



Palestine Polytechnic University
College of Administrative Science and Informatics

Online Patient Transfer System

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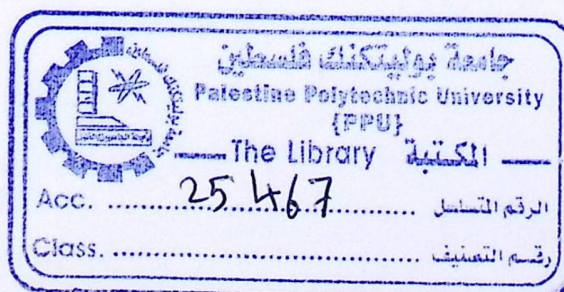
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**This project is submitted as a partial fulfillment for the
requirement of the bachelor degree in Information
Systems**

May/2012



Dedication

To the one who lit the light in my road and made the sun in the darkness, to best woman in the world my mother. To the one who gave me hope to be myself, to my father. To the spike of Grains and the fruits of the olive: Our Home Palestine.

Saed Dweik

دعوني أفرّد إمتناني العميق على طاولة الشكر التي يجلسُ في مقدمتها من تطيرُ إليه
أحلامي وطموحاتي ونجاحاتي قبل الجميع والذي الغالي رحمه الله، ترافقه صاحبة
العطاء الكريم وَرُبّة الحنان الأجل أمي الحبيبة أدامك الله تاجاً فوق رؤوسنا، يظللهم
غُصنَ عائلي المحبّة.

ديب التميمي

Acknowledgment

We also would like to take this opportunity to express our thanks to ALLAH, the one who innovates our soul, help us to complete the project ...

The team members advance deep thanks to our supervisor Dr. Ghassan Shahin who has granted us support, orientation, guidance, help, encourage and advices.

Our thanks and gratitude to everyone who contributed to the success of the project and we don't forget our teachers, lectures, colleagues, friends ...

Table of Contents

Dedication	I
Acknowledgment	II
Table of contents	III
List of tables	VI
List of Figures	VIII
Chapter One: Introduction	1
1.1. Introduction	2
1.2. Problem statement	2
1.3. Project objectives	3
1.4. Work breakdown structure	3
1.5. Project scheduling	4
Chapter Two: Literature Review	6
2.1. Introduction	7
2.2. Definitions of discharge summary and transferring	8
2.3. Problems associated with patient transfer	9
2.4. Recommendations for an effective technology and health system in Palestine	10
2.5. Examples of transferring systems	12
Chapter Three: System Requirements	20
3.1 Introduction	21
3.2 Alternatives	21
3.3 System requirements	22
3.3.1 Functional requirements	22
3.3.2 Non-Functional requirements	22
3.4 Feasibility Study	24
3.4.1 Economical Feasibility	24
3.4.1.1 Development requirements	24
3.4.1.1.1 Development hardware resources	24
3.4.1.1.2 Development software resources	26
3.4.1.1.3 Human development cost	27
3.4.1.1.4 Total development costs	27

3.4.1.2	Operational requirements	28
3.4.1.2.1	Hardware operational cost	28
3.4.1.2.2	Total operational cost	28
3.4.2	Technical feasibility	28
3.4.3	Operational feasibility	29
3.5	Limitations and constraints	30
3.6	Risks and solutions	30
Chapter Four: System Requirements Specification	33
4.1	Introduction	34
4.2	Requirements specifications	34
4.2.1	Functional requirements	34
4.2.1.1	Users functions	35
4.2.1.2	Administrator functions	37
Chapter Five: System Design	41
5.1	Introduction	42
5.2	Output design	42
5.2.1	Administrator	42
5.2.2	Users	42
5.3	Process design	43
5.3.1	Basic search	43
5.3.2	Advanced search	44
5.3.3	Add information to new transferring report	45
5.3.4	Modify transferring report information	46
5.3.5	Uploading complementary information for a patient by excel sheet	47
5.3.6	Log in	48
5.3.7	Periodic backup	49
5.4	Input design	50
5.4.1	Administrator's functions	50
5.4.1.1	Log in page	50
5.4.1.2	Backup policy for the system's database	51
5.4.1.3	Add new hospital information	52
5.4.1.4	Add new doctor information	53
5.4.1.5	Add new system user information	54
5.4.2	User's functions	55

5.4.2.1 Add complementary information	56
5.4.2.2 Basic search	57
5.4.2.3 Advanced search	58
5.4.2.4 General notes	59
5.4.2.5 Add new transferring report	61
5.4.2.6 Modify an existing transferring report	71
5.4.2.7 Report of incoming transferring	72
5.5 Database design	73
5.5.1 UML Model	70
5.5.2 Data dictionary	74
5.5.2.1 Patients	74
5.5.2.2 Hospitals	75
5.5.2.3 Doctors	75
5.5.2.4 System user	76
5.5.2.5 Transferring report	76
Chapter Six: System Implementation And Testing	81
6.1 System implementation	82
6.1.1 Introduction	82
6.1.2 Deployment diagram	85
6.1.3 System installation	87
6.2 System testing	88
6.2.1 Introduction	88
6.2.2 Unit testing	88
6.2.3 Subsystem testing	90
6.2.4 Integration testing	91
6.2.5 System testing	92
Chapter Seven: Conclusion And Recommendations	93
7.1 Conclusion	94
7.2 Recommendations	94
References	95

List of Tables

1.1 Task schedule of project introduction	4
1.2 Task distribution of project introduction	4
1.3 Expected tasks for project	5
1.4 Expected tasks divided for the project	5
3.1 Minimum requirements for system development	25
3.2 Recommended development requirements	25
3.3 Hardware development resources and costs.....	26
3.4 Software development resources and costs	26
3.5 Human development resources and costs	27
3.6 Total development costs	27
3.7 Hardware operational resources and costs	28
3.8 Total operational costs	28
3.9 Expected risks	31
3.10 Effects of the risks	32
4.1 Search for report function	35
4.2 Advanced search function	35
4.3 Add new report function	35
4.4 Transfer patients function	36
4.5 Report of incoming requests function	36
4.6 Upload excel file function	36
4.7 Feedback function	37
4.8 Backup for the system function	37
4.9 Add new doctor function	37
4.10 Add new hospital function	38
5.1 Authentication elements	51
5.2 Backup information.....	51

5.3 New hospital information	52
5.4 New doctor information	53
5.5 New user information	54
5.6 Upload excel information	56
5.7 Basic search using key word	57
5.8 Input data for advanced search	58
5.9 Feedback information	60
5.10 Transferring report information	65
5.11 Data dictionary of patients table	74
5.12 Data dictionary of hospitals table	75
5.13 Data dictionary of doctors table	76
5.14 Data dictionary of system user table.....	76
5.15 Data dictionary of transferring report table.....	77
6.1 Unit testing cases	88
6.2 Subsystem testing cases	91
6.3 Integrated testing cases	91

List of Figures

2.1 Example (1-A) of transferring system	13
2.2 Example (2-A) of transferring system	14
2.3 Example (3-A) of transferring system	15
2.4 Example (1-B) of transferring system	16
2.5 Example (2-B) of transferring system	18
4.1 Context diagram	39
4.2 DFD diagram	40
5.1 Basic search flowchart	43
5.2 Advanced search flowchart	44
5.3 Add information flowchart	45
5.4 Modify information flowchart	46
5.5 Upload excel sheet flowchart	47
5.6 Login flowchart	48
5.7 Backup flowchart	49
5.8 Login page	51
5.9 Periodic backup	52
5.10 Add new hospital page	53
5.11 Add new doctor page.....	54
5.12 Add new user page	55
5.13 Home page of the system	56
5.14 Upload excel sheet.....	57
5.15 Basic search	58
5.16 Advanced search	59
5.17 General notes.....	60
5.18 First page of transferring report	61
5.19 General examination about the patient	62
5.20 Third page of transferring report	63
5.21 Last page of transferring report	64
5.22 Login page	65

5.23 Modifying page	71
5.24 Report page of incoming transferring	72
5.25 Object class diagram	73
6.1 Microsoft visual studio 2011	83
6.2 Microsoft ASP.NET framework	84
6.3 Three tier structure	86
6.4 Upload testing case 1	89
6.5 Upload testing case 2	89
6.6 Upload testing case 3	90
6.7 Search testing	91
6.8 Add new report testing.....	92

1.1 Introduction	
1.2 Problem statement	
1.3 Project objectives	
1.4 Work break down structure	
1.5 Time schedule / Gantt's chart	

CHAPTER ONE

INTRODUCTION

1.1 Introduction

1.2 Problem statement

1.3 Project objectives

1.4 Work break down structure

1.5 Time schedule /Gantt's chart

1.1 Introduction

Nowadays several life aspects aim to use technology to facilitate work, speed it up, and as an attempt to cope with this trend in the medical sector, there were some computerized systems which assist medical work by using Information and Communication Technology (ICT) which organize the medical sectors significantly.

The existing systems achieve several functions as financial reports, patient visiting reports. This project is to develop a new system that helps to make the patient transferring between hospitals easier by having standard form for all hospitals in West Bank area. This technique helps to eliminate the conflicts of information needed between hospitals by having the standard form for all hospitals online.

1.2 Problem statement

For many years, people used the traditional way in getting a paper reports from their doctors which has many problems such as slowness, the presence of errors, accuracy, security and losing prescription or damaging it, another problem is that some information are not available in the reports that is needed by the other hospital, finally the conflict of information between reports requires the need to create a standard form for all hospitals.

To overcome these problems the new system Online Patients Transferring Report will implement new techniques that facilitate the work and increase the security and privacy, these functions will be achieved by providing the doctors with a system that enable the connection between hospitals to create transferring report prescriptions. This system offers standard form for discharging patients, which can be used by all participating hospitals, leading to the facilitation of the work, especially the issue of patient's information.

1.3 Project Objectives

The main objective of this project is to develop an online system that helps hospitals to communicate with each other through online transferring prescriptions. This objective can be achieved through:

1. Proposing a system that enables the doctor to issue online transferring prescriptions for the patients which can be shared and accessed by hospitals.
2. Implementing the system in local hospitals to facilitate the transfer of patients between hospitals.
3. Improve the efficiency and effectiveness of the system of patient transfer.

1.4 Work Breakdown Structure

1. Proposing a system that enables the doctor to issue online transferring prescriptions for the patients which can be shared and accessed by hospitals.
 - 1.1 Identifying the specific software application.
 - 1.2 Identifying the SDLC methodology phases during the project.
 - 1.3 Studying the available software and models that achieve this and explore their compatibility and flexibility.
2. Implementing the system in local hospitals to facilitate the transfer of patients between hospitals.
 - 2.1 Setting up a web-server that we intend to use as a base for our work.
 - 2.2 Examining the existing communication infrastructure.
3. Improve the efficiency and effectiveness of the system of patient transfer.
 - 3.1 Examining the flexibility and response time for the system.
 - 3.2 Ensuring that system has a high level of security; authorized access.

1.5 Project scheduling

The following table 1.1 shows our project introduction tasks.

Number of task	Tasks	Number of weeks
T1	Studying idea	2
T2	Study transferring transaction	2
T3	Understanding transferring tools	2
T4	Collect the requirements	3
T5	Studying of similar sites	2
T6	Building prototype	1
T7	Feasibility study	2
T8	System structure	2
T9	Studying database components	2
T10	Preparation documentation	14

Table 1.1 Tasks schedule of project introduction.

In the following table 1.2 we distribute project introduction tasks distributed on semester weeks.

Week \ Task	1	2	3	4	5	6	7	8	9	10	11	12	13	14
T1	■	■												
T2			■	■										
T3				■	■									
T4						■	■	■						
T5								■	■					
T6									■					
T7										■	■			
T8											■	■		
T9												■	■	
T10	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Table 1.2 Tasks distribution of project introduction.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

2.2 Definitions of discharge summary and transferring

2.3 Problems associated with Patient Transfer

2.4 Technology and Health System in Palestine

2.5 Examples of transferring reports

2.1 Introduction

Due to the continued development in the use of computers as the chairperson of the circulation of information in areas of scientific, cultural, commercial and other fields, the need has emerged for putting up a modern system that meets all these needs, especially as the internet has been playing a major role in the development of the various societal sectors including health systems.(Rural and Regional Health and Aged Care Services Division in Victoria, Australia, 2009).

As a basic health procedure, hospital discharge summaries have traditionally been paper-based (hand written or dictated), and deficiencies have often been reported. Recently, the usage of electronic summaries has been increasing. Those electronic summaries are considered of higher quality than paper-based summaries. However, comparisons between electronic and paper-based summaries regarding documentation deficiencies have rarely been conducted and have been limited in number if any exists.(Rural and Regional Health and Aged Care Services Division, Victoria, Australia, 2009).

This section stands as a brief literature review on the hospital discharge summaries or transfer documents. Definitions of the terms hospital discharge and patient transfer are provided. The content of the patient's transfer document is also presented. In addition, problems associated with patient transfer are identified. Examples of some global electronic patient transfer systems are highlighted

2.2 Definitions of discharge summary and transferring

The hospital discharge summary is defined as “an essential document for communicating with general practitioners (GPs) as it provides clinical and administrative information necessary for the continuity of care of patients discharged from hospital” (Joanne L. Callen, Melanie Alderton, Jean McIntosh, Evaluation of electronic discharge summaries: A comparison of documentation in electronic and handwritten discharge summaries, 2007). On a relevant issue, a patient transfer is defined as the procedure “to convey the responsibility for the care of a patient from one entity to another. It may involve the discharge from one entity and the admission to another along with the patient's medical/dental records or copies” (Medical Dictionary, 2012). Patient’s transfer explicitly shows the transfer of care and responsibility and it is not only a matter of transporting the patient from one place to the other as the word transfer might mean.

According to Joanne, Callen, Alderton and McIntosh(2007), the prerequisite for the delivery of quality ongoing care is the provision of an adequate summary of the patient’s hospital stay and details of any aftercare required. Data cited as being of prime importance include, but not limited to admission and discharge diagnosis, additional diagnoses, physical examination findings and laboratory results, investigations, procedures, complications, management and outcomes, hospital treatments, drug allergies, discharge medications, medical problems at discharge, instructions for ongoing management, follow-up details as well as admission and discharge dates. The electronic summary was printed out and posted to the GP as was the handwritten summary.

2.3 Problems associated with Patient Transfer

According to Rural and Regional Health and Aged Care Services Division in Victoria, Australia (2009), there are a number of problems associated with patient transfer system:

1. Transfer relies heavily on multiple health professionals having local knowledge of the system and the differing service delineations both in metropolitan and rural areas.
2. There is a perceived lack of understanding in the metropolitan and larger regional hospitals about the limited resources and support in rural areas and smaller regional hospitals.
3. There is a lack of defined processes for access to clinical advice, triage and coordination of transport and finding a bed in an appropriate facility.
4. The severity of the patient's illness is often underestimated and the level of escort not appropriate.
5. There is a lack of clear accountability for transfers.
6. A survey of rural hospitals conducted by the Victorian Quality Council in June 2007 identified clinical information, communication and documentation associated with inter-hospital patient transfer as significant areas of concern requiring attention.
7. A traditional patient transfer can take as long as 2 - 12 hours to complete between connecting two doctors to discuss a patient's needs.
8. The process of figuring logistics between hospital administrative staff, the process is extremely time consuming.
9. There are occasions when critical information about the transfer is not recorded accurately, or at all, due to human error.

On a later note, Ball, Chadwick and Mundy (2003) pointed out that with the usage of paper-based health documents such as prescription for example, the patient is responsible for the information included while with the electronic transfer system, and the issue of patient's data privacy is to be taken into consideration.

2.4 Recommendations for an effective Technology and Health System in Palestine.

Before discussing patient's transfer at the Palestinian hospitals, it is useful to discuss the health system in general. The status of the health system in Palestine is one of the most complicated. In order to have a successful Palestinian health system at a minimum level, the system should be public, effective and well regulated, should provide a reasonable access to high quality preventive and curative services, should maintain high quality of training programs, should achieve health outcomes at the population level and meet the international standards recommended by the World Health Organization (WHO) and should be effective, efficient and financially viable as well (Schoenbaum, Afifi and Deckerlbaum, 2005).

As a result of hospitals need of the systems to be computerized, the Ministry of Health started the computerization of the hospitals project in Palestine. (bokra.net, 2010)

The project of health information system has been established in the Ministry of Health that focuses primarily on the computerization of hospitals and health clinics, and to link all these computerized systems with the central managerial and financial system, like the financial department, medicine warehouse supplies and health insurance system. (bokra.net, 2010)

The construction of this system, which would cost 7 million U.S Dollar, is expected to make a big change in hospitals and clinics management, and will also provide all the information that required to the decision maker in the Ministry of Health in order to control and evaluate the performance level of providing the service. The project is in its final level to be ready for work, and all the required databases is ready to use. (bokra.net, 2010)

The project planned to start first at Palestine Medical Center in Ramallah, Alia Hospital in Hebron, Rafedia hospital in Nablus, Darweesh Nazzal Hospital in Qalqelya and also another 8 health clinics in Nablus, Ramallah, Hebron, Qalqelya, Bet Reema, Azzon and Howwara.(bokra.net,2010)

The increase in number of beds in hospitals indicates a growing demand by patients needing admission to local hospitals in Palestine, which might indicate growing rate of inter-hospitals patients' transfer.

To meet the increasing number of patients seeking admission to local hospitals, and in an attempt to improve the health services, the number of beds in hospitals have increased by around 8% to reach 1,197 beds in 2010 compared to 1,108 beds in 2009 (Palestinian ministry of health, 2010)

2.5 Examples of transferring systems

Following are some examples of the electronic-based summary forms.

The first example was structured to show a separate field for each item of information with just one heading pertaining to the item, and space under the heading to enter free text where relevant (Figure 2.1). (Joanne L. Callena, Melanie Alderton^{b,1}, Jean McIntosha, 2007)

Discharge medications were initially hand written onto a pharmacy discharge script from which they were copied into the 'medications on discharge field. The handwritten summary was similarly structured and consisted of a single-page form, carbon-copied in triplicate, with a detachable pharmacy discharge script. It was intended that hand written summaries be completed by the time of discharge or at least as soon afterwards as possible. On discharge, patients were given a five-day supply of discharge medications. Therefore it was necessary to complete the pharmacy discharge script of both the electronic and hand written summaries before the actual discharge, in time for the patient to be given, before leaving the ward, the discharge medications supplied by the hospital.

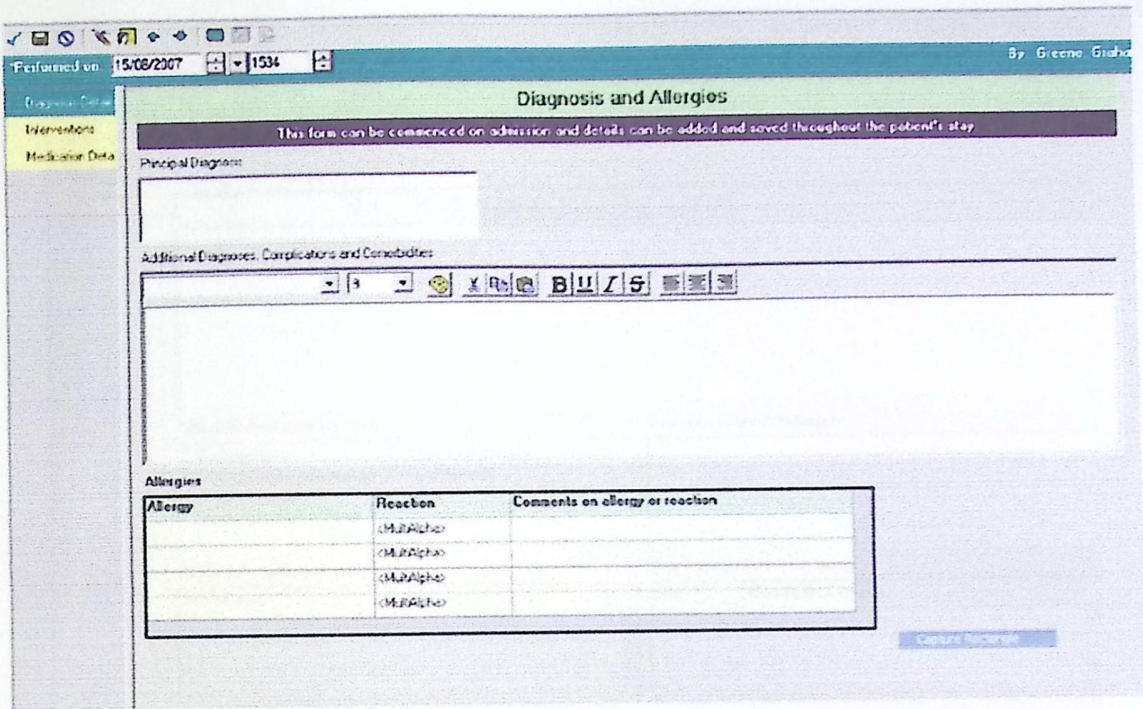


Figure (2.1) Example (1-A) of transferring system.

Discharge date: This was counted as not documented if not in the allotted field, even if noted elsewhere. This was checked against the patient's record for accuracy.

Additional (other) diagnoses: If present but none was listed in the allotted field, they were counted as not documented even if all were noted elsewhere. However, if at least some were listed in the allotted field and the remainder was listed elsewhere, they were counted as documented. No check was made against the patient's record for completeness or accuracy.

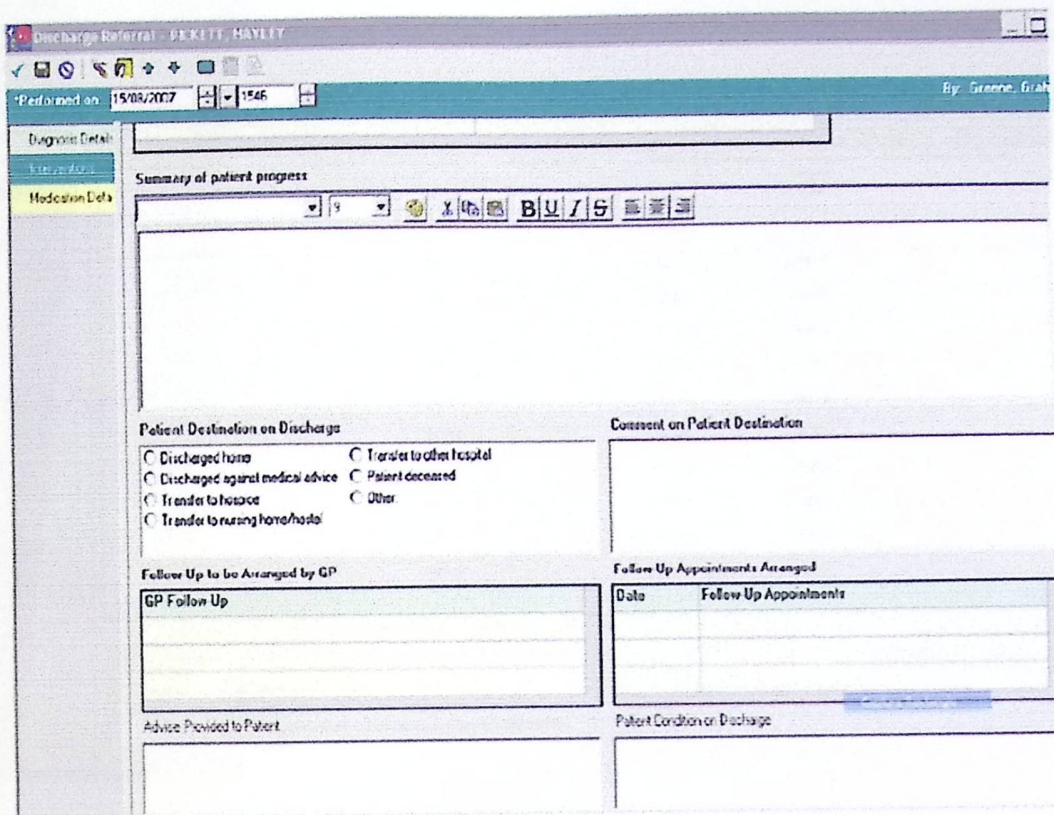


Figure (2.2) Example (2-A) of transferring system.

Summary of patient progress: This was counted as documented if there was an entry in the field. No check was made against the patient's record for completeness or accuracy.

Follow-up requirements: If this field was empty the patient's record was examined to check whether there were indeed no requirements of the GP concerning ongoing care. If none, an N/A score was given. If follow-up requirements were documented in the discharge summary, no check was made for completeness or accuracy.

Investigations and results: If this field was empty, the patient's record was examined to check whether there had indeed been no investigations. If none, an N/A score was given. If investigations were documented in the discharge Summary no check was made against the patient's record for or completeness or accuracy.

Inter-hospital Patient Transfer Form

For NON- Time Critical Patients



Identify	Allergies		Medicare number: _____		(Affix Bradma here) Referring facility URN	
	Nil known allergies <input type="checkbox"/> Signature: _____		Pension / DVA number: _____		Given names _____ Surname _____	
			Private Health Insurance (PHI) fund _____		Address _____	
			PHI number: _____		Postcode _____ DOB _____	
	Transfer discussed with Patient: Yes <input type="checkbox"/> No <input type="checkbox"/>		Primary language spoken _____		Indigenous status (circle) A / TSI / ATSI	
	Date of transfer: _____		Interpreter required: Yes <input type="checkbox"/> No <input type="checkbox"/>		Not: A / TSI / ATSI / Unknown	
	General Practitioner: Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/>		Next of kin (NOK) / Carer			
	GP Name: _____		Name: _____			
	GP Phone No: _____		Phone No: _____			
	GP notified of transfer: Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/>		Relationship to patient: _____			
Referrer / Authorising Practitioner Name: _____		Referring Facility Name: _____		Patient Living arrangements		
Referrer Phone No: _____		Phone No: _____		Living independently <input type="checkbox"/>		
Referrer position (Consult / Reg / HMO / GP / RN / Other): _____		Referrer Unit (ED / OR / Wd / ICU / CCU / Other): _____		Residential facility <input type="checkbox"/>		
Principal Diagnosis / Problem		Past Medical History / Co-morbidities				
		Reason for transfer				
Situation	Respiratory Management Plan / O ₂ Requirements				SpO ₂ Target _____	
					O ₂ Rate _____	
					O ₂ Device _____	
					BEHAVIOUR	
					Harm to self <input type="checkbox"/>	
				Harm to others <input type="checkbox"/>		
				Mechanical restraint <input type="checkbox"/>		
				Pharmacological restraint <input type="checkbox"/>		
				Voluntary Patient <input type="checkbox"/>		
				Involuntary Patient <input type="checkbox"/>		
				GCS:		
				Current Cognitive State: _____		
Intravascular Access		Site & Date of Insertion		Fasting from		
<input type="checkbox"/> Peripheral venous line (1) _____		Faecal Continence: Yes <input type="checkbox"/> No <input type="checkbox"/>		Food <input type="checkbox"/>		
<input type="checkbox"/> Peripheral venous line (2) _____		Urinary Continence: Yes <input type="checkbox"/> No <input type="checkbox"/>		Fluids <input type="checkbox"/>		
<input type="checkbox"/> Peripheral venous line (3) _____		Indwelling catheter: Yes <input type="checkbox"/> No <input type="checkbox"/>		Time of last intake: _____		
<input type="checkbox"/> Central venous line _____		Intermittent catheter: Yes <input type="checkbox"/> No <input type="checkbox"/>		Nasogastric / PEG tube: Yes <input type="checkbox"/> No <input type="checkbox"/>		
<input type="checkbox"/> Other _____		Stoma / Colostomy: Yes <input type="checkbox"/> No <input type="checkbox"/>				
<input type="checkbox"/> No access		Time last voided: _____				
IV Fluids: Yes <input type="checkbox"/> No <input type="checkbox"/>		Time bow els last opened: _____				
Other: _____		Date IDC inserted: _____				
				C-SPINE immobilised: Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>		

Victorian Quality Council Patient Transfer Form

Figure (2.4) Example (1-B) of transferring system.

- Identify category:

This category contains the general information about the patient like his/her medical number the date on the transfer, patient's living arrangement and the general practitioner information.

- Situation category:

This category contains the principal diagnosis/ problem, patient medical history and respiratory Management Plan / O2 Requirements.

				Date	Page 2
Background	Speciality Specific Information			Patient Bradma (please affix)	
				Speciality Specific Information / Comments	
Accompanying	Alerts – Forensic Patient	<input type="checkbox"/>	_____	Hearing	_____ Aid <input type="checkbox"/>
	Alerts – Bariatric Patient	<input type="checkbox"/>	_____	Vision	_____ Aid <input type="checkbox"/>
	Alerts – Infectious risk	<input type="checkbox"/>	_____	Mobility	_____ Aid <input type="checkbox"/>
	Alerts – Pressure Ulcer risk	<input type="checkbox"/>	_____	Falls Risk	_____
	Advance Care Directives	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unknown <input type="checkbox"/>	Weight _____
	NFR / Limitation of Medical Treatment Order	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unknown <input type="checkbox"/>	Dietary Needs _____
	Alerts – Other:				Investigation results:
	Personal Items	N/A	Accompanying Patient	Sent w th Family	X-Rays <input type="checkbox"/>
	Clothing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other _____
	Glasses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pathology Report <input type="checkbox"/>
	Dentures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ECG <input type="checkbox"/>
	Rt Medications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Attached Copy of : (where applicable)
	Equipment	_____			Doctors Letter <input type="checkbox"/>
	Valuables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cognitive Assessment Tool <input type="checkbox"/>
	List Valuables	_____			Allied Health Letter <input type="checkbox"/>
	Other	_____			Advance Care Directives <input type="checkbox"/>
					Observation Chart <input type="checkbox"/>
					Nursing Care Plan / Pathway <input type="checkbox"/>
					Medications Chart <input type="checkbox"/>
					Fluid Balance Chart <input type="checkbox"/>
					IV Orders <input type="checkbox"/>
					Behaviour Management Plan <input type="checkbox"/>
					NFR / Limitation of Medical Treatment Order <input type="checkbox"/>
Responsibility	Receiving Facility (RF)			Appropriate time for transfer agreed Yes <input type="checkbox"/> No <input type="checkbox"/>	
	RF Name: _____			RF Ward Name: _____	
	Acceptance by Receiving Medical Practitioner Yes <input type="checkbox"/> No <input type="checkbox"/>			Acceptance by Receiving Facility Bed Coordinator Yes <input type="checkbox"/> No <input type="checkbox"/>	
	Date:	Time:	Receiving Medical Practitioner / Unit Name:	Date:	Time:
Receiving Practitioner / Unit Phone No & Pager:			Receiving Bed Coordinator Name:		
			Receiving Bed Coordinator Phone No & Pager:		
Patient Transport Provider Name:			Date & Time Booked:		
Form completed by (print name & job designation) :			Signature:		

Figure (2.5) Example (2-B) of transferring system.

- Background category:
This category contains the specialty specific information, patient bradma, comments about the specialty specific information and also information about the senses like the hearing and the vision.
- Accompanying category: This category contains information about things that accompany the patient while transferring him like glasses, clothing and any equipment. It also contains some investigation results and the attach copies that the report attach.
- Responsibility category: This category contains information about the receiving facility (name and ward), and acceptance by receiving medical practitioner, acceptance by receiving facility bed coordinator, the name of the patient transport provider, date and the signature.

CHAPTER THREE

SYSTEM REQUIREMENTS

3.1 Introduction

3.2 Alternatives

3.3 System Requirements

3.4 Feasibility Study

3.5 Limitation and constraints

3.6 Risk and solutions

3.1 Introduction

In this chapter we will introduce the alternative of the system and the functional and non-functional requirements that will be explained in more detail in chapter 4. We also introduce the feasibility study of the system. Finally we analyzed the limitation of the system with the probable solutions as we will see later.

3.2 Alternatives

After the interview conducted by the research team with doctor (Raed Amro, Red Crescent society hospital, Hebron) about transferring between hospitals, in addition the current situation forces the deployment of the technology, we have reached that the best solution for the problems is a system that provides a reliable transferring between hospitals in West Bank area.

As a result of many visits to the hospitals like Alia Hospital and Red Crescent society hospital in Hebron, the research team concluded that there is no system fulfills the requirements of transferring between hospitals.

Some alternatives are:

- Hospitals can have a standard form as paper based, this can overcome the problem of the conflict of the information needed but still slow method for transferring, it will have the problem of the hand writing and papers could be lost.
- Hospitals can have standard form and this standard form can be sent using the existing technologies such as email, but this would have the problem that a technology like email is not a flexible way for hospital communication.
- Some hospitals has a customized system, it uses the system to send the transferring report to other hospitals or its patients electronically. The system is only for one hospital and not shared between all hospitals, and it does not provide a standardization of the form.

3.3 System Requirements

This section talks about system requirements, it describes the main functional and non-functional requirements briefly, however these functions will be described in details in chapter4.

3.3.1 Functional Requirements

- Search for report.
- Add new report information.
- Transfer.
- Report page of incoming requests.
- Backup for the system.
- Upload excel file.
- Add new doctor.
- Add new hospital.
- Feedback.

3.3.2 Non-Functional Requirements

The main nonfunctional requirements are:

1- High security measurements:

The system will apply high security measurements in several ways. At first, it is the server administrator's responsibility to take the periodic system backup to avoid any failure problems. Second, hide login page and access the login page by specific uniform resource locator (URL) to avoid unauthorized attempts to access administrator account.

2-Usability:

User accessibility to the system software is from internet. Users can login to the system though login page where user name and password are required. Training will be provided to the users as they are unfamiliar with it. The system should maintain consistency when users use the system.

The system should respond to the user's requests for less than two tries.

3-Reliability:

The system has to be very reliable due to the importance of the data. First the system must be available 24 hours a day, 7 days a week, in case of any failure due to shortage of power; generators must be available to ensure the continuity of the server operations. Also the system will be recovered by the administrator in case of failure; the system is monitored by the administrator daily with high response time. Finally the information contained in the database is accurate, only doctors deal with the reports according to the system privileges.

4-Time to Repair:

Even if the system fails, the system will be recovered back in less than 15 minutes. In case of failure the user will send a feedback message to the administrator and the administrator in turn will fix the error as soon as possible.

5-Response Time:

The system shall respond to the user in not less than 20 seconds from the time of the request submittal. The system shall be allowed to take more time when doing large processing jobs. As recommended before, the hardware should meet the minimal requirements to function effectively.

6-Ease of use:

This could be achieved through:

User Interface:

The interface should be graphical and user-friendly through:

A. Font:

The type and the size of the text font must be suitable and clear for the user.

B. Color:

The colors that will be used in the user's interface is blue and gray colors in order to make a suitable and comfortable vision.

3.4 Feasibility study

3.4.1 Economical Feasibility

This section represents the feasibility study for development and operational resources and its cost.

3.4.1.1 Development Requirements

3.4.1.1.1. Development hardware resources

Table 3.1 shows the minimum requirement to build the system based on the system capabilities as recommended by Trusted System developers.

CPU	1 GHZ
Ram	1 GB
H.D	40 GB
Monitor	19 Inch ,display 1,024x768
Video card	16-bit
DVD-ROM drive , Keyboard ,mouse	

Table 3.1 Minimum requirement for system development.

Table 3.2 shows the requirements of the recommended hardware to build the system based on the system capabilities as recommended by Trusted System developers.

CPU	2 GHZ
Ram	2 GB
H.D	80 GB
Monitor	19 Inch ,display 1280*800
Video card	32-bit
DVD-ROM drive, Keyboard ,mouse	
Total Price	750NIS

Table 3.2 Recommended development requirements.

Table 3.3 below lists the hardware required for developing the system and their costs:

Cost Type	Number of Items	Cost per unit ¹	Total
Hardware			
Desktop Computer	1	2500 NIS	2500 NIS
Laptop Computer	1	2800 NIS	2800 NIS
Sub-total			<u>5300 NIS</u>

Table 3.3 Hardware Development Resources and Costs

1: Trusted Systems Company for computer and IT

3.4.1.1.2 Development software resources:

The following table lists the software resources needed to develop this project and their costs:

Cost Type	Number of Items	Cost per unit ¹	Total
Software			
Visual studio 2011 software	1	800 NIS	800 NIS
SQL Server Software	1	2600 NIS	2600 NIS
Sub-total			<u>3400 NIS</u>

Table 3.4 Software Development Resources and Costs.

1: Trusted Systems Company for computer and IT

3.4.1.1.3 Human Development Cost:

Table 3.5 below lists the human resources needed to develop the system and their costs:

Cost Type	Hours/week ¹	No. of workers ¹	Cost per hour ¹	Total
Labor cost				
System developer	36	1	40 NIS	3000 NIS
System analyst	13	1	100 NIS	7000 NIS
Sub-total				<u>10000 NIS</u>

Table 3.5 Human Development Resources and Costs

1: Trusted Systems Company for computer and IT

3.4.1.1.4 Total Development Costs:

Hardware total cost	Software total cost	Human total cost	Total cost
5300 NIS	3400 NIS	10000 NIS	<u>18700 NIS</u>

Table 3.6 Total development costs.

3.4.1.2 Operational Requirement:

3.4.1.2.1 Hardware Operational Costs

Cost Type	Number of units	Cost per unit ¹	Total
Hardware component			
Web server cost	1	40000 NIS	40000 NIS
Internet (DSL, network adopter)	1	800 NIS	800 NIS
Sub-total			<u>40800 NIS</u>

Table 3.7 Hardware Operational Resources and Costs

1: Trusted Systems Company for computer and IT

3.4.1.2.2 Total operational cost:

Table 3.8 below shows the total costs for system operation.

Hardware operational cost	Software operational cost	Total cost
40800 NIS	3400 NIS	<u>44200 NIS</u>

Table 3.8 Total Operational Costs

3.4.2 Technical Feasibility

The technical aspects for the development of the proposed system are well within the project team's capabilities to produce such a product. The project team has experience in all aspects of the technology to be used; the World Wide Web (web) and a database program, SQL Server.

The web site to be produced will follow ASP.NET guidelines that will enable easily understanding of meaning of the site and to enable the users to explore it easily. This will be achieved by its ease of understanding via a pleasant use of colors, fonts, text and description of its content.

The database as with our system will be based in SQL Server, a very capable database program. That is a very popular application software title that is easy to use and maintain. User documentation will be provided for the operation of the database. We will also be available to provide technical assistance regarding the database application designed for this project.

The use of the proposed technology has little risk. As stated the team is familiar with the tools to be used. The software to be used has been in use for several years and has been updated periodically. It has been proven and is widely used in both commercial and personal projects/applications.

3.4.3 Operational Feasibility

Hospitals currently using the paper based which causes issues as we discussed before, the new system can offer faster and more efficient transferring for patients, it will reduce the time needed to this transaction. As the system will be in the implementation phase it will face some difficulties that most of the hospitals are not using new technologies that are required to make the system operate, and the system may not be welcomed by the doctors and they would prefer to write it in hand. The system proposed will benefit the hospitals; the information will not be lost this way comparing with the paper based.

3.5 Limitations and Constraints

As the system is new and will be applied for the first time in the west bank hospitals, the system may face a lot of constraints:

- Some doctors do not trust new technologies and modern techniques which use computers instead of humans.
- Some hospitals experienced the traditional paper based for a long time and they do not believe that they need this type of systems because they think that they have a good experience in their job.
- It's hard for some hospitals to communicate with.
- The system might have a security problem. Unauthorized access might happen.
- Some hospitals don't have the technologies needed for the system.
- It needs the cooperation between the hospitals.

3.6 Risks and Solutions

During the different phases of this project some risks may appear and cause delaying, threaten the progress, or even affecting the final outcomes of the project. Table 3.9 summarizes the most important expected risks, access degree of probability (P) that the risk event happens (represented from 1-5 where 5 is the most likely), access degree of effect (E) upon project when it happens (represented from 1-5 where 5 is the worst), and the risk index which equal the product ($P \times E$). These risks were listed according to the developers of Trusted Systems Company as they recommended

No	Risk	Probability (P)	Effect (E)	Risk Index (P × E)
1	Member absence	4	2	8
2	Lack of time	2	3	6
3	The emergence of new requirements	2	3	6
4	Loss of data	3	5	15
5	Increased cost of the amount raised in the feasibility study	4	4	16
6	Security and hackers risk	3	3	9
7	Unexpected results	2	3	6

Table 3.9 Expected Risks

Table 3.10 below shows the effects of the risks listed previously on the progress of the project and some possible actions that can be taken to avoid them or hold their effect down for these risks.

No	Risk	Effect on the project	Action
1	Member absence	Delaying	Commitment of each member
2	Lack of time	Delaying	Commitment to time schedule
3	The emergence of new requirements	Delaying / project expansion	Study and analyze the system requirement accurately
4	Loss of data	Delaying / partial or complete failure	Backup
5	Increased cost of the amount raised in the feasibility study	Partial failure	Use the hardware and software that have been specified in the feasibility study
6	Security and hackers risk	Delaying / partial or complete failure	Analyze the system requirements in terms of security and use appropriate mechanisms
7	Unexpected results	Delaying / partial failure	Perform requirement analysis carefully right from the beginning

Table 3.10 Effects of the risks

CHAPTER FOUR

SYSTEM REQUIREMENTS SPECIFICATION

4.1 Introduction

4.2 Requirements Specification

4.3 Context Diagram

4.4 Data Flow Diagram

4.1 Introduction

In this chapter we will introduce the requirements specification in more detail. From the analysis of how the system should be and how hospitals transfer the patients, DFD and context diagrams represent the system and the flow of information.

4.2 Requirements Specifications

Functional requirements determined the specific behavior or functions of the system. The functional requirements done by two types of users:

1. Administrator
2. User

4.2.1 Functional Requirements

This section describes the main requirements of the system which are classified according to the main user types of the system which are: administrator and users.

4.2.1.1 Users Functions

This part includes the functions for system users.

Function 1:

Function	Search for report
Description	Allowing users to search for the report and review the results
Input	Search key (any information attribute like report number)
Source	The information of the report is put by the user
Output	View the results
Requirements	Search key

Table 4.1 Search for report function

Function 2:

Function	Advanced search
Description	Browsers can search about report information in details
Input	Select field to search in it, keyword, logical operations
Source	Browser
Output	Search result
Requirements	Select field to search in it, keyword, logical operations

Table 4.2 Advanced search function

Function 3:

Function	Add new report
Description	Allowing users to add report to the system
Input	Transferring report information
Source	The information of the report is put by the user
Output	The report will be added to the system's database
Requirements	Transferring report information

Table 4.3 Add new report function

Function 4:

Function	Transfer Patients
Description	Allowing users transfer patient form one hospital to another
Input	Transferring report information
Source	The information of the report is put by the user
Output	The report will be added to the system's database
Requirements	Transferring report information

Table 4.4 Transfer patients function

Function 5:

Function	Report of incoming requests
Description	Allowing users to see the last incoming transfer requests
Input	Needs other hospital to send the request
Source	Same database, other hospital's request
Output	New report of the last transfer
Requirements	Select the right hospital

Table 4.5 Report of incoming requests function

Function 6:

Function	Upload excel file
Description	Upload information of the used drugs for the patient
Input	Selecting the excel file from the user's PC
Source	User's PC
Output	Excel file loaded to the database
Requirements	Excel file

Table 4.6 Upload excel file function

Function 7:

Function	Feedback
Description	Users can send feedback to the administrator in case of error
Input	The information of the feedback report
Source	User's feedback
Output	Message to the administrator
Requirements	Feedback information

Table 4.7 Feedback function

4.2.1.2 Administrator Functions

In addition to the general user functions listed above, the administrator has additional functions than other users:

Function 1:

Function	Backup for the system
Description	Making periodic backup for the database
Input	The number of days
Source	The number of days
Output	New backup for the system
Requirements	New backup for the system

Table 4.8 Backup for the system function

Function 2:

Function	Add new doctor
Description	Administrator can add new doctor to the database
Input	The information of the new doctor
Source	Hospital feedback about the doctors so the administrator can add them
Output	New doctor to the system
Requirements	Doctor information

Table 4.9 Add new doctor function

Function 3:

Function	Add new Hospital
Description	Administrator can add new hospital to the database
Input	The information of the new hospital
Source	Feedback about new hospitals in the area
Output	New hospital to the system
Requirements	hospital information

Table 4.10 Add new hospital function

4.3 Context Diagram

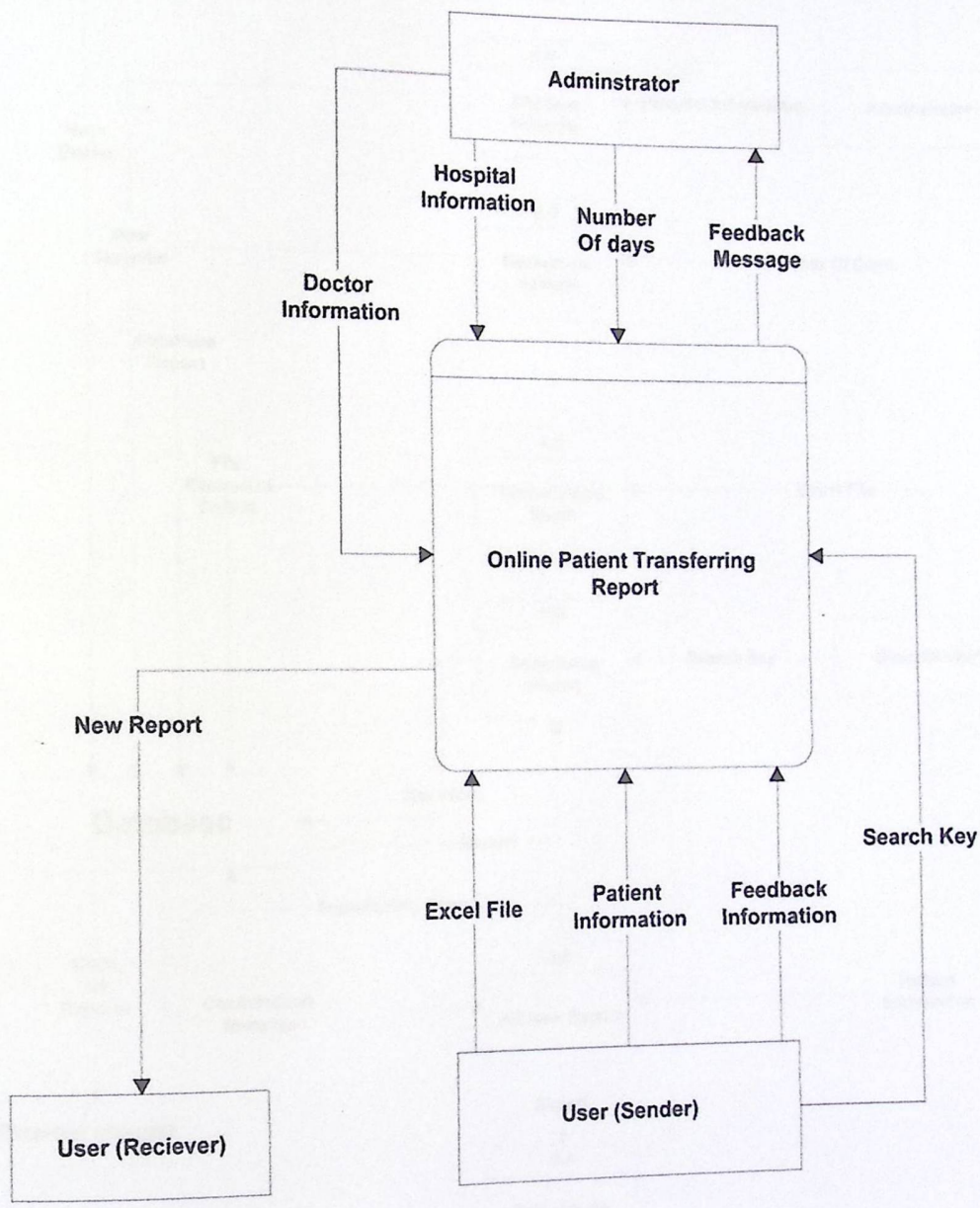


Figure 4.1 Context diagram

4.4 Data Flow Diagram

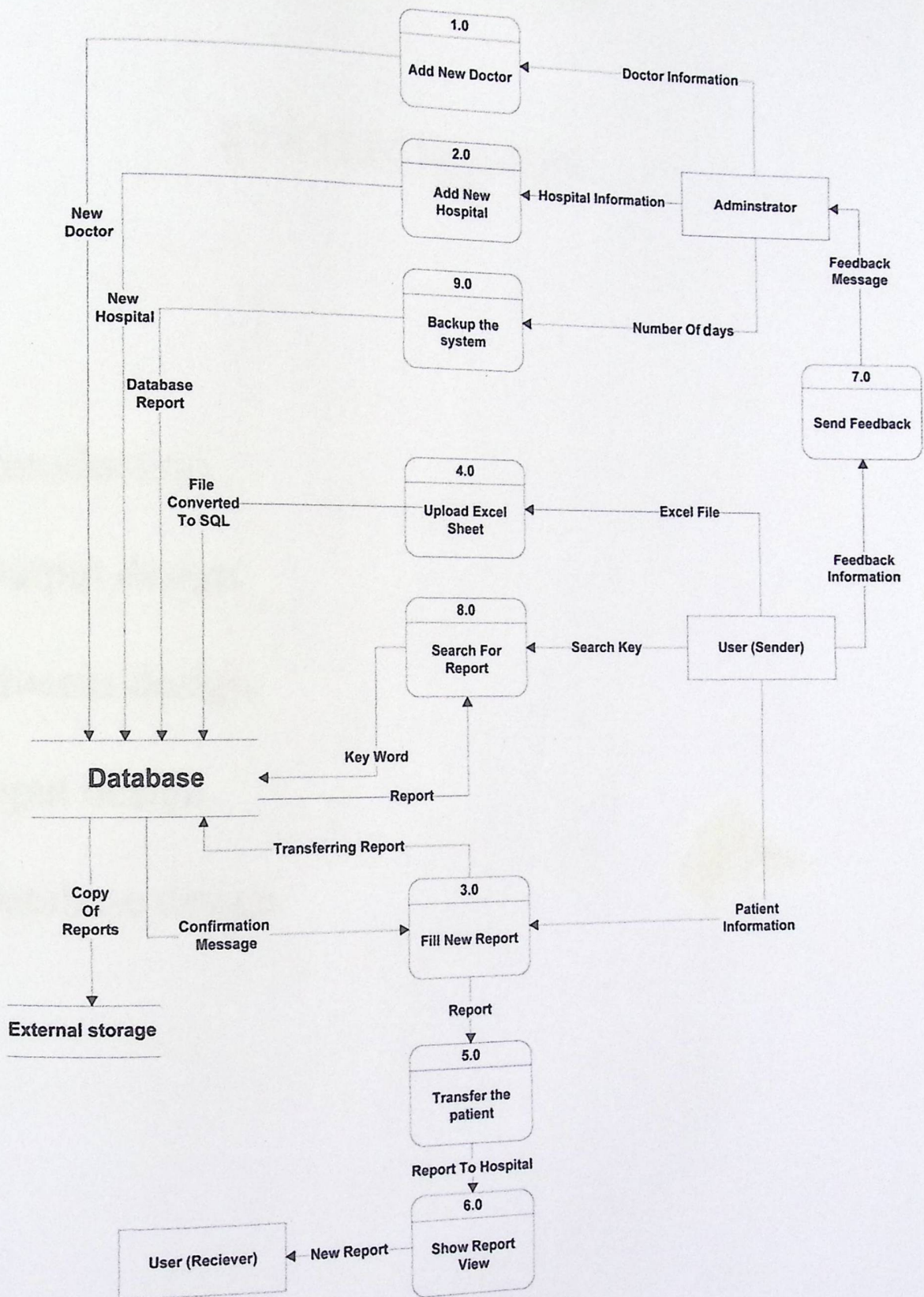
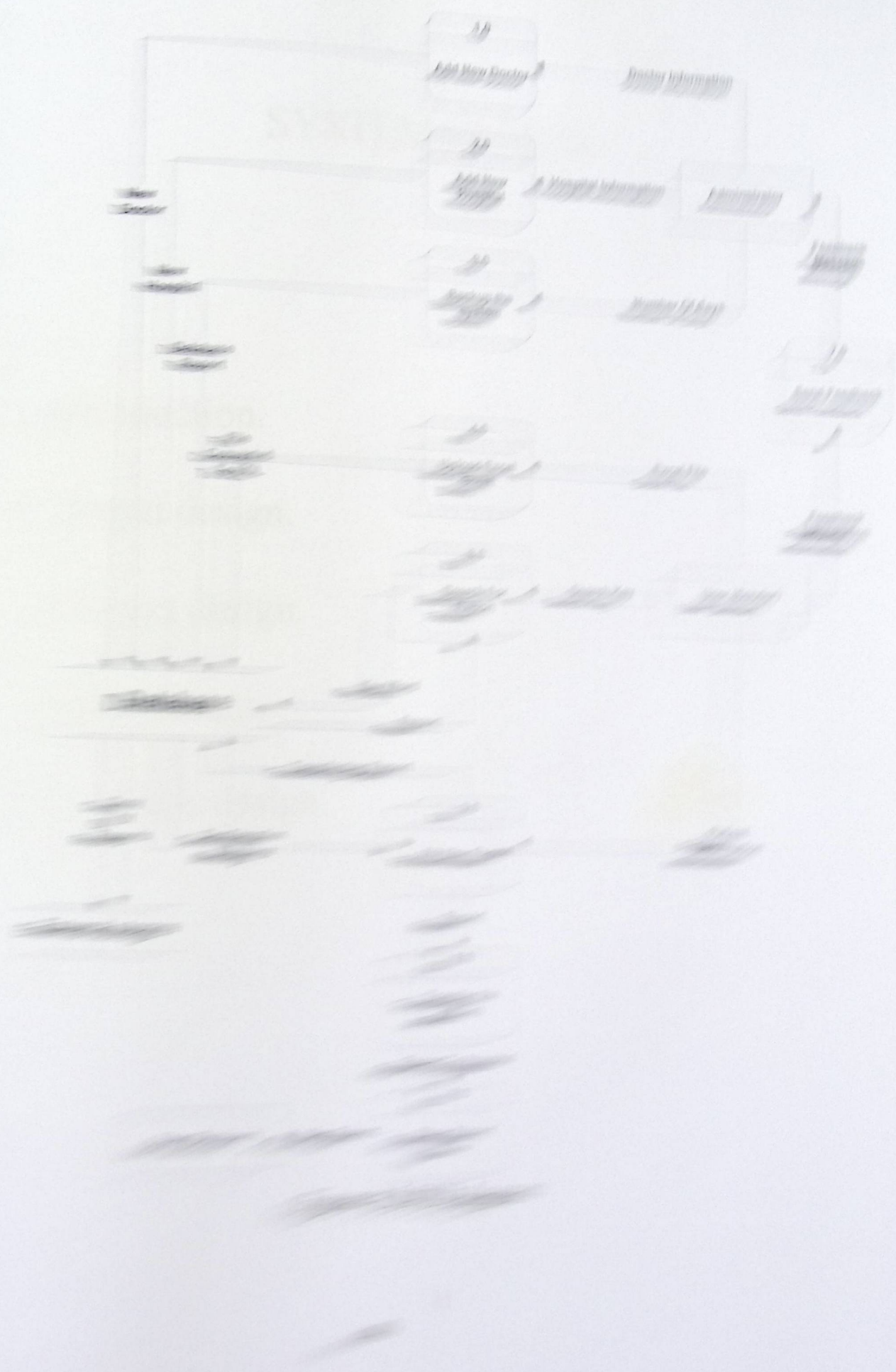


Figure 4.2 DFD diagram

4.4 Data Flow Diagram



CHAPTER FIVE

SYSTEM DESIGN

5.1 Introduction.

5.2 Output design.

5.3 Process design.

5.4 Input design.

5.5 Database design.

5.1 Introduction

This chapter describes the system design of the project, which contains process design, application design, database design and the data dictionary.

5.2 Output design

This section describes how the data can be obtained through the system, such as explicit data. Administrators and users can preview the output data.

5.2.1 Administrator

There are special views to show data and settings to the administrator to help him/her in doing the job, and these views are:

- 1- View all relations (Tables of the database).
- 2- View Modify existing relation (Tables of the database).
- 3- View adding new relation (Tables for the database).

5.2.2 Users:

There are views to show data and settings to the users to help him/her in doing the job, some of the views are:

- 1- Adding new report.
- 2- Uploading excel file.

5.3 Process Design

This section describes the system processes. Each process is described by a flowchart diagram.

5.3.1 Basic search

The user (doctor) will enter keyword in special place, then searching in the system database. If the search process returns more than one result (more than one transferring report), they will be viewed as one file. However, if the search process returns one result, then the system will view the transferring report to the user. This process explained in figure (5.1).

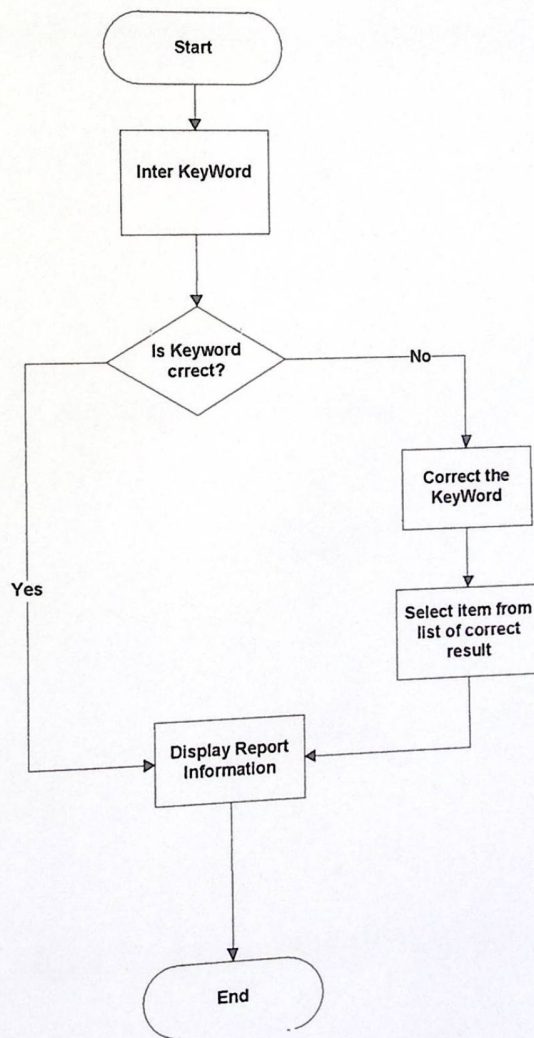


Figure 5.1 Basic search flowchart.

5.3.2 Advanced search

This technique enables users (doctors) to search in specific fields. Users enter the keyword that is related with a specific field. If the system selected more than one fields in the results, it can connect between these fields by one of the logical relationship (And, or, and Not).

The system offers auto complete for each field, when the browser enter a keyword, the system will suggest keyword completion to facilitate search process.

After selecting the fields and enter keyword, the user (doctor) clicks on the search button, then the system will search in the database and show the results. If the search process return more than one result (more than one transferring report), they will be viewed as one file. However, if the search process returns one result, then the system will view the transferring report to the user, the processes is shown in the figure (5.2).

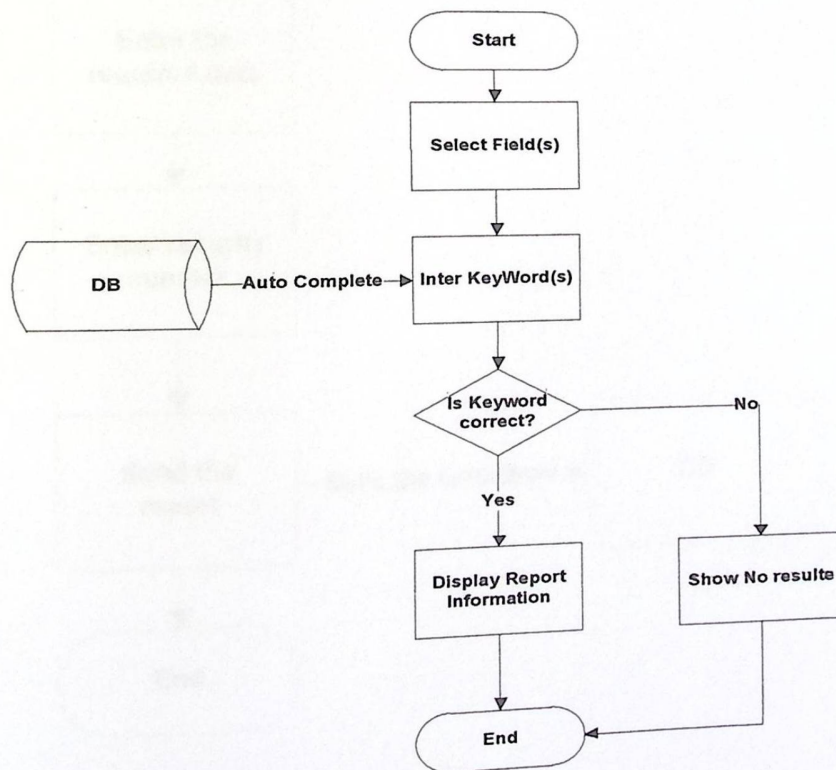


Figure 5.2 Advanced search flowchart.

5.3.3 Add information to a new transferring report.

Users (doctors) can add information to the transferring reports to be saved in the database, this information can include the name of the patient, transferring date, and other attributes will be detailed later.

After the user (doctor) finishes adding all the information needed the system will ask him to enter the security number and then save the report he made. This process explained in figure (5.3)

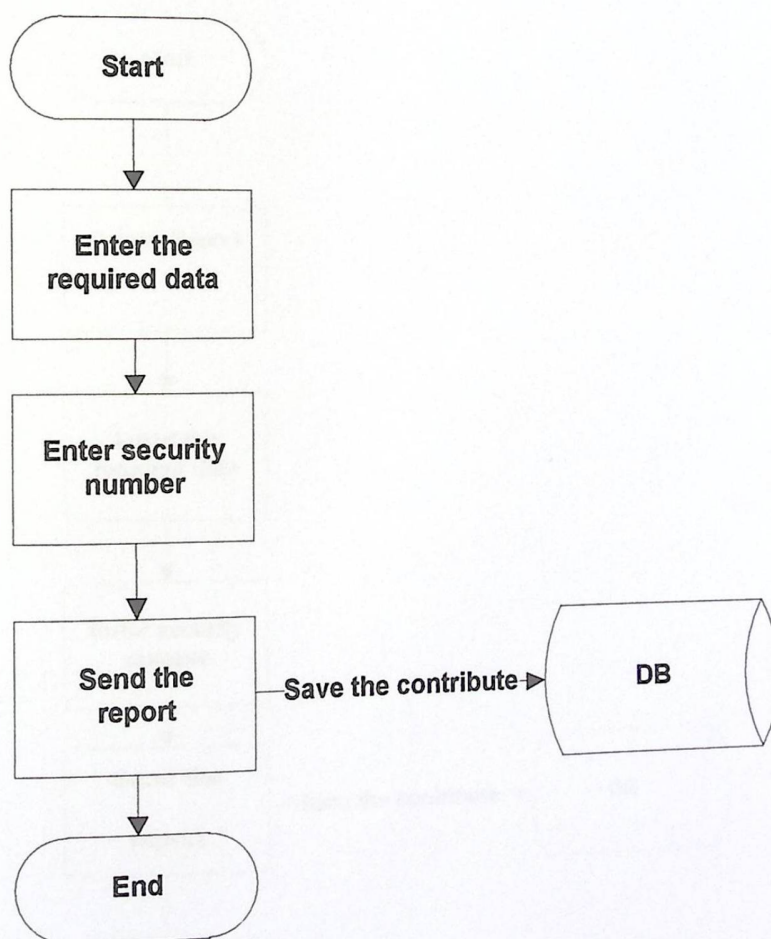


Figure 5.3 Add information flowchart.

5.3.4 Modify transferring report information.

Users (doctors) can add information to the transferring reports that were saved before in the database, this information can include the name of the patient, transferring date, and other information will be detailed later in this chapter.

After the user (doctor) finishes adding all the information needed the system will ask him to enter the security number and then save the contribution he made. This process is explained in figure (5.4).

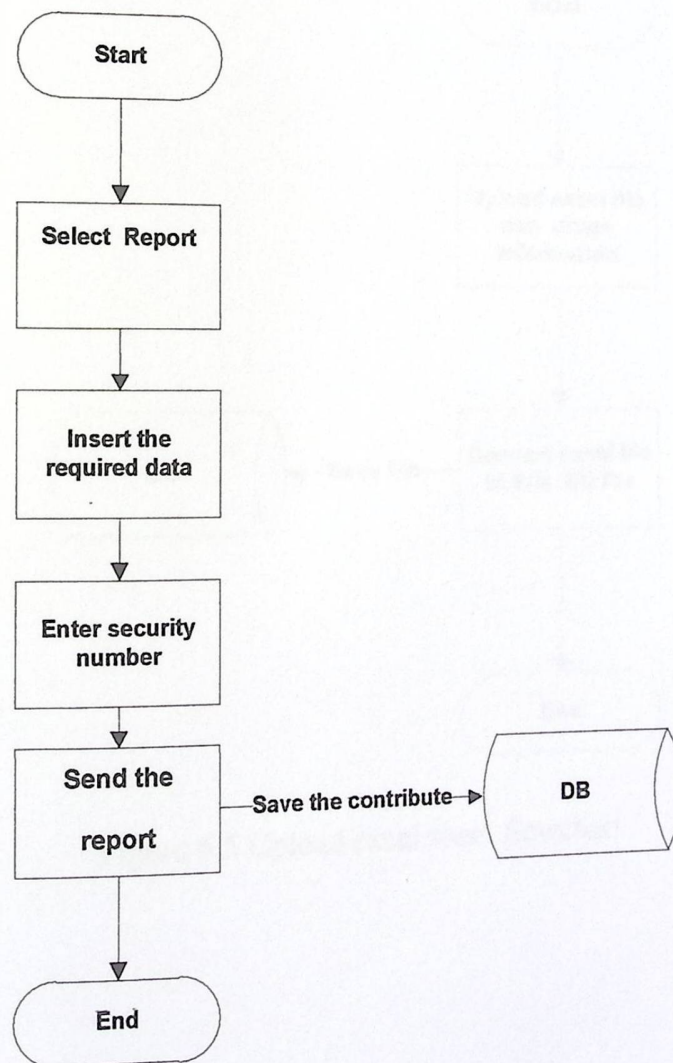


Figure 5.4 Modify information flowchart

5.3.5 Uploading complementary information for a patient by excel file.

Users(doctors) can upload excel file form their computer, uploaded files contain extra information about the patient like the drugs the patient used and the date and the dosage of each, when the users upload the file, the file information will be transferred from excel to SQL DB, then save the information in the system database. This process is explained in figure (5.5).

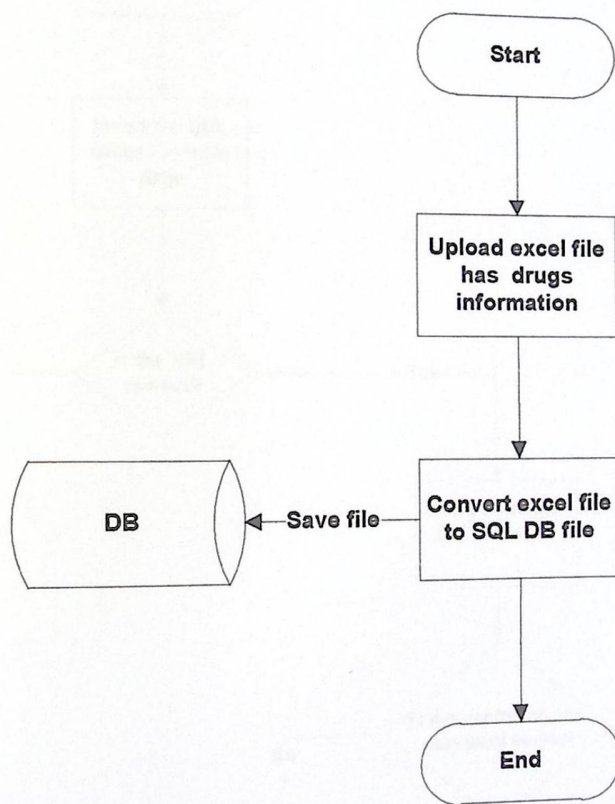


Figure 5.5 Upload excel sheet flowchart

5.3.6 Login

The system offer hidden secured login page, to let administrators enter to the system and execute administration process. The admin can access hidden login page by typing specific URL in address bar. After that, the administrator inserts his username and password to login. If inserted data are correct, the administrator can access administrator pages, but if username or password does not correct, the system show error message and deny the access. This process explained in figure (5.6).

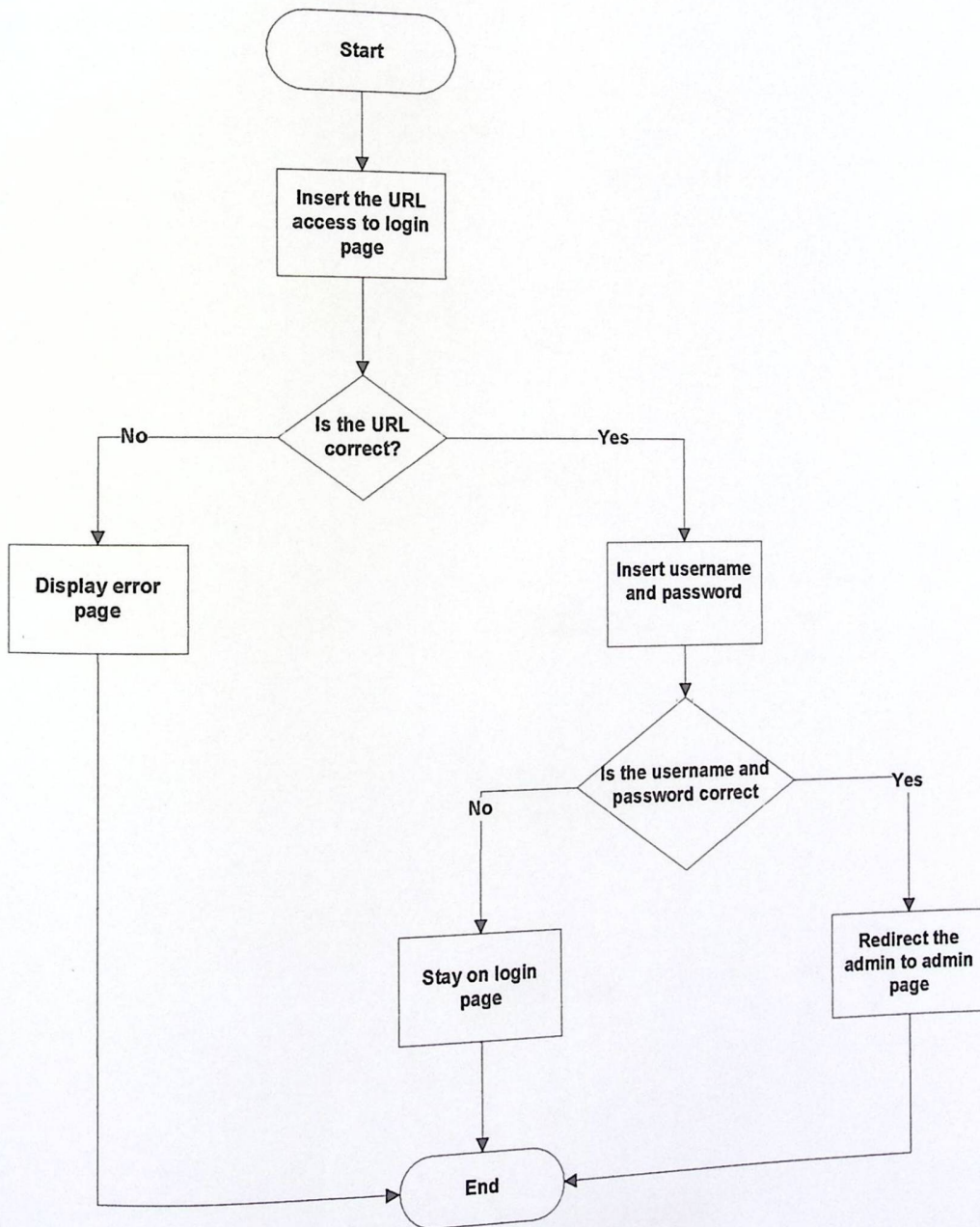


Figure 5.6 Login flowchart

5.3.7 Periodic backup

In the periodic backup, the system makes backup for the database, database information will have backup even if there is no changes. The backup is done by setting the time of it, the backup of the system should be done at 12 am every day. As the patients information are critical, the backup is needed in case if failure that will cause loss of information. The process is shown in figure (5.7)

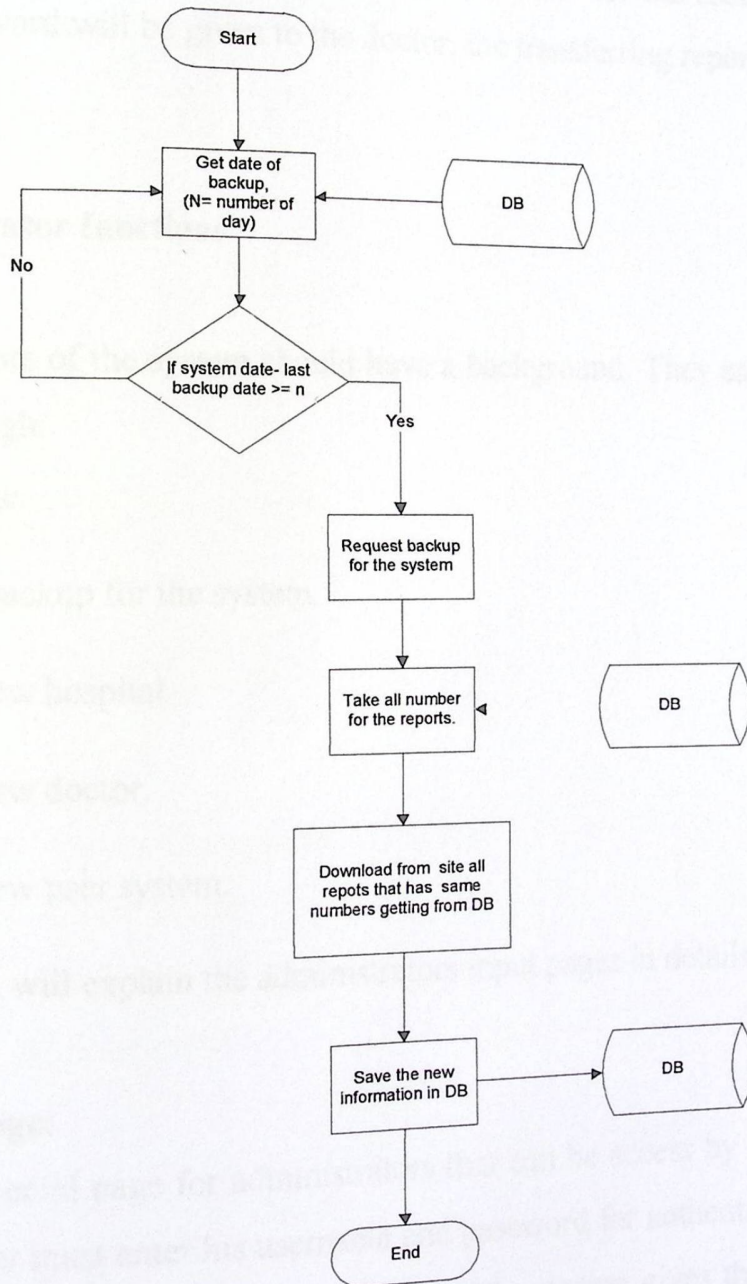
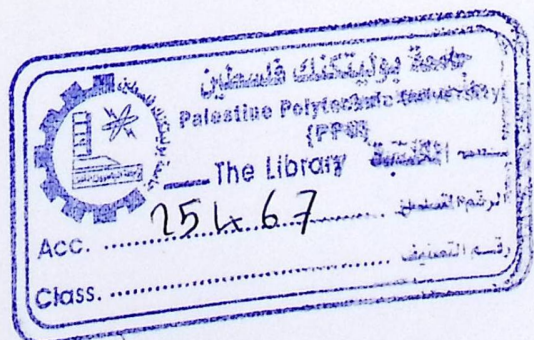


Figure 5.7 Backup flowchart



5.4 Input design

This section describes the screens through which the data can be entered to the system as explicit data or files.

Users (doctors) can insert data into the system through input screens, they can fill the attributes following 3 steps, and each step will be detailed. After the user finishes and click on submit button the system will ask for the user name (doctor name) and password will be given to the doctor, the transferring report will be saved in the database.

5.4.1 Administrator functions

The administrators of the system should have a background. They can interact with the system through:

- Login page.
- Periodic backup for the system.
- Adding new hospital.
- Adding new doctor.
- Adding new user system.

In the following, will explain the administrators input pages in details:

5.4.1.1 Login page:

Login page is special page for administrators that can be access by a special URL. The administrator must enter his username and password for authentication process. If the elements of authentication are right, then the system gives the administrator the permission to access his page otherwise the system will deny access to administrator's page, see figure (5.8).

Item	Type	Size	Source	Note
Username	Nvarchar	20	Administrator	Should be unique
Password	Nvarchar	20	Administrator	Must have complexity

Table 5.1 Authentication elements

Log in. Enter your user name and password below.

User name

Password

Remember me?

Log in

Figure 5.8 login page

5.4.1.2 Backup policy for the system's database:

Administrator can create backup for the database of the system, this way we can avoid the loss of data in case of failure. The hospital data are critical for patients so the backup must be done every day at 12 am. The page design is shown in figure (5.9).

Item	Type	Source
Number of Days	Int	Administrator

Table 5.2 Backup information.

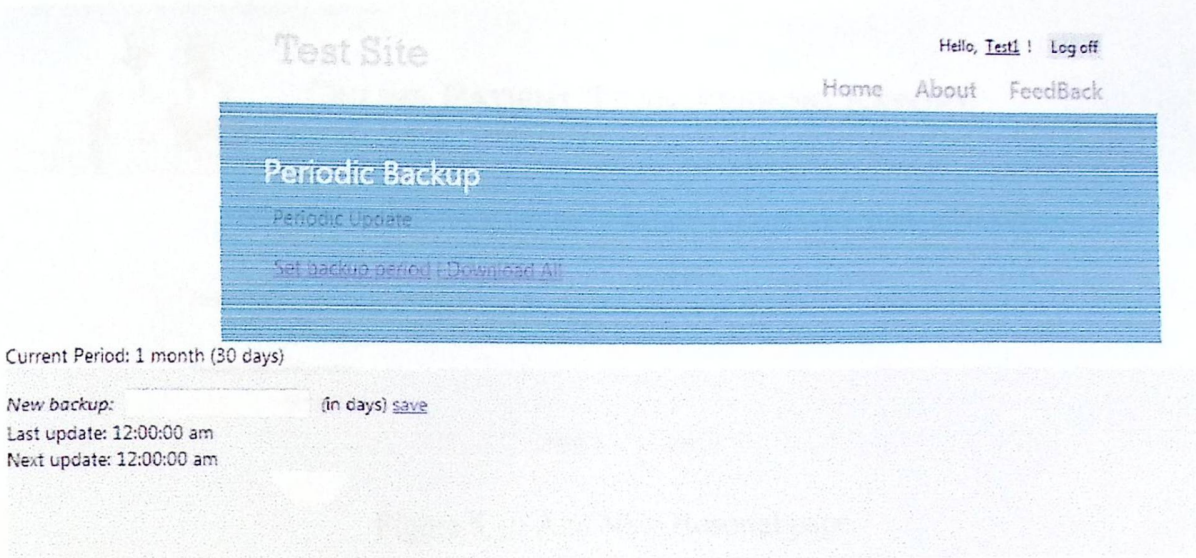


Figure 5.9 Periodic backup

5.4.1.3 Add new hospital information:

The administrator can add new hospital; the hospital name and telephone number will appear as drop down list when the user fills the report. Figure (5.10) shows adding new hospital page.

Name	Type	size	Source
Hospital Number	Int	3	System
Hospital Name	Text	20	Administrator
Hospital Tel.No	Text	9	Administrator
Fax Number	Text	9	Administrator

Table 5.3 New hospital information.

Figure 5.10 Add New Hospital page.

5.4.1.4 Add new doctor information:

The administrator can add new doctor; the doctor name will appear as drop down list when the user fills the report. Figure (5.11) shows adding new doctor.

Name	Type	size	Source
Doctor Number	Int	3	System
Doctor Name	Text	30	Administrator
Doctor TelNo	Text	9	Administrator

Table 5.4 New doctor information.

Figure 5.11 Add New Doctor page.

5.4.1.5 Add new system user information:

The administrator can add new user, this will be the user of the system, and each hospital has one or more users. Figure (5.12) shows adding new user information.

Name	Type	size	Source
User ID	Int	3	System
User name	Text	30	Administrator
User Password	Text	6	Administrator
Email	Text	9	Administrator

Table 5.5 New user information.

ONLINE PATIENT TRANSFERRING REPORT

Register Login

First Step Second Step Final Step FeedBack Advanced Search Basic Search Backup Upload

User ID: #1

User Name: _____

Password: _____

Confirm Password: _____

E-mail: _____

Submit Cancel

Figure 5.12 Add New user page.

5.4.2 User's functions

The users can make many the following processes through the input pages as the following:

- Upload excel sheet.
- Basic search.
- Advance search.
- General notes.
- Add new transferring report.
- Modify exist transferring report.
- Report of incoming transferring.

The following figure is the home page of the system:

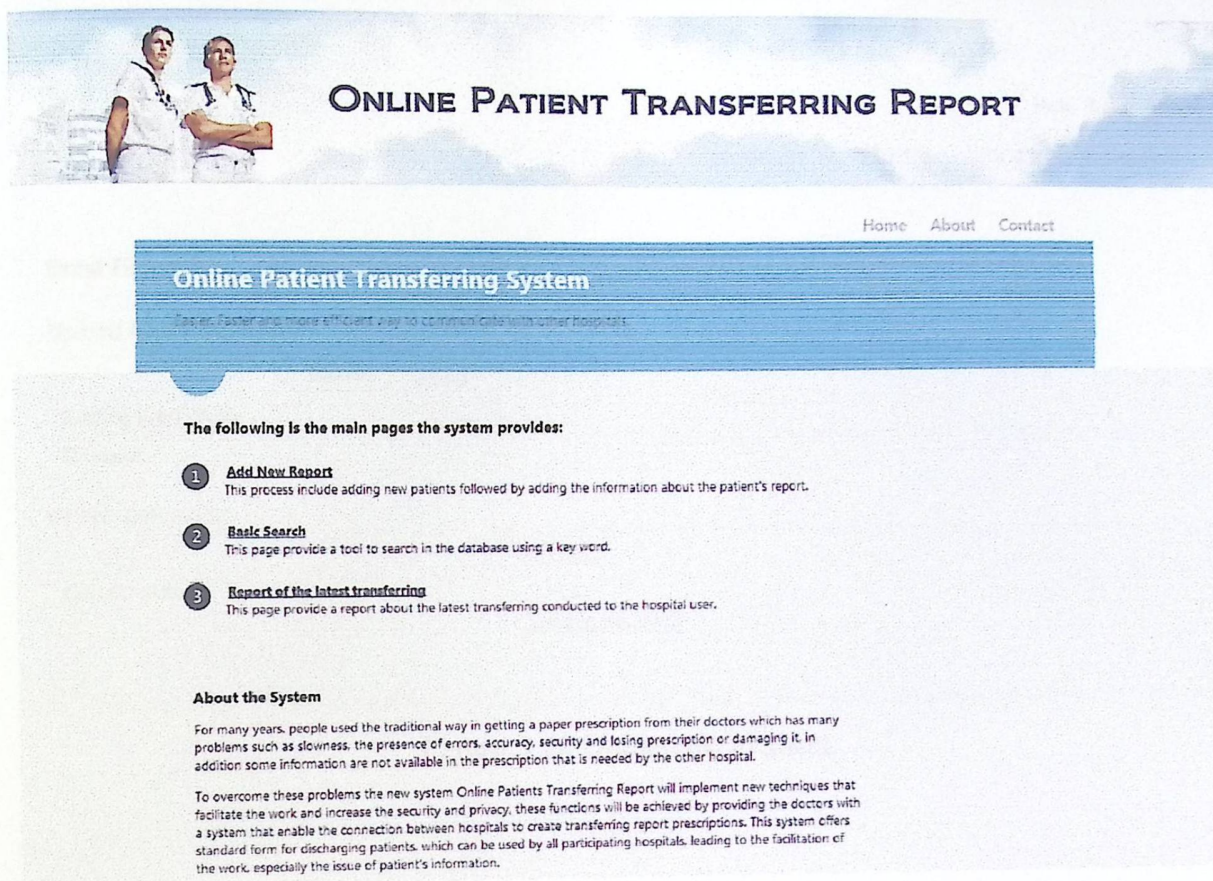


Figure 5.13 Home page of the system.

The following explains the users input pages in details:

5.4.2.1 Add complementary information (upload excel file):

The system enables the user(doctors) to add information by uploading an Excel file which contains the needed information, then the system adds this information to the database as new protein, see figure (5.14).

Item	Type	Source	Note
File name	Excel	User	Brows from user's computer

Table 5.6 Upload excel information

Excel File(s)

Upload New Excel Sheet

[Upload](#)

Existing Excel File(s):

Drugs.xls

conversion state:

[Convert](#)

Current state

[Load to database](#)

Figure 5.14 Upload excel sheet.

5.4.2.2 Basic search:

As shown in figure (5.15), the page contains basic search mechanism; the system enables the users to enter any keyword to search in the Database.

Item	Type	Source
Keyword	Text	User
Hospital Name	Text	User

Table 5.7 Basic search using key word

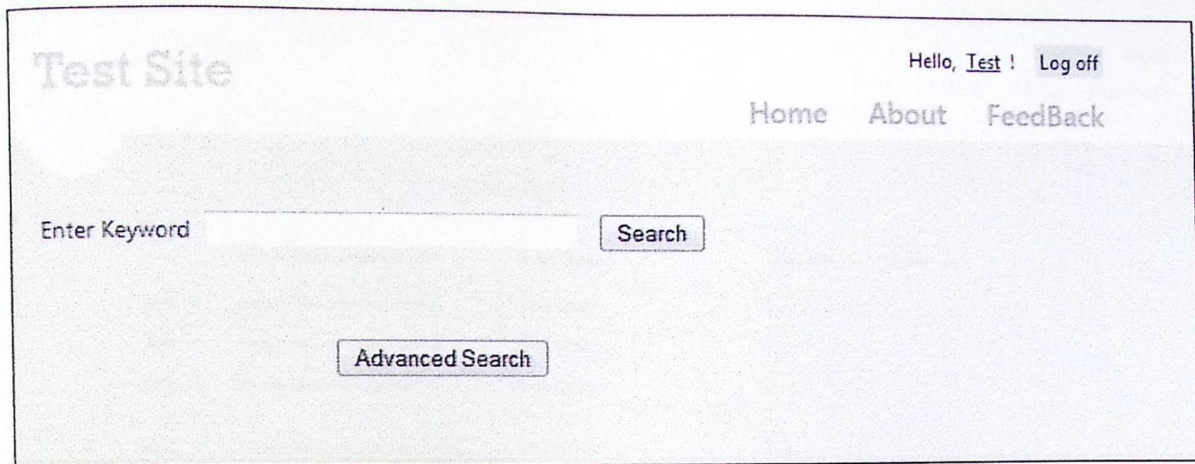


Figure 5.15 Basic search

5.4.2.3 Advanced search:

The system enables the browsers to search in the Database based on selecting specific attributes and searching inside this property for specific information. The system also enables the browsers to make combining search about more than one property at the same time and use logical operation (and, or and not) to combine between properties, see figure (5.16).

Item	Type	Source
Filed	Text	User
Logical operation	Text	User

Table 5.8 Input data for advanced search.

Test Site Hello, Test ! Log off
Home About FeedBack

Simple Search

	choose Field Hospital Number ▾	Enter Query <input type="text"/>	<input type="button" value="Add Row"/>	<input type="button" value="Search"/>
AND ▾	choose Field Hospital Number ▾	Enter Query <input type="text"/>	<input type="button" value="+"/> <input type="button" value="-"/>	
AND ▾	choose Field Hospital Number ▾	Enter Query <input type="text"/>	<input type="button" value="+"/> <input type="button" value="-"/>	
AND ▾	choose Field Hospital Number ▾	Enter Query <input type="text"/>	<input type="button" value="+"/> <input type="button" value="-"/>	
AND ▾	choose Field Hospital Number ▾	Enter Query <input type="text"/>	<input type="button" value="+"/> <input type="button" value="-"/>	

Chose Hospital: <All Hospital>

- Hospital Number
- Patient Number
- Medication History
- Attachment Number
- Hospital Nme
- Transformation Date
- Status at discharge
- Patient Name
- Patient Tel
- Hospital Tel
- Discharge Medication

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Figure 5.16 Advanced search.

5.4.2.4 General notes:

The system offers a form to enable the users (doctors) to communicate with the administrators of the system by sending a note about any error or feature in the system. See figure (5.17).

Item	Type	Size	Source
Name	Text	30	User
Subject	Text	20	User
Message	Text	200	User

Table 5.9 Feedback information.

Doctor Name:
 Telephone Number:
 Subject:
Message:

Figure 5.17 General notes

5.4.2.5 Add new transferring report:

The system offers a form to enable the browsers to add new transferring report information and send it to the database to be saved there, the user will fill the blanks of the transferring report in 4 steps; the first page has information about the patient, the other steps have information about the report. Figure (5.18) shows the first page of the transferring report.

Register Login

First Step Second Step Final Step FeedBack Advanced Search Basic Search Backup Upload

First Name: Middle Name: Third Name: Family Name:

DOB: DOD:

Gender: Male Female

Telephone Number:

Fax Number:

Next

Figure 5.18 First page of the transferring report

After the user finishes filling the blanks of the report he should click on next button to proceed to the next page that has the report information, the user can chose the name of the doctor were the system will refer the number of it. It also has general examinations about the patient as shown in figure (5.19).

The screenshot shows a web application interface for an online patient transferring report. At the top, there is a header with a blue sky background and two medical professionals. The title "ONLINE PATIENT TRANSFERRING REPORT" is centered in the header. Below the header, there is a navigation menu with the following items: "First Step", "Second Step", "Final Step", "FeedBack", "Advanced Search", "Basic Search", "Backup", and "Upload". On the right side of the header, there is a user greeting "Hello, Al-Ahli!" and a "Log off" link. The main content area contains several form fields: "Serial Number: #1", "Patient Number: #1", "DOA:" with a calendar icon, "Referring Doctor: Deab Tamimi" with a dropdown arrow, "Chief Complain:" with a text input field, "History of present illness:" with a large text area, "Past medical history:" with a text input field, and "Family History:" with a text input field. At the bottom center of the form area, there is a "Next" button.

Figure 5.19 General examinations about the patient

Step three; this page has information like physical examination as continuing to the previous step. The page has a next button to go to the next and last page of the report as shown in figure (5.20).

Hello, [Al-Zhi](#) ! [Log off](#)

Hospital Name: Hospital Telephone Number:

PHYSICAL EXAMINATION:

Vital Signs:

T	Bp	Pulse	RR	Wt	Length	HC
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

General appearance:

Skin:

H.N.E.N.T:

Chest:

Heart:

Skeletal:

Neurological:

Abdomen:

Investigations:

CBC

HGB	MCV	WBC	Neut.%	L.%	PLT	RDW
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Blood G

PH	PCO2	PO2	HCO3	BE
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

CSF Analysis

T.Cells	WBC	Neut%	Sugar	Protein
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

NA	K	CL	Ca	Urea	Creatinine	RBS
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Mg	SGOT	SGPT	Bilirub.T	Bilirub.D	Alc.Phos
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Figure 5.20 Third page of transferring report.

The final step is step 4 where the user fills the needed information and after that the user should click on submit button where the information will be saved in the database as a new transferring report. Figure (5.21) shows step 4.

ONLINE PATIENT TRANSFERRING REPORT

Hello, Al-Ahli! Log off

First Step Second Step Final Step FeedBack Advanced Search Basic Search Backup Upload

EEG: pending report

Urine Analysis: WBC: RBC: Chest x-ray:
Blood Culture: Urine Culture: CSF Culture:

Hospital course and management:

Status on discharge:

Diagnosis:

Discharge Medications:

Recommendations:

Submit Cancel

Figure 5.21 Last page of transferring report.

When the user enter click on submit button the system will ask for the doctor name and password as shown in the figure (5. 22) if the user name and the password are correct the system will accept the report and it will be saved in the database, if the user name or the password the system will deny the request.

Enter your user name and password below.

User name

Password

Remember me?

Figure 5.22 Log in page

Item	Type	Size	Source
Serial Number	Int	6	System
Patient Number	Int	6	User
First Name	Text	10	User
middle Name	Text	10	User
Third Name	Text	10	User
Family Name	Text	10	User
Patient Tel. No	Text	9	User

Fax Number	Text	9	User
Gender	Int	1	User
DOB	Date	8	User
DOA	Date	8	User
DOD	Date	8	User
Status	Int	1	System
Chief Complain	Text	40	User
History of present illness	Text	500	User
Past medical history	Text	500	User
Family history	Text	100	User
Physical examination			
T	Float	3.1	User
Bp	Text	5	User
Pulse	Int	3	User
RR	Int	3	User
Wt	Int	3	User

Length	Int	3	User
HC	Float	3.1	User
General appearance			
Skin	Text	100	User
H.N.ENT	Text	100	User
Chest	Text	100	User
Heart	Text	100	User
Abdomen	Text	100	User
Skeletal	Text	100	User
Neurological	Text	100	User
Investigations			
BCB			
HGB	Int	3	User
MCV	Int	3	User
WBC	Int	3	User
Neut.%	Float	3.1	User

L %	Float	3.1	User
PLT	Int	3	User
RDW	Int	3	User
NA	Int	3	User
K	Int	3	User
CL	Int	3	User
Ca	Int	3	User
Urea	Int	3	User
Creatinine	Int	3	User
RBS	Int	3	User
Mg	Int	3	User
SGOT	Int	3	User
SGPT	Int	3	User
Brilirub.T	Int	3	User
Brilirub.D	Int	3	User
Alk.Phos	Int	3	User

Blood G.			
PH	Int	3	User
PCO2	Int	3	User
PO2	Int	3	User
HCO3	Int	3	User
BE	Int	3	User
CSF Analysis			
T. Cells	Int	3	User
WBC	Int	3	User
Neut%	Int	3	User
Sugar	Int	3	User
Protein	Int	3	User
EEG: pending report			
Urine analysis			
RBC	Int	3	User
WBC	Int	3	User

Blood Culture	Text	30	User
Urine Culture	Text	30	User
CSF Culture	Text	30	User
Chest x-ray	Text	30	User
Hospital course and management	Text	100	User
Status on discharge	Text	100	User
Diagnosis	Text	100	User
Discharge Medications	Text	100	User
Recommendations	Text	100	User

Table 5.10 Transferring Report information

5.4.2.6 Modify an existing transferring report:

The system offers a form to enable the browsers to modify existing report information and send it to the database modified there. The user first has to search for the report he/she wants to modify and then open the report with the information filled before, the user can chose any field to modify it, for example he can Recommendation field to change the information there. Figure (5.23) shows the modified portion information form.

Test Site Hello, Test1 ! [Log off](#)
[Home](#) [About](#) [FeedBack](#)

Hospital Name: Al-Ahli Hospital Telephone Number: 02-2257447

PHYSICAL EXAMINATION:

Vital Signs:

T	Bp	Pulse	RR	Wt	Length	HC
37.5	120/80	93	70%	80	170	30

General appearance:

Skin: Normal
H.N.ENT: Normal
Chest: Normal
Heart: Normal beating
Skeletal: Normail
Neurological: Normal

Investigations:

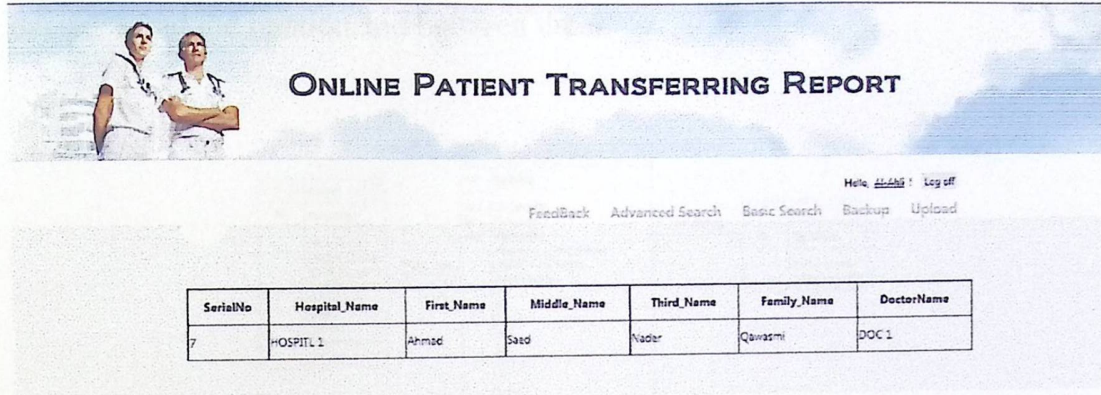
CBC

HGB	12	MCV	54	WBC	70	Neut.%	89	L %	80	PLT	70	RDW	65
-----	----	-----	----	-----	----	--------	----	-----	----	-----	----	-----	----

Figure 5.23 Modifying page

5.4.2.7 Report of incoming transferring:

After the user send the report to the receiver hospital, the receiver one can see it through a report page of the latest incoming transferring as shown in figure (5.24)



SerialNo	Hospital_Name	First_Name	Middle_Name	Third_Name	Family_Name	DoctorName
7	HOSPITAL 1	Ahmed	Said	Nader	Qawasmi	DOC 1

Figure 5.24 Report page of incoming transferring

5.5 Database design

This section describes the system database in details.

5.5.1 Object class diagram

Figure shows the object class diagram that describes all tables in the system database and the relationship between them.

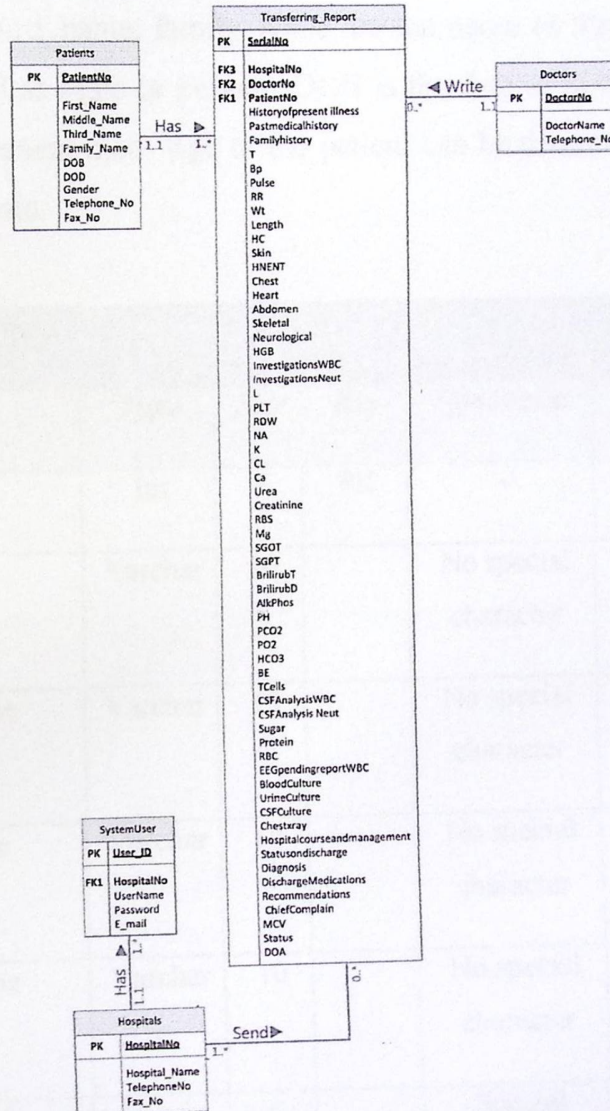


Figure 5.25 Object class Diagram

5.5 Database design

This section describes the system database in details.

5.5.1 Object class diagram

Figure shows the object class diagram that describes all tables in the system database and the relationship between them.

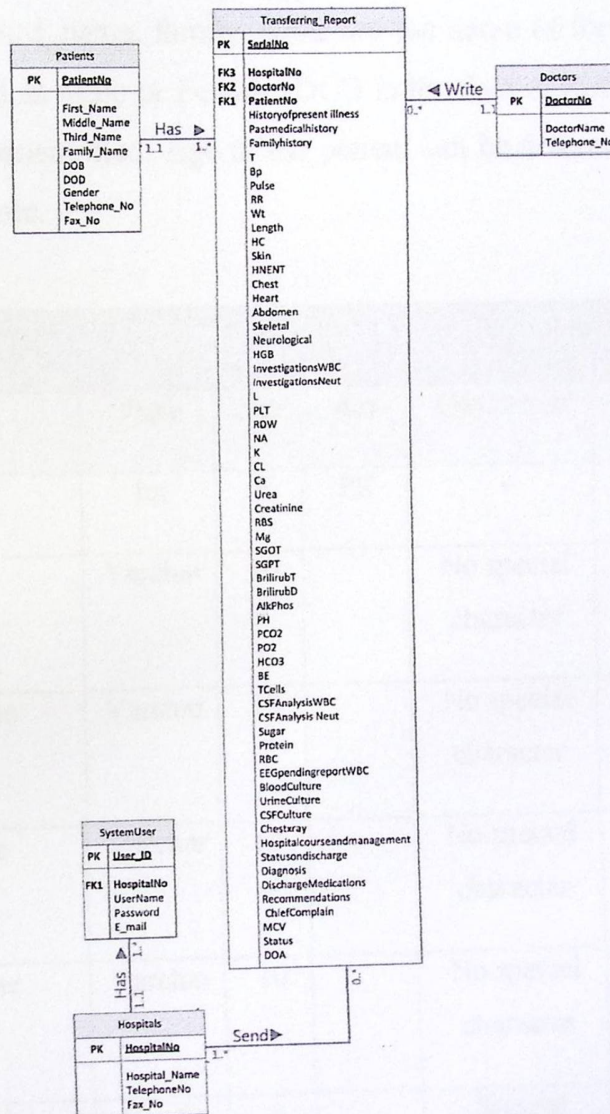


Figure 5.25 Object class Diagram

5.5.2 Data dictionary

The following tables describe all database tables and properties size, data type and some constrains.

5.5.2.1 Patients:

This table contains the information about patients to be transferred. Starting with PatientNo is Number and it's the primary key for the table. First_name, middle_name, third_name, family_name are the name of the patient. Gender is to be determined as Male or Female. DOB is the date of birth, DOD is the date of death if the patient died. Age of the patient can be determined by the system using the birth date.

Description:

<i>Table Name: Patient</i>						
<i>Attribute</i>	<i>Type</i>	<i>Size</i>	<i>Key</i>	<i>Constraint</i>	<i>Null?</i>	<i>Description</i>
PatientNo	Int	6	PK	-	No	
First_Name	Varchar	10		No special character	No	
Middle_Name	Varchar	10		No special character	Yes	
Third_Name	Varchar	10		No special character	Yes	
Family_Name	Varchar	10		No special character	No	
Telephone_No	Varchr	9		Special Character		
Fax_No	Varchar	9		Special Character		

DOB	Date	8		-	No	Date of birth
DOD	Date	8		-	Yes	Date of death
Gender	Int	1			No	

Table 5.11 Data dictionary of Patients Table

5.5.2.2 Hospitals:

This table has all the information about the hospitals that are participated in the system as users. It includes HospitalNo as number and primary key of the table. Hospital_Name is the name of the hospital of type character.

<i>Table Name: Hospitals</i>						
<i>Attribute</i>	<i>Type</i>	<i>Size</i>	<i>Key</i>	<i>Constraint</i>	<i>Null?</i>	<i>Description</i>
HospitalNo	Int	3	PK	-	No	
Hospital_Name	Varchar	20		-	No	
TelephoneNo	Varchar	9			Yes	
Fax_No	Varchar	9			Yes	

Table 5.12 Data dictionary of Hospitals Table

5.5.2.3 Doctors:

This table has the information about the doctors who issues the transferring report, the name of the doctor is written on the report. This table has DoctorNo as primary key with Int type. DoctorName which includes the name of the doctor and its type is character.

<i>Table Name: Doctors</i>						
<i>Attribute</i>	<i>Type</i>	<i>Size</i>	<i>Key</i>	<i>Constraint</i>	<i>Null?</i>	<i>Description</i>
DoctorNo	Int	3	PK	-	No	
DoctorName	Varchar	30		-	No	
Telephone_no	Varchar	9			Yes	

Table 5.13 Data dictionary of Doctors Table

5.5.2.4 System user:

This table has the description of system users attributes, User_ID is the primary key for the table, and user name is text type with a length of 20, password for the user with length 6 characters at least.

<i>Table Name: SystemUser</i>						
<i>Attribute</i>	<i>Type</i>	<i>Size</i>	<i>Key</i>	<i>Constraint</i>	<i>Null?</i>	<i>Description</i>
User_ID	Int	3	PK	-	No	
UserName	varchar	20			No	
Password	varchar	6			No	
E_mail	varchar	9			No	

Table 5.14 Data dictionary of system user Table

5.5.2.5 Transferring Report:

This table contains the information about the patient we want to transfer to other hospitals. Serial Number is the primary key, its type is Integer. DoctortNo, PatientNo, HospitalNo are foreign keys. Other attributes and their type are described in the table.

Admission Report						
	Type	Size	Key	Constraint	Null?	Description
AdmissionNo	Int	6	PK	-	No	
HospitalNo	Int	3	FK	-	No	
DoctorNo	Int	3	FK	-	No	
PatientNo	Int	6	FK	-	No	
DOA	Date	8			No	date of admission
HistoryOfPresentIllness	Varchar	500			No	
PastMedicalMistory	Varchar	500			No	
FamilyHistory	Varchar	100			No	
T	Float	3.1			No	
Bp	Varchar	5			No	
Pulse	Int	3			No	
RR	Int	3			No	
Wt	Int	3			No	
Length	Int	3			No	
HC	Float	3.1			No	
Skin	Varchar	100			No	
HNENT	Varchar	100			No	
Chest	Varchar	100			No	

Table Name: Trasferring_Report

<i>Attribute</i>	<i>Type</i>	<i>Size</i>	<i>Key</i>	<i>Constraint</i>	<i>Null?</i>	<i>Description</i>
SerialNo	Int	6	PK	-	No	
HospitalNo	Int	3	FK	-	No	
DoctorNo	Int	3	FK	-	No	
PatientNo	Int	6	FK	-	No	
DOA	Date	8			No	date of admission
HistoryOfPresentIllness	Varchar	500			No	
PastMedicalMistory	Varchar	500			No	
FamilyHistory	Varchar	100			No	
T	Float	3.1			No	
Bp	Varchar	5			No	
Pulse	Int	3			No	
RR	Int	3			No	
Wt	Int	3			No	
Length	Int	3			No	
HC	Float	3.1			No	
Skin	Varchar	100			No	
HNENT	Varchar	100			No	
Chest	Varchar	100			No	

<i>Attribute</i>	<i>Type</i>	<i>Size</i>	<i>Key</i>	<i>Constraint</i>	<i>Null?</i>	<i>Description</i>
Heart	Varchar	100			No	
Abdomen	Varchar	100			No	
Skeletal	Varchar	100			No	
Neurological	Varchar	100			No	
HGB	Int	3			No	
MCV	Int	3			No	
WBC	Int	3			No	
Neut	Float	3.1			No	
L	Float	3.1			No	
PLT	Int	3			No	
RDW	Int	3			No	
NA	Int	3			No	
K	Int	3			No	
CL	Int	3			No	
Ca	Int	3			No	
Urea	Int	3			No	
Creatinine	Int	3			No	
RBS	Int	3			No	
Mg	Int	3			No	
SGOT	Int	3			No	
SGPT	Int	3			No	

<i>Attribute</i>	<i>Type</i>	<i>Size</i>	<i>Key</i>	<i>Constraint</i>	<i>Null?</i>	<i>Description</i>
BrilirubT	Int	3			No	
BrilirubD	Int	3			No	
AlkPhos	Int	3			No	
PH	Int	3			No	
PCO2	Int	3			No	
PO2	Int	3			No	
HCO3	Int	3			No	
BE	Int	3			No	
TCells	Int	3			No	
WBC	Int	3			No	
Neut	Int	3			No	
Sugar	Int	3			No	
Protein	Int	3			No	
RBC	Int	3			No	
WBC	Int	3			No	
BloodCulture	Varchar	30			Yes	
UrineCulture	Varchar	30			Yes	
CSFCulture	Varchar	30			Yes	
Chestx_ray	Varchar	30			Yes	
HospitalCourseand Management	Varchar	100			No	

<i>Attribute</i>	<i>Type</i>	<i>Size</i>	<i>Key</i>	<i>Constraint</i>	<i>Null?</i>	<i>Description</i>
StatusOnDischarge	Varchar	100			No	
Diagnosis	Varchar	100			No	
DischargeMedications	Varchar	100			No	
Recommendations	Varchar	100			No	

Table 5.15 Data dictionary of Transferring Report Table

CAPTER SIX

SYSTEM IMPLEMENTATION AND TESTING

6.1 System Implementation.

6.2 System Testing.

6.1 System Implementation

6.1.1 Introduction

This section will discuss the implementation phase that includes development environment requirements, physical equipment, tools, and required environment to implement the system.

1- Microsoft Visual Studio 2011

Microsoft Visual Studio is an Integrated Development Environment (IDE) from Microsoft, it's used as development environment, helps in finding errors and correct them, design system interfaces, activate the Web.NET and help in execute instructions. Also, it supports different programming languages by language service which allows for editor and debugger to support many programming languages. These languages are C/C++, C#, F#, J#, VB.NET and others. Also, it include a built-in tools as Graphical User Interface (GUI) application, class designer, database schema designer, and web designer, Figure (6.1) shows this environment.

To develop the project we use ASP.NET technology with VB.NET language, which are included in visual studio environment.

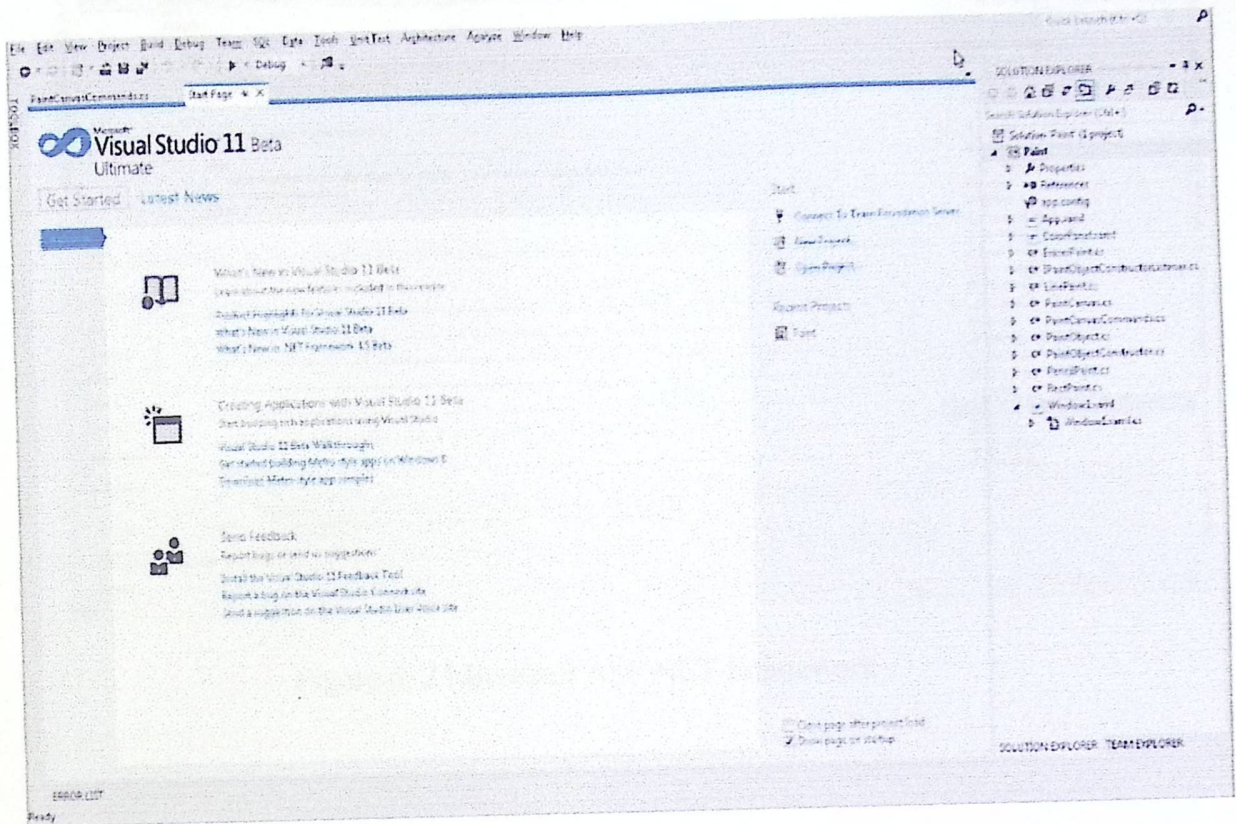


Figure 6.1 Microsoft Visual Studio 2011

2- Microsoft ASP.NET

ASP.NET is a unified Web development model offered by Microsoft that includes all service necessary to create enterprise-class Web applications. It contain programs like Visual Studio.NET and Visual Web Developer that allow for developers to develop dynamic websites by a visual interface that write by code and scripts. ASP.NET is part of the .NET Framework. The developer can code the application in any language compatible with the common language runtime (CLR) such as Microsoft Visual Basic and C# that enable the developer to develop ASP.NET applications, Figure(6.2) shows screenshot for asp.net program.

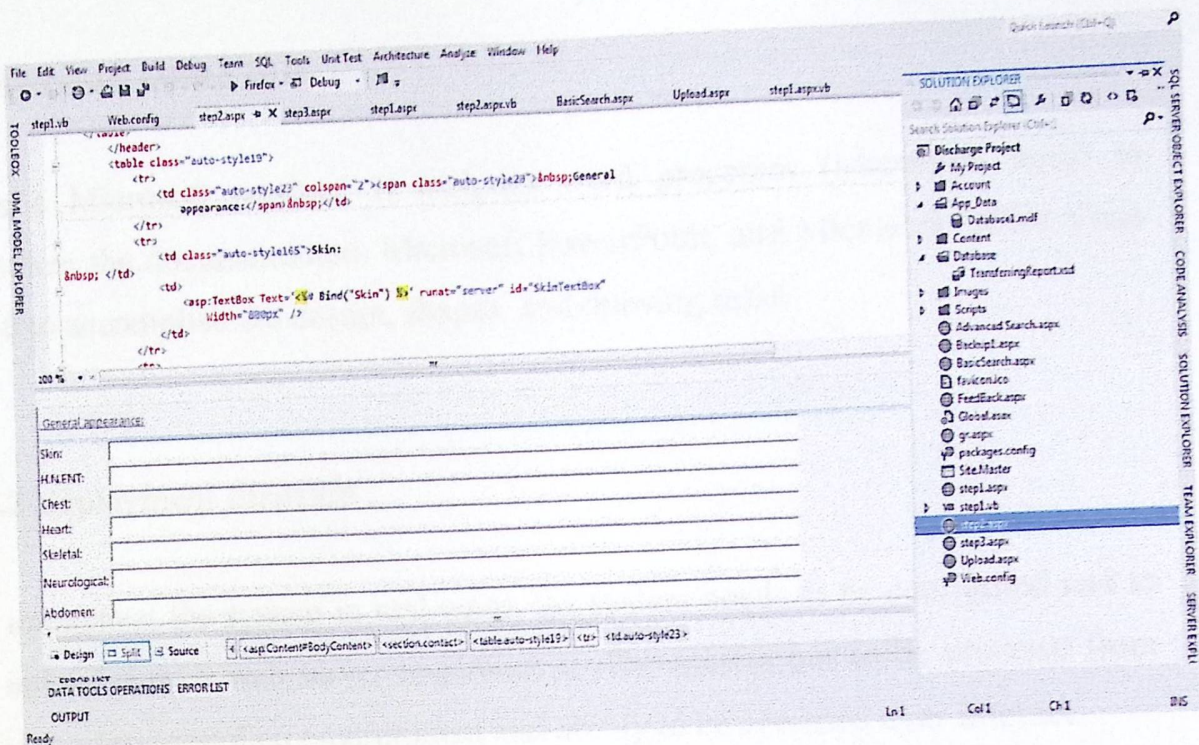


Figure 6. 2 Microsoft ASP.NET Framework

3- Microsoft SQL Server 2008

SQL Server provides a complete and easy platform for databases including database creation, controlling, and management. It supports three types of authentication: SQL Server authentication, Windows Authentication, and Mixed mode which use both types. SQL Server has many features. Firstly, stored procedure; is a mediator between program page and database that used to build and examine procedure for one time and use it at any time. Secondly, default value where can establish a number of a default value for desired fields. Thirdly, determine rules for fields so any field would not accept any data does not meet rules. Finally, support a large number of users at the same time.

SQL Server 2008 supports structured and semi-structured data include audio, video, and digital media formats for picture and other multimedia data. SQL Server 2008 can store different varieties of data as XML, calendar, document, email, and file. Also offers many tools like analysis, sharing, search, and query.

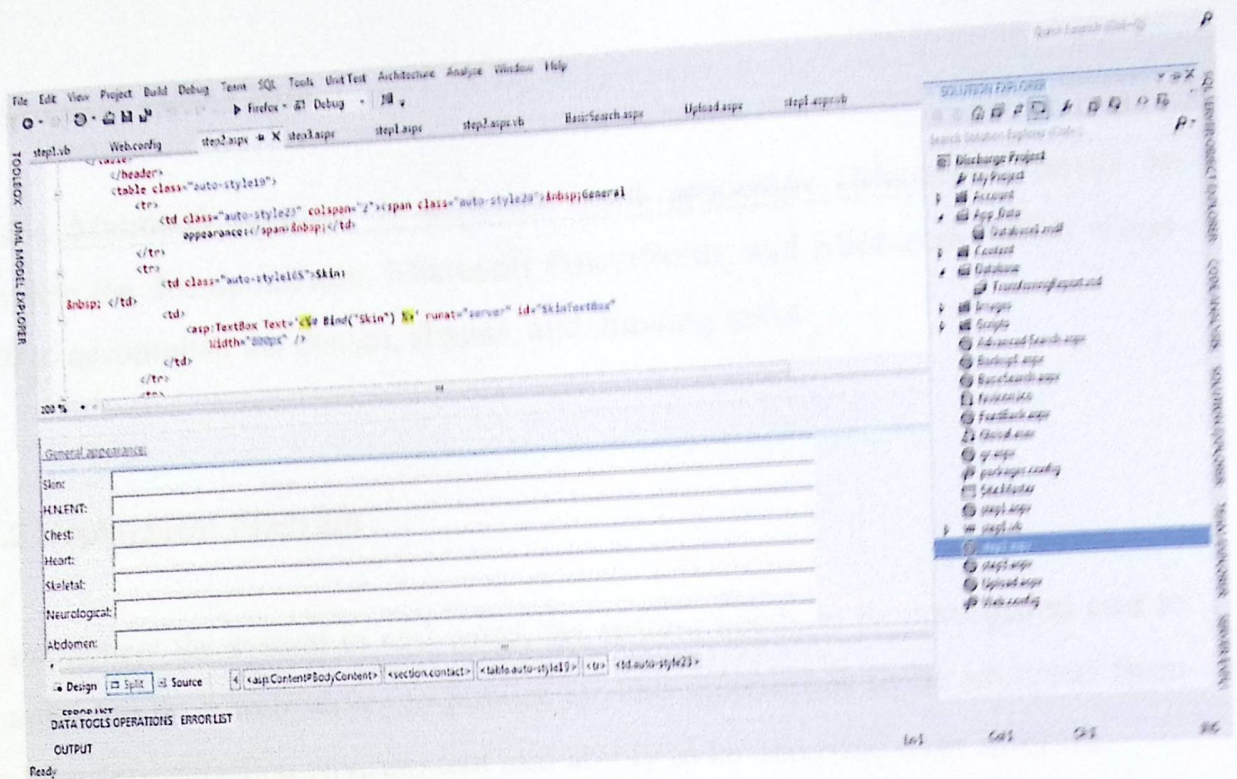


Figure 6. 2 Microsoft ASP.NET Framework

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SQL Server provides a complete and easy platform for databases including database creation, controlling, and management. It supports three types of authentication: SQL Server authentication, Windows Authentication, and Mixed mode which use both types. SQL Server has many features. Firstly, stored procedure; is a mediator between program page and database that used to build and examine procedure for one time and use it at any time. Secondly, default value where can establish a number of a default value for desired fields. Thirdly, determine rules for fields so any field would not accept any data does not meet rules. Finally, support a large number of users at the same time.

SQL Server 2008 supports structured and semi-structured data include audio, video, and digital media formats for picture and other multimedia data. SQL Server 2008 can store different varieties of data as XML, calendar, document, email, and file. Also offers many tools like analysis, sharing, search, and query.

4- Microsoft Office 2010

It is a Microsoft product. It includes word processor (Microsoft word) to complete the documentation, Microsoft PowerPoint, and Microsoft Office Visio 2010 to accomplish the design, shapes, and drawing tasks.

6.1.2 Deployment diagram

To implement the system in real world, the system needs to be configured and to be uploaded on a web server to publish it. The system has to be browsed from any browser-controlled environment and ability to be accessed over Internet. To offer the ability for all clients to access the website without need to install any additional components on their desktop, the system designed as a Three-Tier Architecture shown in figure (6.4).

Three-Tier Architecture has three layers as a following:

1. User interface layer representing web pages.
2. Business logic, it uses classes and builds functions in it, these classes receive data as parameter and pass the parameters to the procedure in the database, so it is an intermediary between the user interface and database procedure.
3. DBMS includes stored procedures that execute SQL statements in databases, which is used to insert, update and delete data.

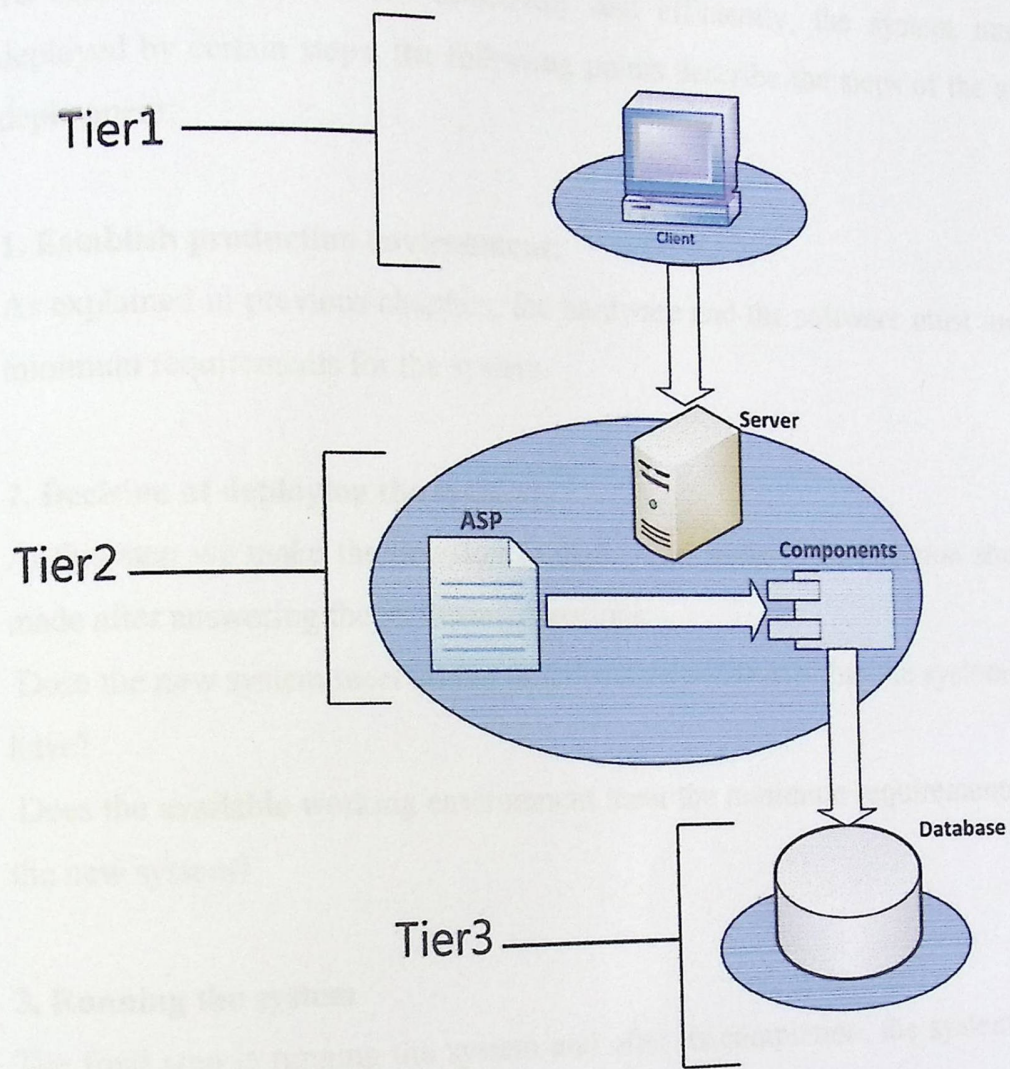


Figure 6. 3 Three-Tier structure

6.1.3 System installation

To make the system work effectively and efficiently, the system must be deployed by certain steps; the following points describe the steps of the system deployment:

1. Establish production environment:

As explained in previous chapters, the hardware and the software must meet the minimum requirements for the system.

2. Decision of deploying the system:

At this step we make the decision to deploy the system, the decision should be made after answering the following questions:

Does the new system meet all the functional requirements that the system should have?

Does the available working environment meet the minimum requirements to run the new system?

3. Running the system

The final step is running the system and after its completion, the system should be running.

In this project the deployment need many hardware and software requirements and these requirement are:

1- Web Server, it will be used to put the application on it to publish it over the internet.

2- Database server will used to put the application database on it.

3- Internet connection to let researchers access the website over the internet.

6.2 System Testing

6.2.1 Introduction

Testing is very important step before deliver the system to ensure that the system work as expected and satisfy the system requirements.

The system need testing phase to check the efficiency and the effectiveness of the system. The system will be test according to these levels:

1- Unit testing.

2- Sub-system testing.

3- Integration testing.

1- System testing.

6.2.2 Unit testing

In this phase we divide the system into separate components, and then testing each component separately to ensure that each unit achieves the requirements.

The system contains many unit testing cases, these cases are search testing, upload excel file, backup the system database.

In this section we will discuss "upload excel file" as an example for unit testing.

Case	Test case	Expected Result	Actual Result
1	Server goes down	Destination Connection error	Error message
2	Lose the connection with the database	Connection establish error	Error message
3	All information uploaded correctly.	Upload excel information to the database	successful message

Table 6.1 Unit testing cases

Case 1:

This test is about connection to server, so we will turn off internet connection, and then browse the excel file, figure (6.4) will show test result.

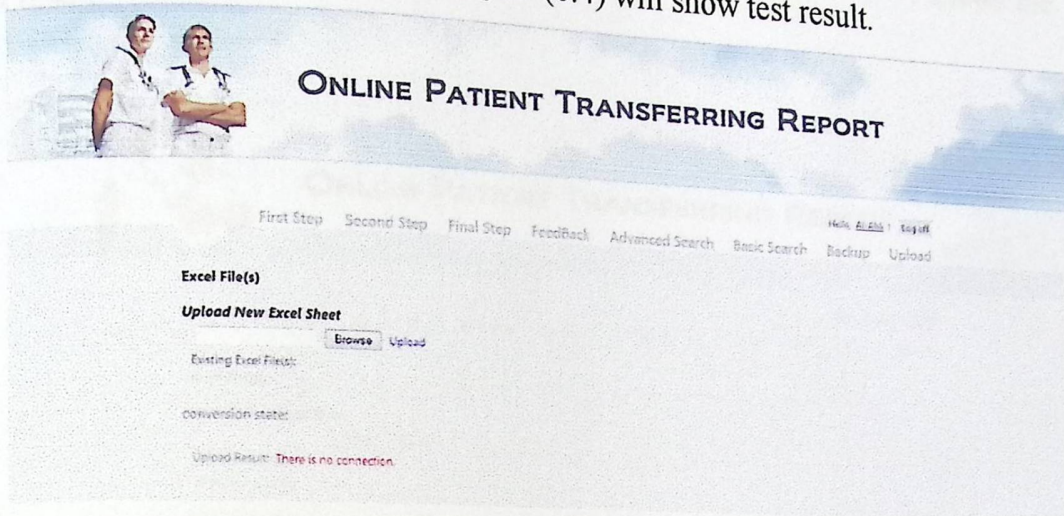


Figure 6.4 Upload testing case 1

Case 2:

This test is about connection to database, so when we select the file and try to upload it, the system will send an error message as shown in the figure (6.6).

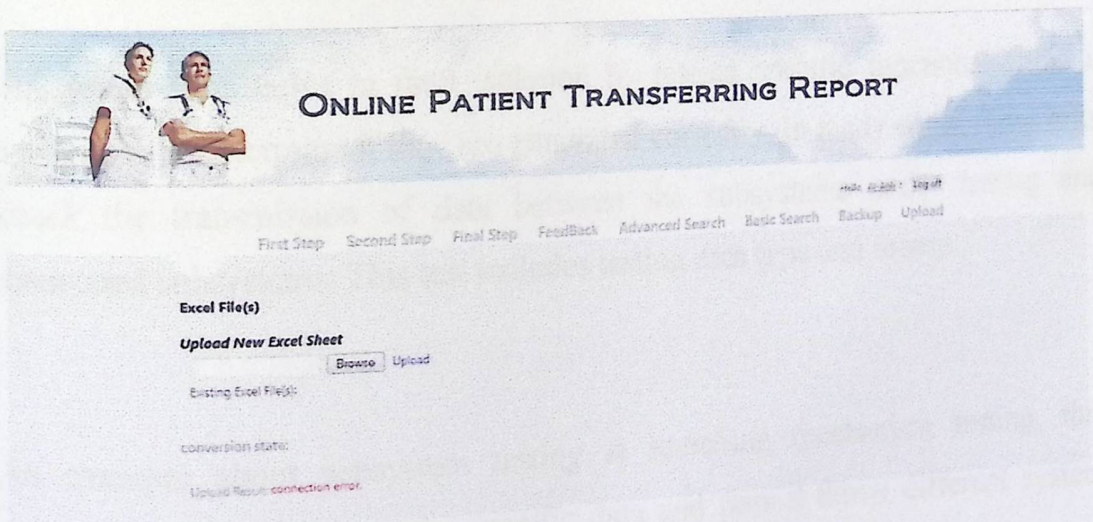


Figure 6.5 Upload testing case 2

Case 3:

This test shows a successful uploading for the excel file, figure (6.7) shows the test result.

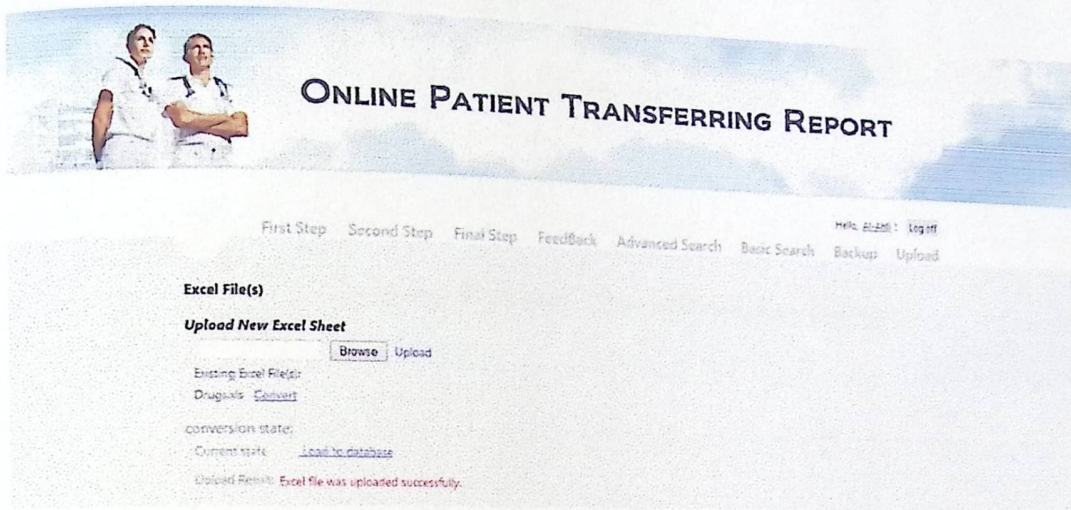


Figure 6.6 Upload testing case 3

6.2.3 Subsystem testing

Subsystem tests help in fault isolation by testing specific functions within a subsystem to determine if they are generated correctly. In many cases, these tests check the transmission of data between the subsystems under testing and associated subsystems. This test includes testing data type and format.

An example about subsystem testing is searching mechanism testing, this subsystem works to search for specific data and pass it through different system pages. Table (6.2) shows test cases.

Case	Test case	Expected Result	Actual Result
1	No words were entered to search about.	User validation	Validation will be shown
2	Enter wrong word	Suggest correct words	Word correction
3	Get more than one result	List results	List the results desired

Table 6.2 Subsystem testing cases

Case one result is shown in Figure (6.7).

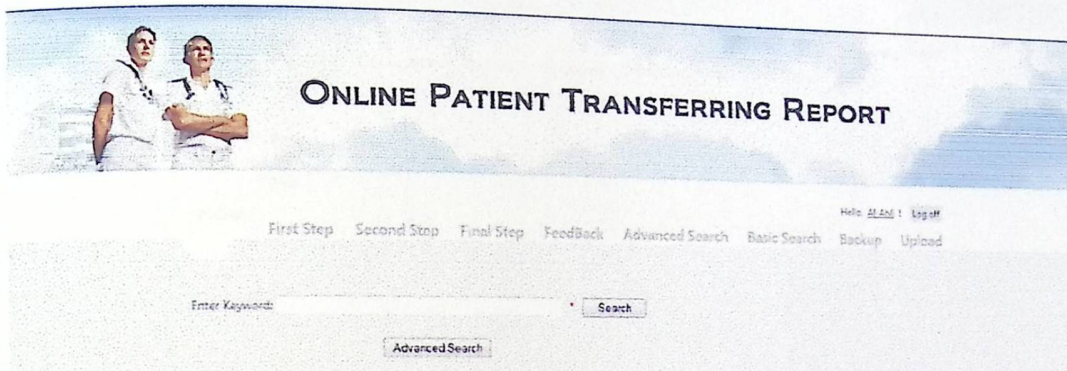


Figure 6.7 Search testing

6.2.4 Integration testing

This phase tests the integral functions as one unit to make sure that the individual modules are combined and tested as a group, completely compatible and matching the requirements. The example we will take for this testing is "contribute to add new transferring report".

The table below shows many states about this testing.

Entered values	Expected Result	Actual Result
The user did not enter all the required fields.	Validation controls and error summary	Validation required will arise
enter required information correctly	Accept the contribution.	Send the contribution to the database.

Table 6.3 Integrated testing cases

This system has three types of contributions: modify existing reports, add new report and general notes. All these contributions have special information. Figure (6.8) shows testing of add new report information.

ONLINE PATIENT TRANSFERRING REPORT

First Step Second Step Final Step FeedBack Advanced Search Basic Search Backup Upload Help Admin Log off

Doctor Name:

Telephone Number:

Subject:

Message:

- Please enter your name.
- Please enter the telephone number.
- Please write the message.

Send Cancel

Figure 6.8 Add new report testing

6.2.5 System testing

This phase of testing aims to validate the system accuracy, performance and efficiency, also this test simulates a real data under environment requirements.

The system is tested by the users and the administrator trying to simulate the real environment to make sure that the system functioning just like the real environment.

CHAPTER SEVEN

CONCLUSION AND ECOMMENDATIONS

7.1 Conclusion

7.2 Recommendation

7.1 Conclusion

The results of this analysis are to provide new system software to conduct and coordinate the transferring between hospitals. Hospitals can be informed about the latest transactions, provide the necessary assistance and medication to the arrived patient and save lives by offering the right procedures to the patients based on the information coming from the previous hospital. The rapid speed of technological development forces and its effects on strategies forces us to keep up with the changing environment that demands the use of latest technologies in their business processes. Archiving using paper based era is disappearing; new system software is the best solution for it.

The system is implementable and can be used in the scope of the project as it mentioned before. The system can also be used for any other hospital outside the boundaries of the scope, it can be improved and provide other functions to serve the medical sector, it can include bank of information with data like blood type in case we need volunteers that have a rare type.

7.2 Recommendations

The team members recommend the ones who work in the field:

1. Improve the system to have bank of information about the patients.
2. Improve the system to include the issuing of Prescription online and integrate it with pharmacy system.

2.1 Conclusion

The results of this analysis are to provide new system solutions to reduce and
optimize the transferring between hospitals. This can be achieved through
the use of telemedicine, provide the necessary information and education to the
patient and care lines by offering the right opportunities to the patient
and on the minimum coming from the previous hospital. The right system
of technology and equipment can be used to provide the right system
to deal with the changing environment. The hospital can use of their
resources in their business process. Reducing costs, improve quality of
care, and provide better outcomes for the patient.

The system can also be used for the patient, their family, and
the community. It can be used to provide the right system to
provide the medical sector. It can include the use of telemedicine, reducing the
cost of care, and provide better outcomes for the patient.

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References:

- Ball, E., Chadwick, D. W., and Mundy, D. (2003). Patient privacy in electronic prescription transfer. *IEEE*, 1:2, pp. 77-80.
- Palmer J. and Sutherland A. (1987). Problems associated with transfer of patients to a regional burns unit. *Injury*, 18:4, pp. 250-257.
- Schoenbaum, M., Afifi, A., and Deckerlbaum, R. (2005). *Strengthening the Palestinian Health System*. RAND Cooperation: Santa Monica.
- Joanne L. Callen, Melanie Alderton, Jean McIntosh. (2007). Evaluation of electronic discharge summaries: A comparison of documentation in electronic and handwritten discharge summaries.
- Victorian government Department of Human Services, Melbourne, Victoria.(2009), Rural and Regional Health and Aged Care Services Division
- Victorian Quality Council / Clinical Information and Knowledge Management
<http://www.health.vic.gov.au>.
- The Ministry of Health: Annual Health Aid Report(2010), retrieved from this website <http://www.moh.ps/?lang=0&page=4&pid=113>
- Bokra(2010): Retrieved from this website <http://www.bokra.net/article.aspx?id=1018213>