UTM

UNIVERSITI TEKNOLOGI MALAYSIA

OBJECT ORIENTED PROGRAMMING

SECJ2154 - 04

Project Report

Title: Hospital Registration System

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Table of Contents

1. Introduction **1**
1.1 Synopsis **1**
1.2 Problem Statement 1
1.3 Objectives and Scope **2**
2. UML Description **3**
3. Implementation **6**
3.1 Technologies Used **6**
3.2 Development Environment **6**
3.3 Features Implemented **8**
4. User Interface **9**
4.1 Welcome Page **9**
4.2 Administrator Functions 10
4.3 Patient Functions **20**
4.4 Doctor Functions 23
5. Conclusion **28**

1. Introduction

1.1 Synopsis

The objective of this report is to give readers an overview and analysis of the Hospital Registration System, which is intended to improve and streamline the registration and management of both patients and doctors registered with the hospitals. This system automates a variety of registration and management procedures while ensuring seamless data management in an effort to increase productivity, accuracy, and overall user experience.

The initial interaction between patients and the healthcare institution is made easier by the Hospital Registration System, which is an essential part of the larger Hospital Management System. It features a number of functions, such as the gathering of doctor and patient data, the scheduling of patient appointments, and administrative procedures for the registration and management of patients and doctors.

1.2 Problem Statement

Hospital Registration plays a major role between patients and healthcare facilities. As time goes on, technology has evolved to enable many systems to go online . The Hospital Registration System also needs to integrate with the online system in parallel with the modernization. The traditional approach of the Hospital Registration System gives rise to some of the problems such as inflexibility of adding and removing new data. The traditional Hospital Registration system requires the administrator to manually enter the information of the patient and doctor in the hospital and manually sort the information in alphabetically to ease of finding specific information in the future.

Not to forget, in order for the patient to make an appointment with the doctor, the patient has to come to the hospital and fill in the desired date for the information. This is inefficient for the patient that wants to make an appointment as some of the patients require them to travel far to make an appointment.

1.3 Objectives and Scope

The Hospital Registration System was developed to ease the process of registration physically. With the Hospital Registration System, patients are able to do registration and scheduling appointments from home and also can use some extra features in the application. The following are the objectives of the proposed system.

1. Simplify the registration process by providing a user-friendly application that streamlines the process of registration and scheduling appointments for the patients.
2. Provide flexibility for the administrator when adding new patients or doctors and deleting existing patients or doctors in the system.
3. Provide operational efficiency by automating various processes required for registration and scheduling appointments.
4. Provide a report required for the administrator for better analysis of patients and doctors registered in the system.

2. UML Description

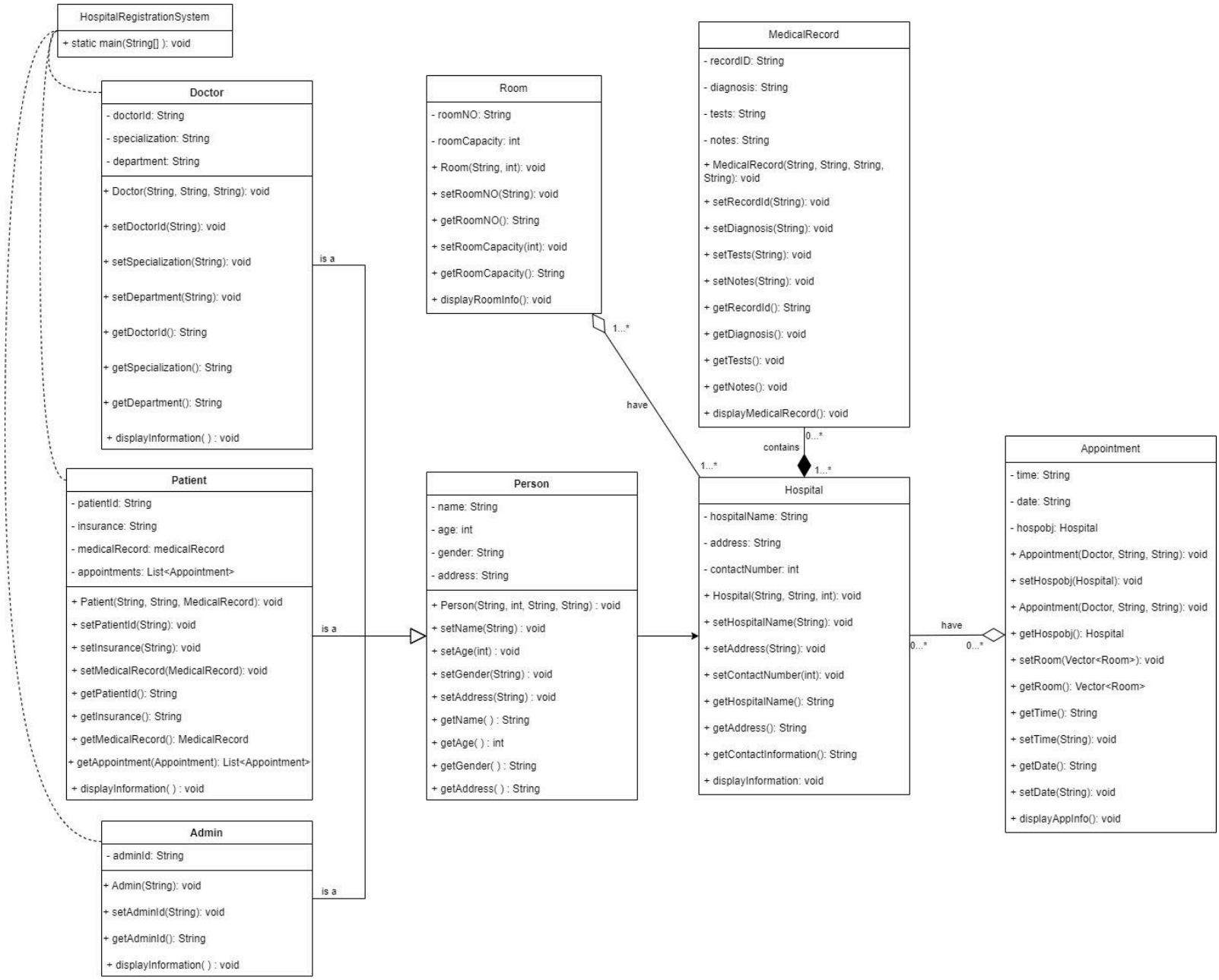


Figure 1: UML class diagram for Hospital Registration System

Description for each class:

Class	Attribute	Description
HospitalRegistrationSystem	static main(String[])	Main function of the system
Person	name	Name of the user
	age	Age of the user
	gender	Gender of the user
	address	Address of the user
Doctor	doctorId	Unique identifier for each doctor
	specialization	Expert domain of the doctor
	department	Department where the doctor belongs
Patient	patientId	Unique identifier for each patient
	insurance	To confirm if the patient has insurance or not
	medicalRecord	To record the history of the patient
	appointment	To store the appointment scheduled for the patient
Admin	adminId	Unique identifier for each admin
Hospital	hospitalName	Name of the hospital
	address	Address of the hospital
	contactNumber	Contact number of the hospital
Room	roomNo	Unique identifier for each room in the hospital
	roomCapacity	Capacity of the room to accommodate the patient
MedicalRecord	recordID	Unique identifier for each

		medical record stored in the system
	diagnosis	Diagnosis of the patient
	tests	Tests carried out on the patient
	notes	Notes about the patient for doctor reference
Appointment	time	Time of the appointment
	date	Date of the appointment
	hospobj	Hospital object to access the function of Hospital class

3. Implementation

3.1 Technologies Used

To be able to complete this project we have used several technologies. All the description of the technologies used is as below:

1) IDE : Visual Studio Code (version 1.79) & replit.com
2) Programming Language: Java (JDK 20.0.1)
3) Additional Libraries & Framework:
    - java.util.*
    - java.util.List
    - java.util.Scanner
    - java.io.File
    - java.io.FileNotFoundException
    - java.util.Vector
    - java.util.ArrayList

3.2 Development Environment

1. **Integrated Development Environment (IDE):** The development environment for this project is Visual Studio Code. Visual Studio Code provides a wide range of features, from debugging tools, intelligent code completion, refactoring capabilities, and a variety of frameworks.

2. **Java Development KIt (JDK) :** The latest version of Java Development Kit (JDK 20) was used for this project. The JDK provides the Java compiler, runtime environment, and necessary frameworks and libraries needed to develop Java applications.

3. **Version Control System :** For this project Git was used as a version control system for this project. It was used to keep track of the code changes and communicate with team members.

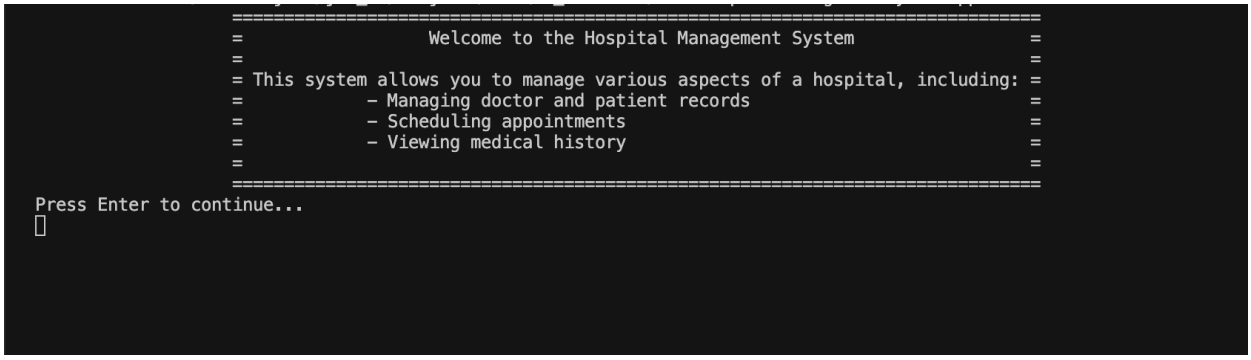
4. **Collaboration tools:** To improve team efficiency of the team, several collaboration tools were used such as Replit and VSCode LiveShare. Besides that Google Meet were used for online communication platforms and Google Docs were used for documentation.

3.3 Features Implemented

Key Features	Description
Object-Oriented Programming (OOP)	The system is built implementing the multiple core principles of Object-Oriented Programming (OOP) which are Polymorphism, Aggregation, Composition, Inheritance, and Association. This system also implements Vector to add flexibility, and extensibility for the system.
User Authentication	There are three different roles of users who use this system which are Admin, Patient and Doctor. To authenticate each user when they are logging into the system, the system will prompt the user to enter their credentials to authenticate the user registered to the system.
Exception Handling	Exception handling was also implemented in the system. One of the exception handling is handling input errors from the user when entering information. Other than that, the system will also handle whether the text file for the system exists or not.
Text file	To enable the system to store information of the users, text file is used to store the information. The text file included for the system are “Patient.txt” and “Doctor.txt”.
Automatic password generator	Each time the admin adds a new user, the system will auto generate a password for the user.
Polymorphism	Polymorphism is implemented in the Patient, Doctor and Admin class. The polymorphism function is displayInformation(). Each function will display a different output based on the object calling the function.
Flexibility	For flexibility of the system, the system implements Vector to store the data of the user. The Vector enables the admin to add or remove patients or doctors based on the index.

4. User Interface

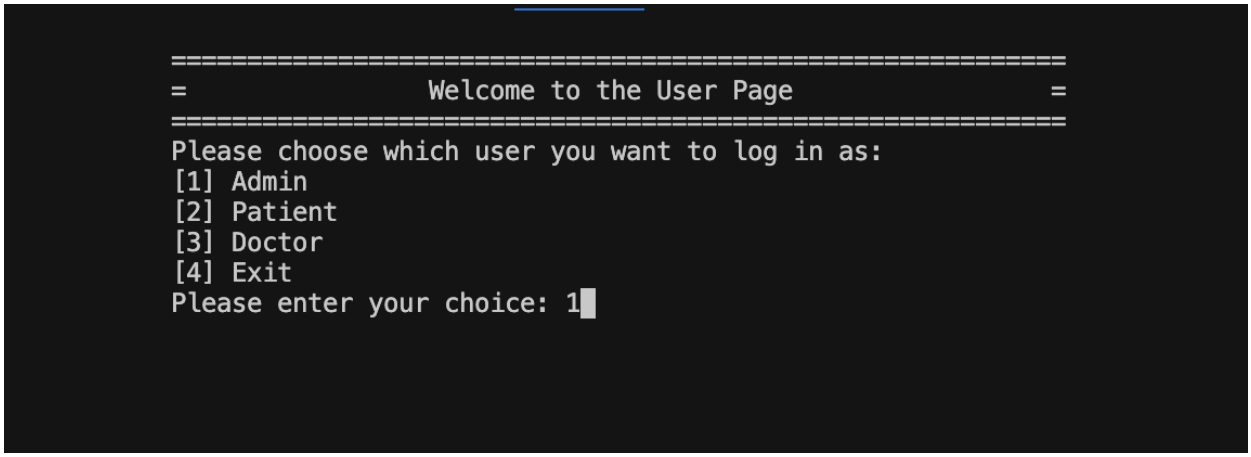
4.1 Welcome Page



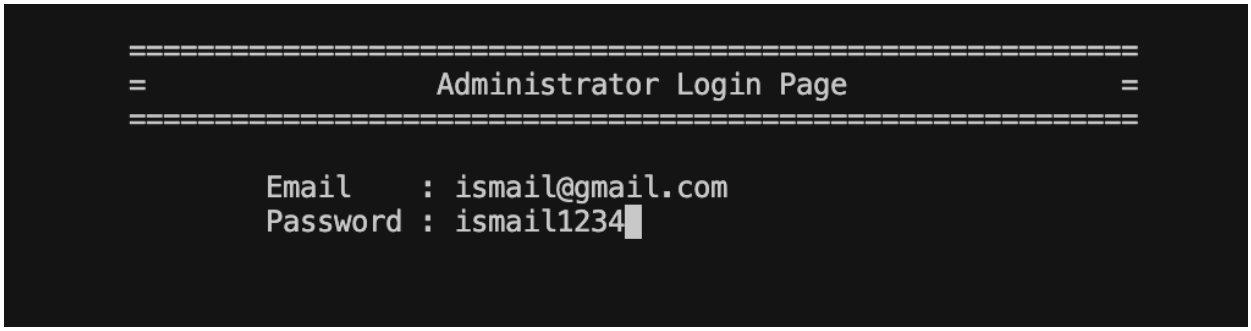
When the user first accesses the system, the Welcome Page will pop up on the screen.

The welcome page will display the functions of the system.

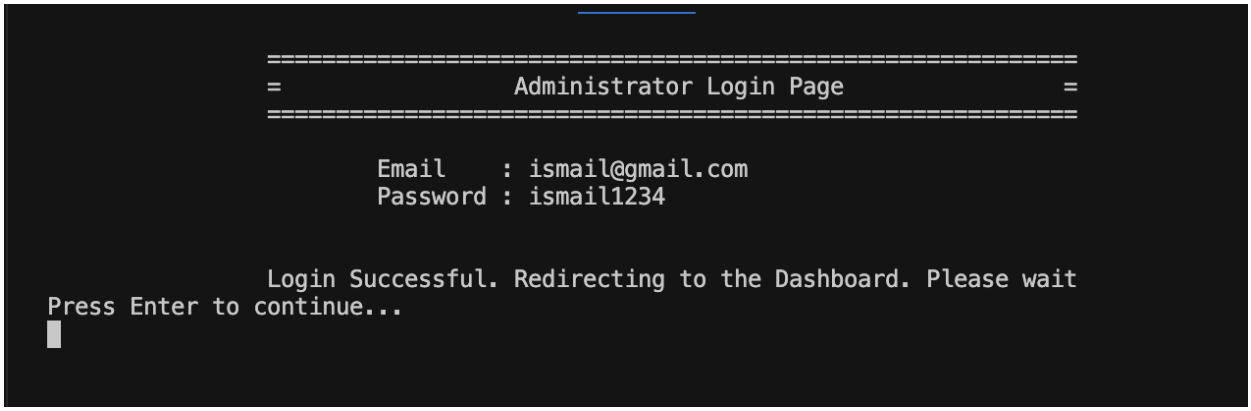
4.2 Administrator Functions



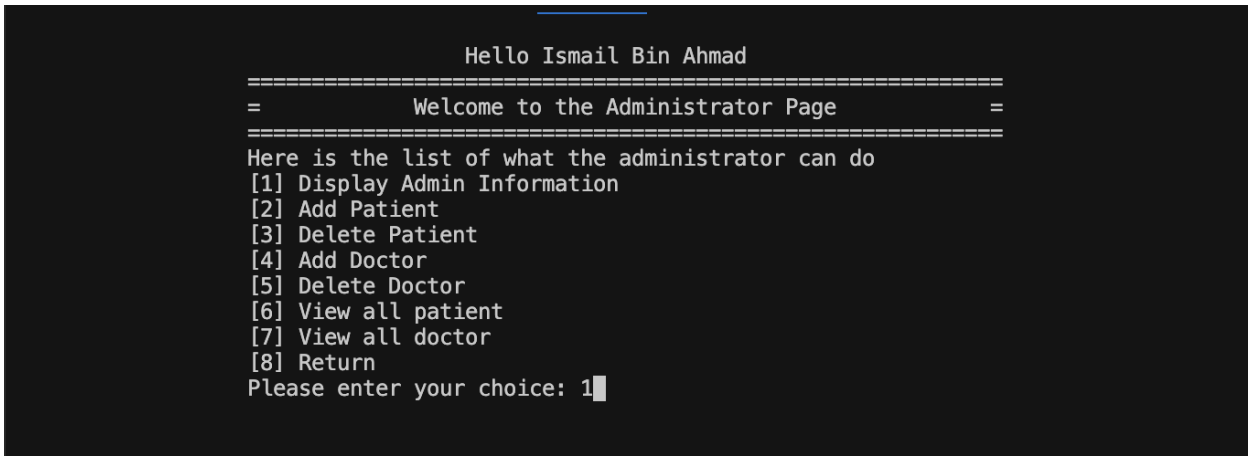
Then, the system will display the user page. There are three types of users who can access the page which are Admin, Patient and Doctor. The user can also choose to exit the system. Firstly, we will start with the Admin. Admin will input '1'.



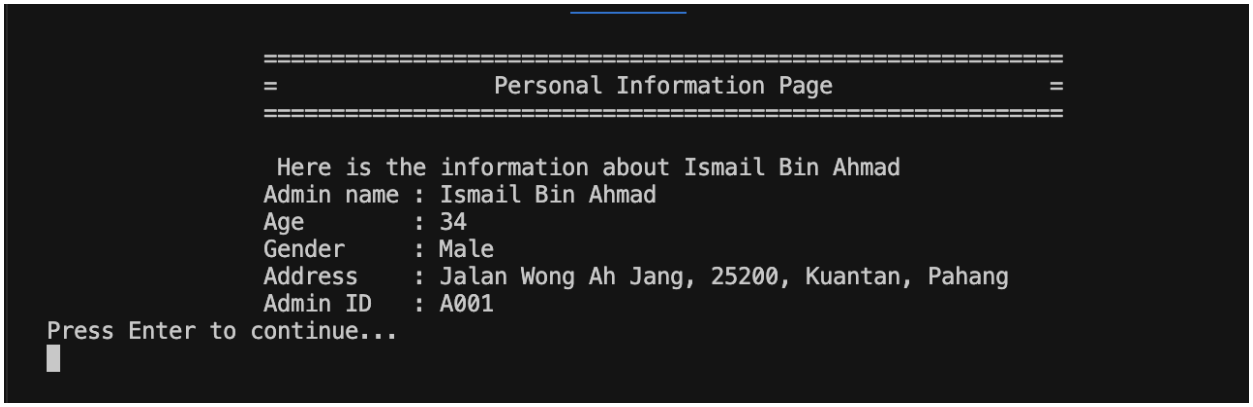
At the administrator login page, the admin will be prompted to enter their email address and password.



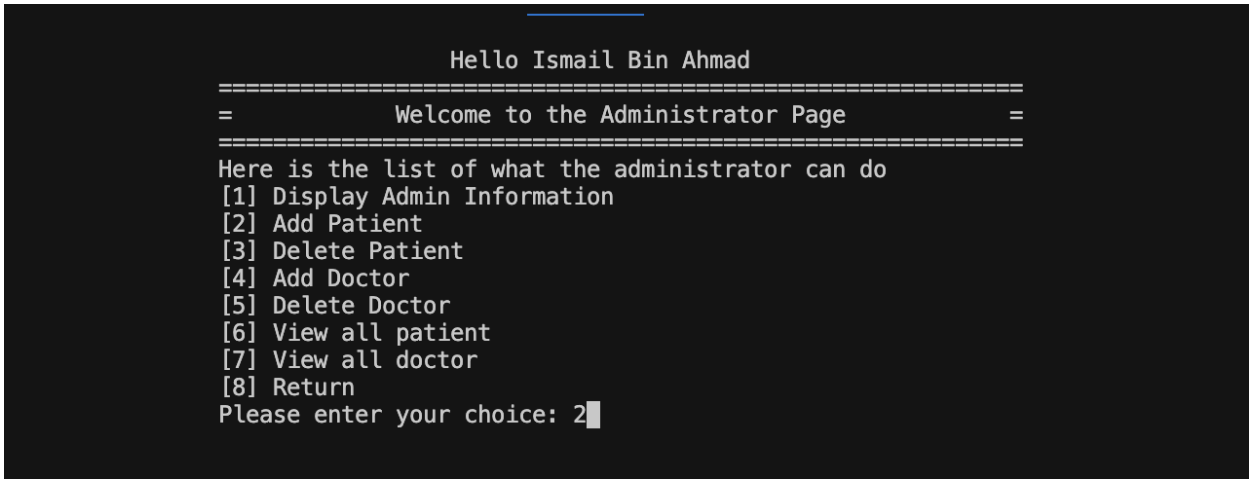
If the admin inputs the correct email and password, the page will indicate that the login is successful and the admin can access the dashboard.



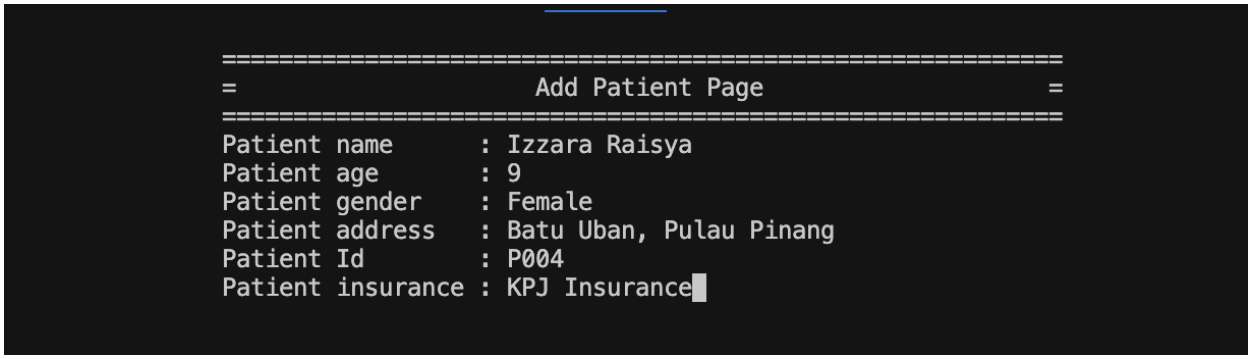
In the administrator dashboard, the system will display the functions that the admin can access to. Here, we'll start with choosing '1'.



These are the admin informations that will be displayed which includes the admin name, age, gender, address and admin ID. Admin can only view their own personal information.



Next, we're going to choose option '2'.



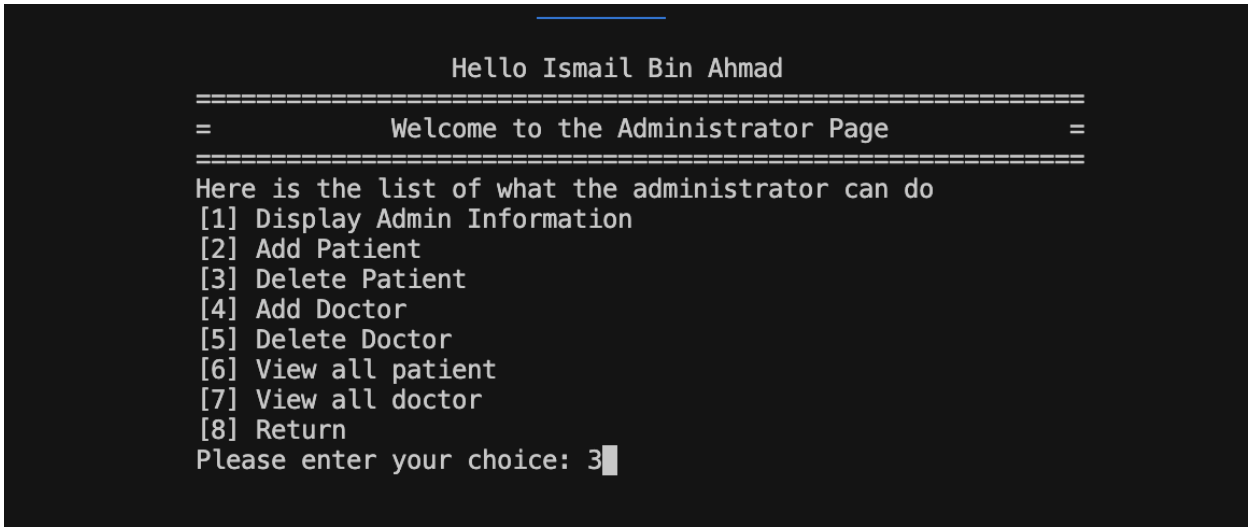
The admin can input the following patient details. Each patient will have their own unique patient ID.

```
                    Hello Ismail Bin Ahmad
=============================================================
=            Welcome to the Administrator Page              =
=============================================================
Here is the list of what the administrator can do
[1] Display Admin Information
[2] Add Patient
[3] Delete Patient
[4] Add Doctor
[5] Delete Doctor
[6] View all patient
[7] View all doctor
[8] Return
Please enter your choice: 6
```

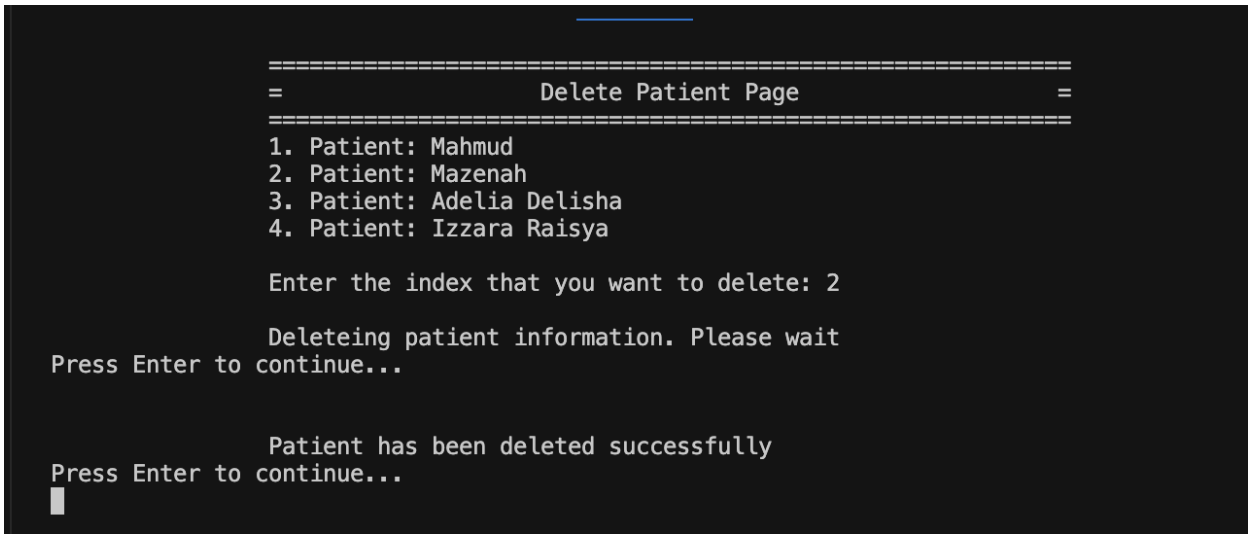
Next, we're going to choose option '6' after inputting the patient details.

```
 Here is the information about Mazenah
Patient name : Mazenah
Age          : 26
Gender       : Female
Address      : Johor
Patient ID   : P002
Insurance    : Not registered

Medical Record History
Medical Record ID : R002
Diagnosis         : Headache
Tests             : Surgery
Notes             : Critical

                            (3)
=============================================================
=                Personal Information Page                  =
=============================================================

 Here is the information about Adelia Delisha
Patient name : Adelia Delisha
Age          : 2
Gender       : Female
Address      : Ipoh, Perak
Patient ID   : P003
Insurance    : MiCare

No Medical Record History

                            (4)
=============================================================
=                Personal Information Page                  =
=============================================================

 Here is the information about Izzara Raisya
Patient name : Izzara Raisya
Age          : 9
Gender       : Female
Address      : Batu Uban, Pulau Pinang
Patient ID   : P004
Insurance    : KPJ Insurance

No Medical Record History
Press Enter to continue...
```

Here is the list of patients that are currently in the system. Note that patient 3 and patient 4 are the ones that were input by the admin.



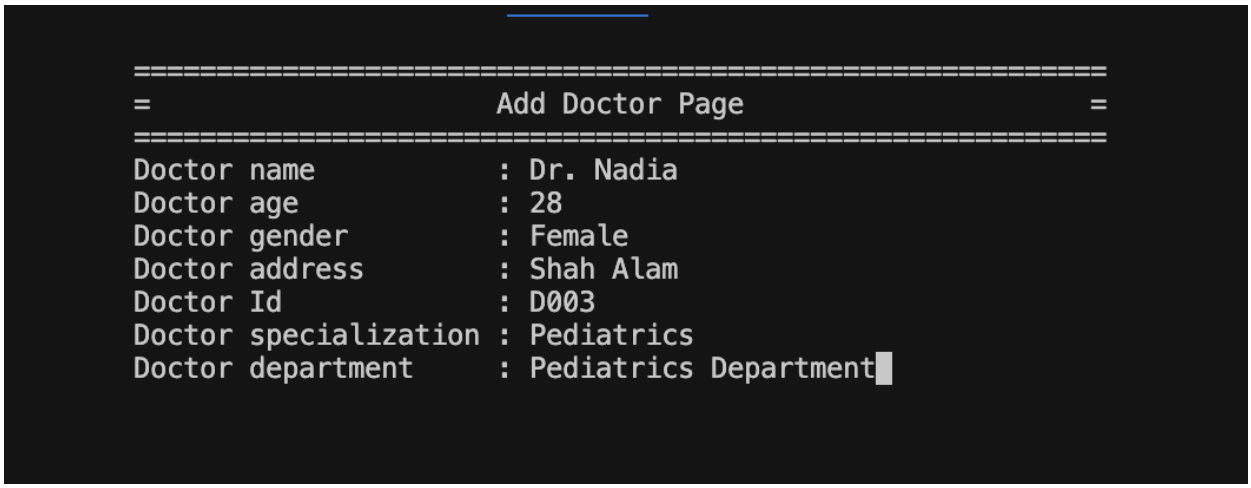
Next, we're going to choose option '3'.



Admin can choose to delete any one of these patients from the system. Let's say the admin wants to delete patient 2.

Now, when the admin views all the patients again, patient 2 is no more in the system and patient 3 is shifted to become the 2nd patient.

Next, we're going to choose option '4'.



The admin can input the following doctor details. Each doctor will have their own unique doctor ID.

```
                    Hello Ismail Bin Ahmad
============================================================
=            Welcome to the Administrator Page             =
============================================================
Here is the list of what the administrator can do
[1] Display Admin Information
[2] Add Patient
[3] Delete Patient
[4] Add Doctor
[5] Delete Doctor
[6] View all patient
[7] View all doctor
[8] Return
Please enter your choice: 7
```

Next, we're going to choose option '7' after inputting the doctor's details.

```
                              (1)
============================================================
=                Personal Information Page                 =
============================================================

 Here is the information about Ali
Patient name   : Ali
Age            : 30
Gender         : Male
Address        : Pahang
Doctor ID      : D001
Specialization : Neurology
Department     : Neurology Department

                              (2)
============================================================
=                Personal Information Page                 =
============================================================

 Here is the information about Rokiah
Patient name   : Rokiah
Age            : 50
Gender         : Female
Address        : Johor
Doctor ID      : D002
Specialization : Dermatology
Department     : Dermatology Department

                              (3)
============================================================
=                Personal Information Page                 =
============================================================

 Here is the information about Dr. Nadia
Patient name   : Dr. Nadia
Age            : 28
Gender         : Female
Address        : Shah Alam
Doctor ID      : D003
Specialization : Pediatrics
Department     : Pediatrics Department
Press Enter to continue...
```

Here is the list of doctors that are currently in the system. Note that doctor 3 is the one that was input by the admin.

```
                    Hello Ismail Bin Ahmad
============================================================
=            Welcome to the Administrator Page             =
============================================================
Here is the list of what the administrator can do
[1] Display Admin Information
[2] Add Patient
[3] Delete Patient
[4] Add Doctor
[5] Delete Doctor
[6] View all patient
[7] View all doctor
[8] Return
Please enter your choice: 5
```

Next, we're going to choose option '5'.

```
                ============================================================
                =                  Delete Doctor Page                      =
                ============================================================
                1. Doctor: Ali
                2. Doctor: Rokiah
                3. Doctor: Dr. Nadia

                Enter the index that you want to delete: 2

                Deleteing doctor information. Please wait
Press Enter to continue...


                Doctor has been deleted successfully
Press Enter to continue...
```

Admin can choose to delete any one of these doctors from the system. Let's say the admin wants to delete doctor 2.

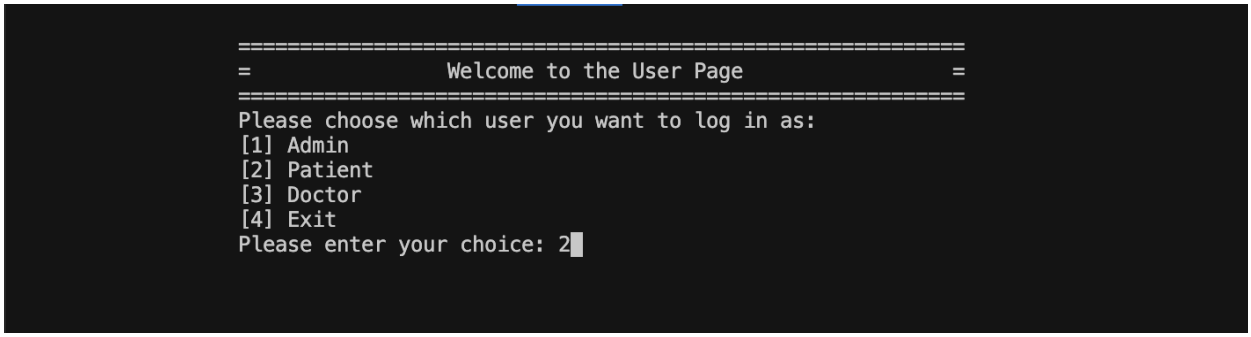
```
                                    (1)
                ============================================================
                =                Personal Information Page                 =
                ============================================================

                 Here is the information about Ali
                Patient name   : Ali
                Age            : 30
                Gender         : Male
                Address        : Pahang
                Doctor ID      : D001
                Specialization : Neurology
                Department     : Neurology Department

                                    (2)
                ============================================================
                =                Personal Information Page                 =
                ============================================================

                 Here is the information about Dr. Nadia
                Patient name   : Dr. Nadia
                Age            : 28
                Gender         : Female
                Address        : Shah Alam
                Doctor ID      : D003
                Specialization : Pediatrics
                Department     : Pediatrics Department
Press Enter to continue...
```

Now, when the admin views all the doctors again, doctor 2 is no more in the system and doctor 3 is shifted to become the 2nd doctor.

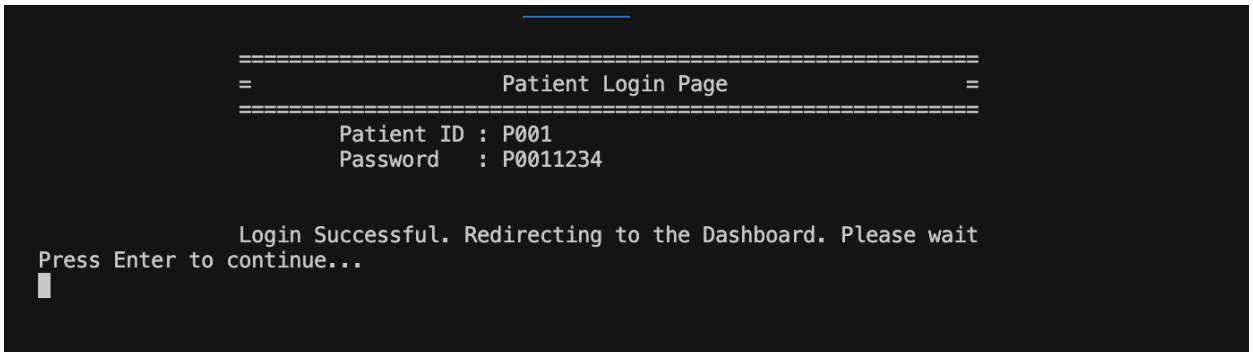
```
                    Hello Ismail Bin Ahmad
            ============================================================
            =            Welcome to the Administrator Page             =
            ============================================================
            Here is the list of what the administrator can do
            [1] Display Admin Information
            [2] Add Patient
            [3] Delete Patient
            [4] Add Doctor
            [5] Delete Doctor
            [6] View all patient
            [7] View all doctor
            [8] Return
            Please enter your choice: 8
```

Lastly, we're going to choose option '8' to return back to the user page.

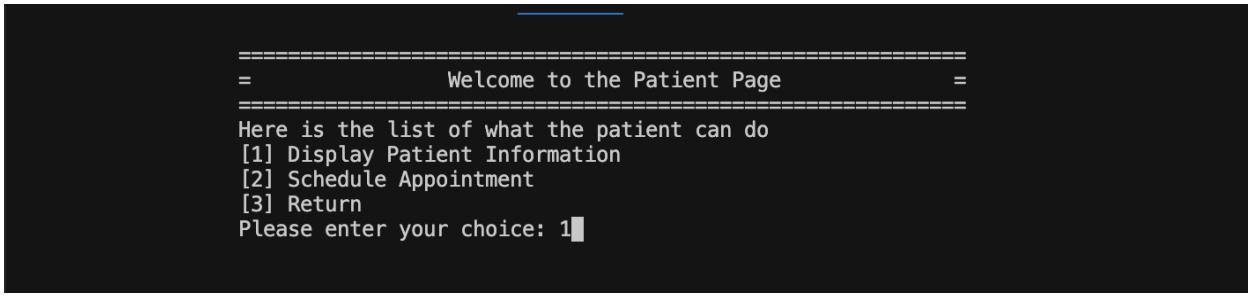
4.3 Patient Functions



Moving on, we're going to choose the next user which is to log in as the Patient.



If the patient ID and the password is correct, the patient can login. Note that the password is concatenated with the patient ID, making each password unique for every patient.



Above is the list of functions that the patient can do. Firstly, we're going to display the patient information of the patient logged in, which is patient P001.

```
============================================================
=                Personal Information Page                 =
============================================================

 Here is the information about Mahmud
Patient name : Mahmud
Age          : 19
Gender       : Male
Address      : Selangor
Patient ID   : P001
Insurance    : HSBC Life

Medical Record History
Medical Record ID : R001
Diagnosis         : Fever
Tests             : Surgery
Notes             : Sever
Press Enter to continue...
```

This is the personal information page of the patient P001. It includes all of the patient's personal details, including his or her medical record history (if any).

```
============================================================
=                Welcome to the Patient Page               =
============================================================
Here is the list of what the patient can do
[1] Display Patient Information
[2] Schedule Appointment
[3] Return
Please enter your choice: 2
```

Next, we're going to go for choice '2' to schedule an appointment for the patient.

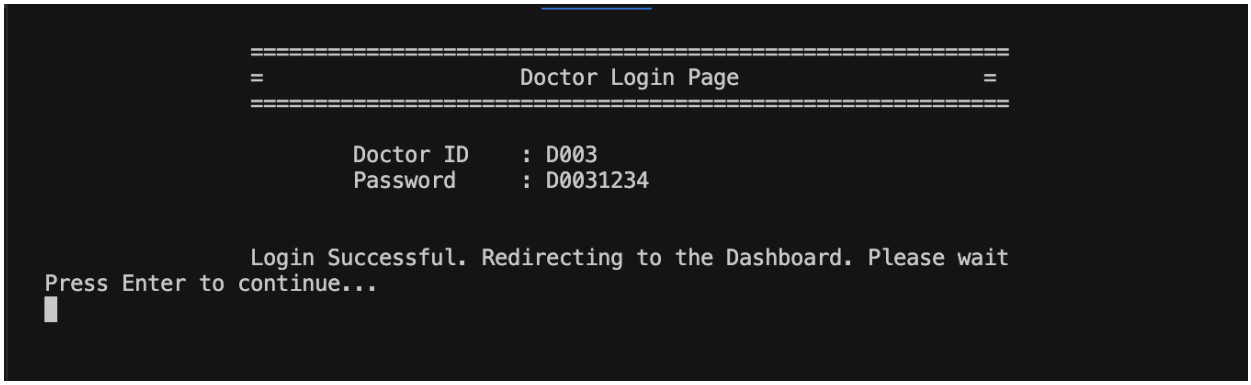
```
                ============================================================
                =                  Schedule Appointment                    =
                ============================================================

                Enter the date (MM/DD/YYYY) : 04/23/2023
                Enter the time (HH:MM)      : 08:23
                Available Doctors:
                          1. Ali
                          2. Dr. Nadia

                Enter the number of the doctor: 2

                Available Rooms:
                          1. Room No.: R001
                          2. Room No.: R002
                          3. Room No.: R003

                Enter the number of the room: 2
                        Scheduling the appointment. Please Wait

                        Appointment scheduled successfully!
Press Enter to continue...
```

To schedule the appointment, the patient has to enter the date and time, and choose which Doctor and Room that they prefer. The system only displays the doctor and rooms which are available at that time.

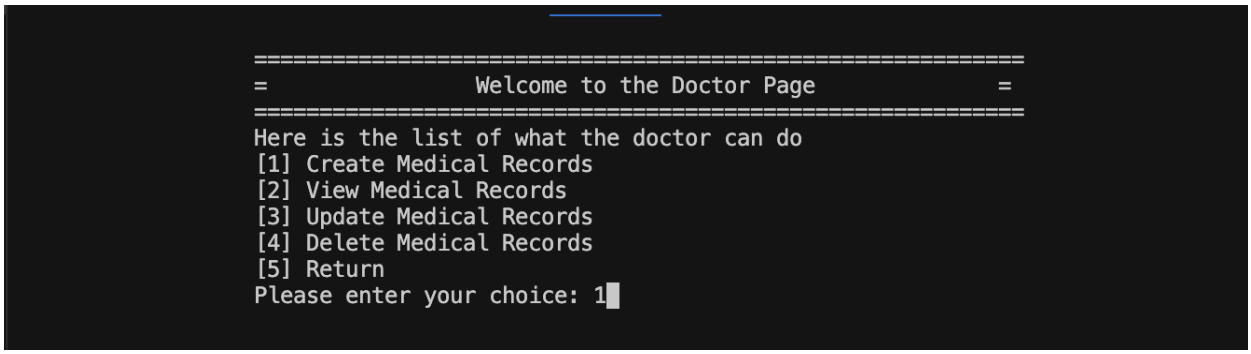
```
            ============================================================
            =               Welcome to the Patient Page                =
            ============================================================
            Here is the list of what the patient can do
            [1] Display Patient Information
            [2] Schedule Appointment
            [3] Return
            Please enter your choice: 3
```

Lastly, choice ‘3’ is to return to the user login page.

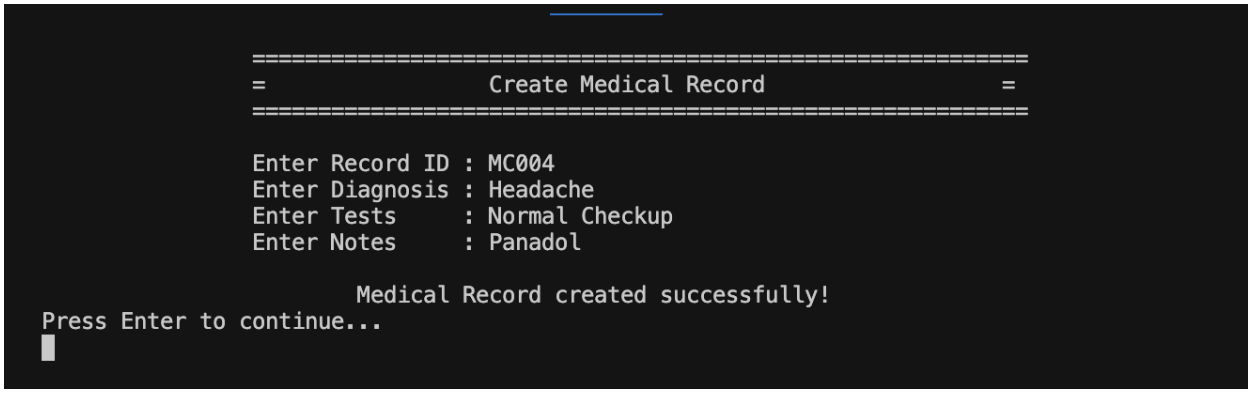
4.4 Doctor Functions



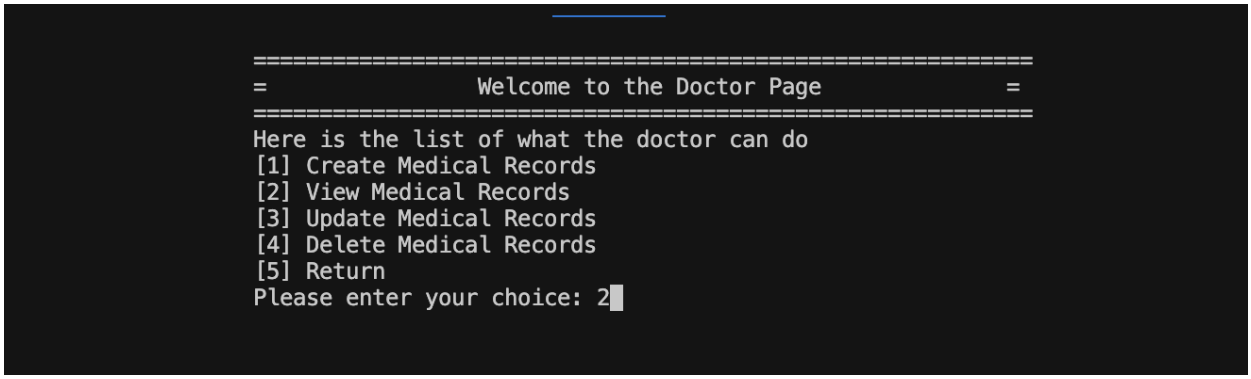
If the doctor ID and the password is correct, the doctor can login. Note that the password is concatenated with the doctor ID, making each password unique for every doctor.



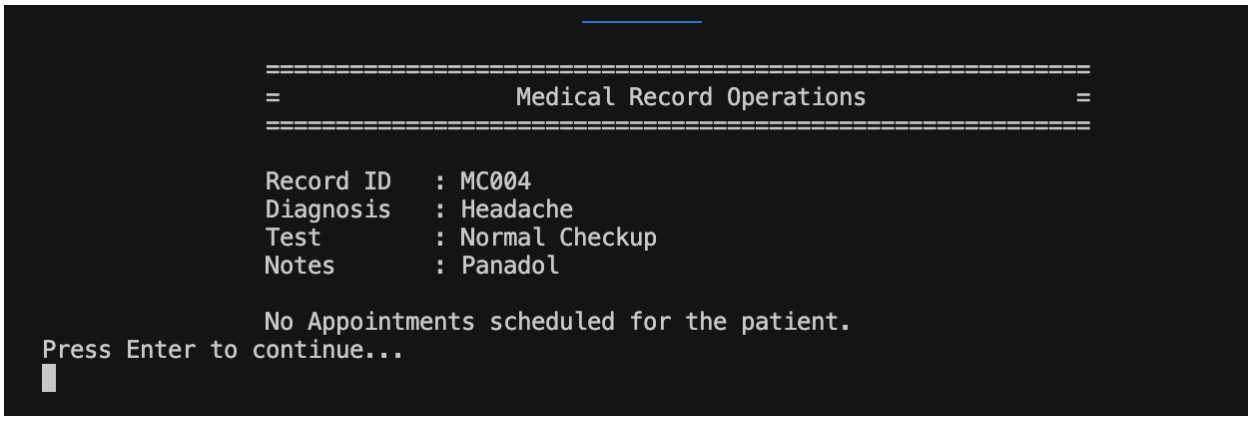
In the doctor dashboard, the system will display the functions that the doctor can access to. Here, we'll start with choosing '1'.



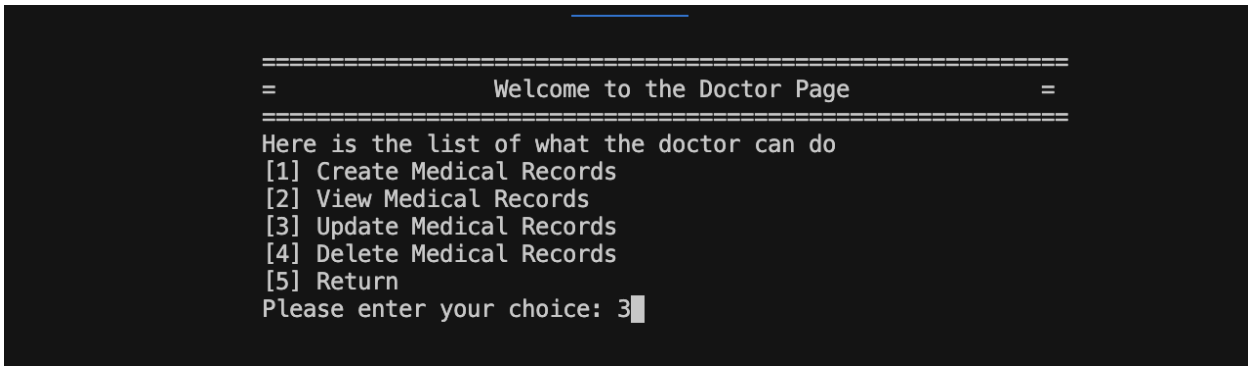
To create a medical record, the doctor are required to enter the information of the medical record before creating a new medical record.



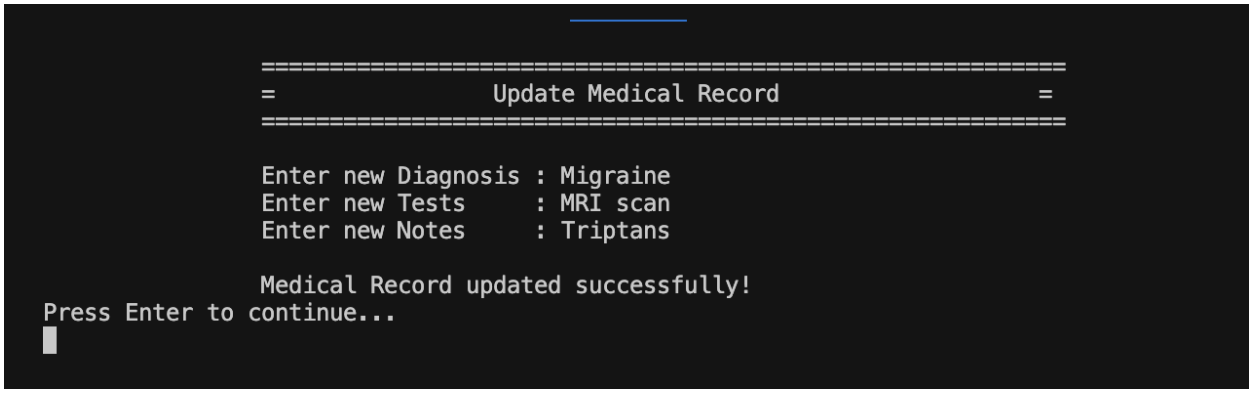
Next, we're going to go for choice '2' to view medical records.



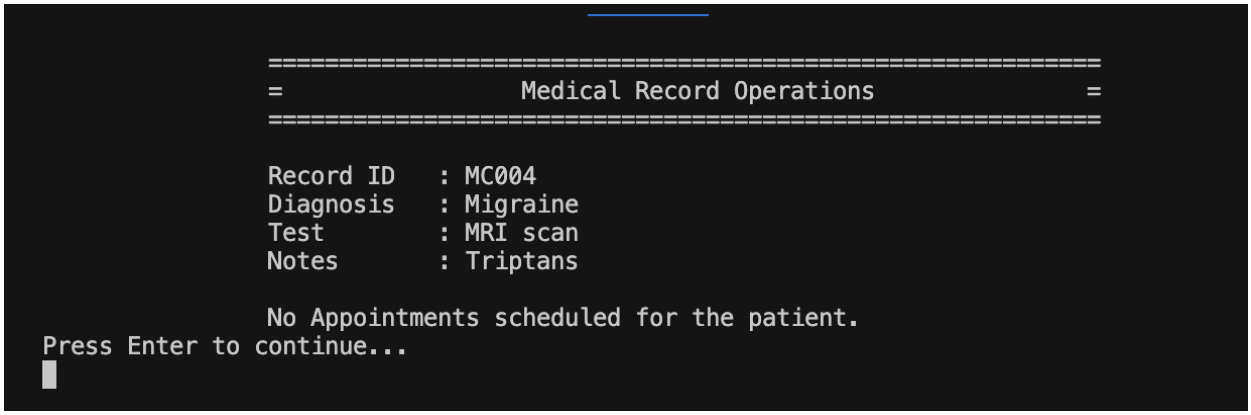
Currently, this is the medical record for the patient which has just been created.



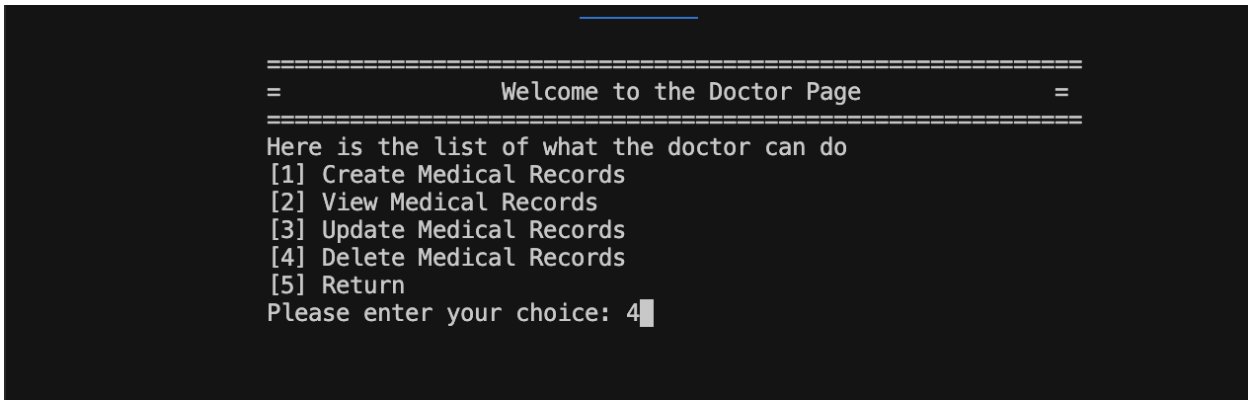
Next, we're going to go for choice '3' to update medical records stored in the system.



The doctor can update the medical record if there are any errors while checking up on the patient.



Then, when the doctor presses on to view the medical record again, the medical record is now updated to the latest one.



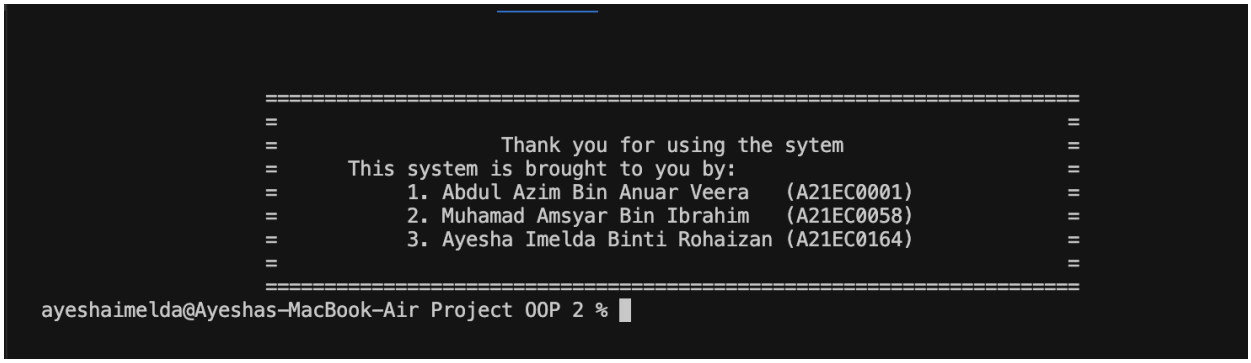
Lastly, the doctor can also choose to delete the medical record of the patient.

```
No Medical Record found for the patient.

No Appointments scheduled for the patient.
Press Enter to continue...
```

When the medical record is deleted, this is what will be displayed on the screen.

```
                ================================================================
                =                 Medical Record Operations                    =
                ================================================================

                Record ID   : R001
                Diagnosis   : Fever
                Test        : Surgery
                Notes       : Sever

                Appointments:
Date: 04/23/2023
Time: 08:23
Hospital: Oculent Care Hospital
Address: Ara Damansara
Contact: 05-9297655
Doctor: Dr. Nadia
Room No.: R002
Date: 02/23/2022
Time: 08:24
Hospital: Oculent Care Hospital
Address: Ara Damansara
Contact: 05-9297655
Doctor: Ali
Room No.: R001
Press Enter to continue...
```

However, if there is an appointment scheduled, the doctor can see all of the details required, making it easier for the doctor to book their own time.



This marks the end of our Hospital Management System.

5. Conclusion

In conclusion, the Java mini project successfully achieved its goals of serving as a Hospital Management System. The effective administration of patient medical records is one noteworthy accomplishment. A patient's medical history can be completely and accurately documented because of the ability of doctors to create, access, amend, and delete medical records. This skill enables doctors to deliver individualised treatment regimens based on current knowledge and to make well-informed decisions.

Another notable result is the addition of appointment scheduling features. Based on their preferences for time, date, and availability, patients can simply make appointments with doctors. The seamless tracking of medical records is an important result. Since each patient's medical record is connected to their profile, doctors can access and edit important data like diagnoses, results of tests, and notes. This feature encourages continuity of care and makes it easier to provide patients with individualised care based on their medical histories.

Comprehensive hospital and room management features are also included in the system. Doctors and patients can see which rooms are available while making an appointment thanks to the system's storage of hospitals and their corresponding rooms. This feature enables effective room allocation and maximises resource utilisation. The user interface is also made to be user-friendly, clean and well-organized.

Overall, the Java mini project has been successful in achieving its goals of offering a safe, effective, and user-friendly platform for storing medical records, making appointments, and getting access to crucial healthcare data. The successes show the system's capacity to improve patient care, streamline healthcare procedures, and boost healthcare institutions' general operational effectiveness.