# **CIE203**

# **Software Engineering**

StethoMan

Medical Center Manager

Software Requirements Specifications

Team Name: SIGSEGV

November & 2016

Project: <Medical Center Manager>

# **Software Requirements Specifications**

#### **Contents**

**Team** 

**Document Purpose and Audience** 

**Introduction** 

Software Purpose

Software Scope

Definitions, acronyms, and abbreviations

**Requirements** 

**Functional Requirements** 

**Non Functional Requirements** 

**System Models** 

**Use Case Model** 

**Use Case Tables** 

**Ownership Report** 

**Policy Regarding Plagiarism:** 

Project: <Medical Center Manager>

### **Software Requirements Specifications**

#### **Team**

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#### **Document Purpose and Audience**

This document describes the software requirements for management of a medical center or clinic. It is intended for the manager of medical center, physicians working in the medical center and their patients

#### Introduction

#### **Software Purpose**

Nowadays most of our life is digitized instead of old fashioned papers, and it's hard to keep moving with papers that contains medical records. In addition to that, it's hard to remember all the medical information. In case of accidents or emergencies it's better to have full medical record for the patient.

Project: <Medical Center Manager>

#### **Software Requirements Specifications**

Thus, we will make an app that helps in management of medical centers. It stores the medical records and information of the patients, gives a notification to patients about medications they should take and facilitate the contact process between doctor and his patients.

This software should be able to help in management of medical centers and clinics. Moreover, it should offer patients all their medical information in an easy and efficient way.

Software name will be "Stehman" = "Stethoscope" + "Manager".

To make this software reachable, it will be available for downloading over the web for free but the project will be financed by advertising or a premium version of software without Ads can be purchased.

This software is intended for both Doctors and patients, it's a medical record for the patient and contains useful medical information, medical advice and medications information.

#### **Software Scope**

The major features of the software can be summarized in the following points:

- Management of Medical Centers by ability of adding (New Doctors who are working at the medical center – New Patient that has visited the center)
- Patients should be able to make an appointment with a doctor.
- Patients can view only all their medical records and history, contact their doctors for consulting and review doctors.
- Doctors can edit medical records of patients, add new medications or instructions to patients.
- Patients should receive notifications about the time of their medication.

#### Definitions, acronyms, and abbreviations

- StethoMan: Name of the software application. An abbreviation of "Stethoscope and Manager"
- Manager: The one who is responsible for managing the clinic or medical center (Neither Doctor nor Patient).
- Medical Record: Entry in medical history profile of a patient like blood investigation, backbone x-ray, e.t.c

Project: <Medical Center Manager>

#### **Software Requirements Specifications**

- Medical History: Whole medical profile of patient containing all medical records, visits to doctors and medications taken by patient.

#### **Functional Requirements**

#### 1- Manager:

- 1.1- Add New Doctor: A manager can add a new doctor working in the medical center (Name Address Email Phone Mobile Specialization Achievements and awards). (Complexity: 1)
- 1.2 Add Doctor Time Slots: A manager can add time slots that the doctor will be available at medical center. These time slots will be available to patients to reserve an appointment with doctor. (Complexity: 3)
- 1.3 Add New Patient: A manager can add a new patient (Name Mobile Address Mail National ID number) In addition to the patient blood and general info about him/her and unique ID is generated for each patient. (Complexity: 1)
- 1.4 Add To Any Medical Record: A manager can add laboratory investigation to the medical record for each patient by adding new item, defining type of medical record, the result from the record. (Complexity: 3)
- 1.5 **Add Visit Record:** Manager must store how many times the patient visit the medical center, when, why and the doctor name so that doctor will be able to view and edit medical history of patient. (Complexity: 3)
- 1.6 **Set number of visits in a slot:** A manager can choose maximum number of patients who can reserve an appointment with a doctor at a certain time slot at which the doctor will be available at the medical center. (Complexity: 2)
- 1.7 **Send Message:** A manager can send an offline message to both patients and doctors (Complexity: 4)
- 1.8 **Add New Manager:** A manager can add a new manager to the medical center that has the same privileges.(Complexity: 1)
- 1.9 **Cancel Time Slot:** A manager can cancel a doctor time slot then a notification should be sent to patients to inform them of the cancellation. (Complexity: 3)
  - 1.10 **Delete Patient:** A manager can delete an existing patient (Complexity: 2)
  - 1.11 **Delete Doctor:** A manager can delete an existing doctor (Complexity: 2)

Project: <Medical Center Manager>

### **Software Requirements Specifications**

1.12 **Confirm a Visit:** A manager can search for a time slot and confirm a patient request for visiting a doctor at this time slot

#### 2- Doctor:

- 2.1 **Doctor Edit Info :** A doctor can view and edit his basic data (Name Address Email Phone Mobile Password Achievements and Awards) only. (Complexity: 2)
- 2.2 View My Patient Medical History: A doctor can search for his/her patients only by his/her unique ID. He can also view the medical history of his/her patients ONLY! (Complexity: 3)
- 2.3 **Add Record to My Patient:** A doctor can add a new medical record for his/her patients only by adding new item, defining type of medical record, the result from the record. (Complexity: 3)
- 2.4 **Reply To Message:** A doctor can reply to messages from patients and managers. (Complexity: 4)
- 2.5 **Add Medication:** A doctor can add a new medication or treatment for his patients by adding a new medication and choose the period of taking the medication and for how long will the patient take it. In addition to general comment on medication. (Complexity: 3)

#### 3- Patient:

- 3.1 **Patient Edit Info:** A patient can view his basic data and edit (Name Address Email Phone Mobile password) only. (Complexity: 2)
- 3.2 **Set Appointment:** A patient can search for doctors in specific specialization then request to make an appointment with a doctor at his available time slots at the medical center. (Complexity: 2)
- 3.3 **View my Medical History:** A patient can view his medical reports, lab investigations and medications he takes. (Complexity: 2)
- 3.4 **Send Message:** A patient can contact Managers and his doctors only by sending an offline message. (Complexity: 4)
- 3.5 **Review Doctors:** A patient can review his doctors only in a scale from 1 to 10 and this scale should appear in doctor's' profile in front of any other patient. (Complexity: 5)

**Pay Doctor Fees:** A patient can pay fees of doctor after reservation by a credit card. This requirement won't be supported in our software but it'll be a good addition later. (Complexity: 5)

Project: <Medical Center Manager>

#### **Software Requirements Specifications**

#### 4- Registration Functionalities:

- 4.1- **Check Credentials:** Software should be able to check entered user id and password and verify that they match a correct combination in the users' database. (Complexity: 2)
- 4.3- **Forget Password:** A user can fill a forget password form that is sent to Managers to contact the user and supply him with new password. (Complexity: 4)
- 4.4- **Send Notifications:** Software should be able to send notifications to patients automatically to alert them with time of taking their medication or performing a laboratory investigation according to time entered by doctor / Send notifications to patients in case of time slot of a certain doctor is cancelled. (Complexity: 5)
- 4.5- **Close Slot:** Software should be able to close a doctor's time slot when maximum number of patients has been reached out at this slot. (Complexity: 3)
- 4.6- **Compress Image:** Software should be able to decrease resolution of any uploaded image in software and generate a unique name for it to link it with a data field in database. (Complexity: 3)

#### **Non-Functional Requirements**

#### -Interface

The software consists of three interfaces in English: the first is for the patient and the second interface is for the Doctor and the third one is for the manager. The interfaces should be simple and easy to deal with.

#### -Platform

Software should work on Android platform 4.0 or newer and supports android emulators on Windows platform.

#### -Performance

Project: <Medical Center Manager>

### **Software Requirements Specifications**

Software should have a short response time. All response times should be lower than 2 seconds except for searching operations should be lower than 5 seconds and adding new doctor or medical record with photo should take less than 15 seconds.

#### -Implementation

Programming Language: Java, MySQL, PHP

#### -End User License

The software should be financed over advertisement for free trial version. Or a premium version can be requested with no Ads. Premium version for the medical center software will have brand of medical center on it.

#### -Scalability

The premium version of software should be able to handle data of no more than 300 doctors and no more than 300,000 patients and up to 50 managers. However, the free version should handle data of no more than 5 doctors, 100 patient, and 1 manager.

#### -Security

- Each of the (Manager, Doctor and Patient) should have a password to log in to their account.

#### -On-line User Documentation

- The software should contain online user help that provide each user type with guidelines that help them using the software.

#### -Language Accessibility

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### **Software Requirements Specifications**

- The software should support at least English language with possibility of adding new languages in the future.

#### -Database

- A manager can save a backup from the software database in premium version software.

#### -Availability

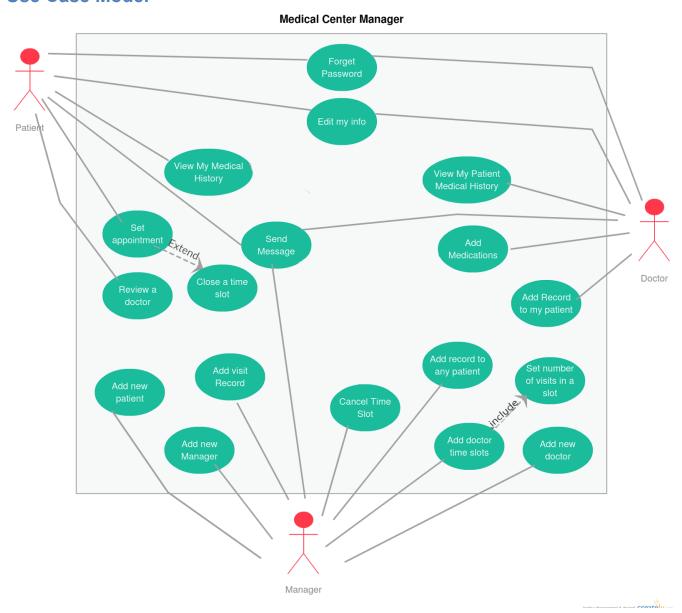
- The software should provide 99.9999% availability to the user.

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### **Software Requirements Specifications**

#### **System Models**

#### **Use Case Model**



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# **Software Requirements Specifications**

#### **Use Case Tables**

Use Case ID:	1.1		
Use Case Name:	Add New Doctor		
Actors:	Manager		
Pre-conditions:	Check that User performing the action is a Manager and number of added doctors is less than the maximum allowed number of doctors.		
Post-conditions:	A new user of type "Doctor" has been added to the database of the application having all the credentials of a Doctor.		
Flow of events:	User Action	System Action	
	1- Enter Doctor Name, phone, mobile, address, mail, specialization, photo, achievements and awards.	2- System Verify data and add new doctor entry with unique id to the	
		database.	
Exceptions:	User Action	System Action	
	1- Enter Doctor Name, phone, mobile, address, mail, specialization, achievements and awards.		
		2- Some of data fields are empty / data of user already exists.	
	3- display message to user to Insert data into missed fields /		

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	User already exists change data or cancel operation.	
Includes:	4.6 Compress a photo	

Use Case ID:	1.2	
Use Case Name:	Add Doctor Time Slot	
Actors:	Manager	
Pre-conditions:	Check that User performing the action	on is a Manager.
Post-conditions:	A new time slot for a certain doctor has been added to database and patients can make an appointment through it.	
Flow of events:	User Action System Action	
	1- Enter Specialization.	
		2- Search for all doctors working in this specialization.
	3- choose a Doctor.	
	4- Choose date and time slot that the doctor will be available.	
	5- Set maximum number of patients who can register in this time slot	
		6- Add new time slot for this doctor in the database

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Ī	Includes	(1.6) Set number of visits in a slot

	_	
Use Case ID:	1.3	
Use Case Name:	Add New Patient	
Actors:	Manager	
Pre-conditions:	Check that User performing the action is a Manager and number of added patients is less than the maximum allowed number of patients.	
Post-conditions:	A new user of type "Patient" has been added to the database of the application having all the credentials of a patient.	
Flow of events:	User Action	System Action
	1- Enter patient Name, mobile, address, mail, blood type and general medical notes.	
		2- System Verify data and add new patient entry with unique id to the database.
Exceptions:	User Action	System Action
	1- Enter patient Name, mobile, address, mail, blood type and general medical notes.	
		2- Some of data fields are empty / data of user already exists
	3- display message to user to Insert data into missed fields /	

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Change data of repeated user or	
cancel operation.	

	1	
Use Case ID:	1.4	
Use Case Name:	Add to any medical record	
Actors:	Manager	
Pre-conditions:	Check that User performing the acti	on is a Manager.
Post-conditions:	A new entry of medical record has been added to database and linked with patient id.	
Flow of events:	User Action	System Action
	1- Enter Patient ID	
		2- Look for patient ID in database
	3- Choose medical record type	
	(X-ray - Lab investigation -	
	Medication - Other)	
	4- Enter description of medical	
	record.	
	5- Attach photo if needed	
		6- Compress photo added and add
		entry of medical record to
		database.
Exceptions:	User Action	System Action
	1- Enter Patient ID	

Project: <Medical Center Manager>

		2- Patient ID isn't found.
	3- Enter another ID or cancel operation.	
Notes and Issues:	When a photo of medical record is uploaded, its resolution should be decreased to 800*800px at most then generate a unique name for it so we can link its hyperlink with data field in database.	
Includes:	4.6 Compress a photo	

Use Case ID:	1.5		
Use Case Name:	Add Visit Record		
Actors:	Manager		
Pre-conditions:	Check that User performing the action is a Manager and Patient has requested a visit to this doctor.		
Post-conditions:	Doctor is able to add and edit medical records of patient.		
Flow of events:	User Action System Action		
	1- Enter Patient ID, Doctor ID and date		
		2- Look for patient ID & Doctor ID in database	
		3- If there is no link between doctor and patient add a new link to make doctor able to view and edit medical history of patient.	

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Exceptions:	User Action	System Action
	1- Enter Patient ID, Doctor ID and date	
		2- Patient ID is wrong or Doctor ID is wrong
	3- Enter Valid Ids or cancel operation.	

Use Case ID:	1.7			
Use Case Name:	Send Message	Send Message		
Actors:	User (Manager-Doctor-Patient)	User (Manager-Doctor-Patient)		
Pre-conditions:	Check that User performing the action is a registered user (Manager-Doctor-Patient).			
Post-conditions:	Message has been sent to the right destination second user (Manager-Doctor- Patient).			
Flow of events:	User Action	System Action		
	1- Enter user ID			
	2-User choose send message button			
	3- Enter the name of the second user (Doctor/ Patient/ manager) and the ID (destination)			

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		4- Look for user (patient/Doctor/Manger) ID in database
		5- Show user profile and ask for message content
	6- Enter Message content	
		7- Send email message to the other user ( Doctor/Patient/Manager).
		8- Display successful message to the first user after sending the message to the second user
Exceptions:	User Action	System Action
	1- Enter user ID	
		2- user ID is wrong is wrong and can't be found in the database
	3- Enter Valid Ids or cancel operation.	
Includes	(4.4)Send Notifications	

Use Case ID:	1.8
Use Case Name:	Add New Manager
Actors:	Manager

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Pre-conditions:	Check that User performing the action is a Manager and number of added managers is less than the maximum allowed number of managers.	
Post-conditions:	A new user of type "Manager" has been added to the database of the application having all the credentials of a manager.	
Flow of events:	User Action System Action	
	1- Enter manager Name, mobile, address, email, unique ID.	
		2- System Verify data and add new manager entry with unique id to the database.
Exceptions:	User Action	System Action
	1- Enter manager Name, mobile, address, email.	
		2- Some of data fields are empty / data of user already exists.
	3- display message to user to Insert data into missed fields / Change data or cancel operation.	
		Exceed the maximum number of registered manager.
	Error message	

Use Case ID:	1.9
Use Case Name:	Cancel Time Slot

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Actors:	Manager	
Pre-conditions:	Check that User performing the action is a Manager.	
Post-conditions:	An existing time slot for a certain doctor has been canceled from the database so patients can book an appointment through it.	
Flow of events:	User Action	System Action
	1- Enter Specialization.	
		2- Search for all doctors working in this specialization.
	3- choose a Doctor.	
	4- Choose date and time slot that the will be cancelled.	
		5- Cancel this time slot for this doctor and delete it from database.
		6- Notifications are sent to both the Patient and the Doctor through the Send Message case 1.7 and add notification by the system
Includes	(4.4)Send Notification	

Use Case ID:	1.10
Use Case Name:	Delete a Patient

Project: <Medical Center Manager>

Actors:	Manager	
Pre-conditions:	Check that User performing the action is a Manager	
Post-conditions:		
Flow of events:	User Action	System Action
	1- Enter Patient ID/Name.	
		2- System Verify that a user with Patient ID exists and display patient info to manager
	3- Confirm Action	
		4- Patient data is deleted
Exceptions:	User Action	System Action
	1- Enter Patient ID/Name	
		2- ID doesn't exist display error message to user
	3- Try another ID or cancel operation	

Use Case ID:	1.11
Use Case Name:	Delete a Doctor
Actors:	Manager
Pre-conditions:	Check that User performing the action is a Manager

Project: <Medical Center Manager>

Post-conditions:		
Flow of events:	User Action	System Action
	1- Enter Doctor ID/Name.	
		2- System Verify that a user with Doctor ID exists and display Doctor info to manager
	3- Confirm Action	
		4- Doctor data is deleted
Exceptions:	User Action	System Action
	1- Enter Doctor ID/Name	
		2- ID doesn't exist display error message to user
	3- Try another ID or cancel operation	

Use Case ID:	1.12	
Use Case Name:	Confirm a Visit	
Actors:	Manager	
Pre-conditions:	Check that User performing the action is a Manager	
Post-conditions:	-Doctor can view patient profile and add records -A notification is send to patient to confirm his visit	
Flow of events:	User Action	System Action

Project: <Medical Center Manager>

1- Search for upcoming Time Slots of Visits.	
	2- System Display info of all coming time slots
3- Select a specific time slot	
4- View Requests for visiting a doctor at this slot and confirm	
	5- a Visit record is added to patient history

Use Case ID:	2.1	
Use Case Name:	Edit Info	
Actors:	Doctor / Patient	
Pre-conditions:	Doctor is logged in and the edited profile id has same id as doctor logged in OR Patient is logged in and the edited profile id has same id as logged in patient.	
Post-conditions:	The doctor/Patient info is changed successfully in database	
Flow of events:	User Action System Action	
	1- User enter his/her edited info	
		2- System updates info of doctor/patient in database.

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Exceptions:	User Action	System Action
	1- User enter his/her edited info	
		2- some fields are empty try again
	3- Add data to empty fields or cancel operation	

Use Case ID:	2.2	
Use Case Name:	View My Patient Medical History	
Actors:	Doctor	
Pre-conditions:	The doctor is logged in and is linked one of his/her patients only)	to this patient profile (this patient is
Post-conditions:		
Flow of events:	User Action	System Action
Flow of events:	User Action  1- The doctor enters the patient's ID	System Action
Flow of events:	1- The doctor enters the patient's	System Action  2- System verify the patient's ID

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Exceptions:	User Action	System Action
	1- User enters patient's ID	
		2- ID is invalid or patient isn't one of the doctors' patients.
	3- Enter another ID or cancel operation	

Use Case ID:	2.3	
Use Case Name:	Add Record to My Patient	
Actors:	Doctor	
Pre-conditions:	Doctor is logged in and patient is one of the doctors' patients	
Post-conditions:	a data entry has been added to the patient profile in the database	
Flow of events:	User Action	System Action
	1- Enter Patient ID	
		2- Look for patient ID in database
	3- Choose medical record type (X-ray - Lab investigation - Medication - Other)	
	4- Enter description of medical record.	
	5- Attach photo if needed	

Project: <Medical Center Manager>

		6- Compress photo added and add entry of medical record to database.
Exceptions:	User Action	System Action
	1- Enter Patient ID	
		2- Patient ID isn't found.
	3- Enter another ID or cancel operation.	
Notes and Issues:	When a photo of medical record is uploaded, its resolution should be decreased to 800*800px at most then generate a unique name for it so we can link its hyperlink with data field in database.	
Includes:	4.6 Compress a photo	

Use Case ID:	2.5	
Use Case Name:	Add Medication	
Actors:	Doctor	
Pre-conditions:	Doctor is logged in	
Post-conditions:	A new medication record is added to patient profile and notifications are sent to patient to take medication on time	
Flow of events:	User Action	System Action
	1- Doctor enters the patient's ID	

Project: <Medical Center Manager>

		2- System shows the profile of the patient
	3- Doctor clicks on editing the medical record to add a medication	
	4- Doctor adds new medication , time at which medication takes & the period for which the patient take the medication	
		A new medication entry is added to database and notifications are sent to user at medication time.
Exceptions:	User Action	System Action
	1- Doctor enters the patient's ID	
		2- Invalid ID or patient isn't linked with doctor.
	3- Try another ID or cancel operation.	
Includes:	Send Notification (to alert patient to	take his/her medication)

Use Case ID:	4.3
Use Case Name:	Forget password

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Actors:	Patient / Doctor	
Flow of events:	User Action	System Action
	1- User press forget password button	
	2- User Enter his User ID	
		3- Sending a Message to Manager that User request new password
Exceptions:	User Action	System Action
		•
	2- User Enter his User ID	
	2- User Enter his User ID	3- Invalid User ID
	2- User Enter his User ID  4- Enter another ID or cancel operation.	

Use Case ID:	3.2
Use Case Name:	Set appointment

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Actors:	Patient	
Pre-conditions:	Patient is logged in & slot chosen by patient is empty	
Post-conditions:	If maximum number of patients registered in the slot so close this slot to prevent any further registration.	
Flow of events:	User Action	System Action
	1- User search for specialization he wants then choose Doctor name.	
		2- System shows available time slots.
	3-user choose an empty time slot.	
		4-system make the slot reserved and type patient name on it to be seen by doctor and manager.
		5- Notification is sent to manager by patient ID and reserved slot.
Exceptions:	User Action	System Action
	3-user choose an empty time slot.	
		4- User has registered for the same doctor in the same time slot before.

Project: <Medical Center Manager>

	5- You have registered before.	
Includes	(4.6) Close a Slot	

Use Case ID:	3.3	
Use Case Name:	View my medical history	
Actors:	patient	
Pre-conditions:	Patient is logged in	
Flow of events:	User Action	System Action
Flow of events:	1- User open his profile medical history	System Action

Use Case ID:	3.5

Project: <Medical Center Manager>

Use Case Name:	Review doctor	
Actors:	patient	
Pre-conditions:	Patient is logged in and patient is linked with doctor (has visited this doctor before)	
Post-condition s:	Doctor's reviewers increases by one and recalculate the review average.	
Flow of events:	User Action	System Action
	1- Choose Specializations and click the doctor's name	
		2- check that patient has visited the doctor before.
	3- User click on review (1 out of 5)	
		4- System add new review to doctor profile and calculates the new average
		5- System changes the review in database for this doctor
Exceptions:	User Action	System Action

Project: <Medical Center Manager>

1- Choose Specializations and click the doctor's name.	
	2- Patient hasn't visited the doctor before.
3- you can't review this doctor.	

Use Case ID:	4.1	
Use Case Name:	Check Credentials	
Actors:	User	
Post-conditions:	User is logged in and interface of this user is opened	
Flow of events:	User Action	System Action
	1- Enter User ID and password	
		2- System Verify data log in to user account
Exceptions:	User Action	System Action
	1- Enter User ID and password	
		2- User ID and password combination doesn't match.

Project: <Medical Center Manager>

### **Software Requirements Specifications**

	3- Error message displays to user	
ļ	to click on forgot Password or try	
	again.	

#### **Ownership Report**

Item	Owners
User Interface Design	Youhana Mourad & Randa Negm
Database Model and Design Process	Mohamed Maher & Omar Merghany
Patient Requirements Implementation	Randa Negm
Doctor Requirements Implementation	Youhana Mourad
Manager Requirements Implementation	Omar Merghany
Registration Requirements Implementation	Mohamed Maher
Testing & Maintenance	All of us

#### Policy Regarding Plagiarism:

- 1. تشجع الكلية على مناقشة الأفكار و تبادل المعلومات و مناقشات الطلاب حيث يعتبر هذا جو هريا لعملية تعليمية سليمة
  - 2. ساعد زملائك على قدر ما تستطيع و حل لهم مشاكلهم في الكود و لكن تبادل الحلول غير مقبول و يعتبر غشا.
    - 3. أى حل يتشابه مع أي حل آخر بدرجة تقطع بأنه منقول من نفس المصدر يعتبر أن صاحبيهما قد قاما بالغش.
      - 4. قد توجد على النت برامج مشابهة لما نكتبه هنا أي نسخ من على النت يعتبر غشا يحاسب عليه صاحبه.
        - 5. إذا لم تكن متأكدا أن فعلا ما يعد غشا فلتسأل المعيد أو أستاذ المادة.
      - 6. في حالة ثبوت الغش يأخذ الطالب سالب درجة المسألة ، وفي حالة تكرار الغش يرسب الطالب في المقرر.