2022

PATIENT RECORD MANAGEMENT SYSTEM (PRMS)

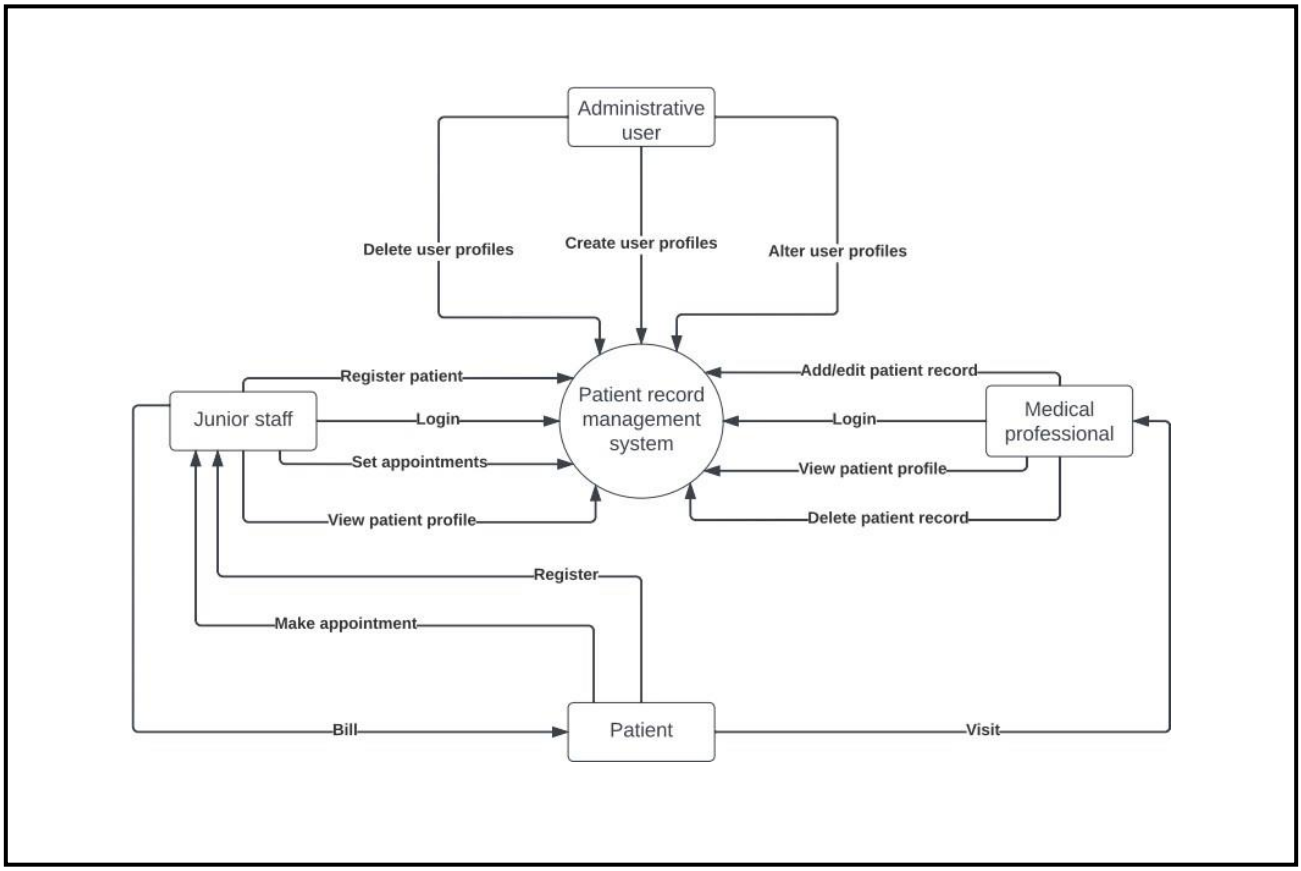
System Design prepared for St. Joseph Mercy Hospital

Names	USI	Contribution
Avinash Singh	1041161	System Architeture
Nicholus Sookraj	1039740	Context model
Nickel Thompson	1041541	User case
Jaden Totaram	1040519	Sequence diagram
Marion Glasgow	1039270	Class diagram
Martin Das	1039810	Activity diagram
Note: the tasks are randomly assigned based on how names are listed upon the group sign up sheet. Discussions are done via a whatsapp group, where the team has the opportunity to look over the assignments before submission and recommend any changes. All members are steadily contributing to the assignment overall.		

Table of Contents

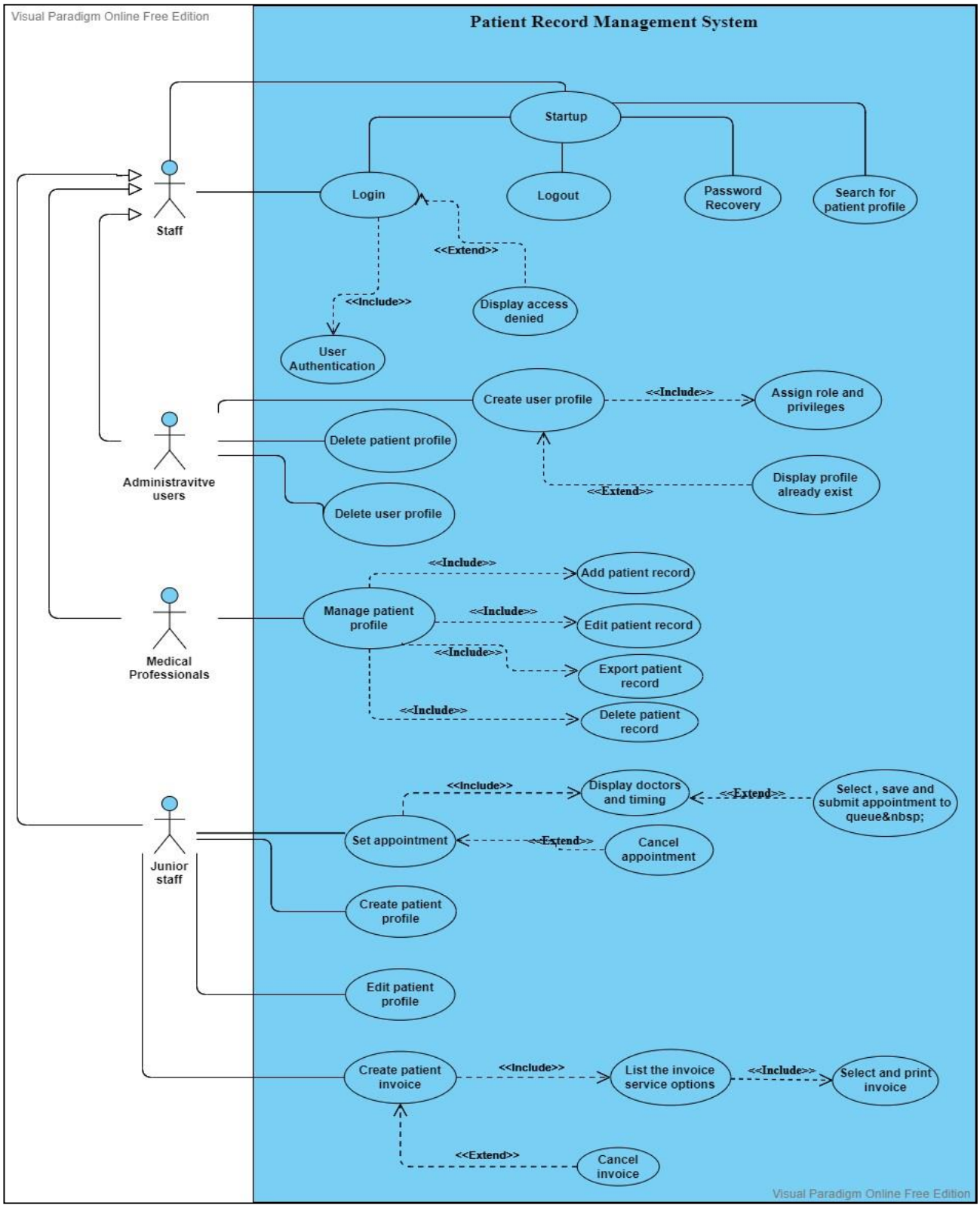
1. **Context model** **1**
2. **Use case model** **2-11**
3. **Sequence diagram** **12**
4. **Class diagram** **13**
5. **Activity diagram** **14**
6. **System Architecture design (MVC)** **15-16**

1. Context model



The diagram above maps the interaction between actors external to the system and their relationship with the system. The patient record management system is directly connected to 3 actors; administrative users, junior staff and medical professionals. Administrative users would gain access and control over all user profiles within the system as well as the ability to delete or add user profiles. Junior staffs would be responsible for handling patient registration matters as well as managing appointments and billing systems. Upon successful registration, patients are then queued and referred to medical professionals who then gains access to patient profiles and assumes full responsibility over all patient record management responsibilities.

2. Use case model



The use case model illustrates how different actors will interact with the Patient Record Management System. The administrative user, medical professionals, and junior staff members are the actors. Each use case is outlined as follows:

Staff use cases:

Use case name:	Startup
Sub-use case name:	Login
Actors	Administrative users, Medical Professionals, Junior Staff, login page
Description	A user is required to login to the system to access the PRMS database.
Data	Username and password
Stimulus	Prompt the user for access credentials
Response	If the login credentials are invalid, an error message will be displayed else the user will be sent to their dashboard.
Comments	The user must be registered in the system and will have 3 attempts to login.

Use case name:	Startup
Sub-use case name:	Logout
Actors	Administrative users, Medical Professionals, Junior Staff, logout page
Description	A user at the end of his/her shift will logout of the system.
Data	Not required
Stimulus	User will click on the logout button.

Response	The user is asked to confirm logout.
Comments	The logout option is available on every screen.
Use case name:	Startup
Sub-use case name:	Password Recovery
Actors	Administrative users, Medical Professionals, Junior Staff, password recovery page
Description	Any registered user can reset his/her password.
Data	Username, email address
Stimulus	The user will click on the reset password option and will input their username and email address.
Response	The user is sent a token to which will be used to reset the password
Comments	The reset password option is available on every screen.

Use case name:	Startup
Sub-use case name:	Search for patient profile
Actors	Administrative users, Medical Professionals, Junior Staff, search page
Description	A user has the ability to search for a patient profile.
Data	Patient first and last name.
Stimulus	User will click on the search icon on their dashboard, enter the patient's full name and hit "Enter" on their keyboard or click on the search button to start a search query.

Response	The user is taken to the patient profile if that is the only patient with that particular name or presented with a list of users with similar name.
Comments	A user must have appropriate permission to edit patient information.

Administrative users use cases:

Use case name:	Create user profile
Actors	Administrative users, create user page
Description	Administrative users have the ability to create new user profiles and assign necessary roles and privileges
Data	1. Bio data: Full Name, Date of Birth, Contact details (email, cell number and alternative number), Address, Job title, 2. Designation: Administrative user, Medical Professional, Junior Staff
Stimulus	The administrative user logins into the system and is presented with the admin dashboard. The administrative user clicks on "Create a new profile" where he/she will complete a form and click create.
Response	User is prompted with a message upon creation of the new profile.
Comments	A user must have appropriate permission to create a user profile.

Use case name:	Delete user profile
Actors	Administrative users, user profile
Description	Administrative users have the ability to delete a user profile.
Data	User full name

Stimulus	The administrative user will search for the user profile they would like to delete and open it. On the user profile the administrative user will click on “Delete Profile" button.
Response	The system will pop up a confirmation box stating “Yes” or “No” for deletion. After deletion all other authorized users/colleagues will receive an email stating that changes were made to the system by the colleague who enacted the deletion.
Comments	A user must have appropriate permission to delete a user profile.

Use case name:	Delete patient profile
Actors	Administrative users, patient profile
Description	Administrative users have the ability to delete a patient profile.
Data	Patient full name
Stimulus	The administrative user will search for the patient profile they would like to delete and open it. On the patient profile the administrative user will click on “Edit patient profile" button then select the “Delete profile” button.
Response	The system will pop up a confirmation box stating “Yes” or “No” for deletion.
Comments	A user must have appropriate permission to delete a patient profile.

Medical professional use cases:

Use case name:	Manage patient profile
Sub-use case name:	Add patient record

Actors	Medical Professionals, patient profile
Description	A medical professional has the ability to add medical records to a patient profile.
Data	Patient medical analysis
Stimulus	The medical professional while on a particular patient profile will select the "Add new record" button. This will prompt the user to select from a list of record types; Physical and Visual Examination, Measurement, Genetic Testing. St. Joseph, Diagnostic Imaging and Cellular and Chemical Analysis. The user will then fill out the form provided and hit the "Save" button
Response	A confirmation of the changes will be printed to screen and the record will be visible on the patient's profile.
Comments	The user must have appropriate privileges to add a record to the patient profile.

Use case name:	Manage patient profile
Sub-use case name:	Edit patient record
Actors	Medical Professionals, patient record
Description	A medical professional has the ability to edit medical records for a patient profile.
Data	Information old data is to be adjusted to.
Stimulus	The user while on the patient profile will click on the patient record to open it. The user will then click on the "Edit" button and makes changes where necessary. The user will then click on "Save changes" button to save the changes they made
Response	A confirmation of the changes will be printed to screen and the edited record will be visible on the patient's profile.
Comments	The user must have appropriate privileges to edit patients record.

Use case name:	Manage patient profile
Sub-use case name:	Export patient record
Actors	Medical Professionals, patient record
Description	A medical professional has the ability to export medical records for a patient profile for printing or dissemination.
Data	Patient medical record
Stimulus	While on the patient profile, the medical professional will click on the record they wish to export to open it. The medical professional will click on the "Export" button at the bottom of the record. The medical professional will then be prompted with a window asking to indicate the location to save the file. The user will then click on "Save" button to save the file to the specified location.
Response	A confirmation box displaying the location and name of the file will be printed to screen.
Comments	The user must have appropriate privileges to export patients record.

Use case name:	Manage patient profile
Sub-use case name:	Delete patient record
Actors	Medical Professionals, patient record
Description	A medical professional has the ability to delete medical records for patients.
Data	Patient medical record
Stimulus	The user while on the patient profile will click on the patient record to open it. The user will then click on the "Delete" button below the record. The user is then prompted with a "Yes" or "No" to confirm or deny deletion

Response	A confirmation box indicating deletion of record will be printed to screen
Comments	The user must have appropriate privileges to delete patient record.

Junior staff use cases

Use case name:	Set appointment
Actors	Junior staff
Description	The junior staff is the only user in the system in charge of scheduling patients' medical visits. After a potential or current patient's appointment information is filled out, it is queued to the appointment queue and forwarded to the doctor.
Data	Information on appointed time, date and doctor's name.
Stimulus	Prompt command to set appointment
Response	Procedures to add appointment to queue.
Comments	When creating an appointment, the user must be able to cancel the entire appointment if needed.

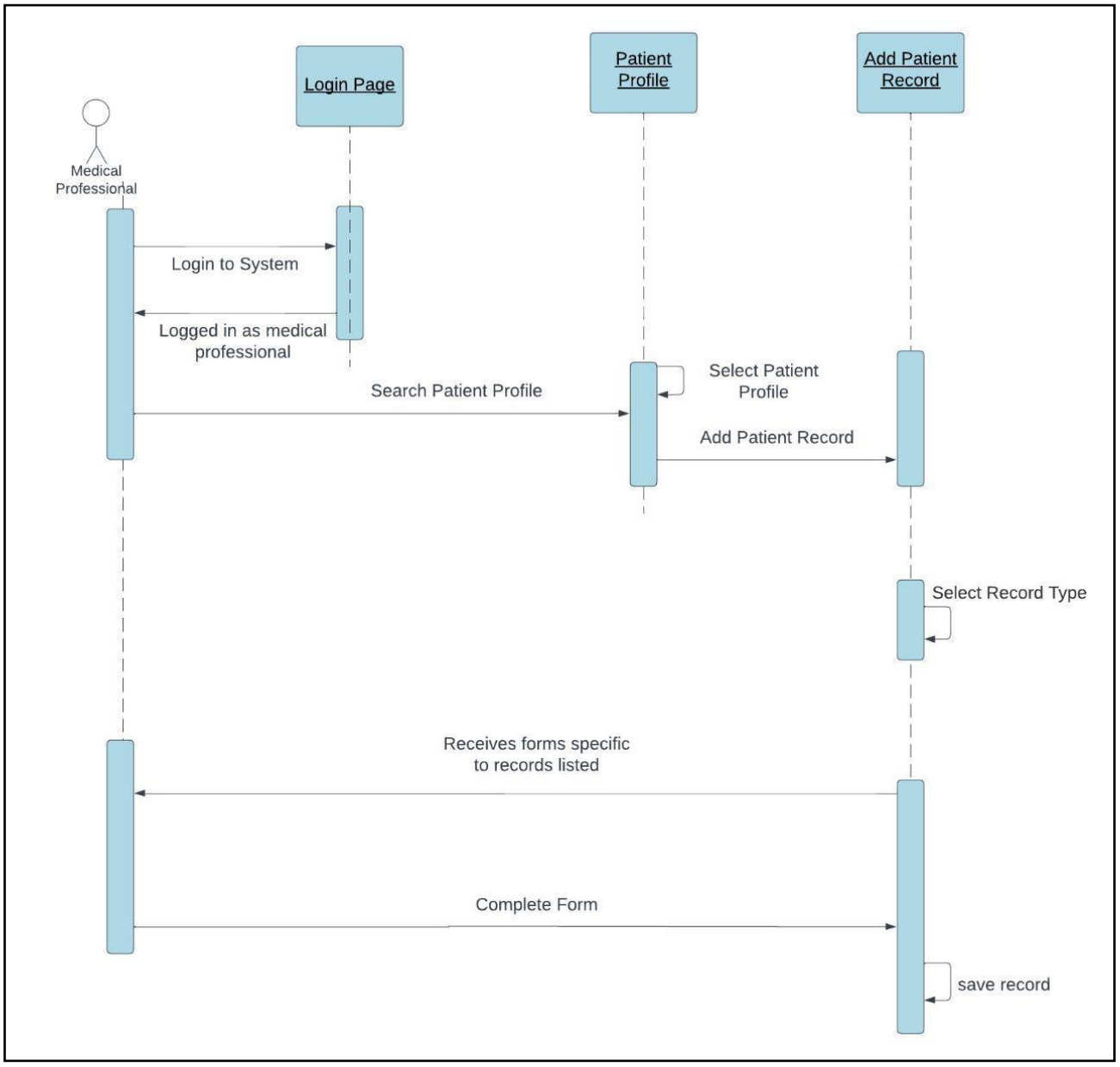
Use case name:	Create patient profile
Actors	Junior staff
Description	Junior staff are first contact for patient’s entering the Hospital as such they have the ability to add patients to the database by creating a profile for the patient.
Data	Patient Full Name, Date of Birth, Contact details (email, cell number and alternative number) and Address.

Stimulus	While on the dashboard the user will click on a button marked “Add patient” which they will then be provided with a form that will ask for the patient basic bio data and contact information. The junior staff will then click on a button marked “Save changes” to save the profile.
Response	User is prompted with confirmation message if the user was successfully added.
Comments	If the system detects duplicate profiles being created it should prompt the user with a warning. A user must have appropriate permission to create a patient profile.

Use case name:	Edit patient profile
Actors	Junior staff
Description	A patient can at any time request any changes to their bio and contact information logged in the system. Upon that request, a junior staff have the ability to make those changes.
Data	Information to be adjusted.
Stimulus	On the patient’s profile, the user will click on the "Edit profile" button to edit the bio information for the patient after the changes are made the user will then be required to click the “Save” button to apply changes.
Response	User is prompted to confirm the changes and upon confirmation a success message will be printed to screen
Comments	A user must have appropriate permission to edit patient profile.

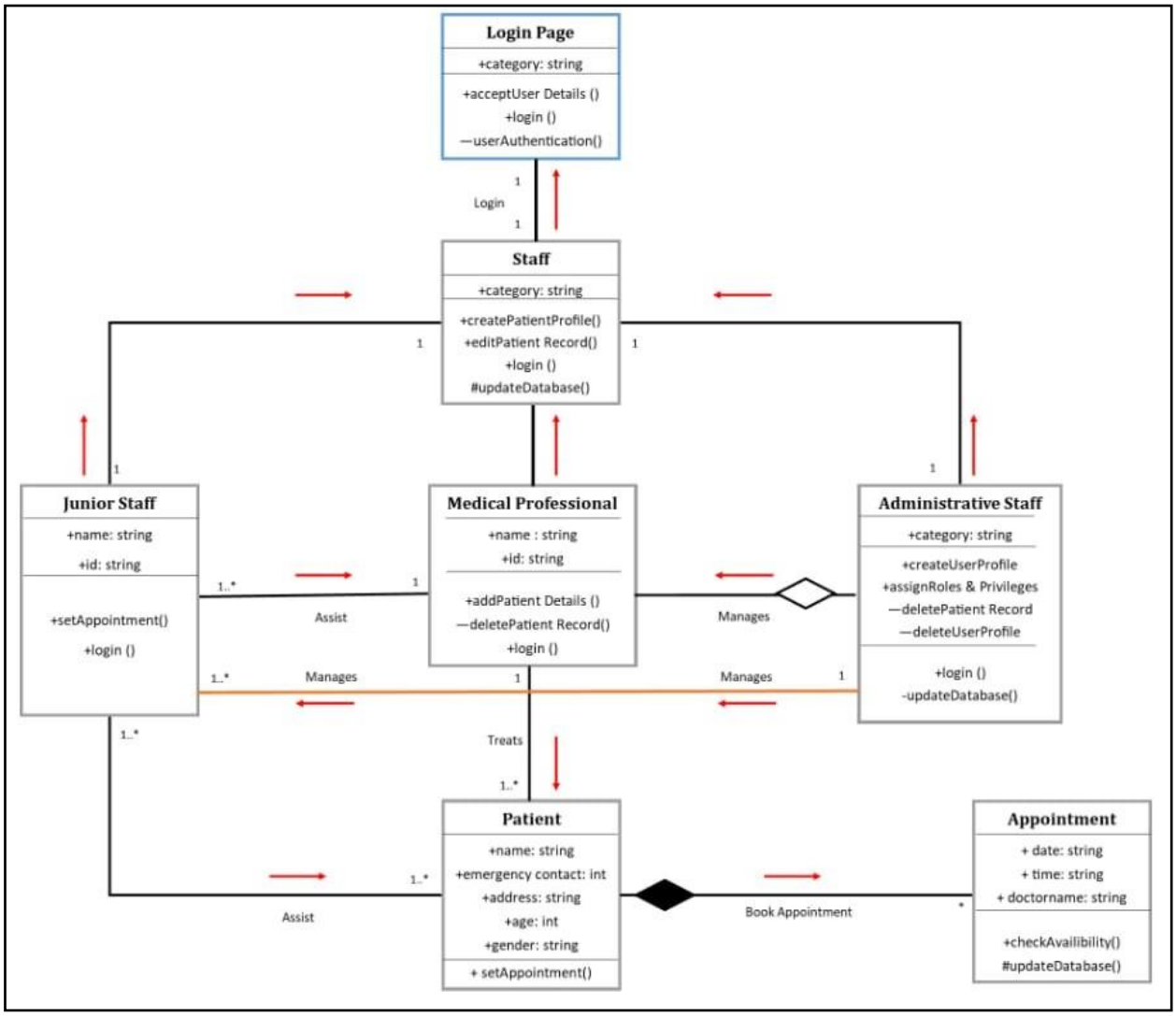
Use case name:	Create patient invoice
Actors	Junior staff
Description	This actor is responsible for providing a correct invoice to a patient for any service charges that the hospital is anticipated to receive.
Data	Service/s rendered to the patient.
Stimulus	Prompted to choose the type of invoice
Response	Prints out completed invoice
Comments	The patient must receive a copy of the invoice.

3. Sequence diagram



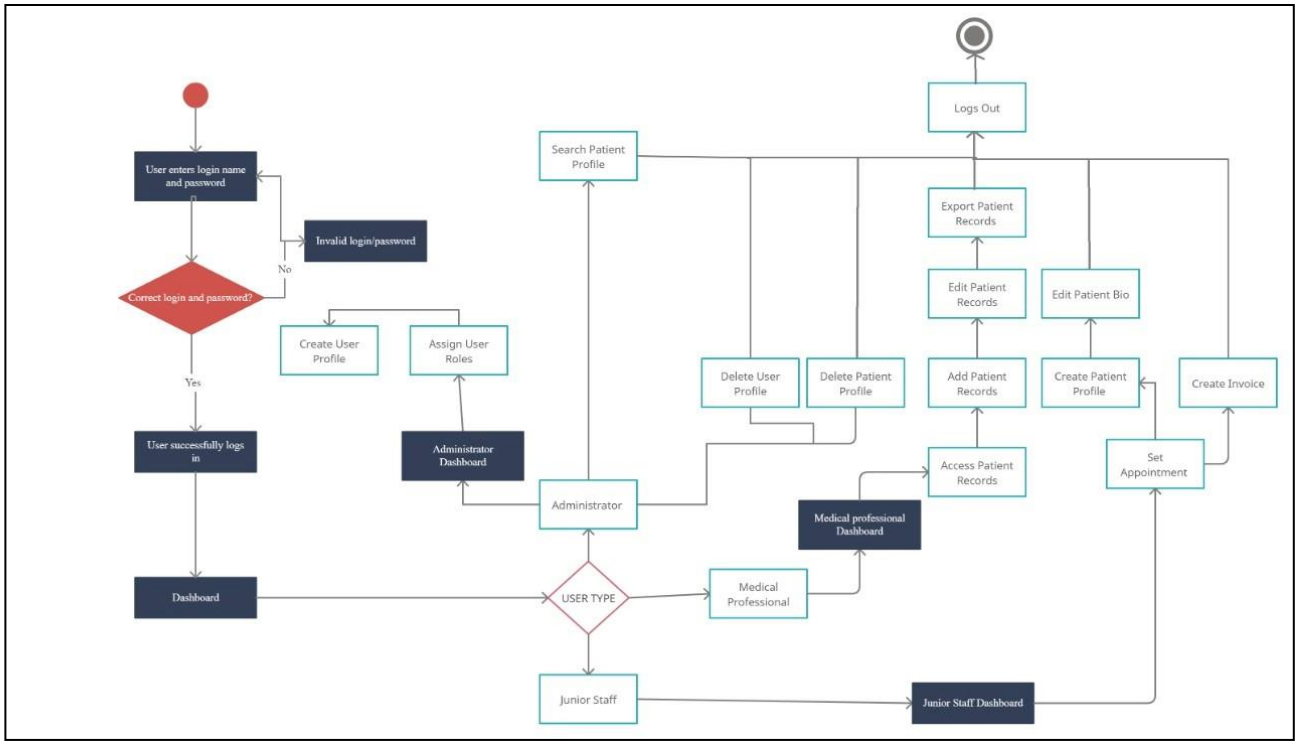
The sequence diagram above illustrates a medical professional entering a patient record. The user will first login to the system, then they will search for the patient profile within the database and open it once found. They will then select the record they wish to add and complete the form then save it. Once the record is added they user will be able to view the record on the patient profile.

4. Class diagram



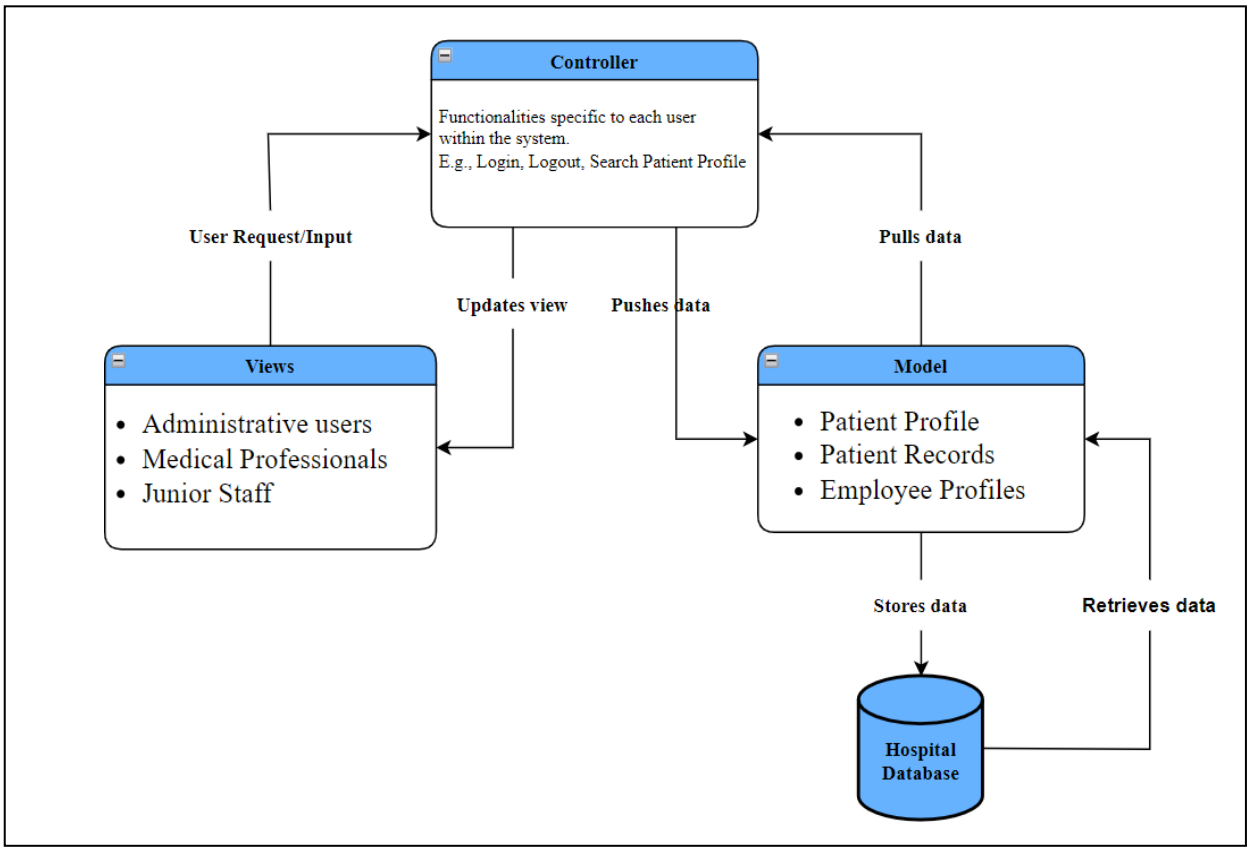
In this class diagram there is a main class named **Staff** and 3 subclasses. The subclasses are Administrative Staff, Medical Professional & Junior Staff. Each class has a specific purpose and relationships with others. Some types of relationships used in this system are: association, aggregation and composition. For example, the "Patient" has a **composition relationship** with the "Appointment".

5. Activity diagram



The activity diagram above depicts the many ways the user can use the system and interact with its contents. The user can, from start, Log into the system, to as much as editing the contents embedded into the system whether it's from the user themselves or from another member who can access and edit content to a certain limitation.

6. System Architecture design (MVC)



Description

Views - the system will be designed with 3 separate dashboards which are tailored for each level of users. However, the format in which the login, logout and password recovery pages are designed will be kept similar. When each user is logged into the system, they are provided with features that are specific for their daily routines. It is from here the user will send requests or inputs to the system.

Controller – based on the features each level of user is allowed to interact with, they are able use them to manipulate the system i.e., they can request or input data. This section of the system contains the functionalities that updates the model and/or view.

Model – users are able to interact with the data stored based on the control called. Here a user, where they have appropriate permission can interact with patient profiles, patient records and employee profiles. Based on the manipulation preformed at this level, the view is updated appropriately.

Scenario - Medical professional wants to add a record to a patient profile.

View - the user upon opening the portal will be provided with a login screen. On this screen the userwill enter his/her username and password. After successful authentication this user is now directed to a dashboard with a menu containing features only medical professionals can interact with. This menu provides them the ability to; search for a patient profile, add a patient record, edit a patient record, delete a patient record and export a patient record. The medical professional will click on area of the screen allowing them to search for the patient's profile and when they find that specific patient, he/she will click on the patient profile to open it. On the patient profile, the user will click on the "Add record" button on the patient profile to which a list of forms will be presented and they will click on the form to add, fill it out then click on the "Save changes" button.

Controller – Every action taken by the user is received by the controller and updates the model.When the login information was inputted and the user click on "login" model is notified to authenticate the login. The model is notified when the user searches for the patient profile. The
model is also notified when the user opens the profile. When the user clicks on "Add record" thenselects a form, fills it out then save it, the model is notified by the controller of this action.

Model – the login credentials are authenticated and directs the user to their dashboard. When the user searches for the patient, a list of matching profiles would be updated to the screen. The screen will update to show the patient profile containing their personal data and history. After the record is added, the application is updated to reflect the added record.