this button to view past test results of the current patient.

Ward Admissions Form:

Ward Admissions

| | | | |
|-------------------|-------------------|---------------------|------------|
| Patient ID | 5 | Referring Doctor ID | AliMed1981 |
| Date of Admission | 3/10/2014 | Time of Admission | 9:14:03 PM |
| Ward Name | Surgery | | |
| Problem | Dengue | | |
| Treatment | Kept in captivity | | |

First Previous Next Last

This form is used to Add, Edit, Delete, Search and Navigate through Ward Admissions Information. It is also used to automatically update the ward status.

Update

When this button is pressed it not only saves the new or edited record but also changes the respective wards status automatically.

Discharging Patients Form:

Discharging Patients

Patient ID: 1

Date Of Discharge: 3/10/2014 Ward Name: Medicine

Description: Expired

Notes to be kept: None

Add Edit Delete

First Previous Next Last

This form is used to Add, Edit, Delete, Search and Navigate through Discharging Patients Information. It is also used to automatically update the ward status.

Update

When this button is pressed it not only saves the new or edited record but also changes the respective wards status automatically.

Doctor Information Form:

The screenshot shows a Windows application window titled "Doctor Information". At the top left is a file icon. On the right are standard window controls: a minimize button, a maximize button, and a close button. Below the title bar are two search input fields: "Search by ID" with a dropdown arrow and a "Search" button, and "Search by Name" with a dropdown arrow and a "Search" button. To the right of these is a blue house-shaped icon. The main area is titled "Personal Information" in blue. It contains the following data entries:

| | |
|----------------|------------------|
| Doctor ID | AftMed1978 |
| Gender | M |
| Name | Aftab |
| Designation | Chest Specialist |
| Department | Medicine |
| Contact number | 0333-5554678 |
| Address | Askari 12 |
| Date of Birth | 11/15/1978 |

To the right of the form are four blue rectangular buttons labeled "Add", "Edit", "Delete", and two empty boxes. At the bottom are navigation buttons: "First", "Previous", "Next", and "Last".

This form is used to Add, Edit, Delete, Search and Navigate through Patient Information Records.

The Wards Information Form:

The screenshot shows a Windows application window titled "Wards Information". Inside, a section titled "Beds Information" displays the following data:

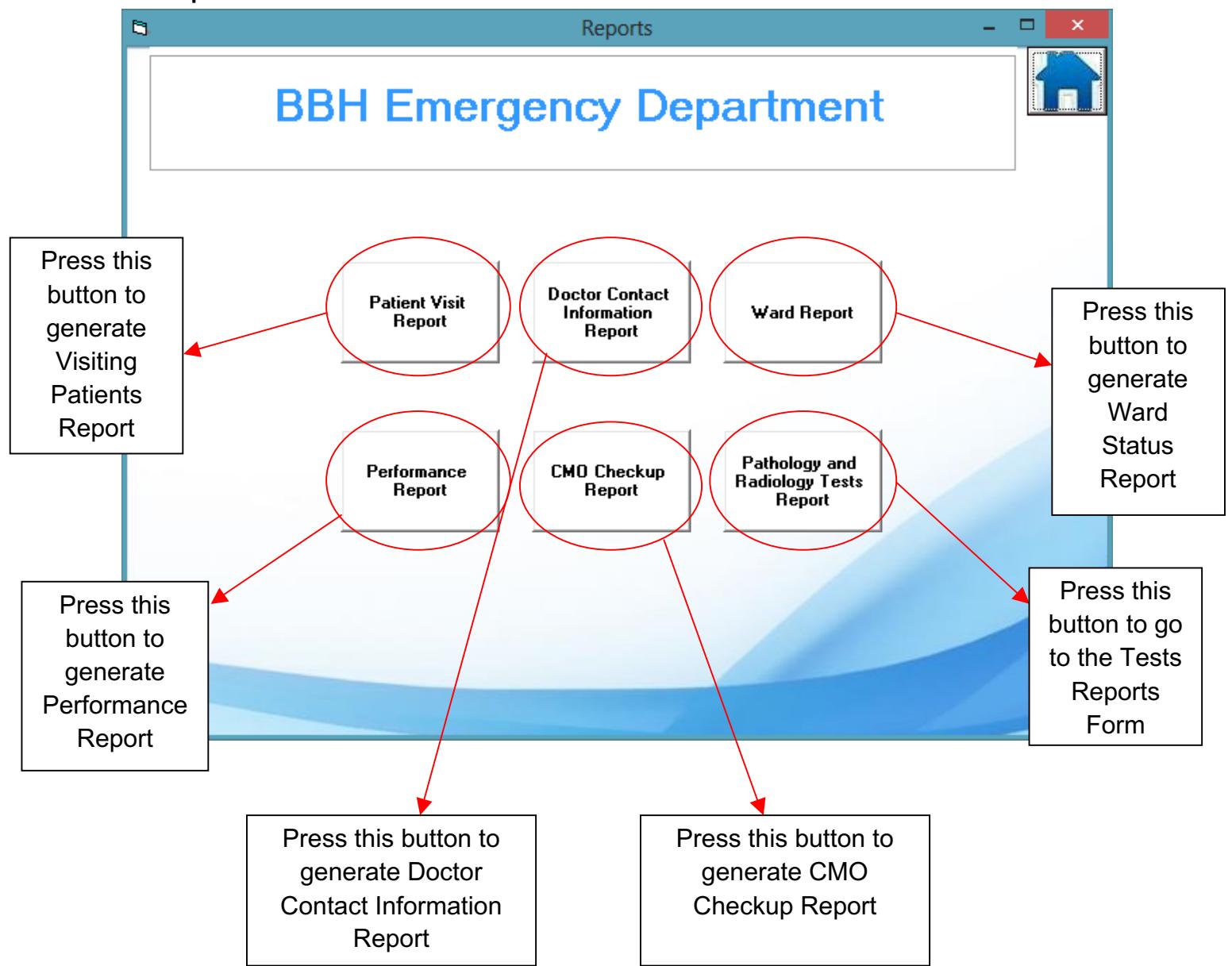
| Ward name | Surgery |
|----------------|---------|
| Total Beds | 50 |
| Beds occupied | 40 |
| Beds available | 10 |

Below the table are three buttons: "Edit" (highlighted in blue), "Update", and "Show ward Information".

Update

In this case when the Edit button is pressed it only allows data to be changed in the total beds field

The Reports Form:



Patient Tests Report:



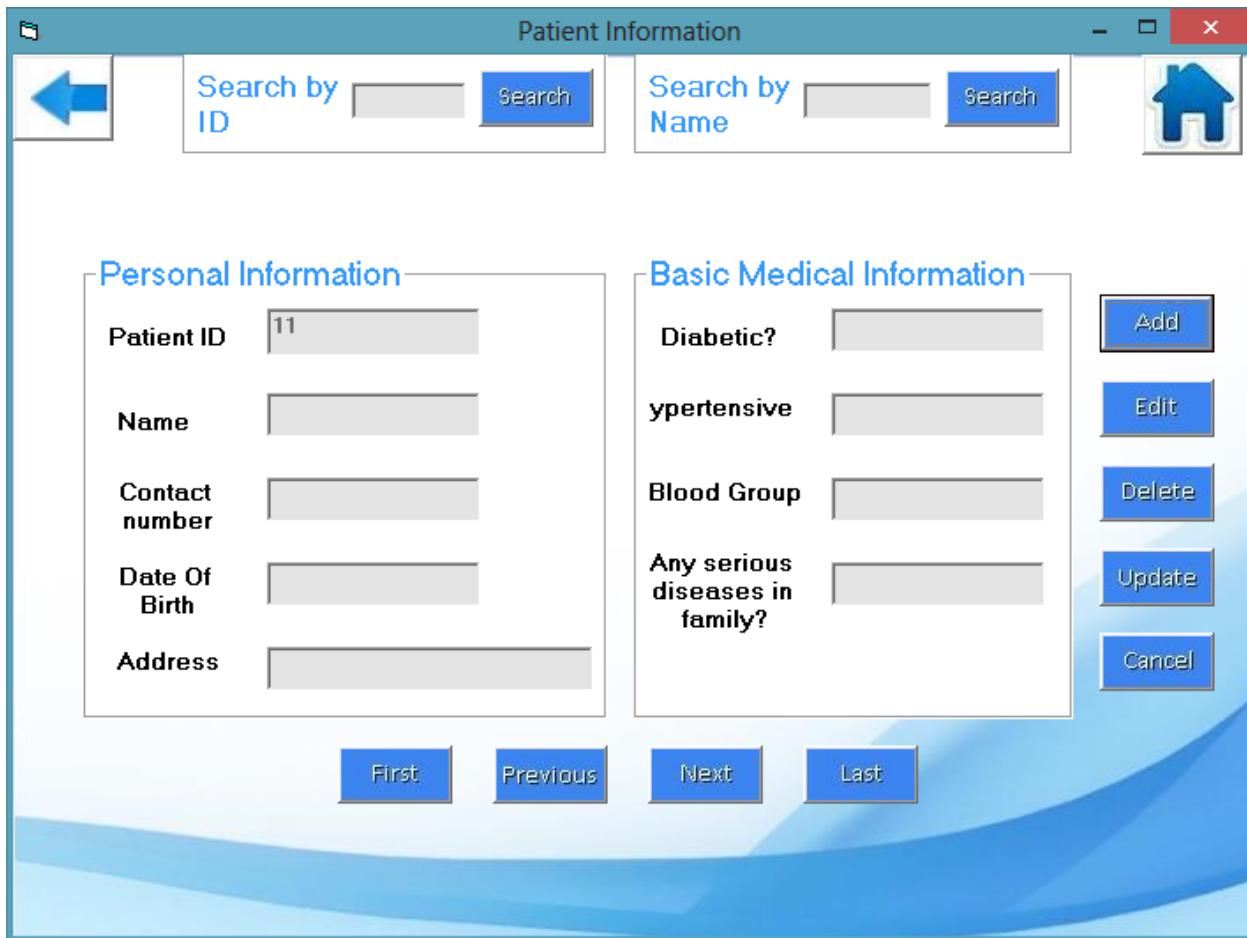
Press the button with the name of the test whose report is to be generated.

BASIC SOFTWARE FUNCTIONS:

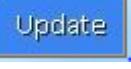
Adding a new Record:

Press 

A blank record will appear as below:



The screenshot shows a software interface titled "Patient Information". At the top, there are two search bars: "Search by ID" and "Search by Name", each with a "Search" button. To the right is a blue house icon. On the left, there is a blue arrow pointing left. The main area is divided into two sections: "Personal Information" on the left and "Basic Medical Information" on the right. The "Personal Information" section contains fields for Patient ID (11), Name, Contact number, Date Of Birth, and Address. The "Basic Medical Information" section contains fields for Diabetic?, Hypertensive, Blood Group, and Any serious diseases in family?. To the right of these sections are five blue buttons: "Add", "Edit", "Delete", "Update", and "Cancel". At the bottom, there are four navigation buttons: "First", "Previous", "Next", and "Last".

Fill in all required fields and then press 

All fields will go through validation checks and if they pass then the record will be saved.

EDITING A RECORD:

Press 

The fields will now be available for editing.

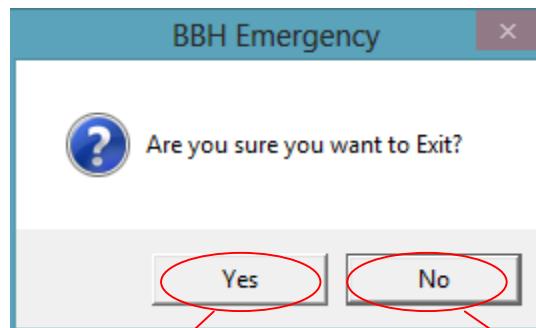
Change any field you want and press 

After passing through validation checks the record will be edited and saved.

DELETING A RECORD:

Press 

A confirmation box will appear :

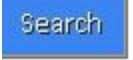


Press this
button to
confirm
deletion

If you do not
want to
delete press
this button

SEARCHING A RECORD:

Choose the criteria (ID or Name) and then choose the ID or Name from the drop down list for example in the case of searching a name the list would look like this after selecting

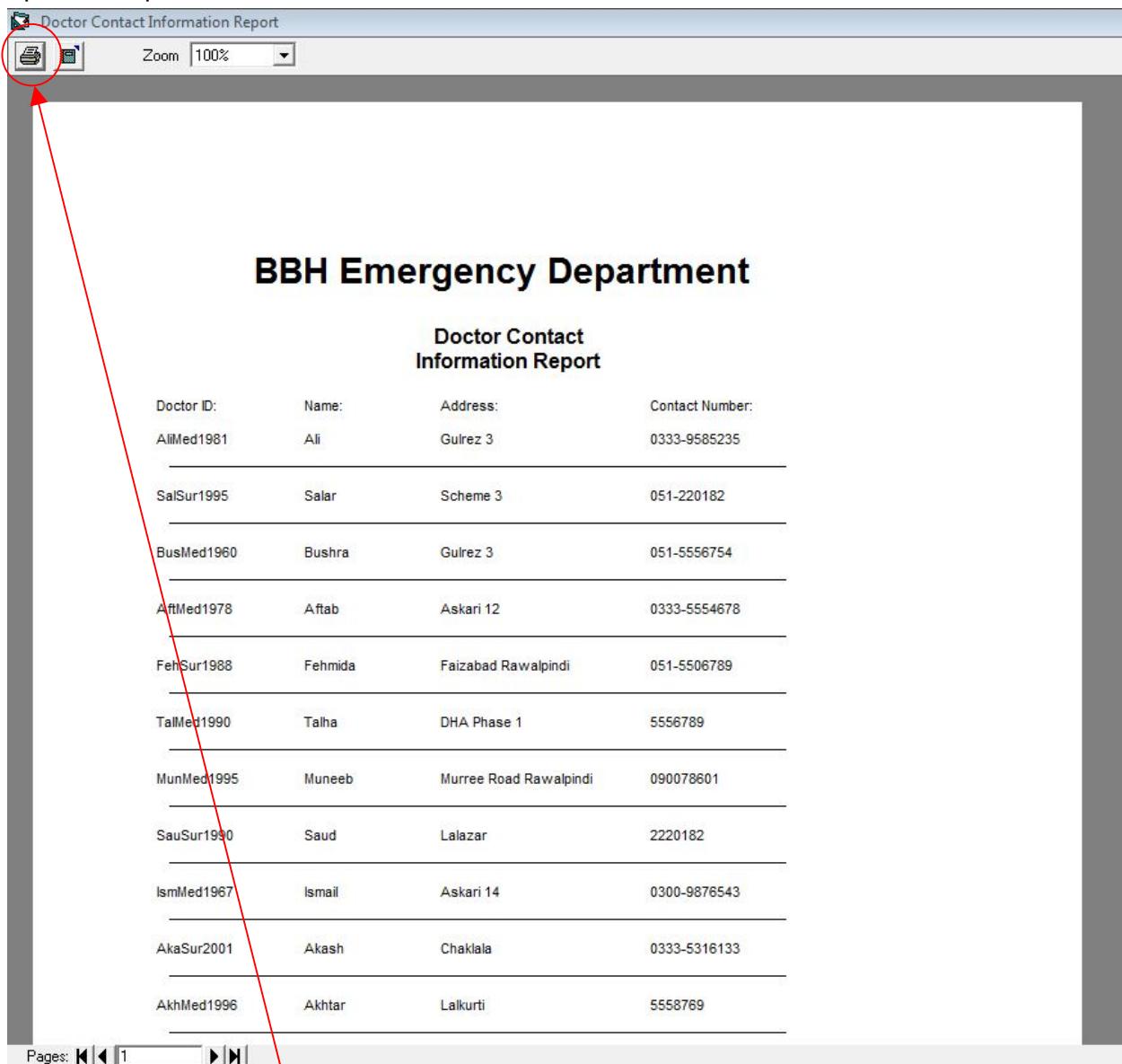
Press 



The whole field of the searched ID or Name will be displayed

Printing a report:

Open the report:



Doctor Contact Information Report

Zoom 100%

BBH Emergency Department

Doctor Contact Information Report

| Doctor ID: | Name: | Address: | Contact Number: |
|------------|---------|------------------------|-----------------|
| AliMed1981 | Ali | Gulrez 3 | 0333-9585235 |
| SalSur1995 | Salar | Scheme 3 | 051-220182 |
| BusMed1960 | Bushra | Gulrez 3 | 051-5556754 |
| AftMed1978 | Aftab | Askari 12 | 0333-5554678 |
| FehSur1988 | Fehmida | Faizabad Rawalpindi | 051-5506789 |
| TalMed1990 | Talha | DHA Phase 1 | 5556789 |
| MunMed1995 | Muneeb | Murree Road Rawalpindi | 090078601 |
| SauSur1990 | Saud | Lalazar | 2220182 |
| IsmMed1987 | Ismail | Askari 14 | 0300-9876543 |
| AkaSur2001 | Akash | Chaklala | 0333-5316133 |
| AkhMed1996 | Akhtar | Lalkurti | 5558769 |

Pages: |<|<|1|>|>|

Press this button to print the report

4.2.4 TROUBLESHOOTING

1. Access being denied during login

Solution:

- Check that you're entering the username and password correctly
- Check and see if the capslock is switched off

2. Records aren't being deleted:

Cause:

- The record is linked with other records and deleting it can malfunction the system so don't delete it.

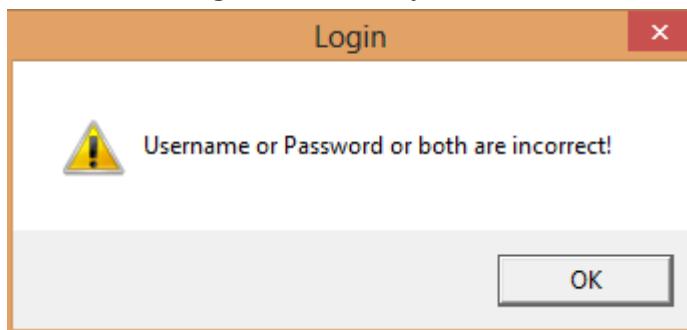
3. Antivirus says that te software has been infected and is beyond repair

Solution:

- Backup database
- Uninstall application
- Run a complete scan
- Reinstall Application
- Restore Database

4. Commonly encountered Errors:

- When the wrong username or password has been entered



- When user tries to admit a patient but there are no beds available in the wards



- When the user types in anything but characters in a field where only alphabetic characters are allowed such as name



- When user enters anything other than numbers and hyphens in the contact number field



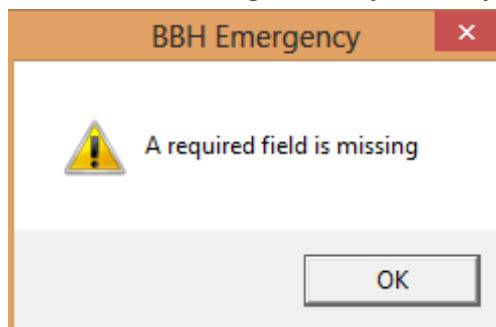
- Wrong entry in field where only digits are allowed such as patient ID



- When the limit to a field has been reached



- When the user forgets to input a required field



INDEX:

| | | | |
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| Add..... | 341 | Patient Tests Form..... | 334 |
| CMO/SMO Forms..... | 332-333 | Patient Treatment Form..... | 331 |
| Delete..... | 342 | Patient Visit form..... | 329 |
| Discharging patients..... | 336 | Reports Main Form..... | 339 |
| Doctor info..... | 337 | Running the program..... | 321 |
| Edit..... | 341 | Searching..... | 342 |
| Hyperlinks..... | 322 | Test reports..... | 340 |
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| Login..... | 324 | Ward Admission Form..... | 335 |
| Main form..... | 235 | Wards Info Form..... | 338 |
| Patient Information Form..... | 330 | | |
| Patient Main Form..... | 327 | | |

5. EVALUATION AND DEVELOPMENT:

5.1 EVALUATION IN GENERAL TERMS:

In my opinion the new system developed has surpassed the old system in all aspects of functionality. The new system is not only more reliable but is also better for patients in the sense that it is faster than the previous slow manual system. The patients now don't have to wait long and are catered to in no time. This will have a huge positive impact on the impression of the organization. All of the previously listed computer objectives have been achieved. A user-friendly environment has been created with pictures, coloured screens etc. The user does not get irritated or bored due to monotony of the program. Many of the irritating tasks like writing down the visit ID for every patient, writing down the date and time of the visit etc have been overcome with computerization and they are now automatically done. In the Implementation Phase I had referred to this section to see the accuracy of the software. Below is a summary of the evaluation of my software.

| Objective No. | Objective | Status | Explanation |
|---------------|--|----------|--|
| 1 | Create a database to store all required information. | Achieved | A database had been made specially designed for the program. See Implementation > Creating Tables MS Access |
| 2 | To accept input and record information of patients. | Achieved | The system is accepting input and adding records to tables through forms. See Test 5 Page: |
| 3 | To accept input and record information of doctors. | Achieved | The system is accepting input and adding records to tables through forms. See Test 5 Page: |
| 4 | To accept input and enter data regarding patient upon visit. | Achieved | The system is accepting input and adding records to tables through forms. See Test 5 |

| | | | Page: |
|---|---|-----------------|---|
| 5 | To accept and record information regarding patient treatment. | Achieved | The system is accepting input and adding records to tables through forms. See Test 5 Page: |
| 6 | To input and accept data regarding patient admissions and discharge. | Achieved | The system is accepting input and adding records to tables through forms. See Test 5 Page: |
| 7 | To design a user friendly interface in a programming language. | Achieved | A user friendly interface has been developed in by developing forms in Visual Basic 6. See Implementation > How forms were made for screenshots |
| 8 | To have the ability to show ward information. | Achieved | The new system has a separate form for the viewing of ward information as well as a ward status report. See Test 7 Page: |
| 9 | To have the ability to automatically change the status of wards upon admissions and discharging through mathematical coding | Achieved | The new system automatically changes the ward status as soon as a patient is admitted or discharged. See Test 16-17 Page: |

| | | | |
|----|---|-----------------|--|
| 10 | To use database grids in the forms for easy access for doctors to patient medical history. | Achieved | The Doctors are able to view the past patient Medical History. See Test 27 Page: |
| 11 | To ensure through coding that minimum time be taken to enter patient information upon arrival for e.g automatic entry of date and time. | Achieved | The new system automatically enters the date and time upon arrival. See Test 26 Page: |
| 12 | To have the ability to automatically generate a unique numeric id for patients. | Achieved | The new system is generating both Patient Personal ID and Patient Visit ID See Tests 23 and 24 Page: |
| 13 | To accept admission of patient only if beds are available in wards otherwise notify user | Achieved | The new system only allows admission if beds are available See Test 28 Page: |
| 14 | To secure patient information by applying passwords so only authorized personnel can access data. User rights will be applied so that only authorized personnel can make changes in data. | Achieved | The new system has a login form which requests a username and password and gives rights according to the user who logged in. See Tests 1 and 2 Page: |

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| 15 | To apply search coding for efficient and quick searching of data. | Achieved | The new system searches a given criteria and displays the searched record without any problem See Tests 9 and 10 Page: |
| 16 | To apply validation checks on the front end through coding to check if correct data type was entered. | Achieved | The new system accepts data after validation only. See Tests 18, 19 and 20 Page: |
| 17 | Apply presence checks and length checks. | Achieved | The new system allows a maximum length of data to be entered in fields and does not accept a record unless required fields are keyed in See Tests 21 and 22 Page: |
| 18 | To have navigation buttons for quick navigation through records | Achieved | The system can navigate through records See Test 4 Page: |
| 19. | To obtain a report of patient information | Achieved | The report is being generated See Test 29 Page: |
| 20 | To develop a report through specific field from the doctor | Achieved | The report is being generated |

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| | personal information table to contact him in case of emergency. | | See Test 31 Page: |
| 21 | To develop a report through ward information form fields to show ward status. | Achieved | The report is being generated See Test 32 Page: |
| 22 | To develop queries for the generation of Performance, CMO checkup reports through different tables and different fields. | Achieved | The report is being generated See Tests 30 and 33 Page: |
| 23 | To generate reports on each individual test. | Achieved | The report is being generated See Test 34 Page: |
| 24 | To generate a unique Doctor ID using coding. | Achieved | The ID is being generated See Test 25 Page: |

5.2 POSSIBLE FUTURE DEVELOPMENTS:

Although I have met all the requirements of the organization and all the previously related computer objectives have been achieved, nevertheless I would like to suggest some improvements to the system in the future:

- **Automatic Backup Ability:**

The system could have the ability to backup automatically on regular intervals. The main reason for this is that as there are a lot of daily visitors to the hospital there is a lot of data stored regarding patient information. Although backup is currently being taken with the help of USB flash drives however it is not as efficient and losing this data can be disastrous for both the hospital and the patients who will visit again in the future and the main aim of saving time will become ineffective.

- **Networking:**

The system should have the ability to share information within all the computers of the organization in use of the doctors. The reason behind this is that it will reduce time for doctors to look at stuff like patient tests results as they will automatically be sent to the doctor's computer. This reduction in time would greatly be an advantage to the critically ill patients.

- **The ability of administrator to change login rights:**

The system could be enhanced so that the administrator once logged in could change user rights. This is because although the rights assigned permanently in my software are sufficient but perhaps in the future these rights might be insufficient or another user introduced. At that point user rights would need to be redefined. This will greatly increase the system security as the administrator would know best what rights to apply where.

- **Online Linking with NADRA:**

The system could be linked to NADRA (National Database and Registration Authority) which is charged with the establishment of a new registration system for the entire population of Pakistan in such a way that the patient need only tell his NIC (National Identity Card) number and the system will automatically pick up all the basic information like name, address, date of birth etc from NADRAS Database. The reason behind this is to ensure even less time in attending to patients and this will prove to be a very good addition to the software as patients will be tended to in even less time.

5.3 CLIENT EVALUATION:

I discussed with the AMS of the Emergency Department whether the system was easy to use. He assured that the new system was very user friendly as it took almost no time for the staff to get used to it. The new system is working well until now he said. I discussed the matter with some of the patients who were really satisfied as they did not have to wait in queues for a long time. The AMS congratulated me on my efforts saying that it made work easier and employee efficiency has also gone up. On the next page you will find the evaluation by the AMS. The evakuation includes all the requirement specifications and the extent to which the AMS who is also the Director of the Emergency Department thinks that each requirement has been fulfilled.

BBH EMERGENCY AUTOMATION EVALUATION

CLIENT EVALUATION

EVALUATION OF SOFTWARE REQUIREMENT SPECIFICATION FROM A BUSINESS POINT OF VIEW

For every listed down requirement specification please state by checking the box whether the requirement was met or not.

THE OBJECTIVES OF THE REQUIREMENT SPECIFICATION

- To store all data at one particular place.

Met: Absolutely Almost completely Somewhat Not at All

- To have a permanent record of patients to avoid entry of data again in future.

Met: Absolutely Almost completely Somewhat Not at All

- To store personal information of doctors.

Met: Absolutely Almost completely Somewhat Not at All

- To store information about incoming patients.

Met: Absolutely Almost completely Somewhat Not at All

- To store information involving patients' treatment by doctors.

Met: Absolutely Almost completely Somewhat Not at All

[Signature]
Additional Medical
Superintendent
Benazir Bhutto Hospital

BBH EMERGENCY AUTOMATION EVALUATION

- To store information about patient admission and discharge.

Met: Absolutely Almost completely Somewhat Not at All

- To have an easy to use system (user friendly).

Met: Absolutely Almost completely Somewhat Not at All

- To view availability of beds in wards.

Met: Absolutely Almost completely Somewhat Not at All

- To automatically calculate how many beds are available in each ward.

Met: Absolutely Almost completely Somewhat Not at All

- To store patient medical history with the CMO, Senior Medical Officer and previous medical record of patient tests.

Met: Absolutely Almost completely Somewhat Not at All

- Minimize the time taken to enter patient information upon arrival.

Met: Absolutely Almost completely Somewhat Not at All

- To have a unique id for each patient

Met: Absolutely Almost completely Somewhat Not at All

- To make sure that beds are available in wards when patient is being admitted.

Met: Absolutely Almost completely Somewhat Not at All

[Signature]
Additional Medical
Superintendent
Benazir Bhutto Hospital

BBH EMERGENCY AUTOMATION EVALUATION

- To secure patient personal information from falling into wrong hands and only allow authorized personnel to make changes to data.

Met: Absolutely Almost completely Somewhat Not at All

- To easily search through patient records.

Met: Absolutely Almost completely Somewhat Not at All

- To ensure that the data in the field is accurate.

Met: Absolutely Almost completely Somewhat Not at All

- To ensure that all data requirements are fulfilled and that the data isn't too long or short.

Met: Absolutely Almost completely Somewhat Not at All

- To move through records.

Met: Absolutely Almost completely Somewhat Not at All

- To have reports of visiting patients.

Met: Absolutely Almost completely Somewhat Not at All

- To have a report on doctor contact information in case of emergency.

Met: Absolutely Almost completely Somewhat Not at All

- To have a ward status report.

Met: Absolutely Almost completely Somewhat Not at All


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BBH EMERGENCY AUTOMATION EVALUATION

- To have multiple reports created through different fields of different tables for example a report on performance comprising on when the patient visited, when was he checked by the CMO and when by the Senior Medical Officer.

Met: Absolutely Almost completely Somewhat Not at All

- To have report on all patient tests performed separately.

Met: Absolutely Almost completely Somewhat Not at All

- To have a unique ID for doctors.

Met: Absolutely Almost completely Somewhat Not at All

[Signature]
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Superintendent
Benazir Bhutto Hospital