CS5200 - Database Management System

Medical Record Management System - Project Report

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Our project aims to create a database management system to maintain the medical record of patients. Data stored as part of this system include the patient information, the practitioner information, the hospital that practitioner works at. It also stores information about, the specializations each practitioner has, the appointments a patient schedules with a practitioner, the assessment the practitioner provides, including the medicines prescribed, and the tests that a practitioner performs on the patients along with the results.

The expected users of this system are:

- Patients: A patient can register on the application with their email id, password and required details. After logging in, they can book an appointment with a practitioner. To do so, they can search for a particular practitioner by their first name, last name and specialization. Once an appointment has been booked, they get an option to view their pending, accepted and rejected appointments. A patient can also see their details, prescriptions, assessments, and test results.
- Practitioners: A practitioner is provided credentials by the database administrator. When they log in, they get to see their name, department and specializations in the top right corner. They also get to see a list of patients they are associated with. They can see the pending, accepted, and rejected appointments. They can also accept or reject an appointment. For each patient, they can view, update, delete, and insert ailments, prescriptions, and tests.

READ ME

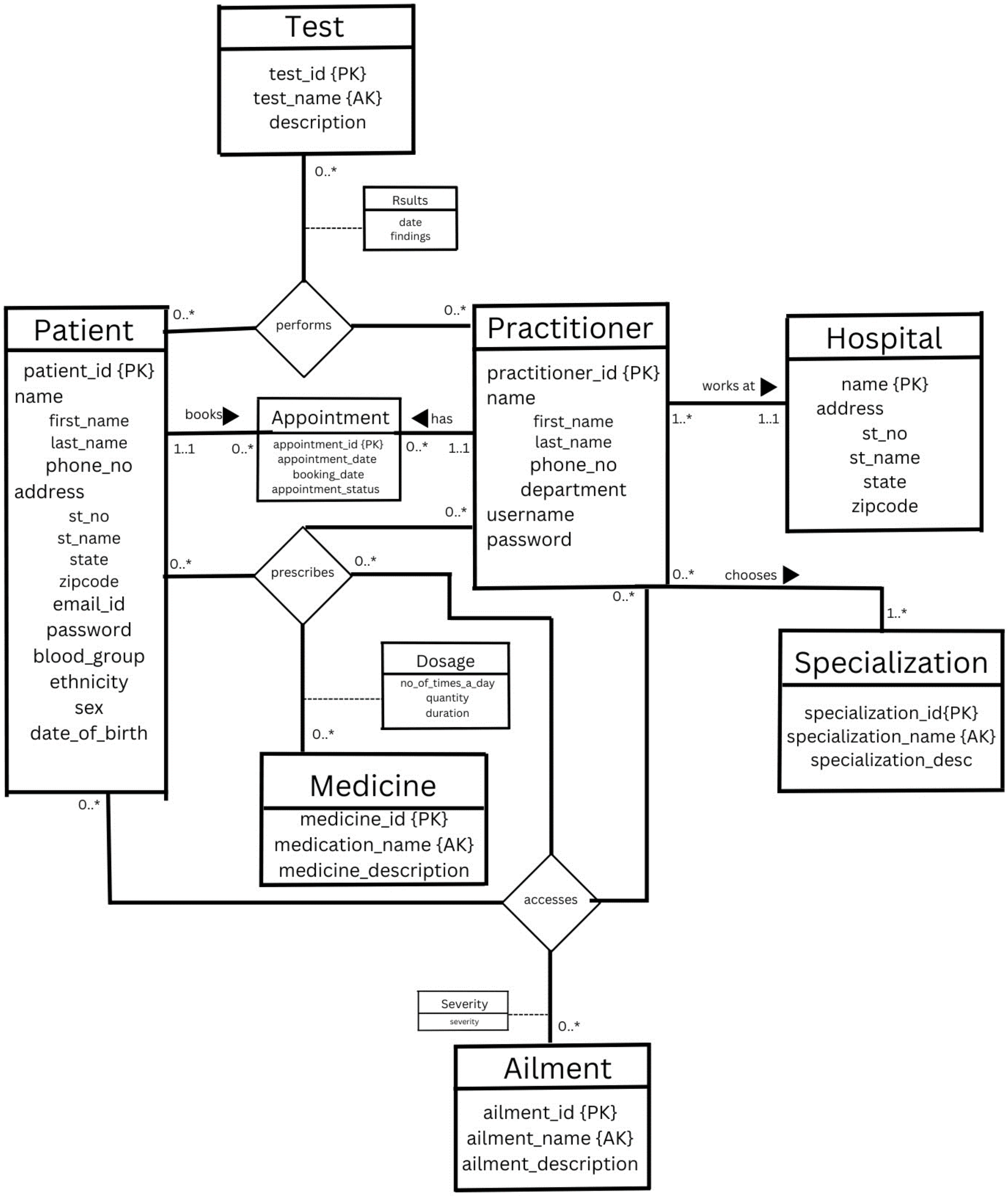
Download the project zip and the SQL dump, run the dump file in MySQLWorkbench.
Unzip the project Folder and open it in a java editor (IntelliJ Preferred).
Go to the OpeningFrame class and edit the database username and password to match yours.
Run the application to see the GUI and perform operations.

Technical SpecificationspassOlivia123

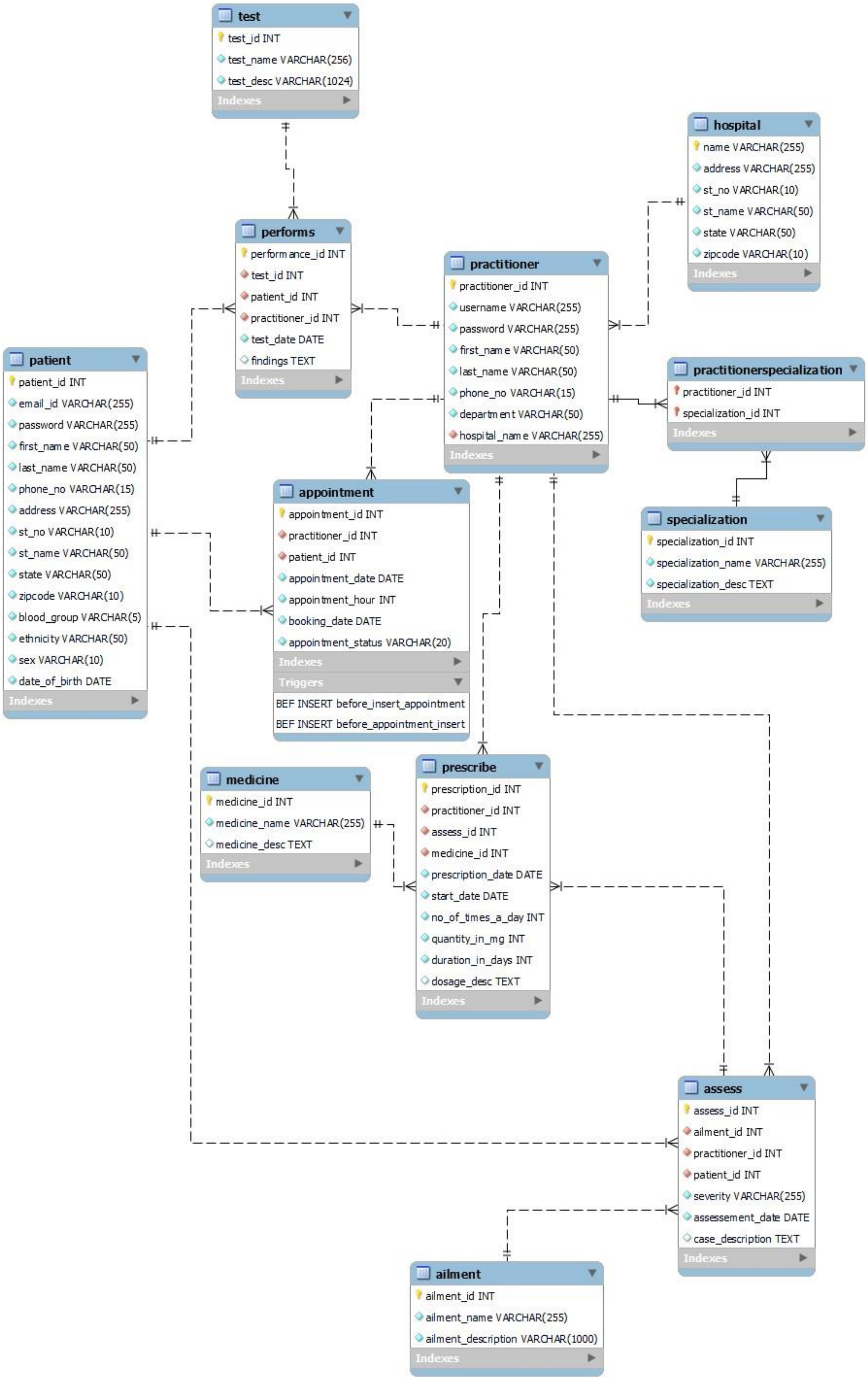
Our project uses a relational database using SQL for storage.

The application has been developed using Java swing interface.

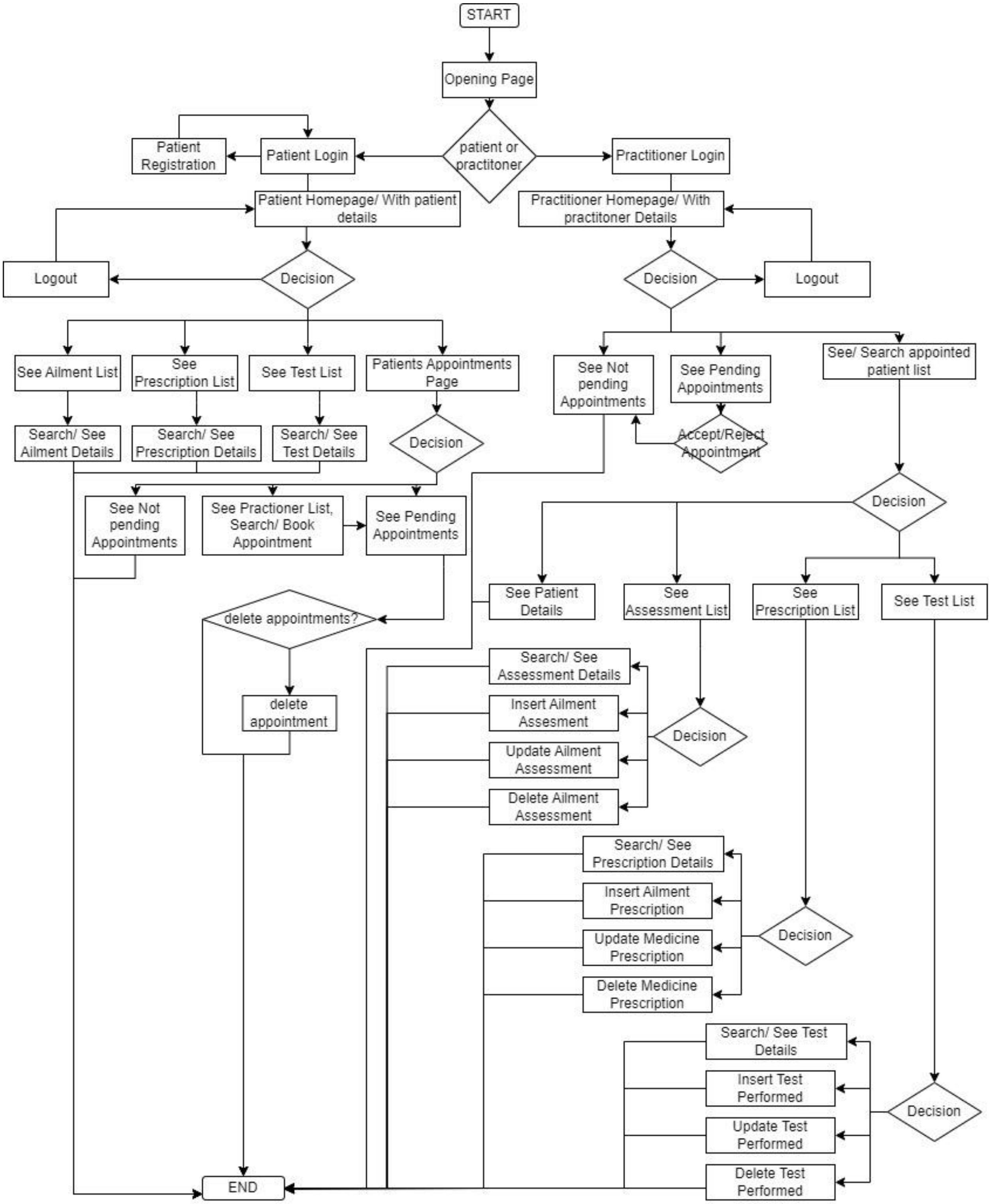
UML Diagram:



Logical Design of Database Schema:

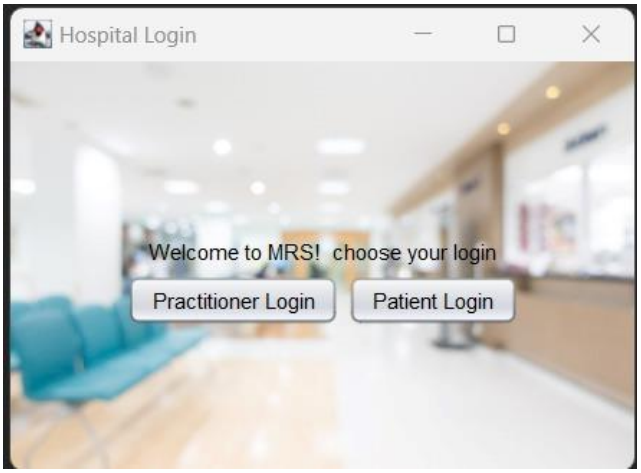


User Flow:

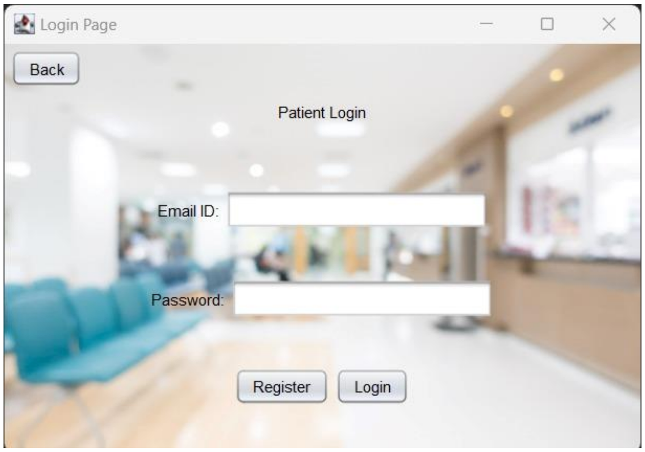

START
Opening Page
patient or practitoner
Patient Registration
Patient Login
Practitioner Login
Patient Homepage/ With patient details
Practitioner Homepage/ With practitoner Details
Logout
Decision
Decision
Logout
See Ailment List
See Prescription List
See Test List
Patients Appointments Page
See Not pending Appointments
See Pending Appointments
See/ Search appointed patient list
Search/ See Ailment Details
Search/ See Prescription Details
Search/ See Test Details
Decision
Accept/Reject Appointment
See Not pending Appointments
See Practioner List, Search/ Book Appointment
See Pending Appointments
Decision
See Patient Details
See Assessment List
See Prescription List
See Test List
delete appointments?
delete appointment
Search/ See Assessment Details
Insert Ailment Assesment
Update Ailment Assessment
Delete Ailment Assessment
Decision
Search/ See Prescription Details
Insert Ailment Prescription
Update Medicine Prescription
Delete Medicine Prescription
Decision
Search/ See Test Details
Insert Test Performed
Update Test Performed
Delete Test Performed
Decision
END

We have developed a front-end application for two user roles – Patient and Practitioner. Our application validates the patient credentials. Once logged in, a patient can see the ailment list, prescription list, and test list. They can book appointments for a particular practitioner. They can also see pending and non-pending appointments. They can only book up to 3 appointments in a single day. We have implemented a trigger to restrict users from making more than 3 appointments and spamming the application. They also have an option to delete an appointment before it's confirmed.

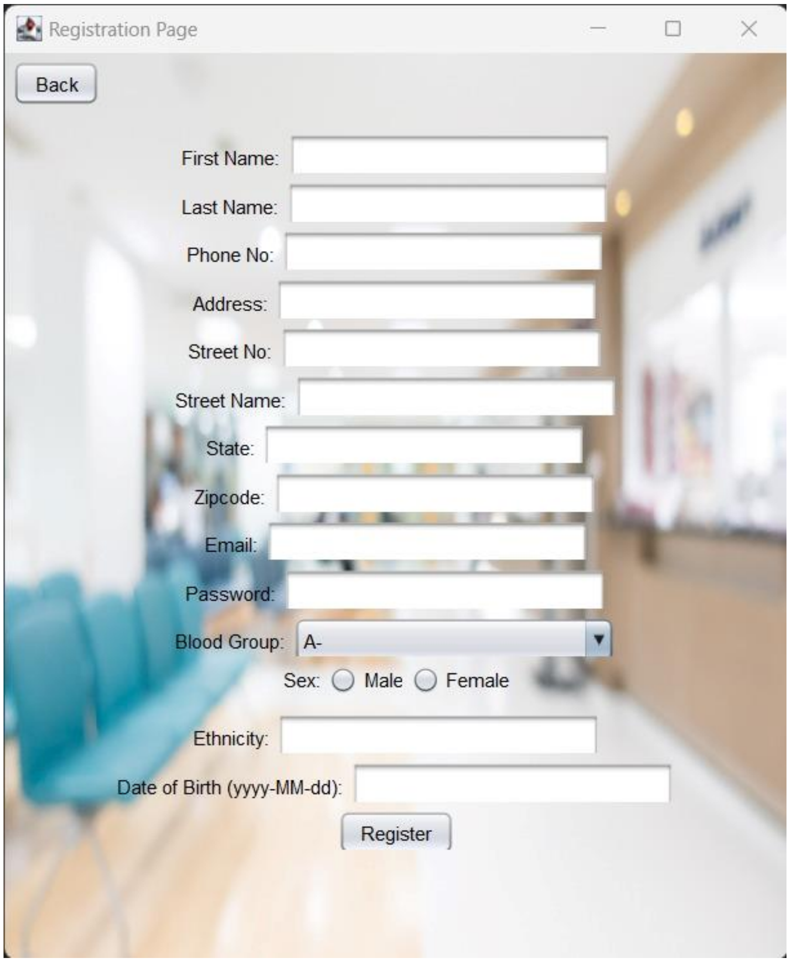
When a practitioner logs in, they can see their pending and non-pending appointments. They can then accept or reject a particular appointment. They can also search for a patient, whom they have appointments with and see their details, assessment list, prescription list and test list. They can perform CRUD operations on all the three tables.



Patient Login



Register a patient



First Name:

Last Name:

Phone No:

Address:

Street No:

Street Name:

State:

Zipcode:

Email:

Password:

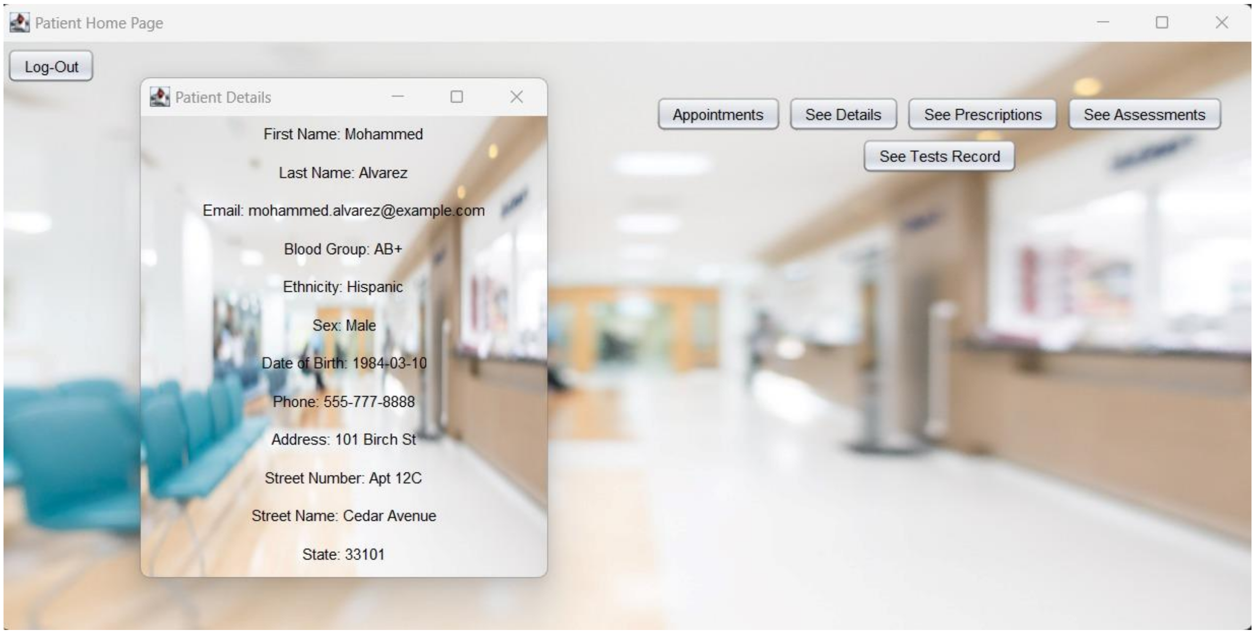
Blood Group: A-

Sex: ○ Male ○ Female

Ethnicity:

Date of Birth (yyyy-MM-dd):

Patient home page



First Name: Mohammed

Last Name: Alvarez

Email: mohammed.alvarez@example.com

Blood Group: AB+

Ethnicity: Hispanic

Sex: Male

Date of Birth: 1984-03-10

Phone: 555-777-8888

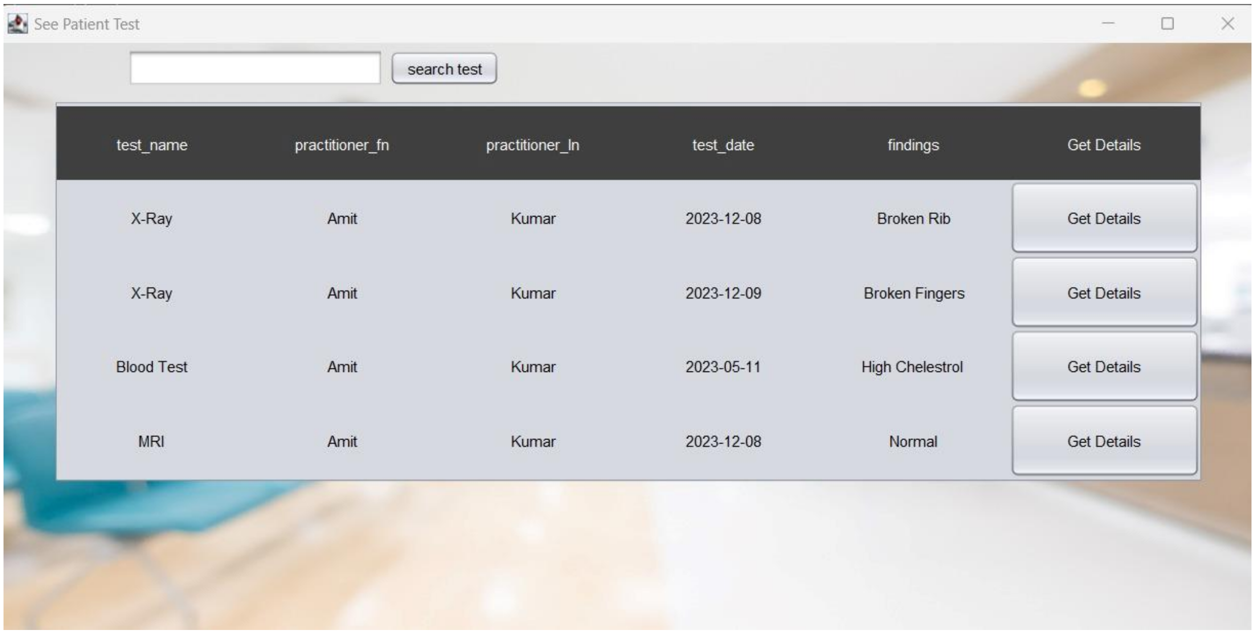
Address: 101 Birch St

Street Number: Apt 12C

Street Name: Cedar Avenue

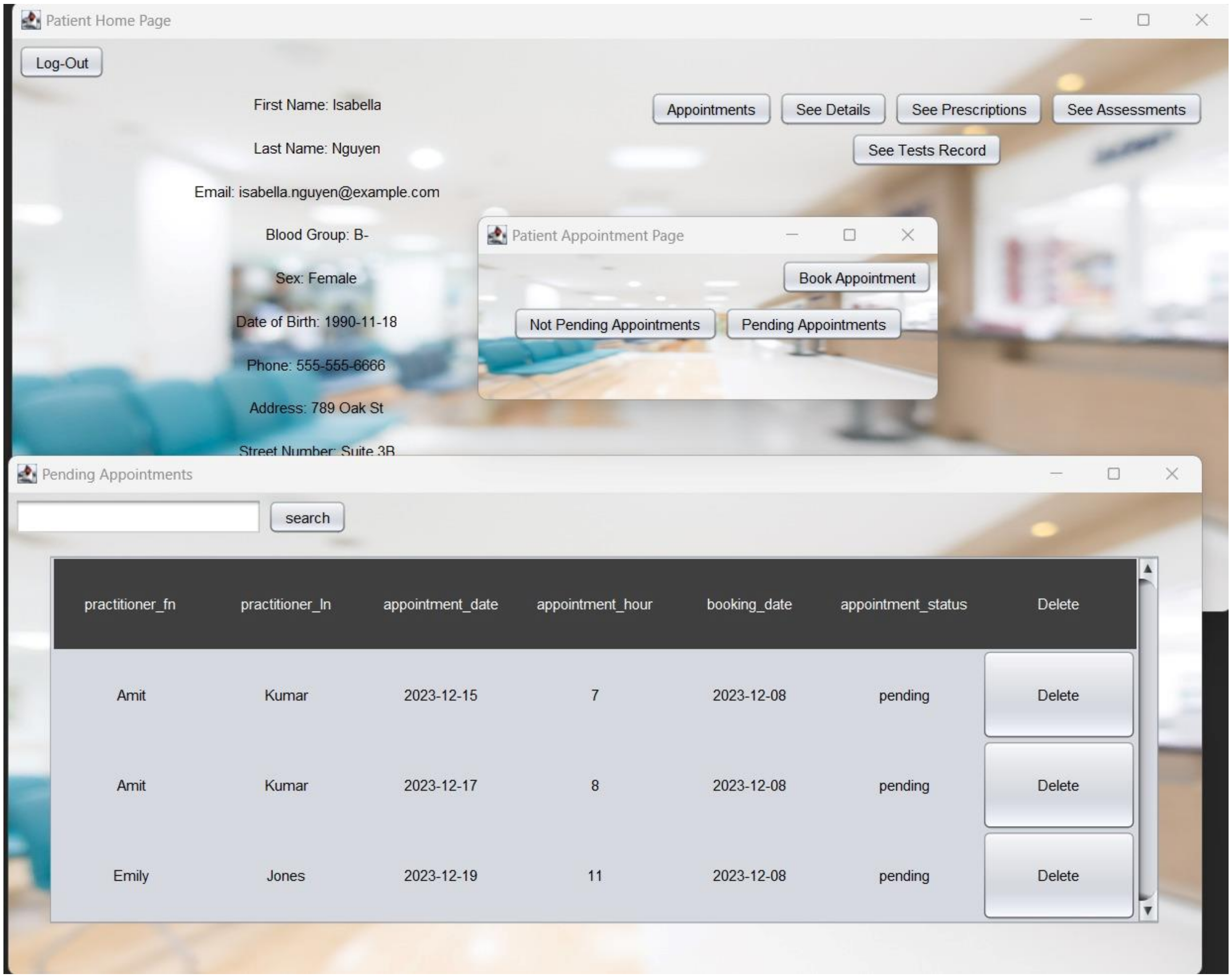
State: 33101

See tests functionality for patients.



test_name	practitioner_fn	practitioner_ln	test_date	findings	Get Details
X-Ray	Amit	Kumar	2023-12-08	Broken Rib	Get Details
X-Ray	Amit	Kumar	2023-12-09	Broken Fingers	Get Details
Blood Test	Amit	Kumar	2023-05-11	High Chelestrol	Get Details
MRI	Amit	Kumar	2023-12-08	Normal	Get Details

Booking an appointment



First Name: Isabella

Last Name: Nguyen

Email: isabella.nguyen@example.com

Blood Group: B-

Sex: Female

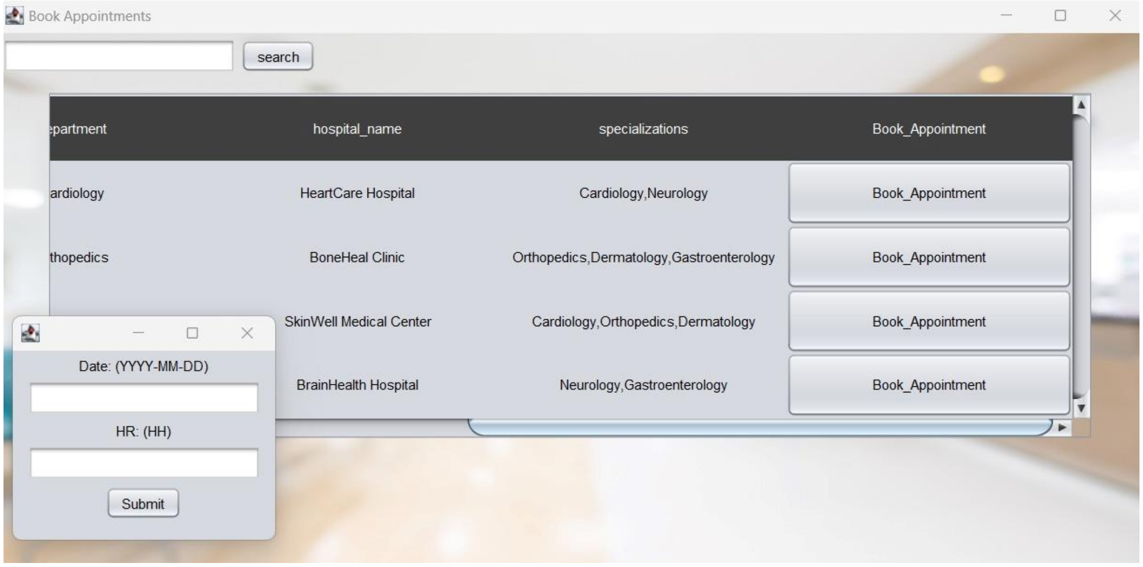
Date of Birth: 1990-11-18

Phone: 555-555-6666

Address: 789 Oak St

Street Number: Suite 3B

practitioner_fn	practitioner_ln	appointment_date	appointment_hour	booking_date	appointment_status	Delete
Amit	Kumar	2023-12-15	7	2023-12-08	pending	Delete
Amit	Kumar	2023-12-17	8	2023-12-08	pending	Delete
Emily	Jones	2023-12-19	11	2023-12-08	pending	Delete

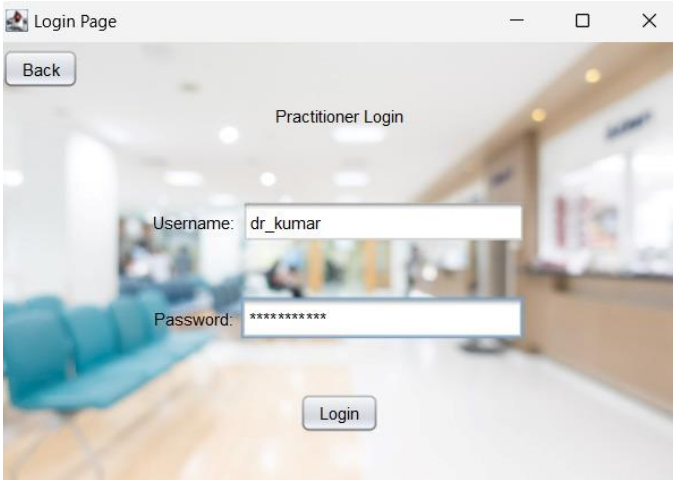


epartment	hospital_name	specializations	Book_Appointment
ardiology	HeartCare Hospital	Cardiology,Neurology	Book_Appointment
thopedics	BoneHeal Clinic	Orthopedics,Dermatology,Gastroenterology	Book_Appointment
	SkinWell Medical Center	Cardiology,Orthopedics,Dermatology	Book_Appointment
	BrainHealth Hospital	Neurology,Gastroenterology	Book_Appointment

Date: (YYYY-MM-DD)

HR: (HH)

Practitioner Login

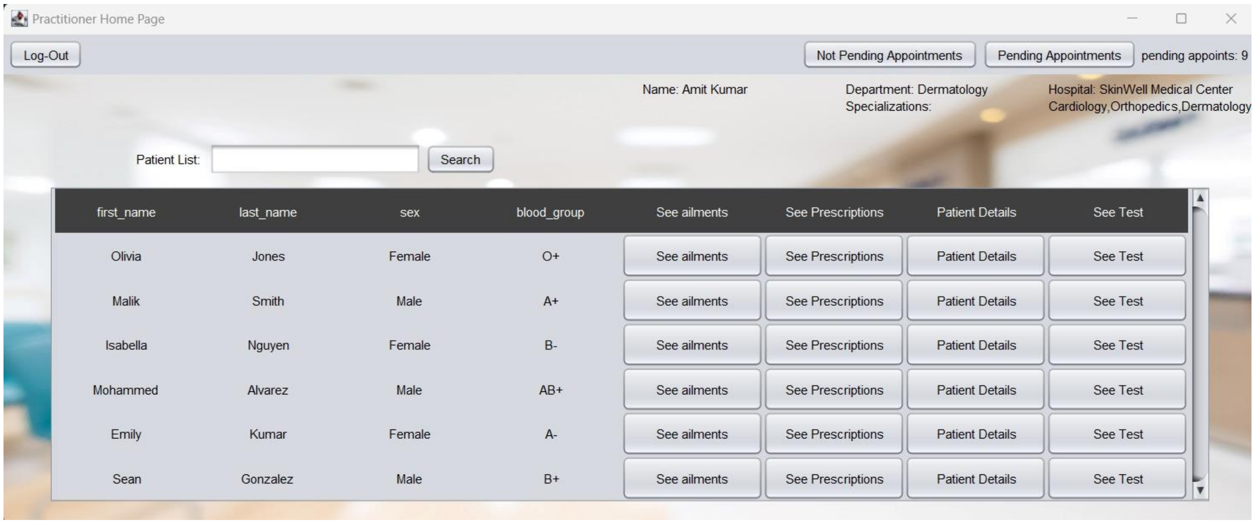


Practitioner Login

Username: dr_kumar

Password: ***********

Practitioner home page



pending appoints: 9

Name: Amit Kumar

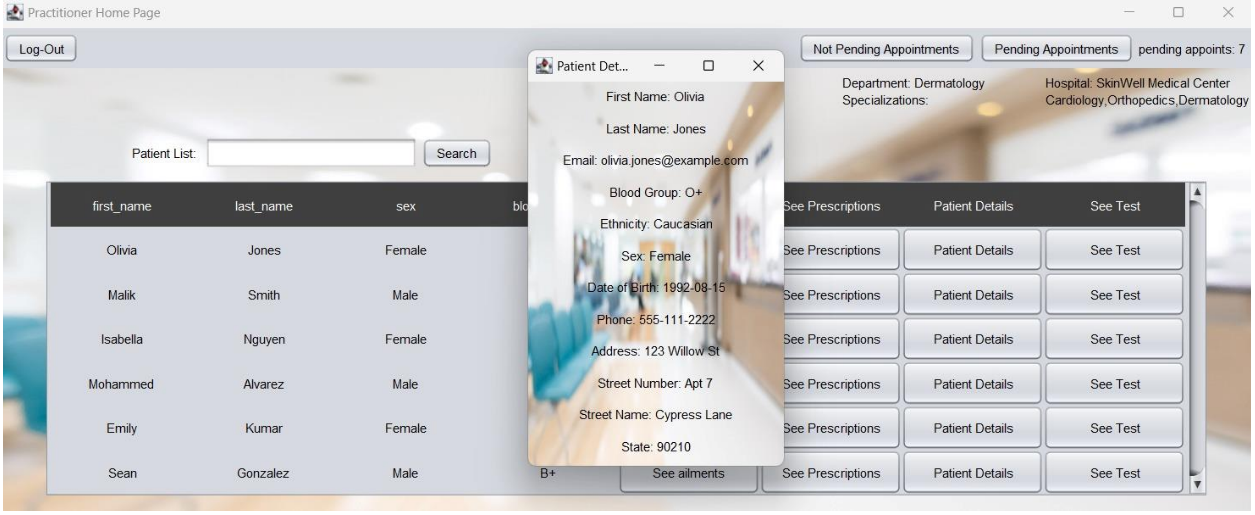
Department: Dermatology
Specializations:

Hospital: SkinWell Medical Center
Cardiology,Orthopedics,Dermatology

Patient List:

first_name	last_name	sex	blood_group	See ailments	See Prescriptions	Patient Details	See Test
Olivia	Jones	Female	O+	See ailments	See Prescriptions	Patient Details	See Test
Malik	Smith	Male	A+	See ailments	See Prescriptions	Patient Details	See Test
Isabella	Nguyen	Female	B-	See ailments	See Prescriptions	Patient Details	See Test
Mohammed	Alvarez	Male	AB+	See ailments	See Prescriptions	Patient Details	See Test
Emily	Kumar	Female	A-	See ailments	See Prescriptions	Patient Details	See Test
Sean	Gonzalez	Male	B+	See ailments	See Prescriptions	Patient Details	See Test

See patient details.



Practitioner Home Page

pending appoints: 7

Department: Dermatology
Specializations:

Hospital: SkinWell Medical Center
Cardiology,Orthopedics,Dermatology

Patient List:

first_name	last_name	sex	blo		See Prescriptions	Patient Details	See Test
Olivia	Jones	Female			See Prescriptions	Patient Details	See Test
Malik	Smith	Male			See Prescriptions	Patient Details	See Test
Isabella	Nguyen	Female			See Prescriptions	Patient Details	See Test
Mohammed	Alvarez	Male			See Prescriptions	Patient Details	See Test
Emily	Kumar	Female			See Prescriptions	Patient Details	See Test
Sean	Gonzalez	Male	B+	See ailments	See Prescriptions	Patient Details	See Test

Patient Det...

First Name: Olivia

Last Name: Jones

Email: olivia.jones@example.com

Blood Group: O+

Ethnicity: Caucasian

Sex: Female

Date of Birth: 1992-08-15

Phone: 555-111-2222

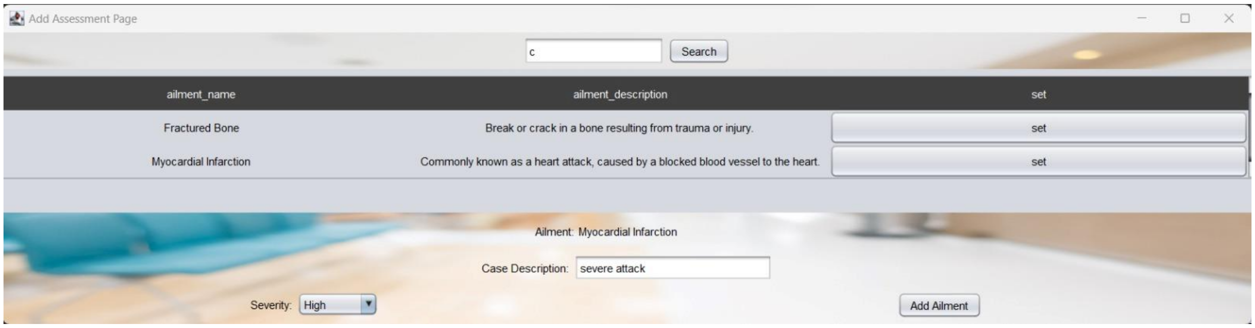
Address: 123 Willow St

Street Number: Apt 7

Street Name: Cypress Lane

State: 90210

Add assessment



Add Assessment Page

c

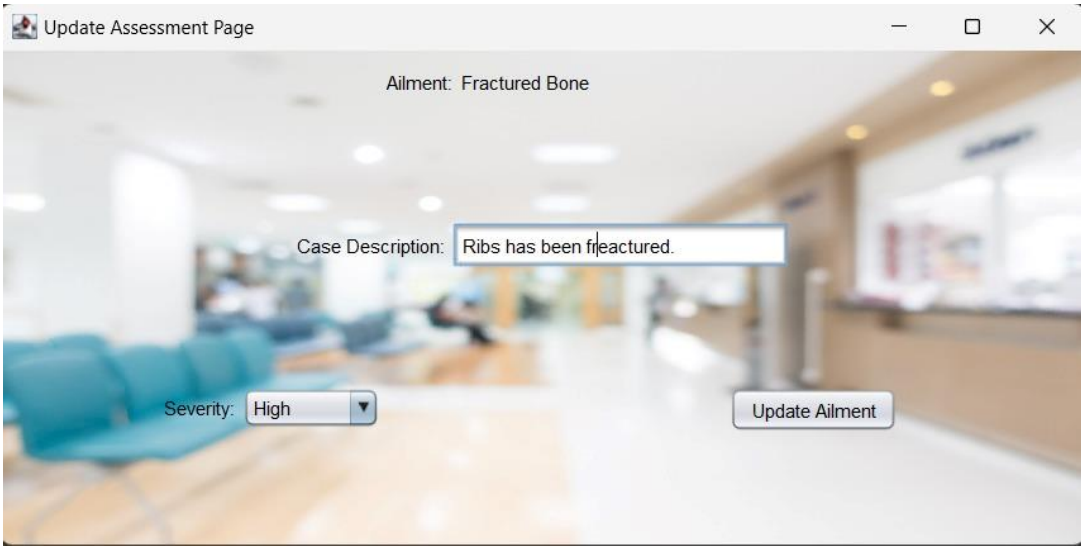
ailment_name	ailment_description	set
Fractured Bone	Break or crack in a bone resulting from trauma or injury.	set
Myocardial Infarction	Commonly known as a heart attack, caused by a blocked blood vessel to the heart.	set

Ailment: Myocardial Infarction

Case Description: severe attack

Severity: High

Update Assessment



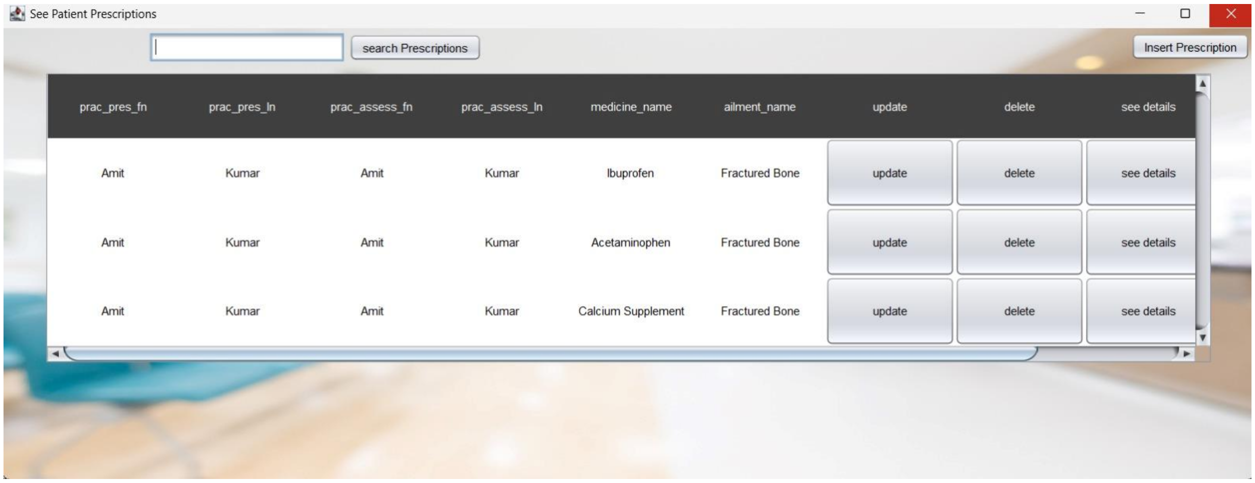
Update Assessment Page

Ailment: Fractured Bone

Case Description: Ribs has been freactured.

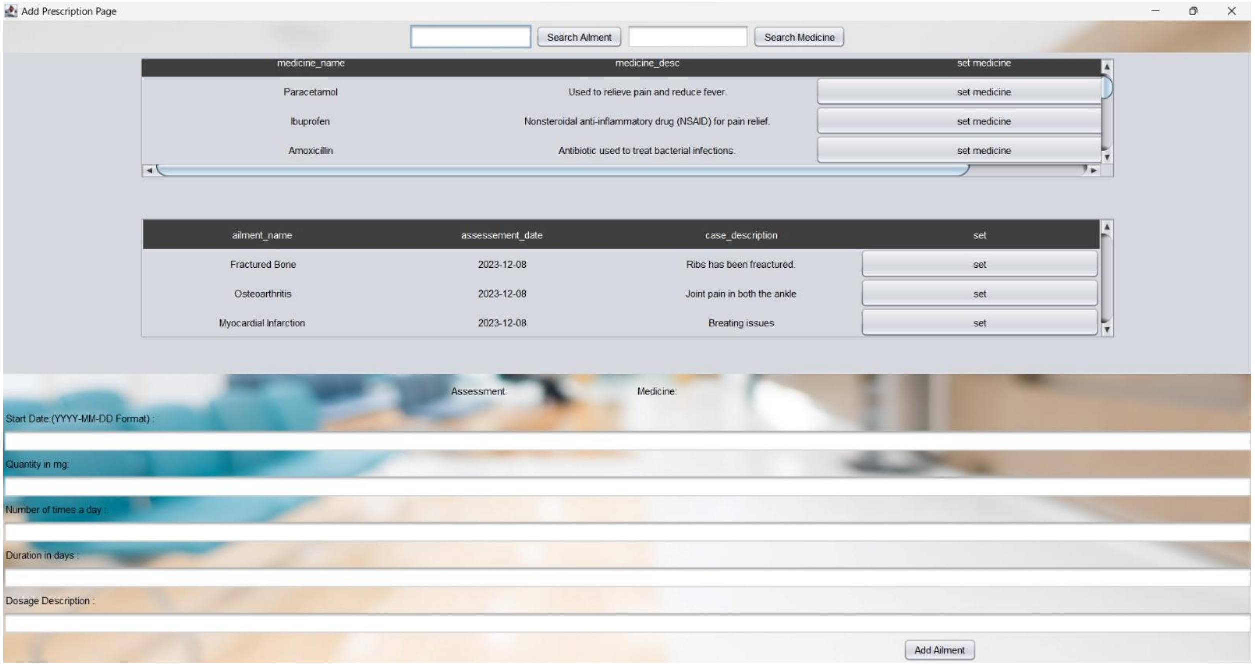
Severity: High

Patient prescriptions



prac_pres_fn	prac_pres_ln	prac_assess_fn	prac_assess_ln	medicine_name	ailment_name	update	delete	see details
Amit	Kumar	Amit	Kumar	Ibuprofen	Fractured Bone	update	delete	see details
Amit	Kumar	Amit	Kumar	Acetaminophen	Fractured Bone	update	delete	see details
Amit	Kumar	Amit	Kumar	Calcium Supplement	Fractured Bone	update	delete	see details

Add prescriptions



medicine_name	medicine_desc	set medicine
Paracetamol	Used to relieve pain and reduce fever.	set medicine
Ibuprofen	Nonsteroidal anti-inflammatory drug (NSAID) for pain relief.	set medicine
Amoxicillin	Antibiotic used to treat bacterial infections.	set medicine

ailment_name	assessement_date	case_description	set
Fractured Bone	2023-12-08	Ribs has been freactured.	set
Osteoarthritis	2023-12-08	Joint pain in both the ankle	set
Myocardial Infarction	2023-12-08	Breating issues	set

Assessment: Medicine:

Start Date:(YYYY-MM-DD Format) :

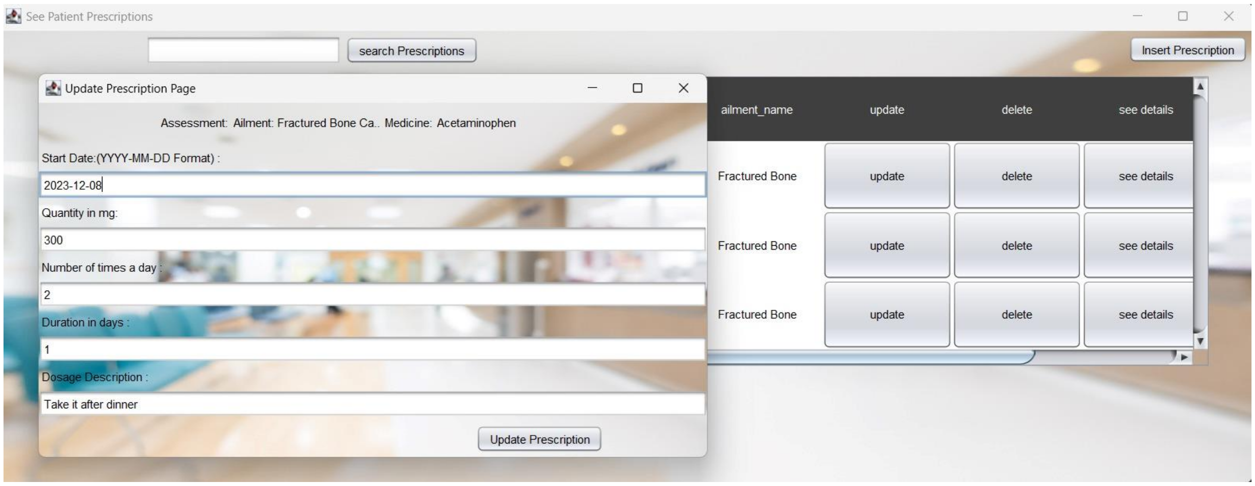
Quantity in mg:

Number of times a day :

Duration in days :

Dosage Description :

Update prescriptions



Assessment: Ailment: Fractured Bone Ca.. Medicine: Acetaminophen

Start Date:(YYYY-MM-DD Format) :

2023-12-08

Quantity in mg:

300

Number of times a day :

2

Duration in days :

1

Dosage Description :

Take it after dinner

ailment_name	update	delete	see details
Fractured Bone	update	delete	see details
Fractured Bone	update	delete	see details
Fractured Bone	update	delete	see details

Lessons Learned

Technical Expertise Gained

Since MySQL workbench was used in this project for storing data, we got hands on experience on how to work with relational databases. For this project, we have written two triggers and some complex procedures to fetch data. While implementing the CRUD operations, we understood the significance of database programming objects. We also developed a graphical user interface using Java swing, and hence working on this project has helped us improve our knowledge of Java language. We gained experience in developing end-to-end swing applications that integrate different technologies to achieve a comprehensive system.

Insights

We have gained several insights while working on this project which will help us in future projects.

- We realized that planning plays a very crucial role in project development. Drawing the UML helped us to narrow down what could be a very vast and unorganized database. Based on the feedback received, we were able to make changes to the UML diagram and then start working on the development of the application.
- There are many different domains available, but every domain has its pros and cons. We chose java swing because it is cross-platform compatible, supports MVC architecture and provides a robust event handling mechanism.
- Managing the time plays a very crucial role in any project, we had to ensure that we submit a well-built application on time. We learned that breaking the project into several parts,

dividing it into team members wisely would help us finish the project in the given time frame.

Alternative Design/Approaches to the Project

To develop this project, we had several alternative designs and approaches. We could have used NoSQL database which helps in handling unstructured data. Additionally, there were different languages and frameworks to get the same results. If we were to use a different tech stack for this project, we would create a web application using Node.js and Express.js.

Future Work

Planned Uses of Database

Many hospitals and clinics store medical records of patients in files or on excel sheets. It is very easy to misplace or lose medical records if not stored properly. Our application will make it easy for the practitioner to access patient data and modify it. They can also get to see all the ailments that a patient has suffered, which would help them to provide a better treatment plan. At the same time, patients can also see the list of doctors based on their specializations and book appointments with them.

Potential Areas for Added Functionality

There is some added functionality that can be incorporated into the application.

- We can add attributes to the test table to store pictures. This would help the doctor to capture X ray reports, MRI etc. Having such type of attributes would help us visualize the data in a better way.
- We can also create an admin interface. Presently, the administrator has to go to MySQL workbench and insert values into it. But, with an admin interface, we can do so via the application and admin login credentials.