



**Ministry of Higher Education and Scientific Research**

**University Of Technology**

**Computer Engineering Department**



# **H**ospital Management System

## **Design and Implementation**

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

(( وَقُلْ رَبِّ زِدْنِي عِلْمًا ))

(( سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا طه ))

إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ ُ ))

صدق الله العظيم

سورة (طه) آية (144)

سورة (البقرة) آية (32)

# شكر وتقدير

لا يسعني وأنا أنهي بحثي هذا إلا ان اتقدم  
بفائق الشكر والتقدير الى الاستاذة الفاضلة  
(سما سلام سمعان) بما أبدته من توجيه  
وتصحيح خلال فترة البحث وكانت خير دليل  
في تخطي العقبات والصعوبات التي واجهتنا  
في البحث وبذلك فلها فضلٌ علينا، لذلك لا  
أجد ما يعبر عن فنائي لها سوى تقديم  
الشكر والامتنان والعرفان والله الموفق  
والمستعان ....

# الأهداء

الى الشفاء التي اكرمت لنا الدعاء كلما نطقته ...

الى التي لولاها ما مسكتني أنا القلم ...

الى التي حملتني وهناً على وهن وسهرت الليالي على راحتني ...

والدتي العزيزة

الى من أبلى الدهر كي يراني أرتدي ثياب العز والرفعة ...

الى معلمي الاول وقدوتي في الحياة ...

والدي العزيز

الى قلاع طفولتنا وعنفوان شبابنا الى من طال بهم شوط الانتظار الى روافد

الوفاء ...

الى من أشد بهم في الحياة ....

أخوتي الاعزاء

الى كل من علمني حرفاً ولم يبخل بجهد من اجلنا

الاساتذة الافاضل

الى كل من أحب اهدي جهدي المتواضع هذا ...

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# Chapter one

## INTRODACTION

### 1.1 Abstract

A hospital management information system (HMIS) is an element of health informatics that focuses mainly on the administration needs of hospitals. In many implementations, this is a comprehensive, integrated information system designed to manage all the aspects of a hospital. One of the most important issues is health care services.

Hospital management information system (HMIS) is a province-wide initiative designed to improve access to patient information through a central electronic information system. HIS goal is to streamline patient information flow and its accessibility for doctors and other health care providers. These changes in service will improve patient care quality and patient safety over time.

The patient carries system record patient information, patient laboratory test results, and patient doctor information. Doctors can access easily person information, test results, and previous prescriptions. Patient schedule organization and early warning systems can be provided by related systems.



## 1.2 Introduction

In the present era of globalization and advanced technology efficient record keeping cannot be overemphasized. Imagine the scenario when the manual processes and manual modes of instruction get replaced with electronic systems. One of such replacement can be done in the area of patient's database management system within a hospital. Developing patient database management system software would benefit the hospital management who can have effortless access to the data securely and more easily. Hospitals are not excluded in record keeping. The records kept include patient data, which help to maintain patient's medical records. The medical records must have correctly all of the patient medical history. Physicians must maintain flawless records, because this document serves a number of purposes. It serves as a communication tool. As an important source of patient information. Well-kept records usually reflect the level of care given to a patient by the physician. Therefore medical records can be used as an evaluation tool. The more complete the record, the better they will serve the physician and the patient in the event of any action. Patient's identity which includes the patient's first name, last name, sex, age, address, etc.

## 1.3 Background

A Hospital is a place where Patients come up for general diseases.

Hospitals provide facilities like :

- Consultation by Doctors on Diseases.
- Diagnosis for diseases.
- Providing treatment facility.
- Facility for admitting Patients (providing beds, nursing, medicines etc.)
- Immunization for Patients/Children.

Various operational works that are done in a Hospital are :

- Recording information about the Patients that come.
- Generating bills.
- Recording information related to diagnosis given to Patients.
- Keeping record of the Immunization provided to children/patients.
- Keeping information about various diseases and medicines available to cure them.

## 1.4 THE OLD SYSTEM

The procedure involved in the current system is that, when a patient visit the hospital for medication, the patient will first of all buy the identification card which contains name, and other relevant information needed, and card identification number. The patient will then waits for the card to be processed together with a file jacket that holds the card that has column for diagnosis made by physician, drugs

prescribed, and date at the waiting room for the arrival of the card. When the file arrived, the patient joins the queue to see a doctor. In this current system, file cabinets are used for keeping individual patient card enclosed in a file. This system is so tedious in tracing a record files slow in processing of records, space occupied by the file time waiting while waiting for the patient file to be retrieved by the receptionist.

## 1.5 STATEMENT OF PROBLEM

### Problems with conventional system

**1. Lack of immediate retrievals:** The information is very difficult to retrieve and to find particular information like- E.g. - To find out about the patient's history, the user has to go through various registers. This results in inconvenience and wastage of time.

**2. Lack of immediate information storage:** The information generated by various transactions takes time and efforts to be stored at right place.

**3. Lack of prompt updating:** Various changes to information like patient details or immunization details of child are difficult to make as paper work is involved.

**4. Error prone manual calculation:** Manual calculations are error prone and take a lot of time this may result in incorrect information. For example calculation of patient's bill based on various treatments.

**5. Preparation of accurate and prompt reports:** This becomes a difficult task as information is difficult to collect from various registers.

## Definition of Basic Terms

**Hospital:** An institution that provides medical, surgical or psychiatric care and treatment for the sick or the injured.

**Patient:** One who receives medical treatment attention care.

**Medical records:** It's any data, which is collected and use to diagnose or treat a patient's health problem.

**Database:** A collection of data arranged for ease and speedy search and retrieve.

## 1.6 OBJECTIVES

Hospital Information Systems provide a common source of information about a patient's health history. The system have to keep data in secure place and controls who can reach the data in certain circumstances. These systems enhance the ability of health care professionals to coordinate care by providing a patient's health information and visit history at the place and time that it is needed. Patient's laboratory test information. HIS provide internal and external communication among health care providers.

The HIS may control organizations, which is Hospital in these case, official documentations, financial situation reports, personal data, utilities and stock amounts, also keeps in secure place patients information, patients medical history, prescriptions, operations and laboratory test results.

The HIS may protect organizations, handwriting error, overstock problems, conflict of scheduling personnel, official documentation errors like tax preparations errors.

## 1.7 THE NEW SYSTEM

This new system is designed for medical practitioner/physician to keep track of all patient's medical record/information such as diagnosis, drug prescribed, admission and discharged, etc the new system will take care of the long processes and tedium work involved in tracing and retrieving a patient's record in the old system in a nut shell this will improve the efficiency of the management in a daily work as it can provide required records on time.

### Hardware requirement

- RAM (64)
- Hard disk capacity of 40GB
- Printer

### Software requirement

- Operating System Window XP and up
- Note on window 8 and up need to open some port at firewall , or exception the program from the firewall

## 1.8 BENEFIT OF NEW SYSTEM

### **1. Planned approach towards working:**

The working in the organization will be well planned and organized. The data will be stored properly in data stores, which will help in retrieval of information as well as its storage.

**2. Accuracy:** The level of accuracy in the proposed system will be higher. All operation would be done correctly and it ensures that whatever information is coming from the center is accurate.

**3. Reliability:** The reliability of the proposed system will be high due to the above stated reasons. The reason for the increased reliability of the system is that now there would be proper storage of information.

**4. No Redundancy:** In the proposed system utmost care would be that no information is repeated anywhere, in storage or otherwise. This would assure economic use of storage space and consistency in the data stored.

**5. Immediate retrieval of information:** The main objective of proposed system is to provide for a quick and efficient retrieval of information. Any type of information would be available whenever the user requires.

**6. Immediate storage of information:** In manual system there are many problems to store the largest amount of information.

**7. Easy to Operate:** The system should be easy to operate and should be such that it can be developed within a short period of time and fit in the limited budget of the user.

# Chapter Two

## 2. Literature Review

The prospection is structured to enable readers to gain a quick overview of the learnings from the literature, as well as to gain a more detailed understanding of the evidence on presents the overview.

In this chapter I will choose the most prominent health care management that have emerged and what are the problems may face.

### 2.1 Brief Historical Overview

One of the oldest systems that entered in health care management system was computer-based patient record (CPR).

Computer-based patient record (CPR) implementation over the past decade reveals that clinical, workflow, administrative, and revenue enhancement benefits of the CPR outweigh barriers and challenges but only if healthcare organizations redesign certain work processes. Among other key efforts, organizations must train and motivate users to navigate CPR systems, as well as develop a common structured language. Clinicians who used CPRs found that electronic access to clinical information saves time and provides a thorough and efficient way to manage patient information.



According the evolution of technology has become necessary intervention technology to medical system not only in the Patient registration system even beyond that to the stage of patient management but also in process management of entity hospital.

The hospitals around the world have widely utilized information system (IS) for over 30 years. for many hospitals in US and UK have been automated since the emergence of IBM systems.

For example, US government has made the adoption of the electronic medical records as mandatory to all healthcare providers by 2014 (RAND Health 2005). Besides that , the emergence of the technology evident the adoption of the systems has taken place across hospitals in most countries like :

USA (Smith and Swineheart 2001; Trimmer et al. 2002; Ovretveit et al. 2007; Meinert and Peterson 2009; Lee and Meuter 2010),

Egypt and Jordan (Zineldin 2006; Hammad et al. 2010),

Scotland (Walsh et al. 2010) and New Zealand (Lowe 1999).

At the beginning of IS implementation, it focused only However, as the need to manage and integrate clinical, financial and operational information

grows and evolves, HMS gives many benefits such as it could provide the best possible support of patient care and administration by electronic data processing (Ammenwerth, Kaiser, Wilhelm and Hofer 2003).

Realizing these benefits,hospitals around Malaysia including (Terengganu, Pahang and Sarawak). The adopted HMS is the systems that can help the selected hospitals to become the benchmark of modern, automated hospitals and realize the goals of becoming a model “e-hospital” in Malaysia.

## **2.2CASE STUDY - THE HOSPITAL IN NIGERIA**

### **2.2.1 BACKGROUND INFORMATION**

St. Ross hospital is situated in Borno city in NIGERIA. On average, around 500 patients per day tend to visit the hospital, resulting in large queues. With such a diverse range of services offered.

Health care in Nigeria as in many other countries is confronted with growing demand for medical treatment and services :

1) due to factors such as a graying population and higher standard for the quality of life.

2) Miller[2], say that health care has been an issue of growing importance for national government. Many national and regional health care plans have been developed in the past decades, in order to control the cost, quality and the availability of health care for all citizens.

3) Brown[3], opined that the application of electronic clinical information system (ECIS) has generated useful insight into the quality of data accuracy and health care provision in primary care settings. This is partly one of the adapted style and approach to data entry influenced by the design presented by the recent structure. They further emphasize, that there is a great need for improved education and protocols for consisting data entry in the (ECIS) and also subsequent follow up of patient clarification on the policy for duration and frequency treatment.

4) Laubbel[4], define medical, health record, or medical documentation of a patient's medical history and care as "medical record" used both as the physical folder of patients and for the body of information which comprises the total of each patient's health history.

Medical records are intensely personal document and there are many ethical and legal issues surrounding them such as the degree of third-party access and appropriate storage and disposal.

The key advantage of shifting to computer-based patient record is the opportunity to strengthen the link between the hospital records and management information system so that resources uses and quality of care can be analyzed using Hospital database which increase physician efficiency and reduce costs, as well as promote standardization of care.

### **2.2.2 The Difficulties**

This literature review was developed to examine empirically the factors hindering adoption of hospital information systems in Nigeria. The study was focused on the perceived paucity of health information technology policy in Nigeria and the causes of poor implementation of hospital information systems in the country. The findings of the literature review highlighted hindrances to the adoption of hospital information systems to include; the high cost of full implementation of a hospital information system, inadequate human capital, corruption, and problems associated with poor infrastructure in Nigeria. The recommendations were that the Nigerian government needs to provide stable electricity, basic communication infrastructures, and Internet access to boost private initiatives in the adoption of health information technology across the country.

### **2.2.3 The Results**

The system has reduced the queue completely, greatly reducing stress for staff and ensuring a good experience for patients.

Data captured using the system will be used to improve appointment scheduling in the future as it provides a clear picture on patient flow from entry to exit. The system provides information on daily work flow, which has the benefit of enabling roster makers to improve staff rosters in the future and ensure high traffic areas are appropriately looked upon.

## 2.3 System Scope

It can be used in any Hospital, Clinic or Dispensary for maintaining patient details and their test results.

## 2.4 Technologies to be used

This project will be a desktop application to be developed in C sharp having MS SQL server as backend.

- Database Design (MS SQL server 2008)
- Form Design (C sharp)
- Coding (C sharp)
- Testing (C sharp)

### **Main facilities available in this project are:**

- Maintaining records of patients.
- Maintaining patients diagnosis details, advised tests to be done.
- Providing different test facilities to a doctor for diagnosis of patients.
  - ✓ Urine Test
  - ✓ Blood Test
- Maintaining patient's prescription and medicine
- Providing billing details for patients.
- Results of tests and prescription advice will be automatically updated in the database.
- Related test reports, patient details report, prescription and billing reports can be generated as per user requirements.

## **User Characteristics**

Every user should be:

- Comfortable of working with computer.
- He must have knowledge in medical field.
- He must also have basic knowledge of English too.

## **Constraints**

- GUI is only in English.
- Login and password is used for identification of user and there is no facility for guest.

# Chapter Three

## System Design

### 3.1 Introduction

The purpose of the Design phase is to plan a solution for the problem specified by the requirements. System design aims to identify the modules that should be in the system, the specification of those modules and how they interact with each other to produce the results. The goal of the design process is to produce a model that can be used later to build that system. The produced model is called design of the system. System design is the process of defining the architecture, components, modules, interfaces and data for a system to satisfy specified requirements. Normally, the design proceeds in two stages:

- Physical design
- Database design

### Physical Design

The physical design is a graphical representation of a system showing the system's internal and external entities and the flow of data into and out of these entities. An internal entity is an entity within the system that transforms data. To represent the physical design of the system, we use diagrams like data flow diagrams, use case diagrams, etc.

## 3.2 Feasibility Study

Depending on the results of the initial investigation, the survey is now expanded to a more detailed feasibility study. “**FEASIBILITY STUDY**” is a test of system proposal according to its workability, impact of the organization, ability to meet needs and effective use of the resources. It focuses on these major questions:

1. What are the user’s demonstrable needs and how does a candidate system meet them?
2. What resources are available for given candidate system?
3. What are the likely impacts of the candidate system on the organization?
4. Whether it is worth to solve the problem?

During feasibility analysis for this project, following primary areas of interest are to be considered. Investigation and generating ideas about a new system does this.

### Steps in feasibility analysis

Eight steps involved in the feasibility analysis are:

- Form a project team and appoint a project leader.
- Prepare system flowcharts.
- Enumerate potential proposed system.
- Define and identify characteristics of proposed system.
- Determine and evaluate performance and cost effective of each proposed system.
- Weight system performance and cost data.
- Select the best-proposed system.
- Prepare and report final project directive to management.

### 3.2.1 Technical feasibility

A study of resource availability that may affect the ability to achieve an acceptable system. This evaluation determines whether the technology needed for the proposed system is available or not.

- Can the work for the project be done with current equipment existing software technology & available personal?
- Can the system be upgraded if developed?
- If new technology is needed then what can be developed?

This is concerned with specifying equipment and software that will successfully satisfy the user requirement. The technical needs of the system may include:

#### **Front-end and back-end selection**

An important issue for the development of a project is the selection of suitable front-end and back-end. When we decided to develop the project, we went through an extensive study to determine the most suitable platform that suits the needs of the organization as well as helps in development of the project. The aspects of our study included the following factors.

#### **Front-end selection:**

1. It must have a graphical user interface that assists employees that are not from IT background.
2. Scalability and extensibility.
3. Flexibility.
4. Robustness.
5. According to the organization requirement and the culture.



6. Must provide excellent reporting features with good printing support.
7. Platform independent.
8. Easy to debug and maintain.
9. Event driven programming facility.
10. Front end must support some popular back end like MS SQL server.

According to the above stated features we selected C sharp as the front-end for developing our project.

### **Back-end Selection:**

1. Multiple user support.
2. Efficient data handling.
3. Provide inherent features for security.
4. Efficient data retrieval and maintenance.
5. Stored procedures.
6. Popularity.
7. Operating System compatible.
8. Easy to install.
9. Various drivers must be available.
10. Easy to implant with the Front-end.

According to above stated features, we selected MS SQL server as the backend.

The technical feasibility is frequently the most difficult area encountered at this stage. It is essential that the process of analysis and definition be conducted in parallel with an assessment to technical feasibility. It centers on the existing computer system (hardware, software etc.) and to what extent it can support the proposed system.

### 3.2.2 Economic feasibility

Economic justification is generally the “Bottom Line” consideration for most systems. Economic justification includes a broad range of concerns that includes cost benefit analysis. In this we weight the cost and the benefits associated with the candidate system and if it suits the basic purpose of the organization i.e. profit making, the project is making to the analysis and design phase.

The financial and the economic questions during the preliminary investigation are verified to estimate the following:

- The cost to conduct a full system investigation.
- The cost of hardware and software for the class of application being considered.
- The benefits in the form of reduced cost.
- The proposed system will give the minute information, as a result the performance is improved which in turn may be expected to provide increased profits.
- This feasibility checks whether the system can be developed with the available funds. The **Hospital Management System** does not require enormous amount of money to be developed. This can be done economically if planned judiciously, so it is economically feasible. The cost of project depends upon the number of man hours required.

### 3.2.3 Operational Feasibility

It is mainly related to human organizations and political aspects. The points to be considered are:

- What changes will be brought with the system?
- What organization structures are disturbed?
- What new skills will be required? Do the existing staff members have these skills? If not, can they be trained in due course of time?

The system is operationally feasible as it very easy for the End users to operate it. It only needs basic information about Windows platform.

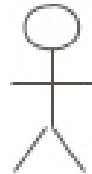
### 3.2.4 Schedule feasibility

Time evaluation is the most important consideration in the development of project. The time schedule required for the developed of this project is very important since more development time effect machine time, cost and cause delay in the development of other systems. A reliable **Hospital Management System** can be developed in the considerable amount of time.

## 3.3 UML Diagram

### Actor:

A coherent set of roles that users of use cases play when interacting with the use 'cases'.



### Use case:

A description of sequence of actions, including variants, that a system performs that yields an observable result or value of an actor.



UML stands for Unified Modeling Language. UML is a language for specifying, visualizing and documenting the system. This is the step while developing any product after analysis. The goal from this is to produce a model of the entities involved in the project which later need to be built. The representation of the entities that are to be used in the product being developed need to be designed.

There are various kinds of methods in software design:

- Use case Diagram.
- Sequence Diagram.
- Collaboration Diagram.
- Activity Diagram.
- State chat Diagram.

### 3.3.1 Use case Diagram

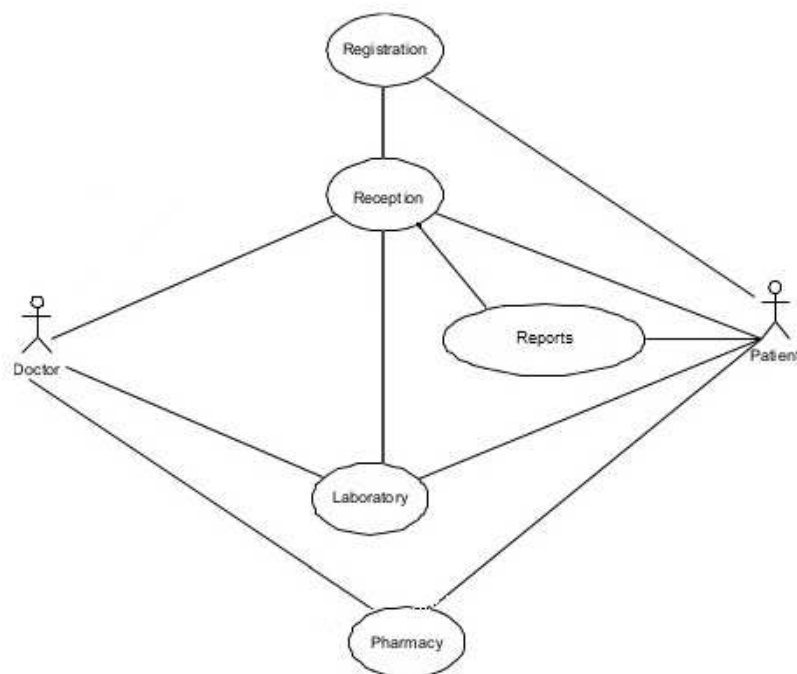
Use case diagram models behavior within a system and helps the developers understand what the user require. The stick man represents what's called an actor.

Use case diagram can be useful for getting an overall view of the system and clarifying who can do and more importantly what they can't do.

Use case diagram consists of use cases and actors and shows the interaction between the use cases and actors.

- To represent the system requirements from user's perspective.
- An actor could be the end-user of the system.

A Use case is a description a set of sequence of actions graphically it is rendered as an ellipse with solid line including only its name. Use case diagram is a behavioral diagram that shows a set of use cases and actors and their relationship. It is an association between the use cases and actors. An actor represents a real-world object.

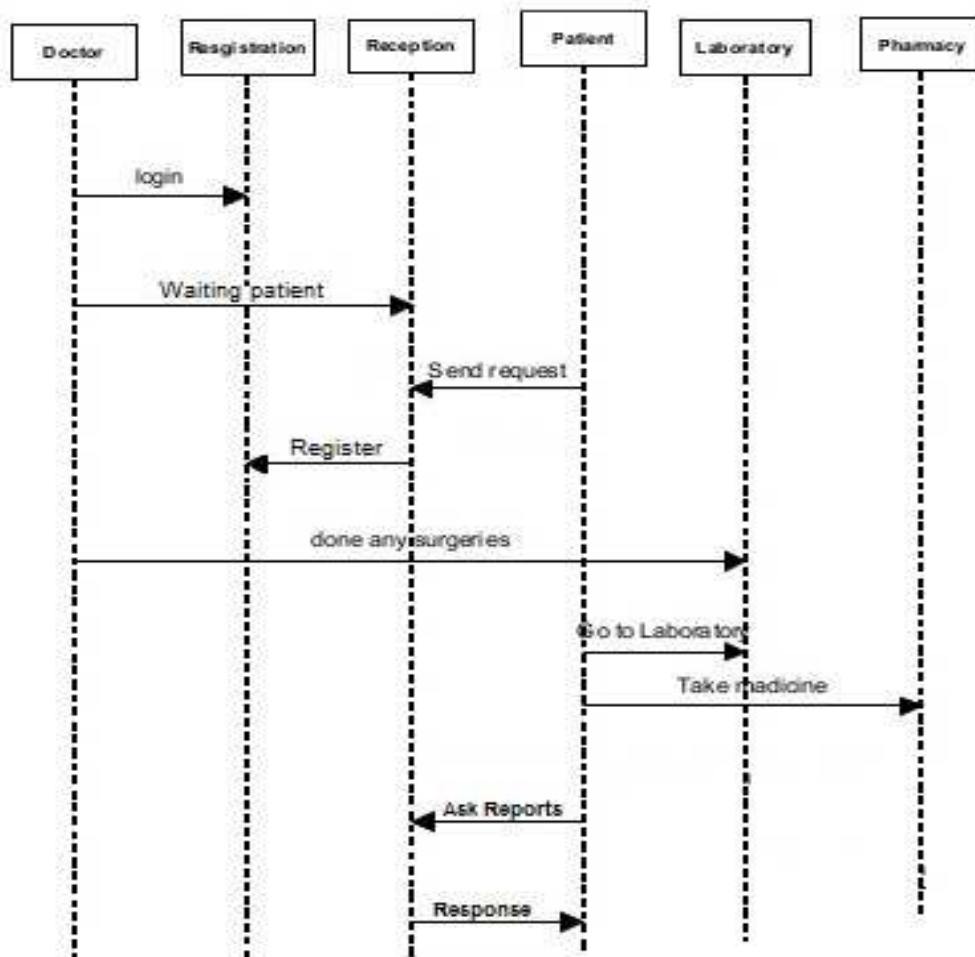


**Fig.No.3.1**

### 3.3.1 SEQUENCE DIAGRAM

Sequence diagram and collaboration diagram are called INTERACTION DIAGRAMS. And interaction diagram shows an interaction, consisting of set of objects and their relationship including the messages that may be dispatched among them

A sequence diagram is an introduction that empathizes the time ordering of messages. Graphically a sequence diagram is a table that shows objects arranged along the X-axis and messages ordered in increasing time along the Y-axis.



**Fig.No.3.2**

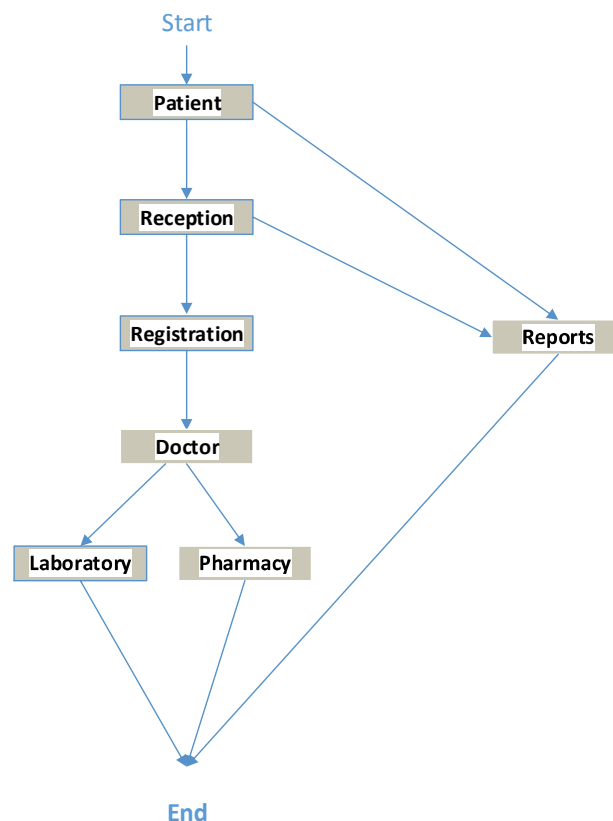
### 3.3.3 COLLABORATION DIAGRAM

A collaboration diagram is an introduction diagram that emphasizes the structural organization of the objects that send and receive messages. Graphically a collaboration diagram is a collection of vertices and arcs.

### CLASS DIAGRAM

Class is nothing but a structure that contains both variables and methods. The Class Diagram shows a set of classes, interfaces, and collaborations and their relationships. There is most common diagram in modeling the object oriented systems and are used to give the static view of a system. It shows the dependency between the classes that can be used in our system. The interactions between the modules or classes of our projects are shown below. Each block contains Class Name, Variables and Methods.

### 3.3.4 Activity diagram


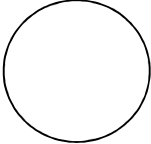
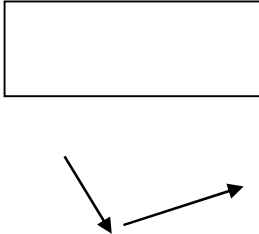
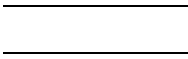


**Fig.No.3.3**

## 3.4 Data Flow Diagrams

The Data Flow Diagram (DFD) is a graphical representation of the flow of data through an information system. Data flow diagrams are used by systems analysts to design information-processing systems but also as a way to model whole organizations. The main merit of DFD is that it can provide an overview of what data a system would processes, what transformations of data are done, what data are stored and which stored data is used.

### Standard Symbols used in DFD:

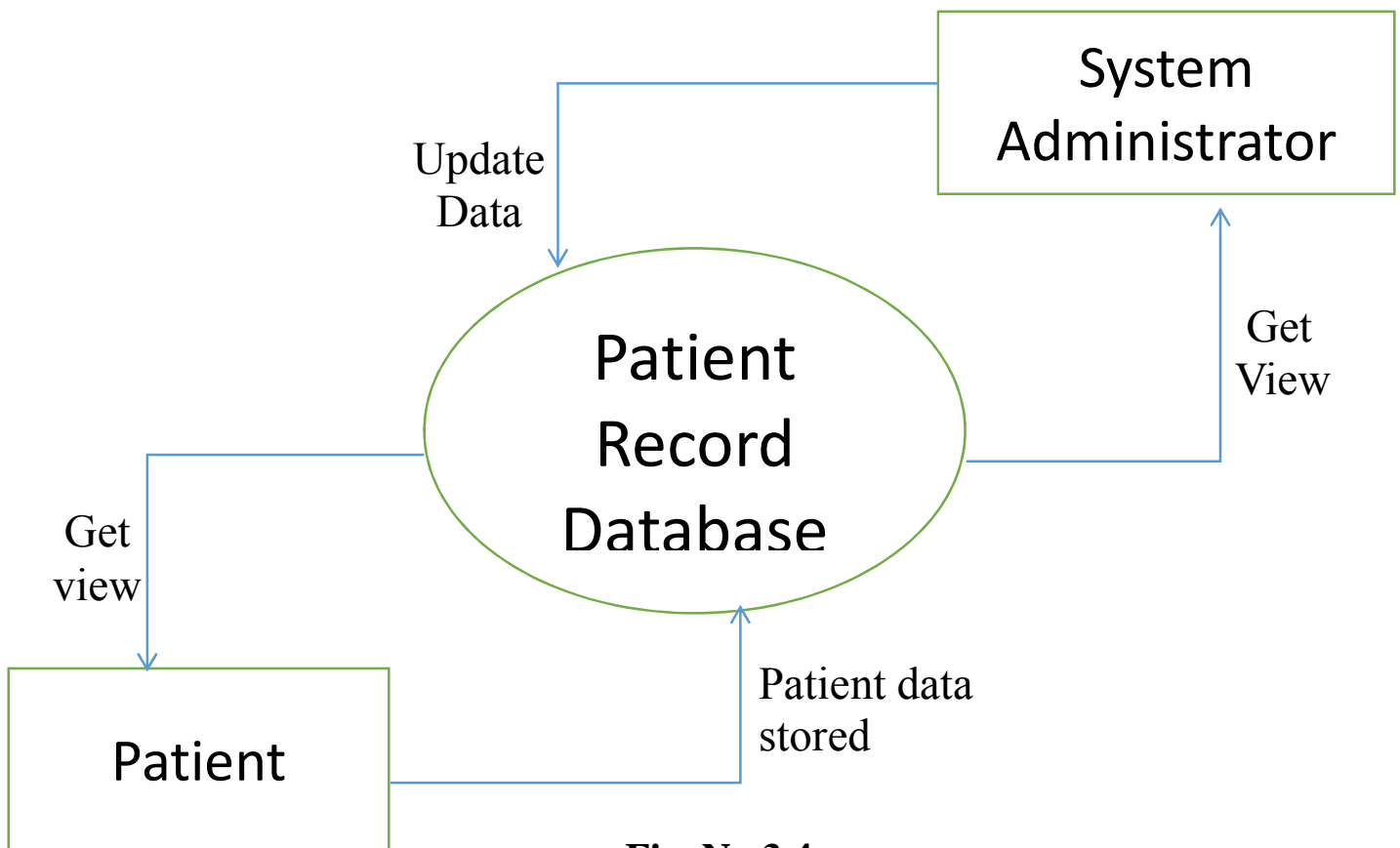
Symbol	Name	Function
	<b>Data Flow</b>	Used to connect processes to each other. The arrowhead indicates direction of data flow.
	<b>Process</b>	Performs some transformation to input data to output data.
	<b>Source or sink.</b>  (external entity)	A source of system inputs or sink of system outputs.
	<b>Data Store</b>	A repository of data. Arrowheads indicate net inputs or net outputs to the store.

**Table No.3.1**



### 3.4.1 Level 0 DFD

A context diagram is a top level (also known as Level 0) data flow diagram. It only contains one process node (process 0) that generalizes the function of the entire system in relationship to external entities. In level 0 DFD, system is shown as one process. The Level 0 DFD shows how the system is divided into 'sub-systems' (processes), each of which deals with one or more of the data flows to or from an external agent, and which together provide all of the functionality of the whole system .and shows the flow of data between the various parts of the system.



**Fig. No.3.4**

### 3.4.2 Level 1 DFD

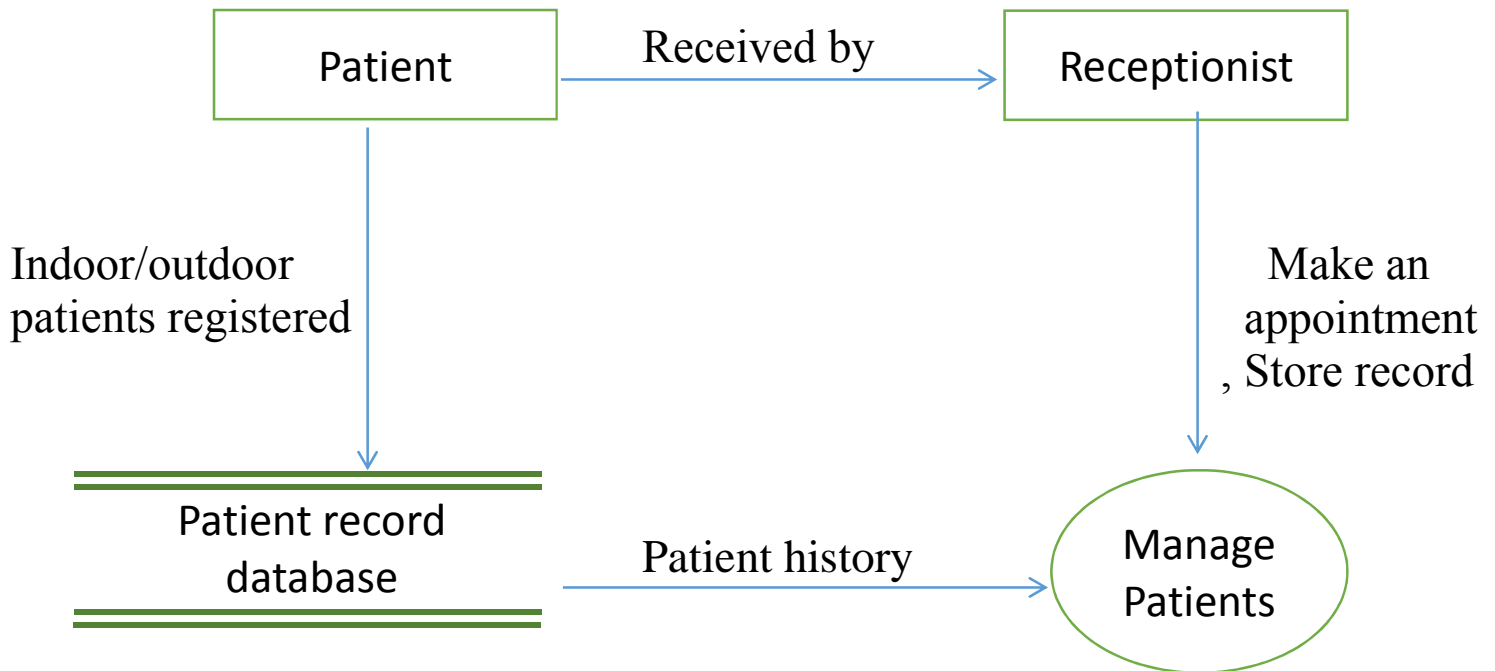


Fig. No.3.5

### 3.4.3 Level 2 DFD

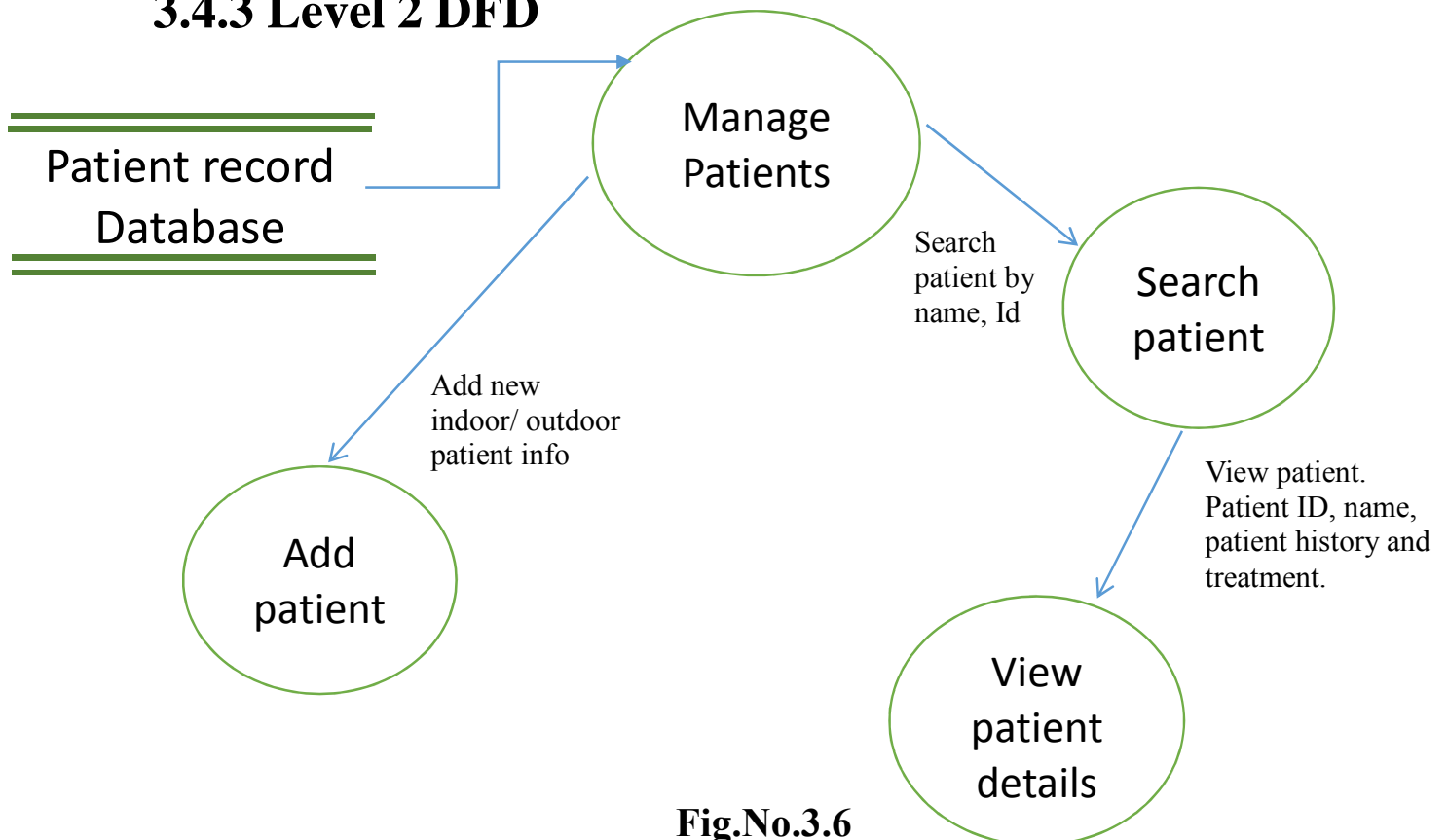

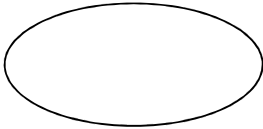
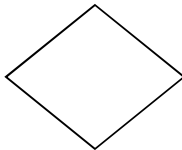


Fig.No.3.6

## 3.5 Entity-Relationship Diagram (E-R)

Entity-Relationship Diagram is a graphical representation of entities and their relationship to each others. It describes how data is related to each other. An entity is a piece of data- an object or a concept about which data is stored. A relationship is how the data is shared between entities.

**In E-R Diagram, there are 3 main Components:**

Symbol	Name	Description
	Entity	An entity can be any object, place, person or anything.
	Attribute	An Attribute Describes a property or characteristics of an entity.
	Relationship	A Relationship Describes relation between entities.

**Table No.3.2**

## E-R Diagram of Hospital Management System

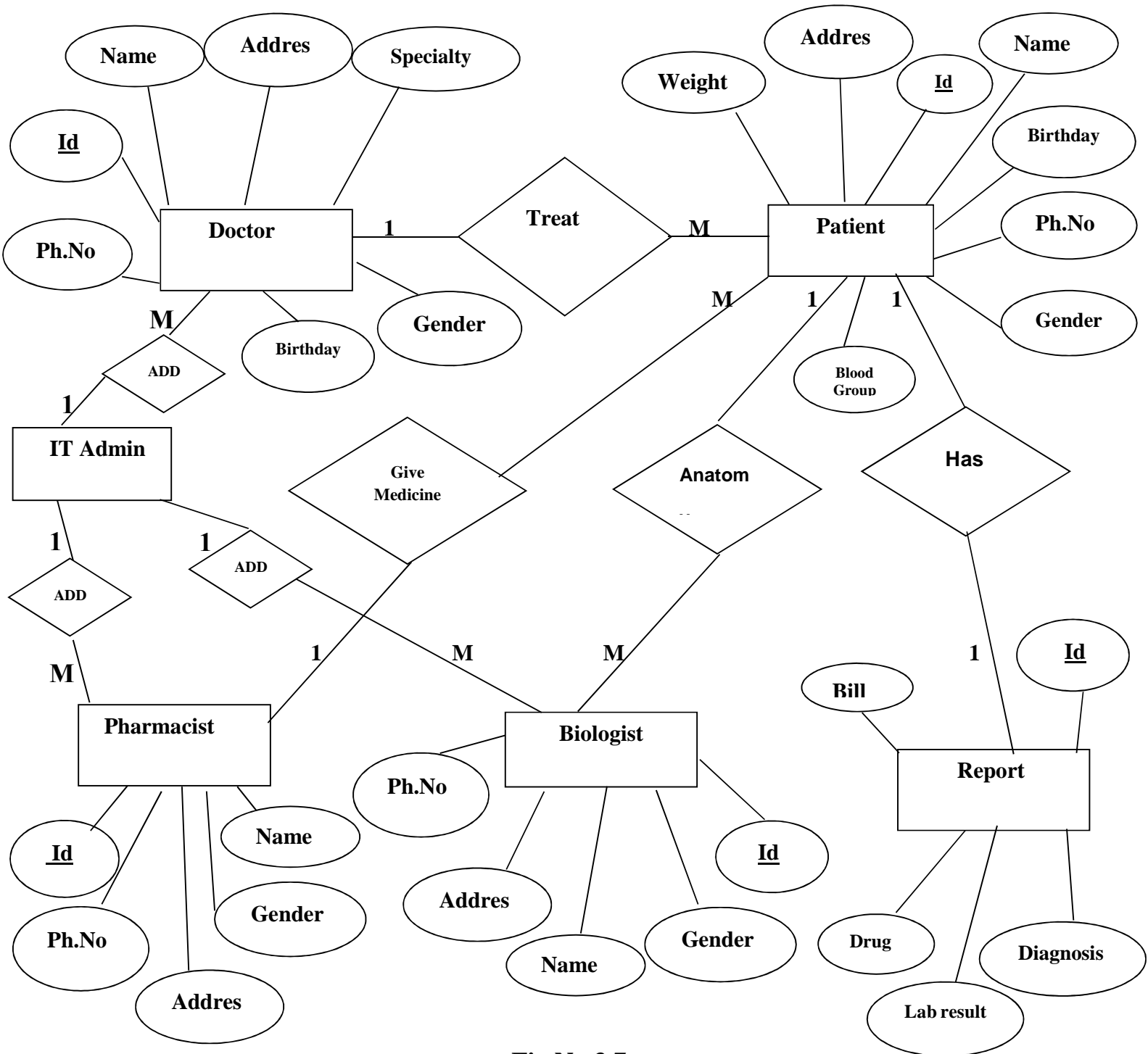


Fig.No.3.7

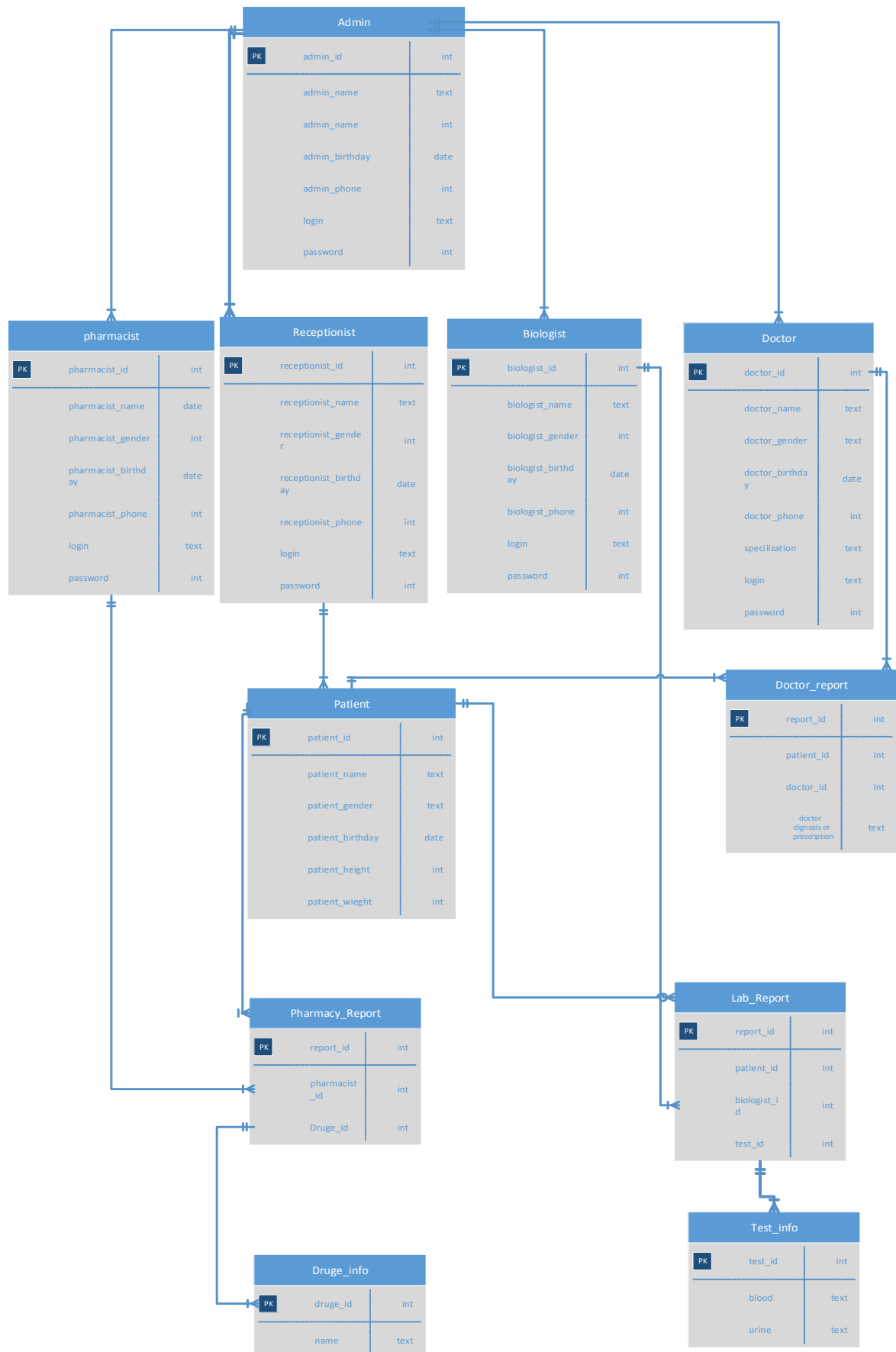


Table.No.3.3

## 3.6 Data Dictionary

### 1. Admin Details

Name-Admin Details			
Name	Type	Size	Description
ID	Integer		ID of the Admin
Name	Varchar	50	Name of the Admin
Address	Varchar	150	Address of the Admin
Phone Number	Varchar	90	Contact number of the Admin
Gender	Varchar	30	Gender of the Admin
Image	Img		Picture of Admin
Birthday	Date		Birthday of Admin
login	Varchar	30	Login name of Admin
Password	integer		Password of Admin

**Table No.3.4**

**2. Doctor Details**

<b>Name-Doctor Details</b>			
<b>Name</b>	<b>Type</b>	<b>Size</b>	<b>Description</b>
ID	Integer		ID of the Doctor
Name	nvarchar	50	Name of the Doctor
Address	nvarchar	150	Address of the Doctor
Phone Number	nvarchar	90	Contact number of the Doctor
Gender	nvarchar	10	Gender of the Doctor
Image	Img		Picture of Doctor
Birthday	Date		Birthday of Doctor
Specialization	Varchar		Specialization of Doctor
login	Varchar	30	Login name of Doctor
Password	nvarchar		Password of Doctor

**Table No.3.5**

### 3. Biologist Details

Name- Biologist Details			
Name	Type	Size	Description
ID	Integer		ID of the Biologist
Name	Varchar	50	Name of the Biologist
Address	Varchar	150	Address of the Biologist
Phone Number	Varchar	90	Contact number of the Biologist
Gender	Varchar	30	Gender of the Biologist
Image	Img		Picture of Biologist
Birthday	Date		Birthday of Biologist
login	Varchar	30	Login name of Biologist
Password	integer		Password of Biologist

**Table No.3.6**



#### 4. Pharmacist Details

Name- Pharmacist Details			
Name	Type	Size	Description
ID	Integer		ID of the pharmacist
Name	Varchar	50	Name of the pharmacist
Address	Varchar	150	Address of the pharmacist
Phone Number	Varchar	90	Contact number of the pharmacist
Gender	Varchar	30	Gender of the pharmacist
Image	Img		Picture of pharmacist
Birthday	Date		Birthday of pharmacist
login	Varchar	30	Login name of pharmacist
Password	integer		Password of pharmacist

**Table No.3.7**

## 5. Receptionist Details

Name- Receptionist Details			
Name	Type	Size	Description
ID	Integer		ID of the Receptionist
Name	Varchar	50	Name of the Receptionist
Address	Varchar	150	Address of the Receptionist
Phone Number	Varchar	90	Contact number of the Receptionist
Gender	Varchar	30	Gender of the Receptionist
Image	Img		Picture of Receptionist
Birthday	Date		Birthday of Receptionist
login	Varchar	30	Login name of Receptionist
Password	integer		Password of Receptionist

**Table No.3.8**

## 6. Patient Details.

Name- patient Details			
Name	Type	Size	Description
Patient_no	Integer	20	ID of the Patient
Name	Varchar	60	Name of the patient
Birthday	nvarchar	20	Age of the Patient
Gender	Varchar	30	Gender of the Patient
Address	Varchar	90	Address of the Patient
Date	Datetime	30	Date of admission
Birthday	Date		Birthday of Patient
login	Varchar	30	Login name of Patient
Password	integer		Password of Patient

**Table No.3.9**

### 7. Lab Result Details.

Name- Lab-Result Details			
Name	Type	Size	Description
Result_no	Integer		ID of the Result , primary key
patient_id	Integer		From patient table
biologist_id	Integer		From biologist tabe
Test-Result	Varchar	450	biologist Test-Result for patient

Table No.3.10

### 8. Pharmacy\_Report Details

Name- Pharmacy_Report Details			
Name	Type	Size	Description
Report_no	Integer		ID of the Report , primary key
patient_id	Integer		From patient table
pharmacist_id	Integer		From pharmacist table
Drug name	Varchar	150	Drug name for patient

Table No.3.11

## 9. Doctor-Report Details

Name- Doctor-Report Details			
Name	Type	Size	Description
Report_no	Integer		ID of the Report
Patient_id	Integer		From patient table
Doctor_id	Integer		From Doctor table
Prescription	Varchar	150	Doctor Diagnosis for patient

Table No.3.12

## 10. Report Details

Name- Report Details			
Name	Type	Size	Description
Report_no	Integer		ID of the Report
Doctor-Report	Integer		Link to <b>doctor-report</b> table
Lab-Result			Link to <b>Lab-Result</b> table
Pharmacy_Report			Link to <b>Pharmacy_Report</b> table

Table No.3.13

# Chapter four

## System Implementation

### 4.1 Physical Network connection

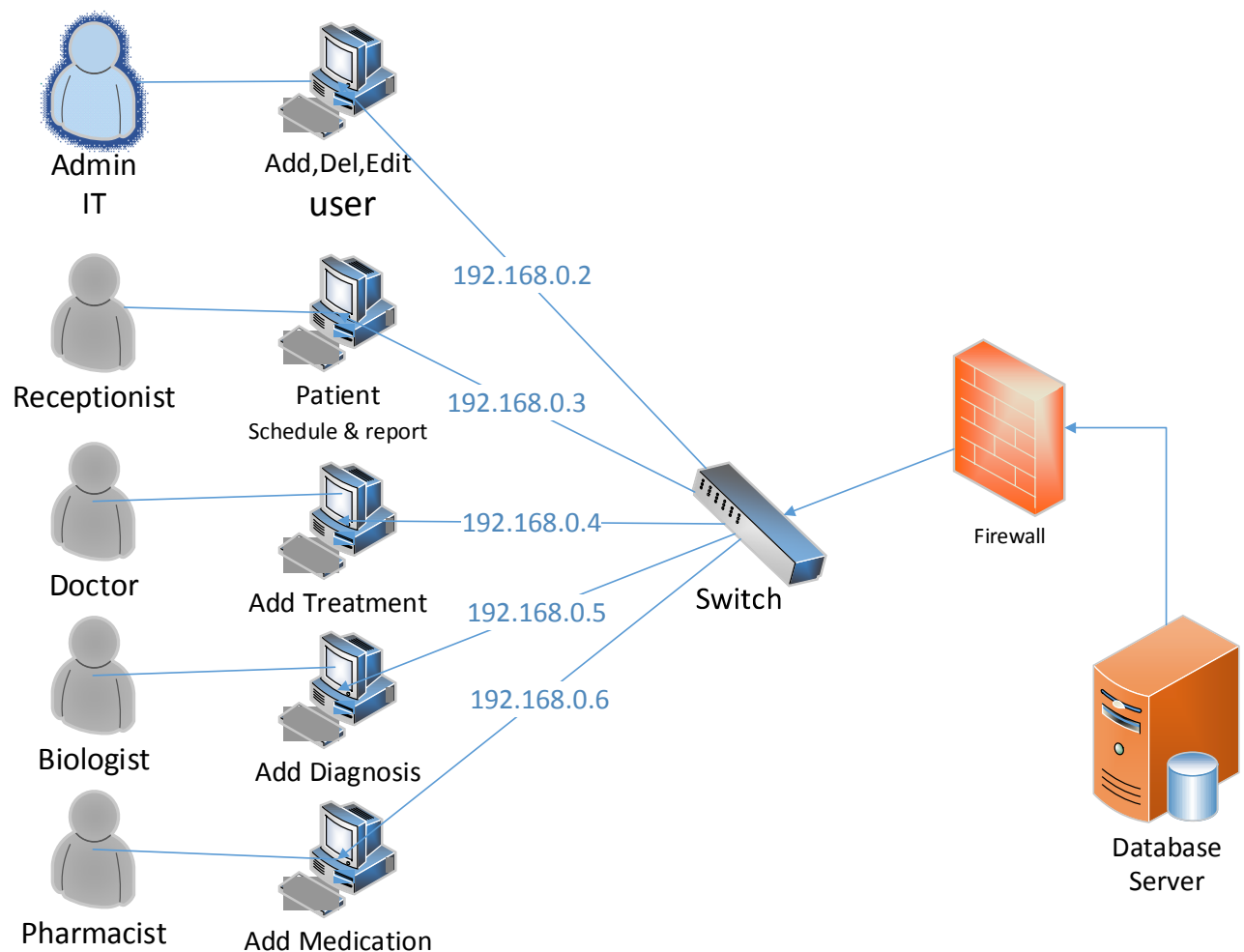


Fig.No.4.1

## [Chapter Four]

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The system will be applied in a LAN as in the fig above. In a Client-Server scenario, we will have the SQL Server installed on a server machine. Clients will be the computers accessing that server using the developed software (which we programmed using C sharp). Each of the clients will provide a way of making a connection to the server instance running on the server. From the server, we will need IP address or server name along with SQL server instance name. They both combined form the host name.

Data Source = ServerName\InstanceName

Once we add a user to SQL Server Instance, we should attach the user to databases we want the user to access and provide the appropriate role(s).

For each computer that will run our application, we should install the executable version on each computer.

## 4.2 Implementation



**Fig.No 4.2**

## **[Chapter Four]**

---

In the main window shown above, when the user wants to login to the system, he/she should choose his/her role in the system and type the user name and password to enter the system.

The system maintains four levels of users:

1. Administrator
2. Doctor
3. Receptionist
4. Pharmacist
5. Biologist

Our application performs the following:-

- Maintaining Patient details.
- Managing patient's appointment with the specified doctor. .
- Providing and maintaining different kinds of tests for a patient.
- Billing and Report generation.



## ➤ LOGIN AS AN ADMIN

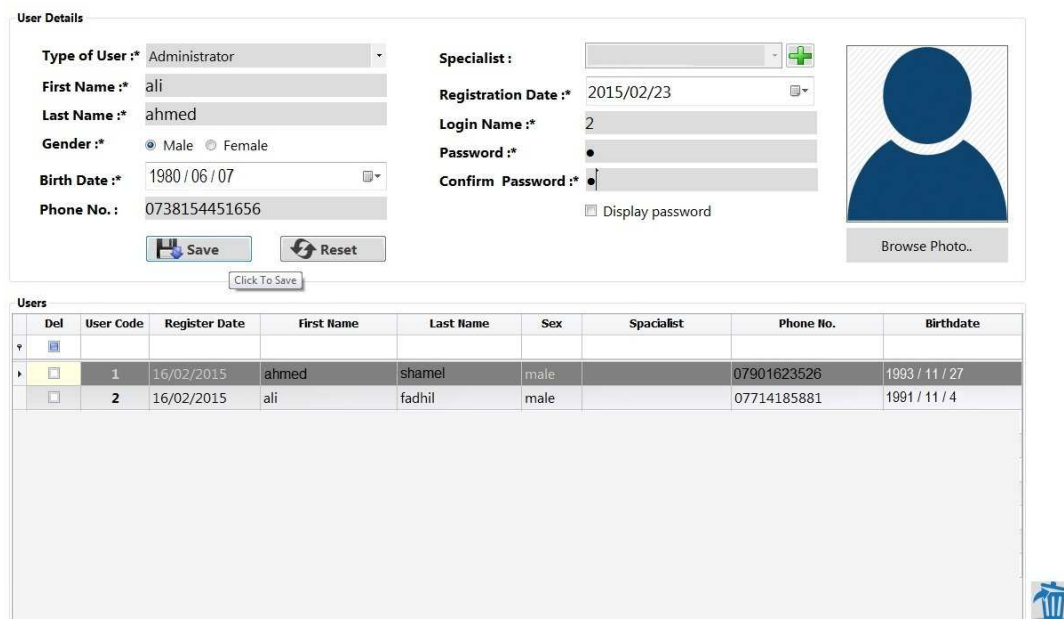


**Fig.No.4.3**

When the user logs in as an admin, the window above will be displayed. The admin adds the user of the system and can backup the database and restore it.

The panel on the right side of the screen used to turn of the system, display information about the system designer and logout and back login to the system.

## [Chapter Four]



The image shows a web application interface for managing users. It consists of two main parts: a 'User Details' form and a 'Users' table.

**User Details Form:**

- Type of User:** A dropdown menu with 'Administrator' selected.
- First Name:** Text input field with 'ali'.
- Last Name:** Text input field with 'ahmed'.
- Gender:** Radio buttons for 'Male' (selected) and 'Female'.
- Birth Date:** Date picker showing '1980 / 06 / 07'.
- Phone No.:** Text input field with '0738154451656'.
- Specialist:** A dropdown menu with a '+' icon.
- Registration Date:** Date picker showing '2015/02/23'.
- Login Name:** Text input field with '2'.
- Password:** Password input field with a dot icon.
- Confirm Password:** Password input field with a dot icon.
- Display password:** A checkbox.
- Buttons:** 'Save' (with a floppy disk icon) and 'Reset' (with a circular arrow icon).
- Photo:** A placeholder for a user photo with a 'Browse Photo..' button below it.
- Click To Save:** A button below the form.

**Users Table:**

Del	User Code	Register Date	First Name	Last Name	Sex	Spacialist	Phone No.	Birthdate
<input type="checkbox"/>	1	16/02/2015	ahmed	shamel	male		07901623526	1993 / 11 / 27
<input type="checkbox"/>	2	16/02/2015	ali	fadhil	male		07714185881	1991 / 11 / 4

A trash can icon is located at the bottom right of the table area.

**Fig.No.4.4**

When the admin chooses Manage users button, the window above will be displayed and he will be able to add a new user (a new admin, doctor, receptionist, pharmacist or biologist) by entering the basic information about the user like first name, last name, age, his personal Picture ...etc.

When the admin chooses the **type of user**, the table in the 2<sup>nd</sup> half of the window will automatically display all the users in the system according to the chosen type. The admin can select the user he needs to edit his information form this table or he may remove him entirely from the system by checking the check box resided in front of his name.

The panel on the right side used to turn of the system, display general information about the system, back to the main admin window and finally logout user (back to the login window).

## [Chapter Four]

### Note:

The specialist combo box will be available only if the type of user selected by the admin is doctor.

If the admin add a new doctor with a new specialist not included in the system, he can add this new specialty by clicking on the add button next to the specialist combo box.

**User Details**

Type of User :\* **Doctor**

First Name :\* Ahmed

Last Name :\* doctor

Gender :\* ☒ Male ☐ Female

Birth Date :\* 1993 / 11 / 27

Phone No. : 0738154451656

Specialist : surgery

Registration Date :\* 2015/02/23

password

Active in doctor case

Browse Photo..

**Add Specialist**

New Spacialist

Save

Spacialist	Delete
Medicine	Delete
Surgery	Delete
Pediatric	Delete
Gynaecology	Delete
Obstetric	Delete
Orthopedic	Delete

**Users**

Del	User Code	Register Date	
<input type="checkbox"/>	1	16/02/2015	ahme
<input type="checkbox"/>	2	16/02/2015	zain

Spacialist	Phone No.	Birthdate
	07901623526	1993 / 11 / 27
	07714185881	1987 / 7 / 5

Fig.No.4.5

## ➤ LOGIN AS RECEPTIONIST



**Fig.No.4.6**

When the user login as a receptionist, a window like the above will appear, the window contains:

**Patient Registration:** to add a new patient

**Leave Patient:** to generate report about the **leaving patient**

**Search:** to search the patients registered in the system.

**Patient Details**

SSNo :\*  First Name :\*  Last Name :\*

Birthdate :\* 2015/05/12  Gender :\* ☒ Male ☐ Female Blood Type :

Wieght :  Height :  Phone :

Address :

**Doctor Details**

Specialist :\*

Dr. Name :\*

**Doctor Queue**

ID	Dr. NName	No. Of Patient
----	-----------	----------------

**Fig.No.4.7**

In the **Patient Registration** form, the receptionist can fill fields with basic information about the patient.

In the **Doctor Details** section, the receptionist ask the patient general questions so he can choose which doctor (currently available in the hospital) to meet according to the patient case.

After that, the receptionist makes an appointment for the patient and asks him/her to wait in the selected doctor's queue until his turn come.

The screenshot displays a software interface for patient management. It is divided into several sections:

- Patient Details:** Contains input fields for SSNo, First Name, Last Name, Birthdate (set to 2014/12/18), Weight, Height, Blood Type, and Phone. A 'Leave' button is located at the bottom right of this section.
- Accounting:** Features three input fields for 'The total amount', 'The amount paid', and 'The remaining amount'.
- Doctor Prescription:** A large empty text area for recording doctor's prescriptions.
- Medical given by Pharmaceutical:** A table with two columns: 'Drug Name' and 'Quantity'. The table is currently empty.
- Biologist Result:** A large empty text area for recording biologist results. A 'Showing Results' button is located at the bottom right of this section.

A vertical sidebar on the right side of the interface contains four icons: a power button, a home button, an information button, and a lock button.

**Fig.No.4.8**

When patient need to leave receptionist will open the form of

**Leavening Patient** to save the history of patient in this visit, window like this one will appear, form contain basic information about patient , Doctor Prescription and medical that given by the pharisaical ,If the patient have a test the result will appear in the field of biologist result and finally the total bill of the patient.

When the receptionist click on the leave button, the details will save in system and another copy will print for the patient.

## [Chapter Four]

### Hospital Management System

Date : 2015-05-14

SSNo : 1,991

Name : ali fedhil

Gender : male

Birth Date : 1991/09/08

Blood Type : B+

Height : 175

Wieght : 78

Phone : 07714185881

Address : inaq/ najaf / hai alasha

Doctor's diagnosis :  
Dr. ahmed noory from Medicine Specialist :  
patient diagnosis before all

Medical lab results :  
Note from doctor to biology department :  
NoDate to biology before sent to bio  
  
Biologist Name : ali bio  
  
Blood Text : Blood text  
Tester now write the result of blood text  
done.  
ahmed shamel  
  
Urine Text : urine text  
Tester now write the result of urine text  
done.  
ali fedhil

Pharmacist Name : ali

<u>Drug Name</u>	<u>Quantity</u>	<u>Receive</u>
lozenam	2	True
asphagic	4	True

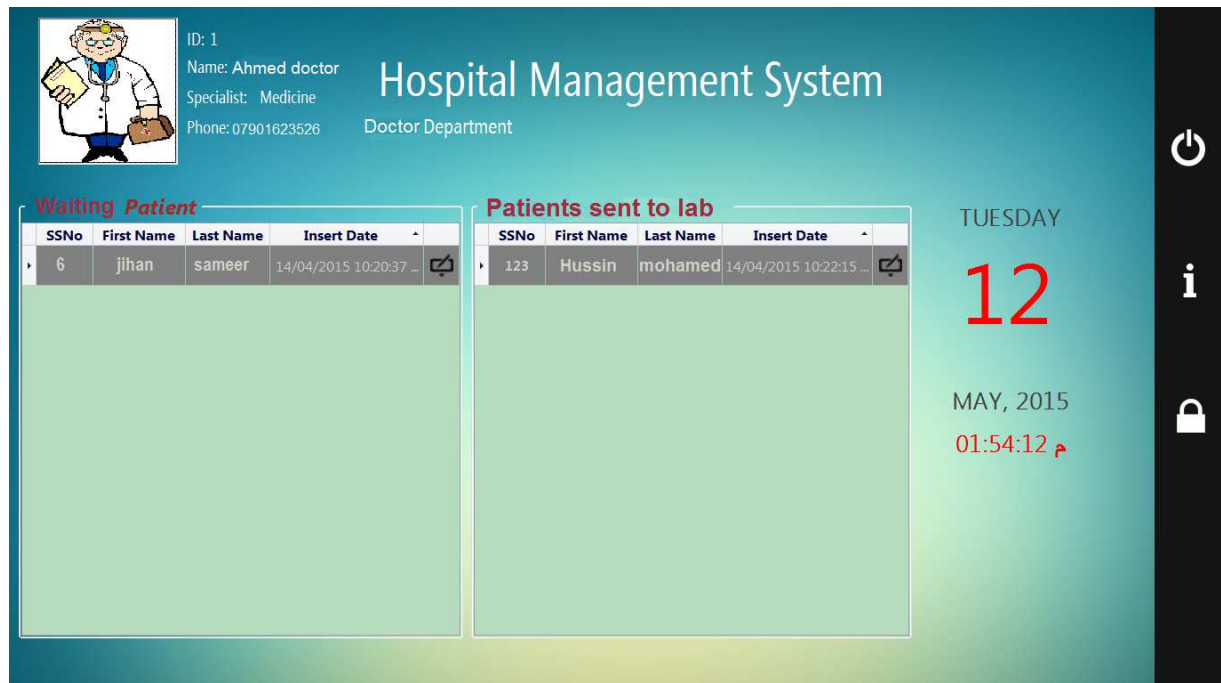
Accounting :

<u>Total Money :</u>	<u>Receive Money :</u>	<u>Remain Money :</u>
50000.00000	20000.00000	30000.00000

Fig.No.4.9

Receptionist will print the report for patient which ask for report that contain the same details of the leave patient form as it is shown above.


## ➤ LOGIN AS DOCTOR



**Fig.No.5.10**

When the user login as a doctor a window as the above will appear,

In the left section, a table of the waiting patients is presented and on the right section, the patient(s) that the doctor sends to the lab to do the required test and their results will appear in this table.

To **write** the patient diagnoses and the appropriate prescription, the doctor clicks on this button  reside beside the patient information in the table.



The screenshot displays a medical application interface with a dark sidebar on the right containing icons for power, home, information, and lock. The main content area is divided into three sections:

- Patient Details:** A form with fields for SSNo (6), First Name (jihan), Last Name (sameer), Birthdate (1993/04/06), Weight (80), Height (78), Address (baghdad), Blood Type (A+), and Gender (Male). It includes buttons for 'old Reboot', 'Reset', and 'Save'.
- Patient diagnosis:** A large empty text area for writing the diagnosis.
- Referral to the Treatment Department:** A section with a 'Drug Name' field, a 'Quantity' field (set to 0), and an '+ Add' button. Below is a table with columns 'Drug Name' and 'Quantity'. To the right of this section is a checkbox 'Refer the patient to the laboratory' and a 'Note To Biologist' text area. At the bottom right is a 'Showing Results' button.

**Fig.No.4.11**

After the doctor click on the button to **write the diagnosis**, a window like this will appear which contain the patient information so that the doctor will be able to see the patient history (if he have a one).

After the doctor diagnosis the patient, he will write prescription and add the drug(s) the patient need and send a copy of this prescription to pharmacist to prepare it to the patient.

If the patient's condition needs lab test, doctor should check the (Refer the to the laboratory) check box and write required test type to send them to laboratory.

## [Chapter Four]

The screenshot displays a medical software interface with three main sections: **Patient Details**, **Patient diagnosis**, and **Referral to the Treatment Department**.

**Patient Details:** This section contains input fields for patient information: SSNo (\*), First Name (\*), Last Name (\*), Birthdate (\*), Weight, Height, Address, Blood Type, and Gender (\*). The values entered are: SSNo: 123, First Name: Hussin, Last Name: mohamed, Birthdate: 1993/04/06, Weight: 80, Height: 77, Address: baghdad, Blood Type: A+, and Gender: Male. There are also buttons for 'old Reboot', 'Reset', and 'Save'.

**Patient diagnosis:** This section is currently empty.

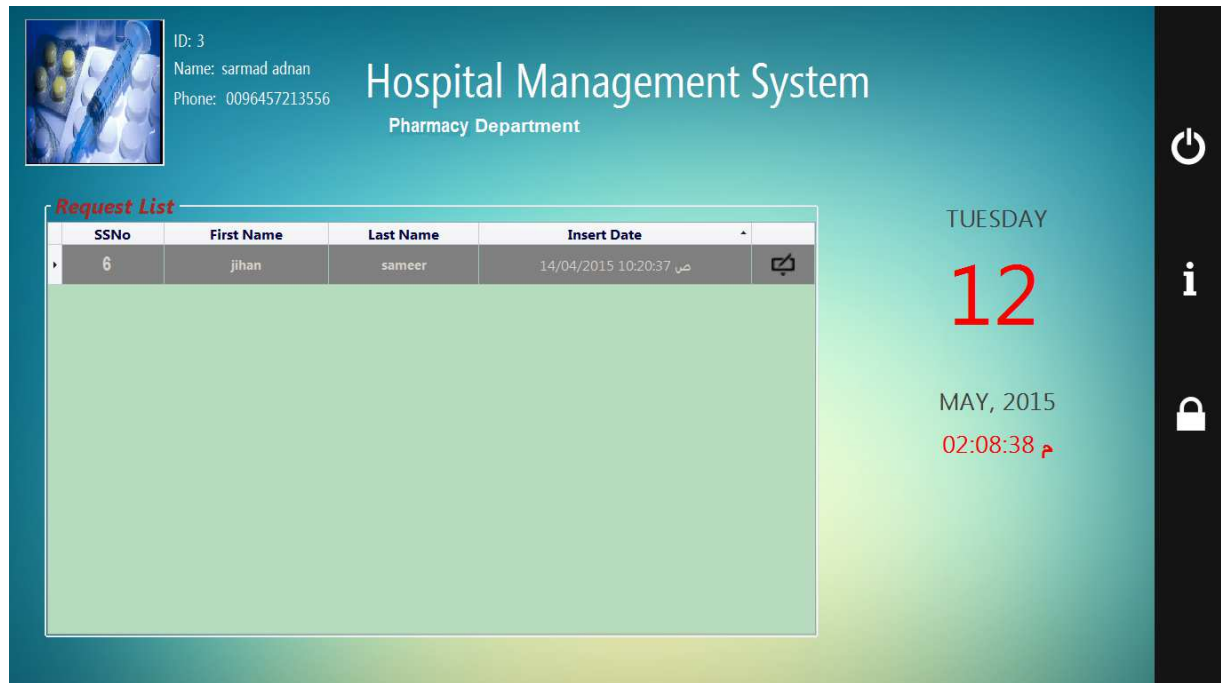
**Referral to the Treatment Department:** This section includes a checkbox labeled 'Refer the patient to the laboratory' which is checked. Below it is a 'Note To Biologist' text area. A blue arrow points to the checked checkbox with the text 'checked, to active send lab'. There is also a 'Showing Results' button.

On the right side of the interface, there is a vertical black bar with four white icons: a power button, a home button, an information button, and a lock button.

**Fig.No.4.12**

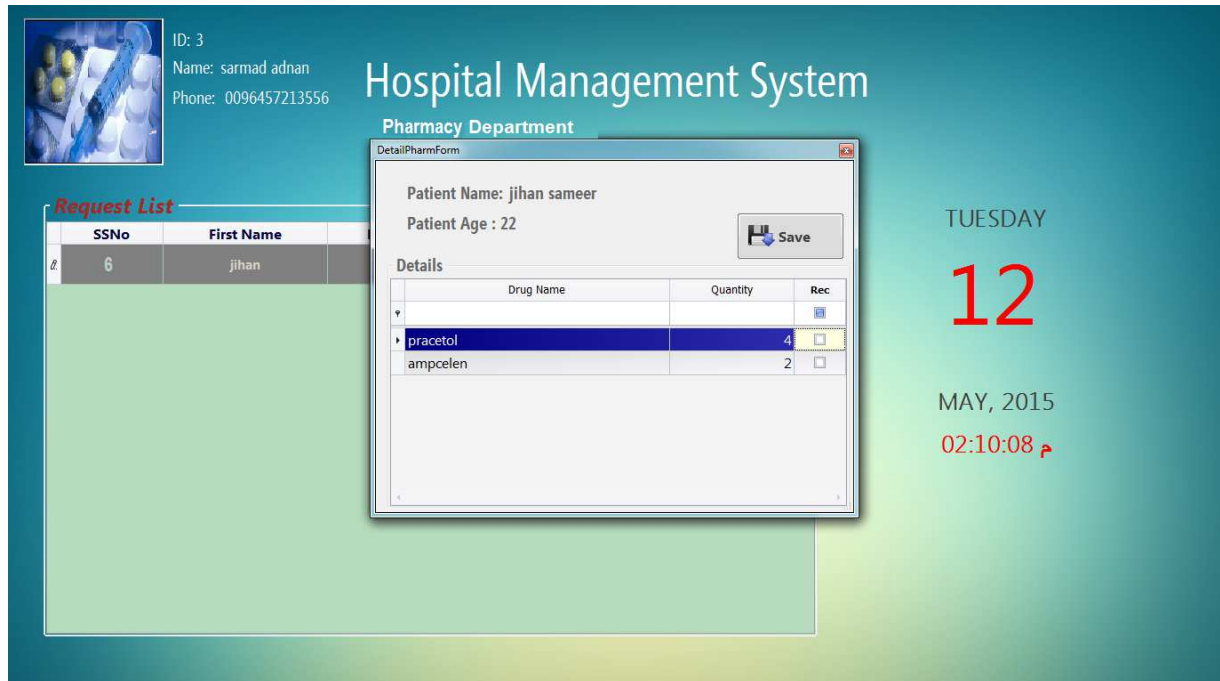
If the Result sent back from the lab, it will appear to the doctor on **undiagnosed patient** table. The doctor opens it to read the result of lab. The doctor will find the button of **show result** active and by clicking on it, the result of test will appear. According to test result, doctor can write prescription and give the appropriate drugs.

## ➤ LOGIN AS PHARMACIST



**Fig.No.4.13**

If user login as pharmacist, the window like the above will appear. The form contains basic patient information. The pharmacist clicks the button beside the patient information to see the drugs that the doctor writes to the patient.



**Hospital Management System**  
Pharmacy Department

ID: 3  
Name: sarmad adnan  
Phone: 0096457213556

**Request List**

SSNo	First Name
6	jihan

**DetailPharmForm**

Patient Name: jihan sameer  
Patient Age : 22

Save

**Details**

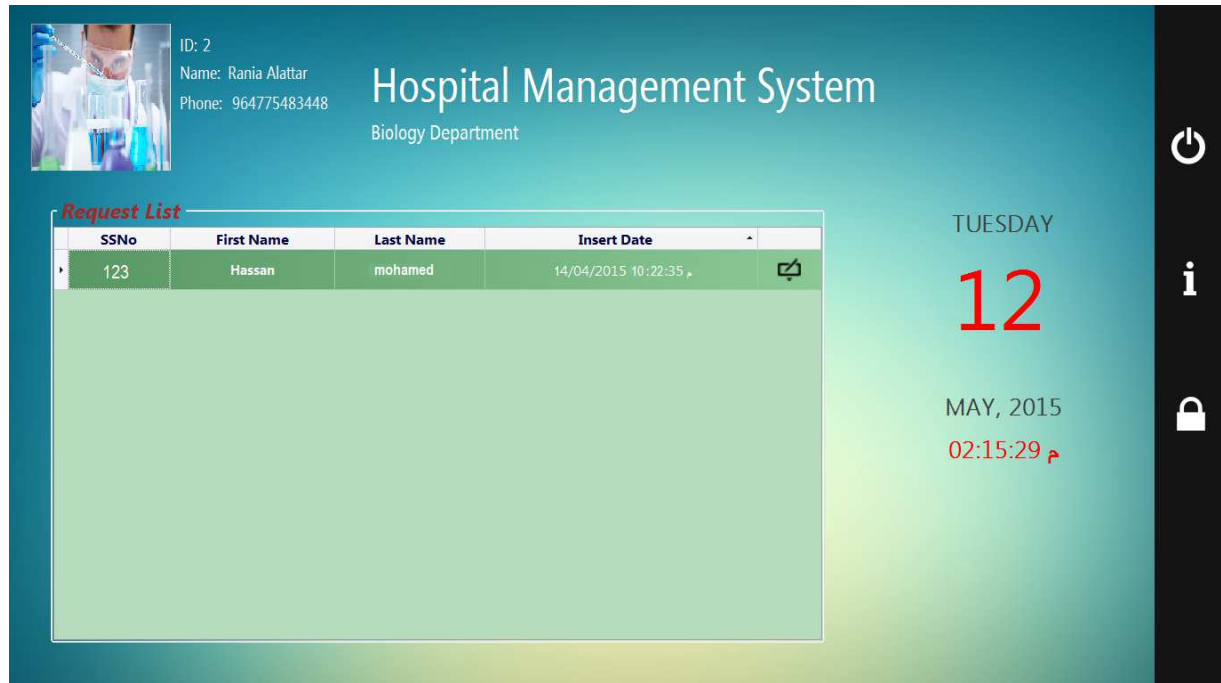
Drug Name	Quantity	Rec
pracetol	4	<input type="checkbox"/>
ampcelen	2	<input type="checkbox"/>

TUESDAY  
**12**  
MAY, 2015  
02:10:08 م

**Fig.No.4.14**

After the pharmacist open the **drug information**, he will check every drug that he will give to patient with a specific quantity written by the doctor to insert the given drug in the patient report.

## ➤ LOGIN AS BIOLOGIST



**Fig.No.4.15**

when the user enter the system as a biologist, a window like this one will appear, the form contain the basic information about the patient , the biologist should click the button beside the patient information to see the test that the doctor ask to do for patient.

The screenshot displays a web-based interface for a Hospital Management System. At the top, a header bar contains the text "Hospital Management System". Below this, a sidebar on the left shows a small image of a person in a lab coat and the text "Biologic Details". The main content area features a form titled "Biologic Details" with the following information: "ID: 2", "Name: Rania Alattar", "Patient Name: Hassan mohamed", and "Patient Age : 13". A "Save" button is located to the right of the patient information. Below the patient details, there are three text input fields: "Note To Biologist" (containing the text "please ...blood analysis"), "BloodText", and "UrineText". The interface has a teal background with a green gradient at the bottom.

**Fig.No.4.16**

After the biologist open the **test detail**, he will see the test that the doctor need which write in the Note To Biologist and after he make the test he will write the result of test in the field allocated to the type of test and save it to send back to the doctor to help him in diagnosis.

# Chapter Five

## Conclusion and future Enhancement

### 5.1 Evaluations

In the attempt to evaluate the designed system, it is imperative that the researcher look back at the predefined functionalities, goals and objectives and analyze those in relation to the expectations met by the system.

The main objective was to design a system that enables faster and more efficient storage, retrieval and updating of hospital records. As far as this is concerned, the system met this expectation by giving direct benefit to the clinic such as fast records retrieval.

### 5.2 Conclusion

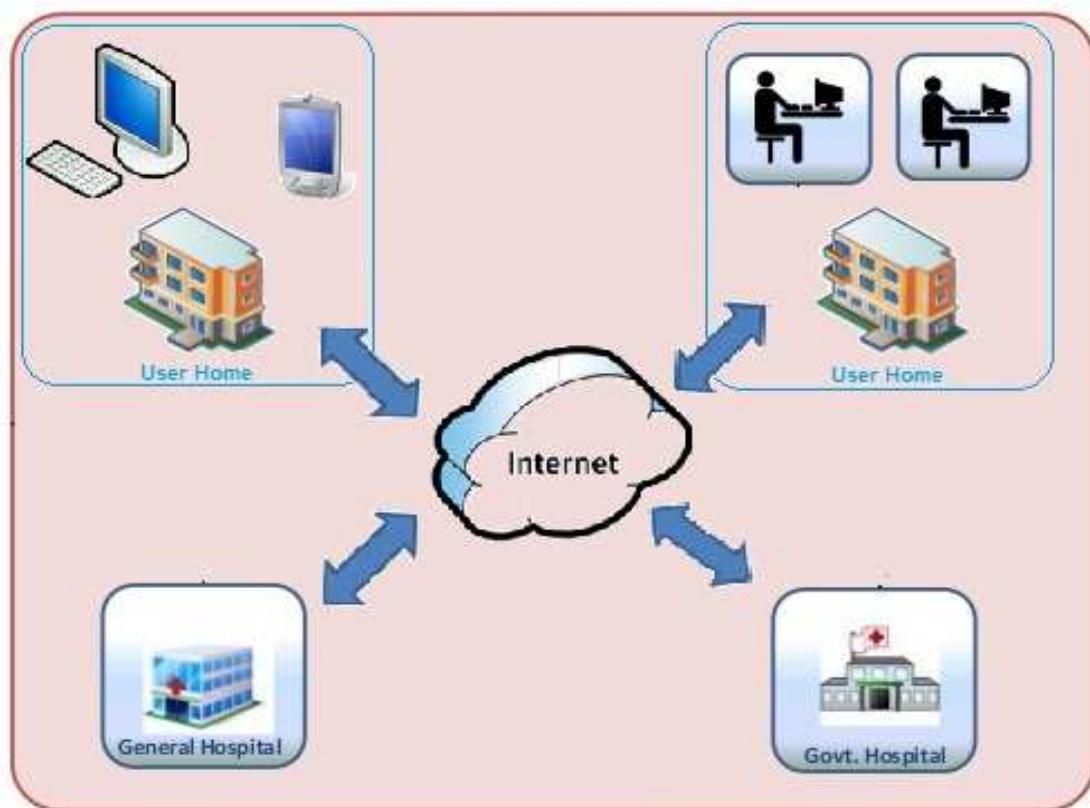
In Conclusion, from a proper analysis and assessment of the designed system, it can be safely conclude that the system is an efficient, usable and reliable records management system. It is working properly and adequately meets the minimum expectations that were set for it initially. The new system is expected to give benefits increased overall productivity, performance and efficient records management.

## 5.3 Future Enhancement

This application avoids the manual work and the problems concerned with it. It is an easy way to obtain the information regarding the various travel services that are present in our System.

We intend to develop the project by make it comprehensive all the aspect of the hospital management like the add birth and death records, make the system ask patient for payment (bill) when a patient resolve to departure after treatment and other aspects of hospital.

The next enhancement is, we will develop online services. That mean, if patient have any problems he can send his problem to the doctor through internet from his home then doctor will send reply to him In this patients have some login name and password. The doctor can ask opinion of a doctor in another hospital or elsewhere the case of certain.



**Fig.No.5.1**



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