Clinic management system
Of
Medical centre
Quaid-e-Azam University,
Islamabad
Submitted by
Muhammad Mubin
&
Javed Ahmad
Supervised by
Dr.Ghulam Muhammad
A project report submitted
as a partial fulfilment of the requirements
for the post graduate diploma
in computer science
to the computer centre
Quaid-e-Azam University,
Islamabad, Pakistan,
June 2002.

In the name of Allah.

The most gracious.

The most Merciful.

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Islamabad, Pakistan.
Dated: June 2002.

Final approval

This is to certify that we have read the report submitted by
Muhammad Mubin and Javed Ahmad and it is our judgement that
his report is of sufficient standard to warrant its acceptance by the
Quaid-e-Azam university Islamabad, Pakistan for the award of
Post Graduate Diploma in computer science.

Committee

. External examiner   ---

. Supervisor

Dr.Ghulam Muhammad   ---
Director computer centre,
Quaid-e-Azam University,
Islamabad.

  Director
Dr.Ghulam Muhammad
Director
Computer centre,
Quaid-e-Azam University,
Islamabad.

Dedicated to
My parents and teachers whose love, affection and prayers made easy for me to achieve this goal. Specially dedicated to my brother Muhammad Amjad (late) whose love will remain in my heart forever.

Muhammad Mubin
June 2002.

Dedicated to
My parents and all brothers specially Maqbool-ur-Rahman (late) whose love, affection and prayers made easy for me to complete this task.

Javed Ahmad
June 2002.

Project brief

Project title: computerisation of clinic management system
Organisation: medical centre, Quaid-e-Azam
University Islamabad.

Undertaken by: Muhammad Mubin
&
Javed Ahmad
Supervised by: Dr.Ghulam Muhammad
Director
Computer centre,
Quaid-e-Azam University,
Islamabad.
Starting date: march, 2002
Completion date: June, 2002
Software used: oracle/developer 2000
System used: Pentium 111
Operating system: window 98

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Muhammad Mubin
&
Javed Ahmad

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ABSTRACT

Clinic management system has been developed, using oracle for medical centre Quaid-e-Azam University Islamabad. It addresses the issue of efficient information, storage and retrieval.

Certain validation checks are provided which improves the accuracy of the system and make it more reliable. The information is retrieved from the database in the form of queries and reports. The information stored in the database is manipulated with the help of various forms layout designed for the system. The developed system possesses all the capabilities of the relational database management system.

Appendices

Shows the diagrams and layouts of different forms and reports related to the system.

Bibliography

It contains the list of books referenced during the project.

Preface

This project report is concerned with analysis, design, development and implementation of a computerised clinic management system for quaid-e-azam university medical centre Islamabad. The entire report consists of seven chapters followed by seven chapters followed by appendices and bibliography.

Chapter 1

This chapter briefly describes the introduction of the project and introduction of the organisation.

Chapter 2

Discuss the existing system, its functionality and problems.

Chapter 3

This chapter describes the proposed system and its objectives.

Chapter 4

This chapter gives an overview of complete design of the proposed system.

Chapter 5

It describes the development of software to achieve the objectives of the proposed system.

Chapter 6

It describes the system implementation, testing and evaluation.

Chapter 7

This chapter describes how to operate the designed system.

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CHAPTER 1

1.1 INTRODUCTION

This university was founded in 1965 as a national institute for higher learning and Research and named as university of Islamabad. Initially the university was started in a rented building at satellite town, Rawalpindi. In 1972, it was shifted to Islamabad In its present building. In 1976, it was renamed as Quaid-e-Azam University on the Occasion of the century celebration of the founder of Pakistan Quaid-e- Azam Muhammad Ali Jinnah.

Soon it was felt that the university is situated far away from the nearby hospital, therefore a dispensary was opened in 1972 in Quaid-e-Azam university hostel#3 for the medical treatment of students. In the beginning there was only one dispenser in the dispensary. Soon the need of qualified doctor was felt and Dr. hasan Abbas was employed in 1980.

Dr.Hasan Abbas felt the need of medical unit. Due to his entire efforts, the dispensary was established in present in the present building in 1988 and its name was changed as medical centre.

This building has 20 rooms. There are facilities such as operation   theatre   and emergency. A few beds for patients are also present in the centre. The medical centre has three doctors, four dispensers, three drivers, one staff nurse, one clerk and one peon. Medical centre is providing medical services to both students as well as employees of the university. Dr Hasan Abbas is the senior under him.

The university ambulance is available for 24hours for the emergency cases in the medical centre during day hours and in the hostels during night hours. If a patient requires special treatment that is not available in the medical centre. He or she is referred to the services hospital and Pakistan institute of medical sciences Islamabad. The old hostel dispensary is also working under the medical centre. Its services is available for hostel students during night hours only. A doctor and a dispenser perform their duties during night hours. Ambulance services are also available under their permission during night

hours .The medical centre provides services to the students and employees of the university only. In the medical centre there is always sufficient store of medicine. If the suggested medicine is not available from the medical centre store, the patient have to purchase the medicine by him or her. Approximately 50 to 60 patients visit the medical centre daily during the working hours, while 40 to 50 students get treatment from the dispensary during night hours also. The dispensary also provides emergency services to the hostel students. At present about 2500 students are studying in the university while about 700 employees are also working in the university. There are five hostels and four annexes. One hostel and one annexe for female students while four hostels and three annexes for male students. There are about 1200 students are residing in the hostels and annexes.

1.2 MISSION AND CAPABILITIES

- Main objectives of medical centre are

To provide medical treatment to the students and employees of the university.

1.3 problem definition

It is observed that doctors and staff of medical centre need the information of the patients. Especially doctor did not know the information about the previous disease of the patient even he or she had just visited two or three days before present visit. While for a doctor it is very important to know about the previous disease and the treatment given to the patient. This will help the doctor in diagnosing the actual disease and suggesting right treatment to the patient. For this problem the computerised system plays an important role in this aspect Moreover sometimes-illegal persons takes medicine by showing himself or herself as a student or employee of the university. So by their registration number we can overcome this problem also. Personal information of the patients can also be taken for the medical centre and the university administration.

1.5 objectives of the project

The purpose of the project is to develop a software package, which will fulfil the requirements of the medical centre. The major activities of the project are as follows:

- To get information about the previous disease of the project.
- To stop illegal persons to visit and get treatment from the medical centre.
- To get personal information about the patients.
- To make the data more reliable and consistent.
- To make accurate and up-to-date information available on the demand at any time.
- To make the data more secure and controlled.
- To provide user friendly interface's that the user will quickly become familiar with the application software.
- To make the system more efficient.

Chapter 2

2.1 Introduction

The process of studying the existing system is to see, its operations and where improvements can be made, is of the paramount importance for the design and development of the efficient system. It is possible, to prevent the solution of the problem faced by the particular system, only after although knowledge of the existing system.

Incorrect or incomplete understanding of the existing system can lead to design error in the new system. As a result the newly developed system may not be able to present a solution of the shortcomings present in the system and cope with the future requirements of the system.

Therefore the study of the working, drawbacks and limitations of the existing system is one of the most important tasks of the analyst's work. So a detailed description of the system study of medical centre Quaid-e-Azam is given in the following sections.

2.2 WORKING OF MEDICAL CENTRE

The medical centre provides medical facility to the students and employee of the university only. The identification of the patient is the first step for taking treatment. The person visiting medical centre has to show his or her identification to the relevant doctor by telling his or her registered name and department name in the university. The doctor writes the name of the patient in a register and also writes it on the slip for medicine. Then doctor check-up the patient and after checking up gives a paper slip to the patient. The patient takes it to the store. The dispenser numbers the prescription writes it in the register and gives medicine to the patient.

If the required medicine is not available in the store, then the patient has to buy it by him or her and no payment is made for this medicine by the university.

2.3 DRAWBACKS IN THE EXISTING SYSTEM

The comprehensive study of the existing system yield the following drawbacks:

- As the system is manual, therefore data entry is difficult to manage.
- Each information has to be filled by hand. This method is very lengthy and time consuming.
- No information of the patient is kept in the record of the medical centre due to the lack of staff.
- Some unauthorised persons get treatment and medicine by showing themselves as the students or employees of the university.
- If the doctor wanted to know the previous visit and suggested treatment then there is no proper method or record for this purpose.
- If the university management or Head of any department needs the medical record of any patient, then it will take many hours to search the record.
- To overcome these shortcomings, the management has decided to develop an efficient PC, based system for providing the relevant information and improving the system.

2.4   NEED FOR COPUTERISATION

In almost all countries of the world, computer is playing a significant role in almost every sphere of life. It is being efficiently utilised by physicians, engineers, doctors, and teacher's etc. computer has also emerged in certain fields where its existence seemed rather impossible.

So considering this fact, management of Medical centre decided to computerise the system for the following reasons.

- To get up-to-date status of the system.
- To make prompt decisions, especially to diagnosing the disease.
- To get complete patient personal information.
- To get complete history of family disease of patient.
- To keep the complete record of the Allergies patient have.
- To provide complete Medical record of the patient to the management of the university and also to the concerning department.
- To get optimum performance of the staff.

CHAPTER 3

3.1 Introduction

Computerisation means a change over from a manual system to a computer-based system. Since our existing system is working manually, so to computerise it, it is essential to develop a logical model for the proposed system. Frequent visit to the medical centre and interviews of the concerned staff and detail study of the existing system are the basics of the proposed system.

In addition, various records maintaining documents and reports prepared were consulted to meet the requirements and problems faced by the administration of the medical centre.

The objectives of the proposed system should clearly be defined and newly designed system should meet these objectives. The proposed system is computerised and has electronic data processing which makes the system more efficient, economical, and reliable and error free.

This chapter explains the objectives of the proposed system, its differences from the existing system, input of the system and describes the software and hardware selection.

3.2 Objectives of the proposed system

For a successful database, it is most important that it satisfies the user requirements. Most projects fail due to unreasonable expectations. User expectations should be defined clearly.

Before designing any computer-based system, it is important and helpful to establish the objectives that a computer based system should satisfy.

The main goal of this project is to design, implement a system, in which data entry and reports generation is possible, which help the doctor and administration.

Following objectives are kept in mind while proposing the system.

- The new system should be efficient. It will be implemented on the PC of the medical centre. The data will be stored on the hard disk that will be used for modification, deletion and retrieval.
- It should be error free and reliable.
- It should be user friendly and provide help to user, where necessary.
- Queries will be answered by just clicking a button.

- The proposed system should be facility of various reports
- The proposed system should be nice and simple for end users.
- To make data reliable, data validation checks should be provided in the system.
- Security will be provided in the system so that only authorised persons could get the access.

Features of the proposed system

This section previews the characteristics of the proposed system.

- Code formation.
- Menu based system.
- User interface.
- Input specifications.
- Queries.
- Reports.
- Online help.
- Checks.
- Flexibility.
- Software selection.
- Hardware considerations.

3.3.1   Code formation

To minimise the storage requirements for storing data and removing textual errors, codes are designed.

3.3.2   Menu based system

Proposed system will be menu based. A main menu will be displayed first with options. User can select any option according to his requirements. In this way this system will become easy to use.

3.3.3 User interface

The most important aspects for the success of any system are that, it must be very attractive to the user i.e. system must be user friendly. For better and attractive user interaction, options are displayed in well-designed manner. Input screen is designed in a way that the user will feel easy while entering data. Very small number of entries would be entered by keyboard.

Input specifications

The use of the keyboard will be very minimal. Just just selecting one of the listed options will fill most of the entries. Some input are constants for each record. They will be entered in the system once and there is no need to enter them again.

Output specifications

The outputs of the system are in the form of reports to be printed on the paper and queries to be displayed on the screen.

Queries.

One major purpose of establishing a database is to retrieve information quickly and efficiently.

Queries are the statements that retrieve information on the screen in any combination i.e. data with in various fields of table can be displayed in any combination.

Queries in the proposed system have been provided, keeping in mind, the questions that may arise in the user's mind regarding retrieval of desired information from the system.

Reports:

Reports are also a form of query that is printed on paper. The reports produced by the system are well formatted. detailed and according to the user requirement. The reports would also be helpful for the management of medical centre.

Online help:

The proposed system is designed in such a manner that it will provide on line help to the user. Any user can operate such system very easily.

The system will be user friendly and appropriate message will be given by the system on wrong inputs or some others errors.

Checks:

Various checks are implemented in the system, particularly data entry, updating and deleting the module to ensure data validity, integrity and consistency. These checks will be

prevent the user from entering data. Some checks are build-in and some are self-determined.

Flexibility:

There is flexibility to extend or enhance the software in order to meet the new needs of the administration.

3.3 Software selection:

Software selection is very important and it depends upon the problem that you are going to solve. There are three aspects of database. Input, output and the program that manage all the operations and storage of information. Out of these three, programming is the most important as it is controls both input and output activities and storage of information inside the database. Thus, it is very important to choose suitable software.

Different languages and packages provide different features. After a

lot of considerations, oracle/developer 2000, and fourth generation language is selected for the development of the proposed system because it is fully relational database package.

3.3.1 Oracle:

The oracle RDBMS is selected due to following feature.

Portability:

Oracle can run on wide variety of machines.

Security:

Oracle allows controlled access to database. It protects data from unauthorized access.

Built-in function:

Oracle provides wide variety of built-in functions. For example execute the query option.

By selecting this option, a user can make any of the database fields and corresponding information will be appeared on the screen.

Single as well as multi user:

Oracle supports not only single user but also allow multi user environment, which allows sharing existing programs and data frequently.

3.3.1 RDBMS:

Data control statements, which are used to access to the database as well The RDBMS (relational data base

management system) is a high performance database management, specially designed for on-line help, transaction processing and large database application.

The data is mostly manipulated in the SQL language, which is considered to the heart of the RDBMS.

Its popularity is due to its ease of use, flexibility and capability.

The SQL language is divided into four categories.

- Queries
- Data manipulation statements, which are used for insert, delete and modify.
- Data definition statements, which are used to define, maintain and drop database objects, which are no longer, needed, including tables.
- Data control statements, which are used to access to the database as well as its data.

3.4 Hardware considerations:

The hardware and operating system requirements for the proposed system   are

- Main Processor   166 MHZ
- Main Memory   16MB
- Hard disk   2.1 GB
- Monitor   VGA colour Monitor
- Printer   Dot Matrix /Laser Monitor
- Operating system   Widow 98

CHAPTER 4

4.1 Introduction

Design phase is based on the information gathered during analysis of the system.

System design is the most challenging job of all the phases in the system life cycle of the project. Analysis has to plan a new system, which should meet the requirements of the organization. Before developing any system, it is very important to sketch preliminary specification and with the help of these specification, and analysis draw a detail design. which should consist of input details, output reports and layout of all database files and their relationships. Hence software design is a process through which requirements are translated into a representation of software. Economy, reliability and modularity should be taken into account in design. These requirements may be best achieved with modest, start and careful testing of each phase before proceeding to the next.

System Design:

The advance information has goal of minimizing the cost of information and processing, therefore a more practicable and effective approach to design a system has been developed. According to this approach all information need and use are defined and organized before system design.

For convenience, system design can be divided into four phases.

4.2.1   Input design
4.2.2   Out put design
4.2.3   Database design
4.2.4   Procedure design

4.2.1   Input Design:

•   Input is the information that is required from the user for further processing by the system. Input design is more important for any computerised system because there is lot of information to be entered. Correct input design gives convience to the user in entering data and

restricting incorrect entries. Thus it is very important to form input design carefully.

Following are the steps to make input design efficient.

- Input form

Forms are the most commonly used dialogues for data entry. Various input forms have been designed for correct information into the database. Data can be retrieved, displayed and edited after entry using the same form.

The most important factor kept in mind while designing forms is that entry form should be user friendly.

Attempt has been made to model screen such that it resembles the existing paper form.

- Code design:

The data input to a computer eventually has to be retrieved. To reduce redundancy and data entry easier pneumonic coding scheme has been adopted. This not only preserves the disk space but also decrease the probability for entering incorrect data.

- Fixed Lists:

While designing forms, it is kept in mind that user would have to enter minimum number of entries. For this purpose, list of all possible values are provided on most entries. User can select any value from the list.

- Validation checks:

To assist the user to enter the correct values, different types of validation checks are implemented. Due to this, user cannot proceed until he enters the correct

4.2.1 Out put design:

The output design constitutes an important part of any computer system, information. because end user is more concerned with the result and screen format, rather than the design and working of the system. The output is in the form of reports and queries.

In designing output following steps are kept in mind.

- It should be good looking.
- It should be user friendly.
- It should be easy to understand.
- It should be well formatted.
- Purpose of output should be clearly mentioned.

- Output should be precise and without unnecessary information.

There are two types of output design.

1. Screen output (Queries)
2. Printed output (Report)

Screen output (Queries)

Queries are the statements that retrieve information in any combination or order. In screen output, the output is displayed on the screen in the response of a query. User enters a query based on certain input criteria and its output is displayed. This output should be precise, appropriate and effective.

Printed output (Reports):

Report is also a form of query; the only difference is that it is in the printed form (in the form of hard copy). The reports of the proposed system are designed; they are simple, meaningful and informative.

Following reports are produced by the system.

- **Patient personal information Report:**

In this report all the personal information of the patient is provided. This report can be useful for the university administration and medical centre administration.

- **Patient treatment Report:**

In this report all the previous treatments of the patient are mentioned. In this report the checking time, doctor name, detail of disease and suggested treatment will be mentioned.

- **Medical profile Report:**

In this report all the records of the family diseases and allergies of the patient will be mentioned. This report is helpful for the doctor to diagnose the disease.

4.2.2 Physical Data base Design:

Physical data base design consists of data base tables, which are interlinked.

Following points should be kept in mind while designing the table.

- Data redundancy should be minimized.
- The table should provide fast retrieval of information.
- The record should be capable of updating.

The system contains the following tables.
1.   Data Tables.
2.   Code Tables.
1.   Data Table:
Data base tables are used to store and retrieve information.
Following data tables are used in the system.

Table No.1
Table Name: P-info
Primary key: P-code
Purpose: this table stores/information about patients, which
get treatment from Q.A.U Medical centre.
Specification.

Sr.No	Field Name	Type	Length	Description
1	P-code	Number	4	Patient code
2	N-Id-No	Vachar2	13	N-id-card-No
3	Name	Vachar2	30	Patient Name
4	F-Name	Vachar2	30	Patient-f-Name
5	Sex	Char	1	Patient Sex
6	M-Stat	Char	1	Pat-mar-status
7	D-O-B	Date	-	Pat-D/O-birth
8	P-O-B	Varchar2	30	Pat-PL/O-birth
9	Occup	Varchar2	30	Pat-Occupation
10	P-Add	Varchar2	40	Pat-P-Address
11	T-Add	Varchar2	40	Pat-Temp-Add
12	B-Gp	Varchar2	4	Pat-Bl-group
13	D-Code	Number	2	Pat-Deptt Code

Table No.2
Table Name: P-phone

Primary key: P-code
Purpose: This table stores information about the Telephone numbers of the patients.
Specification:

Sr.No	Field Name	Type	Length	Description
1	P-Code	Number	4	Pat-Code
2	Ph-No	Number	15	Pat-Ph-No
3	Ph-Type	Number	1	Phone-Type Off/Res/mobile

Table NO 3
Table Name: P- Allergy
Primary key: P-Code
Purpose: This table stores information about the allergies having the patient.
Specification:

Sr.No	Field Name	Type	Length	Description
1	P-Code	Number	4	Patient code
2	A-Type	Number	4	Allergy type

Table No.4
Table Name: F-disease
Primary key: P-Code
Purpose: This table stores information about the family disease of the patient.
Specification:

Sr.No	Field Name	Type	Length	Description
1	P-Code	Number	4	Patient code
2	F-D-Code	Number	2	Fam-Dis-Code
3	R-T-Pat	Number	2	Relation to- Pat

Table No.5
Table Name: P-Treatment

Primary key: P-Code
Purpose: This table stores information about the disease and treatment of the patient.
Specification:

Sr.No	Field Name	Type	Length	Description
1	P-Code	Number	4	Patient code
2	C-Date	Date	-	Checking date
3	C-Time	Varchar2	6	Checking time
4	Dr-Name	Varchar2	30	Doctor Name
5	D-Detail	Varchar2	50	Disease detail
6	S-Treat	Varchar2	150	Suggested treatment.

2-Code Table:
Code table are used to assign a code to some information. So that searching will become easy. Following code tables are used in the system.

Table No.6
Table Name: Dept
Primary key: Dept-Code
Purpose: This table assign code to departments in the university. It stores information about departments in the university.
Specification:

Sr.No	Field Name	Type	Length	Description
1	Dept-cod	Number	2	Dept-cod
2	Dept-Name	Varchar 2	30	Dept-Name

Table No.7
Table Name: F -D-Code
Purpose: This table assign code to family disease of the patient. It stores information about family disease of the patient.
Specification:

Sr.No	Field Name	Type	Length	Description
1	F-D-Code	Number	2	Fam-Des-Code
2	F-D-Des	Varchar2	20	Fam-Des-desc

Table No.8
Table Name: All-Code
Primary key: All-Type

Purpose: This table assign code to allergy type of the patient. This table stores information about allergy types of patients.

Specification:

Sr.No	Field Name	Type	Length	Description
1	All-code	Number	2	All-Type-Code
2	Det-code	Number	2	ALL-Det-code
3	Det-Des	Varchar2	20	All-Det-Desc

4.2.4. Procedural Design:

Different models used in the system are listed below.

- **Main-Module**

  This model is used to communicate with all the other modules. All other modules are called from this module. This module is consists of a pull down menu from which user can select any option. In this way this module is the parent of all the other modules.

- **P-INFO-MODULE**

  This module deals with the personal information of the patient. This module is used for entering the personal information of the patient and registration of new patients in QAU Medical Centre.

- **P-Treat-MODULE**

  This module is used for keeping the record of patients getting treatment from the Medical Centre.

  M-PROFILE-MODULE

  This module is used fir keeping the record of the Allergies and family diseases of the patient.

- **P-Dept-Module:**

  This module is used for keeping the record of all the departments of QAU. All the departments are allotted codes in the form of numeric number. Each department will have a unique code.

- **FAMILY-DISEASE-CODE-MODULE**

  This module is used for keeping the record of all the major family diseases with their unique codes. Any new family disease can be entered with a unique code.

- **Allergy-Module**

This module is used for keeping the record of all the major Allergies with their unique codes. Any new Allergy can be entered with a unique code.

4.3   Password:

The password for the system will be implemented for the security purpose. Whenever a user will log on, he/she would have to provide identification by typing his password, such users are called registered users. Thus password is important factor for securing data.

4.4 Help List:

Oracle provides a facility to display a list of valid values for correct data entry on any defined field. This approach has been adopted to avoid confusion in data entry for the particular field.

Chapter 5

System Development

5.1 Introduction:

Once the system is proposed and designed, its development phase starts which involves the realization of the actual system. In the development phase, software is built to meet the proposed and designed specification. During development phase developer attempts to describe how data structure and software architecture are to be designed, how procedural details are to be implemented, how the design to be translated into programming language and testing will be performed. This field, is more practical and important because it involves the realisation of actual system and it meets the requirements of the management.

5.2 Development Approach

There are several development approaches used in developing the system now a day. These are

•   Top – down approach
•   Bottom-up approach
•   Mixed approach

5.2.1 Top Down Approach:

In this approach, the development with a scheme containing high level abstraction and successive top-down refinement are applied. For example a main program is designed first and then its sub-modules are written.

5.2.2 Bottom-up Approach:

In this scheme the developer starts with a scheme containing basic abstraction and then combines these abstraction. For example all sub-modules are written first and tested and then these entire module are link with main model.

5.2.3 Mixed Approach:

In this scheme, instead of following any particular approach throughout the design, the requirements are partitioned while using top-down approach and part of scheme is designed. For each partition using bottom-up approach, the various scheme parts are then combined.

Approach used:

Out of all these approaches, I have selected the bottom-up approach. In this approach, the programs are separately developed and checked and after that, they are linked with the main module. The importance of this approach is that each and each and every module can be tested separately and then linked them with the main menu to ensure that the system is error free.

5.3 Software Selection:

One of the most difficult tasks after the system requirements are known is to determine whether particular software is capable of meeting the system requirements. After studying the characteristics of each type of database, like the storage factor and access paths. DBMS supports, the type of the user interface, the type of the high level query language, it was decided to the relational database system for the proposed system. After considering a number of relational database management systems available these days, ORACLE was started. The major features that result in the selection of ORACLE for the development of the application are as follows.

- ## Multi user software:

The most important feature is that it is multi-user software. The application development in ORACLE can be connected together into a powerful, distributed database environment. It provides a powerful client/server relationship between the server and the users terminals.

- ## Security:

Oracle provides strict security of applications development in the package by enforcing user name and password. Without password it is not possible for any body to access the system. It is also possible to grant different types of accesses to different users. e.g. updating, addition or deletion rights may be provided to the selected persons, while the others may be allowed to view the records.

- ## Probability:

ORACLE RDBMS is fully over 80 distinct hardware and operating system plat form including VMS, MVS, UNIX, MS-DOS, OS/2 and Macintosh. In Developer 2000, we can convert out binary file to text file, which is independent of plat form.

ORACLE Products:

Oracle provides a number of sophisticated tools for the development of application. SQL*Form, SQL*Menu, SQL*Reports are the distinguishing tools of ORACLE.

SQL*Plus:

SQL*Plus is an interface through which SQL commands may be entered and executed.

Forms:

Forms provide facility to design forms. These forms provide fast and easy data entry updating, deletion and queries to an ORACLE database.

Menu:

Menu is used to construct the user-friendly menu interface to any software application. Report writer can be used to create an ordinary letter or tabular report.

Procedural Language:

ORACLE provides a powerful procedural language extension to SQL known as PL/SQL. PL/SQL significantly increase application performance and developer productivity, while enhancing the power and functionality of other oracle products. With the help of this facility we can write procedures and functions just like any procedural language.

A number of other facilities are also available which allow easy manipulation of data structure along with data stored in these structures. For example oracle provides import/export utilities with the help of which it is move structure along with data contained in these structures from one system to another.

5.4 System Development:

Each system comprises of one or more components relating to one specific branch of the system. A description of system component is given below.

5.4.1 Forms:

A form is basically a data input screen. Oracle form is the main tool of the developer 2000. Form is an arrangement of information that determines how an application will work and how it will appear to the operator while using software.

Forms are created using Developer 2000, which provides a good interface. Forms are used for data entry, modification, deletion and queries in the data base table. Once the form has been

designed, data entry operator needs not to know the SQL language.

5.4.2. Blocks:
Block is a logical container of objects. A form must contain at least one block. Each block corresponds to a base table, in which data is input, deleted and queried.

5.4.3. Base Table:
A database table, which is associated with a block, is called base table for that block. This block will contain all or the some of fields defined in that particular base table. Each operation (insert, delete, query) performed on a block actually operates the base table.

5.4.4. Master Detail Table:
A block is called master block if for each record in master; there exist one or multiple records in detail block. Master detail tables may exist between blocks when a form consists of more than one block. Detail table contains detailed records associated with the record in the master block. So corresponding to a record in master block, there may be many detailed records in the detailed block. There is primary to a foreign key relationship between blocks.

5.4.5 Trigger:
Triggers are the set of processing commands, which are executed when an event occurs. All Triggers are written PL/SQL, which is language integrated with ORACLE database. Triggers are associated with SQL. Triggers may be written at form level, block level, e.g. when we press a button, an event occurs.

5.4.6 Layout Editor:
It is a screen editor in which we can design front-end screen according to our wish. Source field can be put any where on the screen by using built-in facilities, e.g. we can adjust boxes and buttons to make it interactive.

5.5 Form Design:
The following forms have been developed for newly developed system. The layout of the forms is given in appendix.

- P-INFO-FORM

This form is used for the registration of the patients in the QAU Medical centre. It contains the personal information of the patients. This form contains the following data.

a) Block Name: P-info-blk.

Table involved: P-info.

This table contains all the personal information of the patient. When a patient comes first time in the Medical centre then his/her registration is made in this block.

b) Block Name: P-phone-blk.

Table involved: P-phone.

This table stores information about the telephone numbers of the patient.

- ## P-Treat-Form

This form contains the following block.

Block Name: p-treat-blk.

Table Name: p-treatment.

This block contains information about the patient previous diseases with suggested treatments.

- ## M-Profile-Form

This form is used for the history record of patient's allergies and his/her family diseases. It contains the following blocks.

a) Block Name: F-disease-blk.

Table involved: F- disease.

This block contains information about the family diseases of the patient. In his/her family we have mentioned the options for father, mother, brother and sister.

b) Block Name: P-Allergy-blk.

Table involved: P-Allergy.

This table stores information about the allergy type and details of that allergy type.

5.6 Code FORM

This form implements different codes and is used to assign different code to entities. It also helps to delete and introduce new code. These codes are helpful to optimise the memory and fast access of records. The codes are assigned to the following entities.

- P-code
- Dept-code
- Allergy-code
- Allergy-type

- A-type
- F-d-code
- D-code

5.7 Report Generation

The process of report generation is accomplished with the help of Report designer utility of developer 2000. Using report writer, the designer fetches the records from different tables based on a query and forms them as a report. Two types of reports are generated and described below. The layout of reports is given in appendix.

- Reports.
- Queries.

5.7.1 Reports

Reports generated by the system are described below.

- **Patient personal info Report**

This report describes all the personal information of the patient. In this report we have taken the fields such as patient code, name, occupation, dept name etc. This report can be generated for the administration of the medical centre and it could be used for the university administration.

- **Patient Treatment Report**

This report describes the patient's previous disease and suggested treatments. In this report we have used the fields such as checking data, doctor's name, suggested treatment etc. This report helps the doctor for diagnosing the disease by studying his previous suggested treatment and prescribed medicine.

- **Patient Medical Profile**

This report describes the patient's previous allergies and his/her family diseases. In this report we have used the fields such as Allergies code, Allergies type, family disease etc.

This report helps the doctor in diagnosing the disease by studying his/her previous allergies and family diseases record.

5.7.2 Queries

Each entry form contains an option for query. User can retrieve a record or all the records can be retrieved at a time.

Chapter 6
System implementation and Evaluation
6.1 Introduction

System implementation and evaluation is the final phase in the system development life cycle after the development of the software. The software designer must perform certain tests and look into the possibilities of the users while converting from the existing system to the proposed system. So it is very important phase since the new one replaces the existing system.

After implementing the system, the designer evaluates the system for further enhancement and other suggestions. In this chapter various methods of system implementation, description of testing and conversion techniques are described for the developed system. The system is then evaluated according to the standard.

6.2 System Implementation:

Implementation the process of bringing into operational use, a system that has been developed, implementation is the last phase in the development of the system. It is the final destination of the developed system. During this phase the developed system is put into actual operation. The major parts of this phase are following.

- System testing
- System conversion

6.2.1 System Testing

Testing is the process of executing a program with explicit intention of finding errors. Testing and validation is very important to make the system acceptable. Even if the system is developed using correct algorithm, its validity remains doubtful. A test case is used which consist of set of data that the system will process in order to determine whether the system will process it correctly.

There are number of testing techniques.

- Unit testing
- Integrated testing
- System testing

Unit testing:

In unit testing different modules of software are tested independently to locate errors. This helps in locating the error in coding and logic that are contained in a particular code. The

advantage of this testing is that if a module has errors, we can easily remove them, otherwise
it will become difficult to locate errors when system is implemented.

Integrated Testing:

After testing the system a unit/level, combine testing of the modules is carried out. The purpose of this system is to determine that all the modules correctly interacting with each other. Also to ensure that correct forms are invoked by different menu options as they are developed separately.

System Testing

Finally testing is done on the system level to ensure that it is working according to all the desired specifications and requirements of the organization. Using actual data checks the size and structure of the data field. The main reason here is to determine the inconsistency in the developed system.

6.2.2 System Conversion

After the successful completion of the testing phase, conversion is the process of replacing the old system with the new one. There are different methods of performing system conversion. The following three methods are commonly used.

- Pilot conversion
- Direct conversion
- Parallel conversion

Pilot conversion:

In this method, the system is implemented on a particular area of the organization department. Thus the system is implemented in parts. The remaining parts of the organization continue to work with the old system. This approach has the advantage of sound proving ground before full implementation.

Direct conversion:

In this approach, the old system is immediately replaced with the new one. There are no parallel activities. This method requires careful advance planning. In case of failure of the new system, the whole existing system will be collapsed. This is major drawback in this system.

Parallel conversion:

In parallel approach, old and new systems are in parallel operation. They operate side by side. The user continues to use the

old system and simultaneously learns to operate the new system. When the users are full trained, new system replace the old system. This is the safest approach, because in case of failure, the user may immediately turn back to the old system without any wastage of time and data.

Proposed system conversion:

After a through analysis of the different approach used for the system conversion, parallel conversion is recommended for the implementation of the developed system. This approach is selected because.

- It is normally the safest and suitable conversion strategy.
- It minimizes the problems that may arise from system failure.
- If unfortunately system fails, data cannot be lost because old systems will also working.
- It provides the opportunity to compare the result of existing system with those of newly developed system.

Although it is difficult to handle two systems side by side. but it is the best method to judge the efficiency of the designed system over the existing system. In case of parallel conversion, old system is available as a check up, which is useful if newly designed system fails.

6.3 System Evaluation:

When the system is implemented successfully, the designer evaluates the system to see whether the objectives of the system are implemented or not. Also none of the developed system is a complete or perfect system. There is always remains need for improvements. An exercise may achieve an immediate goal and arrive at a stage that logically seems an appropriate point for the termination of the given object. However, a point that appears to be a terminal point for one project may be a good beginning of another. So discussing features of the developed system and future enhancements carries out evaluation of the system.

6.4 Merits of the System

A software system is evaluated by the interface, it provides to its user also called the user interface. Major features of the developed system are following.

- Operating system independence
- Response time

- Query on each field
- Ease to use.
- List of values
- Efficiency
- Error reduction
- User friendly
- Security
- On line help

Operating system independence:

While continuing to operate efficiently, the system can be run on other systems with different operating system. Only minor changes in the parameters setting would be needed to accomplish this task.

Response time:

Time factor plays an important role in any computerized system. The existing system takes large amount of time to produce reports and result while the computerized system provide reports and results in reasonable time.

Query facility on field:

Query facility is provided in almost every field according to some criteria entered by the user. This makes the system more interesting.

Ease of use:

The developed system is menu driven. The help is provided in every possible point. Data entry, updating and query are also easy to use.

Lists of values:

List of values is provided where needed. The user needs not to be remembering the entries already made. Single keystroke drops down a list and users can select desired value from it.

Efficiency:

To increase the efficiency of the system, codes have been assigned to different objectives, which are useful to access the record in a very short time. Using these codes we can save memory.

Error Reduction:

Errors are reduced in the newly designed system. Lists of codes are available at most entries, which help in entering the data. In this way, most of the errors are reduced at entry time.

User friendly:

System is user friendly. The user feels easy while using the system. Interface of the system is very interactive. If user enters wrong input, proper message is displayed on the screen.

Security:

System will work by providing correct user name and password. In this way un-authorised persons cannot access the data.

Online help:

Online help is provided by the system for the user. If user enters a wrong input, it will display proper message.

6.5 Future Enhancement:

Through the design and development of this system, the main objective is to meet all good qualities of the system and to accumulate them into the system by meeting all possible present and future requirements. However, in future, improvements can be made according to the requirements. For example, new reports and queries could be designed. If a new department is introduced in the hospital, it could be attached with the system by just making a separate form for that department.

6.6 Conclusion:

In the end, I would like to say that developing this system was an interesting experience for particular point of view. I learnt a lot during this process because it is not just based on assumptions, but an actual work. The information was collected for all phases of the system life cycle, at concerned department. I hope that with the development of this system, some if not all the problems will be solved.

Chapter 7

User Guide.

7.1 Introduction

This chapter explains the working of the computerized system developed for Quaid-e-Azam University Medical centre. It discusses the features and different operations performed on database such as insertion, deletion and modification.

7.2 User Interface

The fundamental feature of well-engineered software is the measure of the ease the user finds, when he/she runs it. An attractive and meaningful interface raises its popularity among the users, as it is easy to run, use and handle. Simple but attractive input screens and output reports have been designed that resulted from a suitable combination of colours, font style and font weight.

7.3 Logging on to the new system:

Turn on your computer and get logged into windows. Start database by clicking on the start button, programs, personal oracle for window 95 and start database. After a while, oracle database will be stored. Now click on "SQL PLUS 3.3"which is enclosed under oracle for window 95-menu item of your start-up menu. This would ask you the "user name" and "password". After you input valid "password" and "user name", it would take you to the "SQL" prompt. Now open form designer from "developer 2000 for window 95" and then connect to the database. When we are connected to the database by proving the user name and password. we are able to run our program. Open front-form and press run icon, after a while a main menu will b displayed. Layout of the main menu and sub menu is given in the appendix.

7.4   (Pull down Menu)

Main menu is in the form of pull down menu. There are different options listed in its sub menus. User can select any one of them by moving the curser bar up and down with the help of arrow keys and then press enter on the desired option, or by simply clicking the mouse on the option.

7.5   Patient information

From main menu select data entry. The options will be appeared in the sub menu, then select the patient personal information, a screen will be opened. In this screen user will enter the

information of the patient. First of all click on the query button and then enter p-code. If the personal information of the patient is already stored in the database, they will be retrieved in the table; otherwise user will have to enter all the information about the patient. Now click on the save button, the current record will be saved. For the treatment, the user will click on the patient treatment in the sub menu, again a screen will be appeared. Your curser will be blinking at the patient code, while on the task bar, the message of list will be appeared. Now press F9 key, the list of values of the registered patients will be appeared. Select the required patient and enter the record of the suggested treatment. You can also view the previous visits and the suggested treatments of the registered patient from the same screen.

There is also an option of patient Medical profile in the sub menu. In this option, the record of the family diseases of the patient and allergies having the patients is kept.

7.6 Record Manipulation:

Different operations performed on a record are discussed in this section.

Add operation:

If user needs to enter a new record, that does not exist in the data base, then first of all click on the clear button if it is not clear, then enter the record to be inserted and then press save button, the record will be saved.

If record already exists in the database, system will display error message that record already exists.

Retrieve operation:

To search a particular record, press query button and enter the value of any one field in the screen displayed. Then press F8 key. It will display the whole record if it is present in the database. If it is not present in the database, system will display error message.

Display all records

To see all the records in a table, double click on the query button. It will display all the records on the screen. You can see previous and next record by clicking on "previous" and next button.

Deletion operation:

To delete a record, first of all display that record on the screen using query button and then press delete button. System will

conform to delete the desired record. On pressing "yes" button, record will be deleted.

Modification:

If you want to modify an existing record, first of all display that record on the screen and change the required record. After this press save button, it will ask to conform. On pressing "yes", record will be changed.

7.7 Records:

The execution of report modules is simpler as compared to form modules. To generate a report or query, select report option from the main menu. A sub menu will be displayed, where different queries are listed. Select the required one and that will be generated. If it is query, it will be displayed on the screen. If it is report, it will be printed on a paper as well as displayed on the screen

7.8 Special considerations:

The system has been developed in oracle/Developer 2000, which is window 95based. So to operate this system, it is necessary that the user have enough knowledge of window 95. Every user must have a log –on account and password assigned to him by the system administrator. Then he/she has the authority to access the system. The system should be carefully shut down and database should be dismounted properly, otherwise it will result in loss of data.

Appendix A
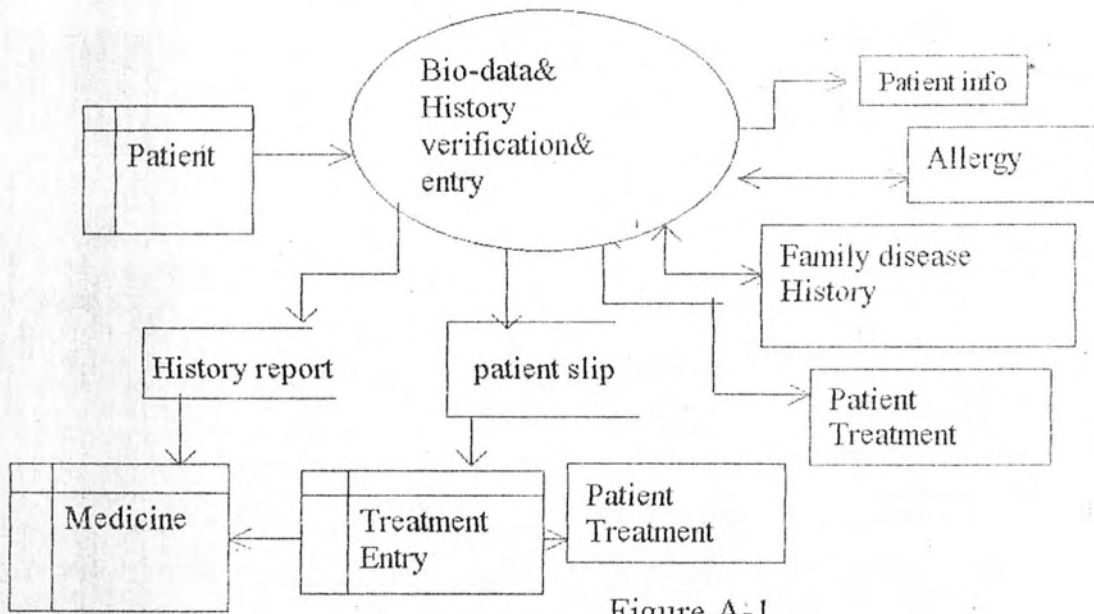## Data Flow diagrams
DFD of the proposed system

Figure A-1

Second Level Diagram of process 1
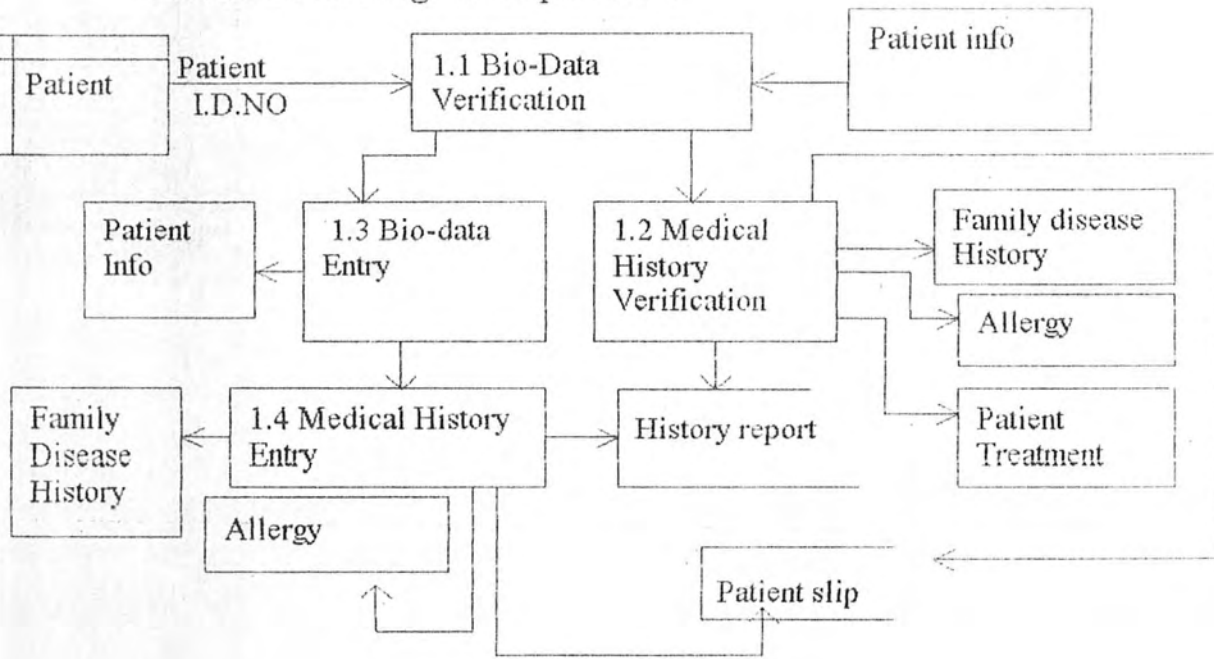
Figure A-2

Second Level Diagram of process 2
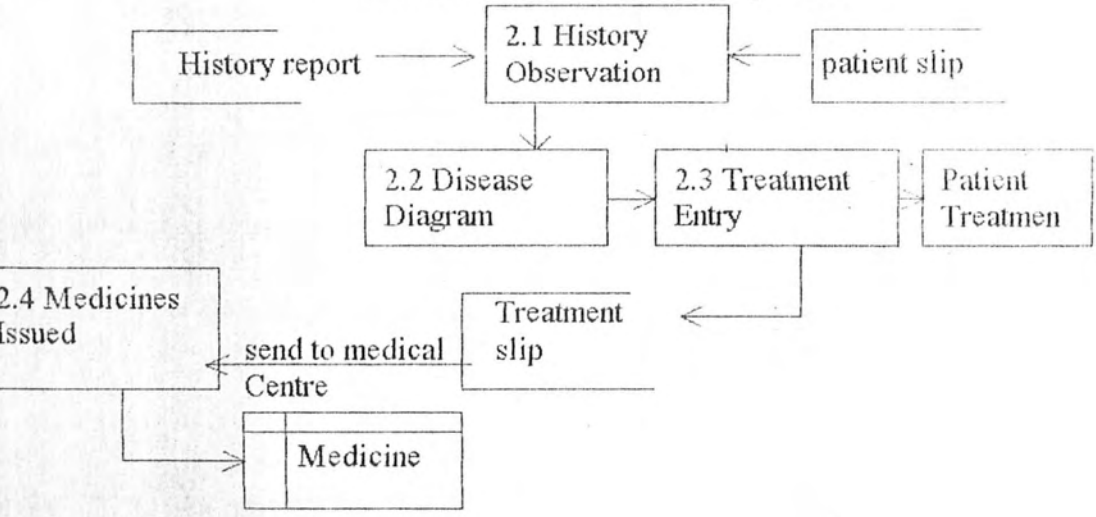
Figure A-3

System flow diagram & Main Menu Diagram
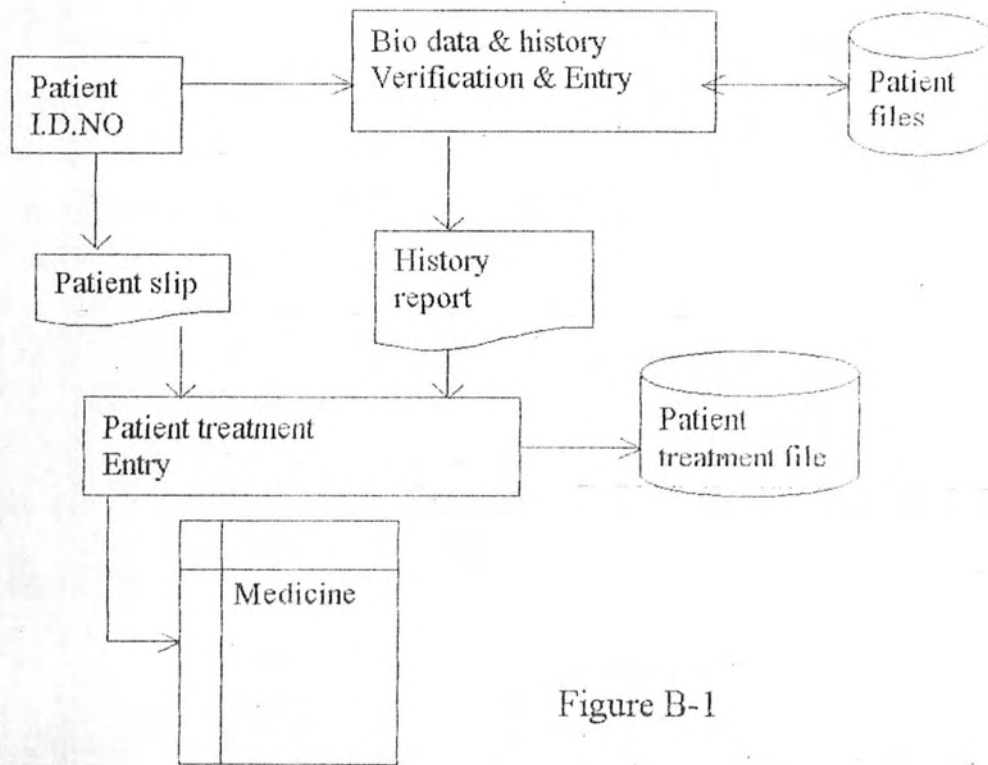
Figure B-1

Main Menu system Flow Diagram
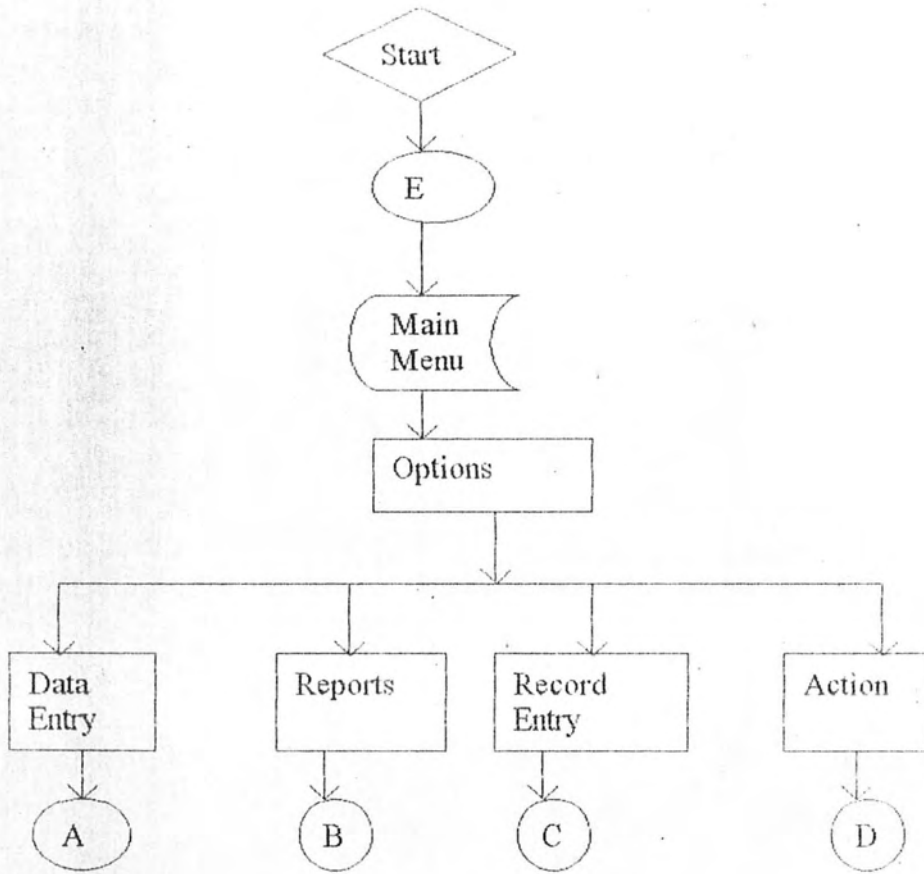
Figure B-2

Sub Menu System Flow Diagram
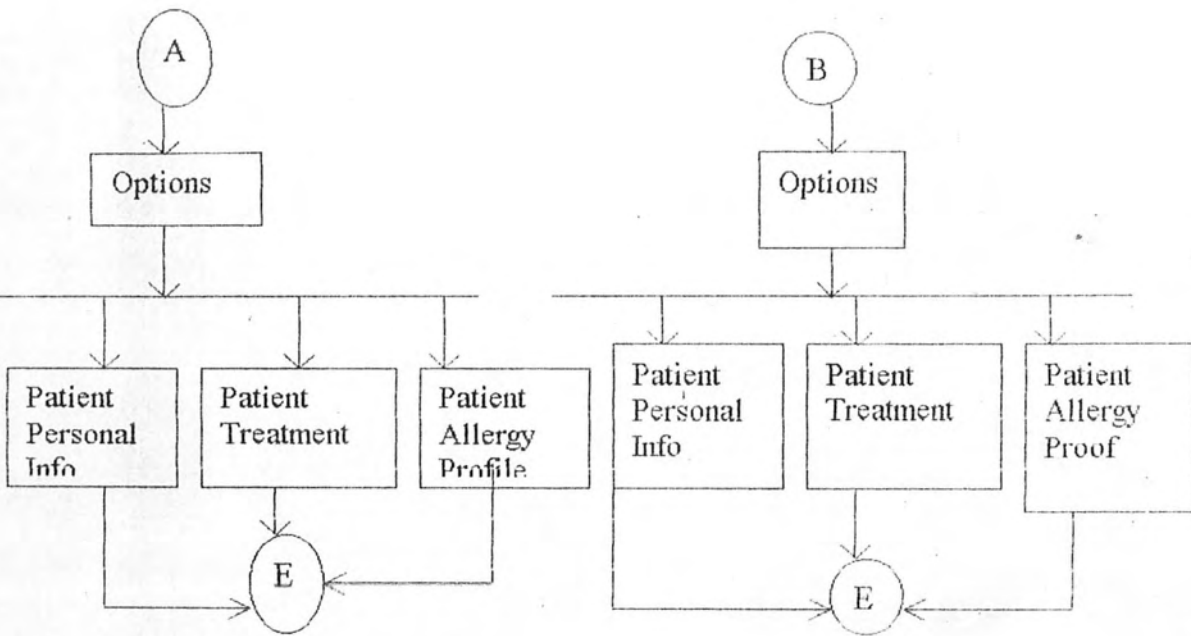
Figure B-3

Sub Menu system flow Diagram
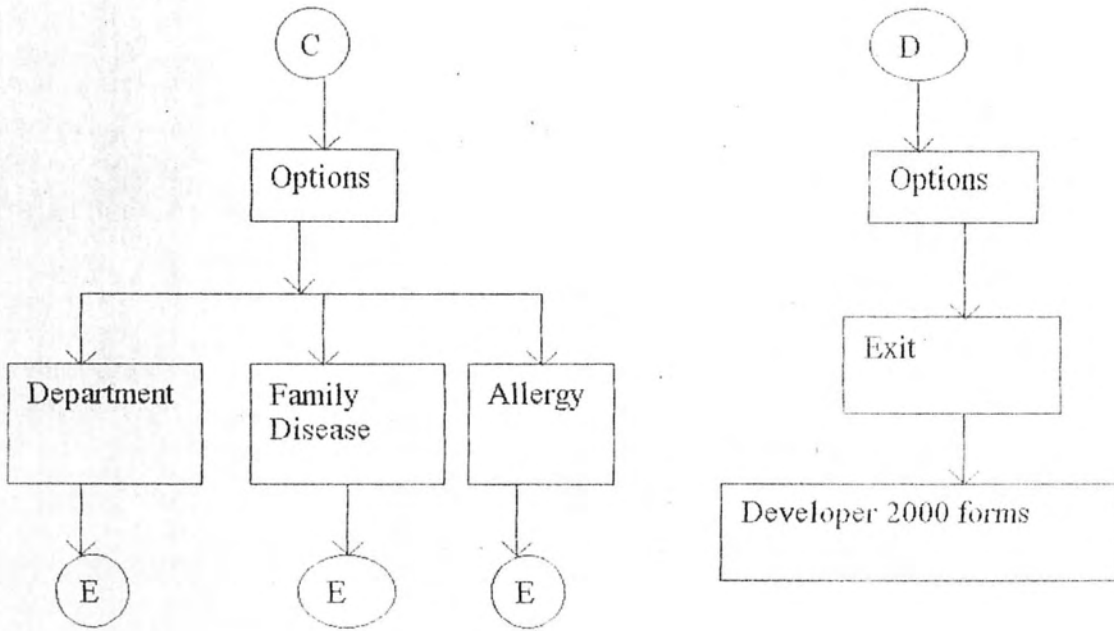
Figure B- 4

Appendix C
Layout of Screens & Out puts

Action Edit Block Field Record Query Window Help

Department Entry Screen

Department
Code — Department Description

1	Anthropology
2	Biology
3	Chemistry
4	Computer Sciences
5	Defense & strategic Studies

EXIT   QUERY   SAVE

Count: 5

Action   Edit   Block   Field   Record   Query   Window   Help

Patient Family Disease Section

Patient Code	Family Disease Code	Relation to Patient
4	1	Father

Patient Allergy Section

Patient Allergy [   ]

[EXIT]   [Query]   [Save]

Count: 1

Action Edit Block Field Record Query Window Help

Family Disease Entry Screen

Disease
Code

Family Disease Description

1	Diabetes
2	Heart Attack
3	High Blood Pressure

Exit   Query   Save

Count 3

Action   Edit   Block   Field   Record   Query   Window   Help

Allergy Entry Screen

Allergy Code [____]   Allergy Description [_____]

Allergy
Detail
Code   Allergy Detail Description

| Exit | Query | Save |

Count: 1

Action Edit Block Field Record Query Window Help

Patient Information Screen

Patient Code # |1

N I D Card	228-72-586763	Sex	(• MALE	(FEMALE
Name	SHAHID NAZIR MIRZA	Marital Status	(• SINGLE	(MARRIED
Father's Name	NAZIR MOHAMMAD MIRZA	Present Address	ROOM#8,ANNEXE#3,QAU,ISLAMABAD	
Occupation	Student	Permanent Address	AS ABOVE	
Date of Birth	07-JAN-1972	Blood Group	O+	
Place of Birth	GUJART	Department Code	4	
Phone Number	051-829513	Phone Type (Res (• Off (Mob		

Exit   Query   Save   Delete

Count: 1

Patient Information Screen

Patient Code # | 1

N I D Card	228-72-596763	Sex ⊙ MALE ○ FEMALE
Name	SHAHID NAZIR MIRZA	Marital Status ⊙ SINGLE ○ MARRIED
Father's Name	NAZIR MOHAMMAD MIRZA	Present Address	ROOM#8,ANNEXE#3,QAU,ISLAMABAD
Occupation	Student	Permanent Address	AS ABOVE
Date of Birth	07-JAN-1972	Blood Group	O+
Place of Birth	GUJART	Department Code	4

Phone Number | 051-829513   Phone Type   ○ Res   ⊙ Off   ○ Mob

Exit | Query | Save | Delete

Count: 1

Action Edit Block Field Record Query Window Help

Disease & Treatment Screen

Patient Code [1]   Checking Date [10-NOV-   ]

Checking Time [14:10]   Doctor Name [SHAHZAD]

Disease Detail [COMPUS MENTUS]

Suggest Treatment [REGULAR WALK & TALK]

[SAVE]   [EXIT]   [QUERY]

Count: 4

Appendix D
Out puts of the Reports

Patient Diseases History

P Code: *1*   Name *SHAHID NAZIR MIRZA*

Checking Date   18-NOV-- 2

Checking Time: 03:21

Doctor Name: BANGASH ASHAL

Disease Detail: HEART MURMURRING.

SuggestTreatment: START DAILY EXERCISE, REMAIN COOL AND CALM TAKE
JUICES ETC.

. . . .

P Code: *20*   Name: *Shahzad Hameed*

Checking Date: 18-NOV- 2

Checking Time: 15:44

Doctor Name: Dr. Zaheer

Disease Detail: Chest Pain, Fever.

SuggestTreatment: Some Medicines and bed rest.

. . . .

Checking Date: 19-NOV- 2

Checking Time: 15:49

Doctor Name: Dr. Bukhari

Disease Detail: High blood pressure.

SuggestTreatment:

Complete rest and daily walk atleast 4 kilometer Also regular
checkup and avoid food that increases fats etc

. . . .

Patient Diseases History

P Code: 1   **Name:** SHAHID NAZIR MIRZA

Date	Time	Doctor Name	Disease Detail	SuggestTreatment
18-NOV 02	03:21	BANGASH ASHAL	HEART MURMURRING	START DAILY EXERCISE, REMAIN COOL AND CALM. TAKE JUICES ETC

P Code: 20   **Name:** Shahzad Hameed

Date	Time	Doctor Name	Disease Detail	SuggestTreatment
18-NOV 02	15:44	Dr Zaheer	Chest Pain, Fever.	Some Medicines and bed rest.
19-NOV 02	15:49	Dr Bukhari	High blood pressure	Complete rest and daily walk atleast 4 kilometer. Also regular checkup and avoid food that increases fats etc.

Patient Allergy & Family Disease

P Code: 20   Name: Shahzad Hameed   Blood Group: AB+

Allergy Record

Allergy Type	Allergy Name
food allergy	Egg

Patient Family Diseases

Disease	Relation
High Blood Pressure	Brother

Patient Personal Information

P Code: 20

Name: Shahzad Hameed

Father's Name: Malik Hameed

N I DCard: 101-74-416985

Date of Birth: 09 AUG 1974

Place of Birth: Sargodha

Sex: Male

Marital Status: Single

Occupation: Student

Department: Statistics

Temporary Address: - d0 -

Permanent Address: House 56, Street 68, Sector G-9/3, Islamabad.

Phone No	Phone Type
051-253672	Residence
051-250980	Residence

Appendix E
Data Dictionary

Data Dictionary

S.No	Field Name	Type	Length	description
1	a_type	number	4	All the allergy types are in this field
2	Allergy-code	number	2	The mjor allergies are given code
3	allergy-des coded	varchar 2	20	describes major allergies
4	allergy-type	number	2	it shows code of main allergies
5	B-group blood	varchar	5	describe patient's group
6	c-date	date	-	describes patient's current checking data
7	c-time of	varchar2	6	shows checking time patient.
8	d-ode	number	2	department code.
9	d-detail	varchar 2	50	disease detail.
10	d-o-b patient.	date	-	date of birth of
11	dept-code	number	2	departments are given codes
12	dept-des	varchar 2	30	name of department.
13	det-code	number	2	detail code of allergies.
14	det-des	varchar 2	20	detail description of allergies
15	dr-name	varchar 2	25	name of doctor to be visited.
16	f-d-code	number	2	family disease code.
17	f-d-des	varchar 2	20	family disease description.
18	f-name	varchar 2	25	father's name of the patient.
19	m-status	char	1	marital status of patient.

20	n-I-d	varchar 2	13	national identity card of the patient.
21	name	varchar 2	25	name of patient.
22	occupation	varchar 2	25	occupation of patient.
23	p-address	varchar 2	50	patient's permanent address.
24	p-code	number	4	patient unique code.
25	p-o-b	varchar 2	20	place & birth of patient.
26	phone-no	varchar 2	15	phone number of patient.
27	phone-type	char	1	phone type of patient.
28	r-t-patient	varchar 2	10	relation to patient.
29	s-treat	varchar 2	150	suggested treatment of the patient.
30	sex	char	1	sex of patient.
31	t-address	varchar 2	50	patient ,s temporary address.
32	symptom	varchar 2	40	symptoms of disease
33	sign	varchar 2	40	signs of the disease
34	test-cod	number	2	unique test code
35	test-detail	varchar 2	20	details of test
36	result	varchar 2	20	results of test
37	dis-code	number	2	unique disease code
38	dis-detail	varchar 2	30	disease detail
39	med-code	number	4	unique medicine code

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