Final Project Readme

Project Summary:

The project designed and developed is an online web application of a Medical Hospital to book appointments by patients. It is a Jakarta application that manages data for a Hospital.

This project's implementation includes CRUD operations ,role based users ,a ER model with multiple types of relationships and various test cases/flows which helped me in ensuring I could explore all the project specifications. The CRUD operations are required for various features of managing appointment booking of a hospital.It has both authentication and role authorization for various users accessing the system. Users of this application are patient, doctor and and admin.

Entities in this project consist of patients, doctors and admin as users for taking appointments with doctors from different departments in the hospital. Other entities would be department and appointment.

Entities

1. Patient

- A patient will be able to login to the portal
- A patient can register with First Name, Last Name, Email ID, Date of Birth.
- The patient will enter symptoms and select the department/doctor he/she intends to visit.
- A patient will also be able to select the appointment date and time also.
- If a patient enters 'fever' and 'cough' as part of his symptoms, he will receive a COVID19 related alert message in red.

1. Doctor

- A Doctor would be able to login to the portal.
- A Doctor can only be added to the hospital system by an Admin.
- A Doctor will be assigned an appointment based on the appointment submitted by the patient.
- A Doctor will be associated with a Department.
- Department ID is the foreign key in the doctor table.
- A Doctor can view/edit and delete an appointment.
- A Doctor will be able to view all appointments but will not be able to book an appointment. He will be routed to a page that denies him access to book an appointment.

1. Appointment

- Appointment is the entity used to form a relationship between doctor and patient
- Appointment table has appointment data time, appointment updated date time, symptom
- DoctorID and PatientID are the foreign keys.

1. Department

- Implemented Enumeration with Department
- Department contains the Department ID used to link the doctors

Admin

- Admin can add a new doctor

- Admin can edit and delete a doctor
- Admin can view all existing doctors
- Admin can view all appointments
- Admin cannot book an appointment. He will be routed to a page that denies him access to book an appointment.

Relationships between entities:
Bidirectional Many to Many: A Doctor can have multiple Patients and a Patient can consult multiple Doctors.

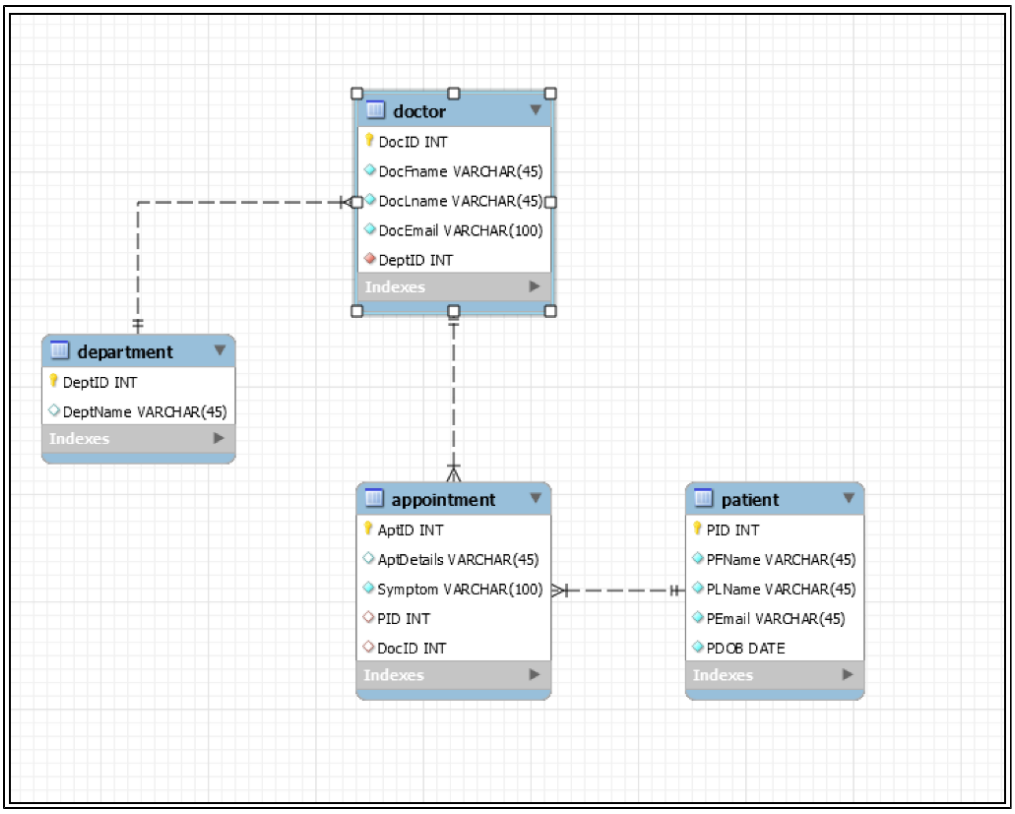
One to One : A patient can have only one Primary Doctor.

One to Many: A Doctor can have many appointments

One to Many : A patient can have many appointments

One to Many : One Department can have many doctors.

ER Diagram



Added JPA inheritance by extending the common attributes between the entities.

Used JSF template tags , JSF Data Tables ,Composite Components and Bootstrap/CSS to render the view pages of the application.

1.Person. java : Contains the common attributes between Doctor and Patient like first name, last name, email and date of birth. The doctor.java and patient. java inherits the properties from Person.java. Person.java extends Entity.java which contains the ID.

2.Entity.java : All the attributes have ID in common hence created Entity.java as an abstract class.

3.Doctor.java and Patient.java extends Person.java and Person.java inherits Entity.java.

Similarly, Appointment.java and Department.java extends Entity.java

---

Users

There are three users:

1. **Admin**
2. **Patient**
3. **Doctor**

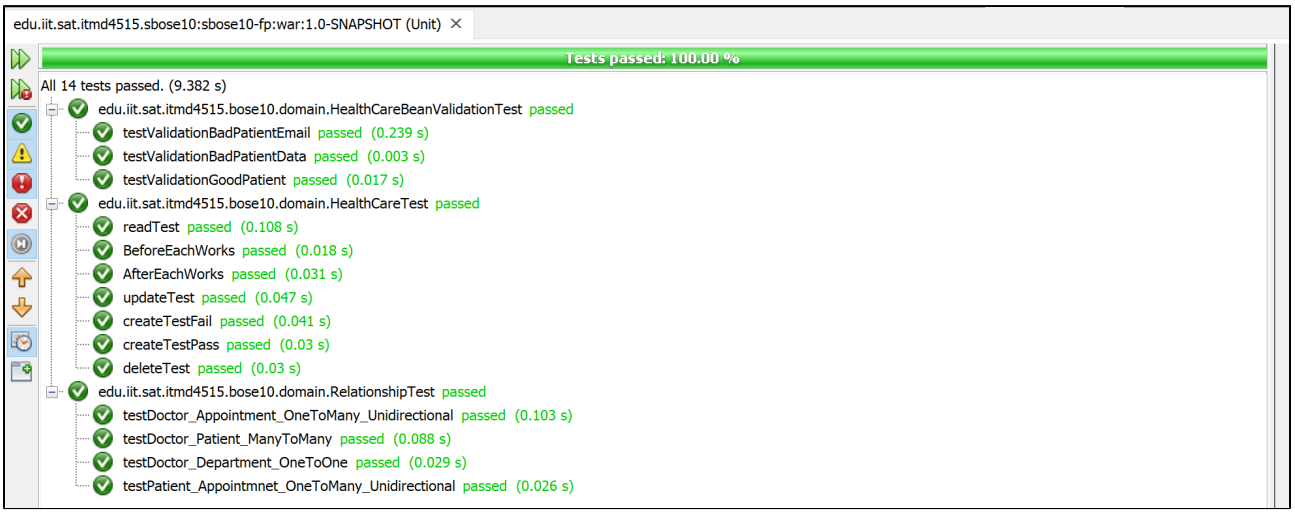
Functionality of each user

Patients register themselves to the Chicago Hospital Center. The patients can login to the portal to book an appointment with a doctor from the drop down and see their appointments.

The chosen corresponding doctor would be able to view delete or edit the particular appointment. The doctors can view all the appointments and patient tab but would not be able to book an appointment for a patient.

The Admin has access to Doctor and Patient Tabs. It can add a new doctor, view the added doctor and delete a doctor entry.

Tests Validated



Successful Build

```
Results:

Tests run: 14, Failures: 0, Errors: 0, Skipped: 0


--- maven-war-plugin:2.3:war (default-war) @ sbose10-fp ---
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by com.thoughtworks.xstream.converters.collections.TreeMapC
stream/xstream/1.4.3/xstream-1.4.3.jar) to field java.util.TreeMap.comparator
WARNING: Please consider reporting this to the maintainers of com.thoughtworks.xstream.convert
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access ope
WARNING: All illegal access operations will be denied in a future release
Packaging webapp
Assembling webapp [sbose10-fp] in [C:\Users\Sonita\OneDrive\Documents\NetBeansProjects\itmd451
Processing war project
Copying webapp resources [C:\Users\Sonita\OneDrive\Documents\NetBeansProjects\itmd4515-s20-fp-
Webapp assembled in [1238 msecs]
Building war: C:\Users\Sonita\OneDrive\Documents\NetBeansProjects\itmd4515-s20-fp-sbose10\sbos

--- maven-install-plugin:2.4:install (default-install) @ sbose10-fp ---
Installing C:\Users\Sonita\OneDrive\Documents\NetBeansProjects\itmd4515-s20-fp-sbose10\sbose10
ository\edu\iit\sat\itmd4515\sbose10\sbose10-fp\1.0-SNAPSHOT\sbose10-fp-1.0-SNAPSHOT.war
Installing C:\Users\Sonita\OneDrive\Documents\NetBeansProjects\itmd4515-s20-fp-sbose10\sbose10
5\sbose10\sbose10-fp\1.0-SNAPSHOT\sbose10-fp-1.0-SNAPSHOT.pom
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time: 18.807 s
Finished at: 2020-05-08T10:31:20-05:00
Final Memory: 20M/69M
------------------------------------------------------------------------
```

Installations:

- **Database**: MySQL Server 8.0.19
- **Server**: Payara Server 5.193
- **IDE**: Apache NetBeans 11.2
- **JDK version**: 11.0.6 (latest version released on 01-15-2020)

Run and Compile

- Import the package sbose10-fp domain into NetBeans
- Please note Persistence.xml has following properties:

```
<property name="javax.persistence.jdbc.url" value="jdbc:mysql://localhost:3306/itmd4515?
zeroDateTimeBehavior=CONVERT_TO_NULL"/>

<property name="javax.persistence.jdbc.user" value="itmd4515"/>

<property name="javax.persistence.jdbc.driver" value="com.mysql.cj.jdbc.Driver"/>

<property name="javax.persistence.jdbc.password" value="itmd4515"/>
```

- Run the Project from NetBeans

Credentials

Admin :

username:admin password:admin

Patient:

username: patient1 password: patient1

username: patient2 password: patient2

username: patient3 password: patient3

username: patient4 password: patient4

Doctor:

username: doctor1 password: doctor1

username: doctor2 password: doctor2

username: doctor3 password: doctor3

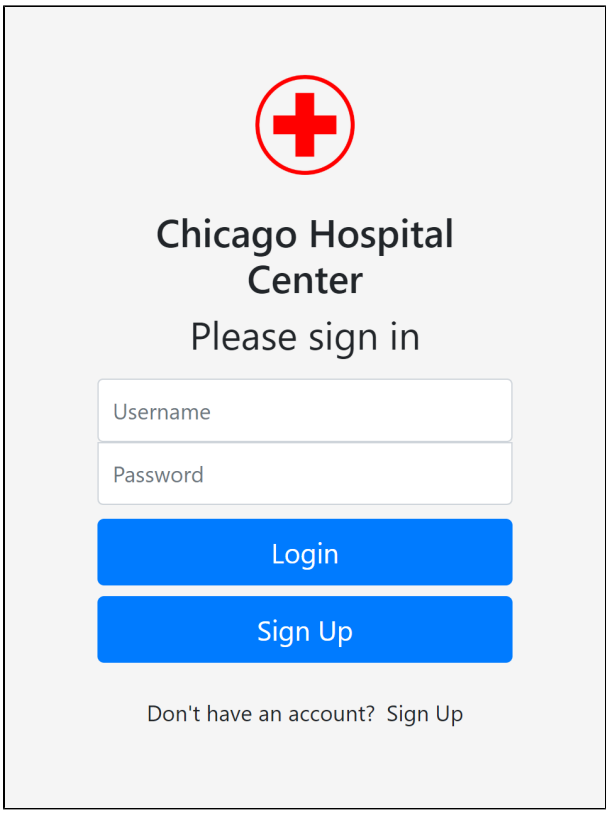
username: doctor4 password: doctor4

username: doctor5 password: doctor5

Flow

(Screenshots)

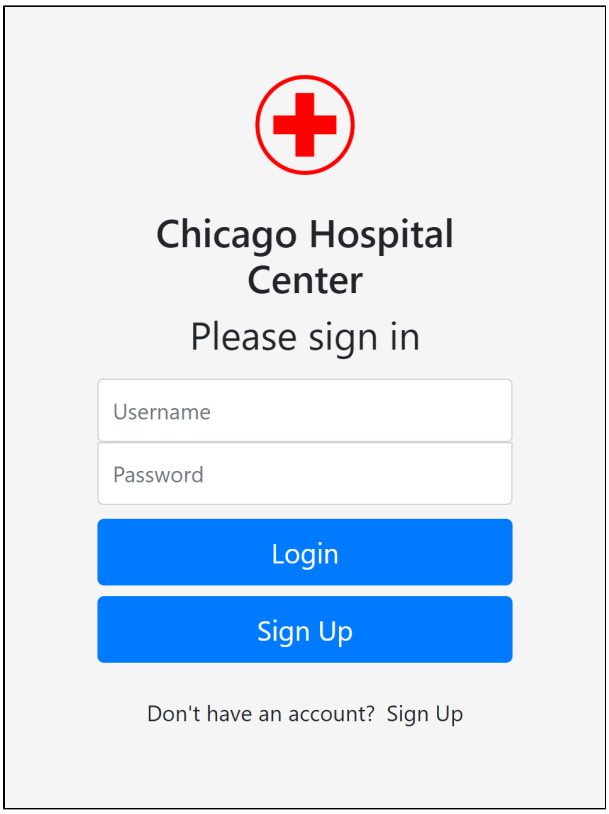
Login Screen



Sign Up

A patient can sign up if they don't already have an account. This Sign Up is only for patients. An Admin or Doctor cannot register themselves as Doctors or Admins through this.

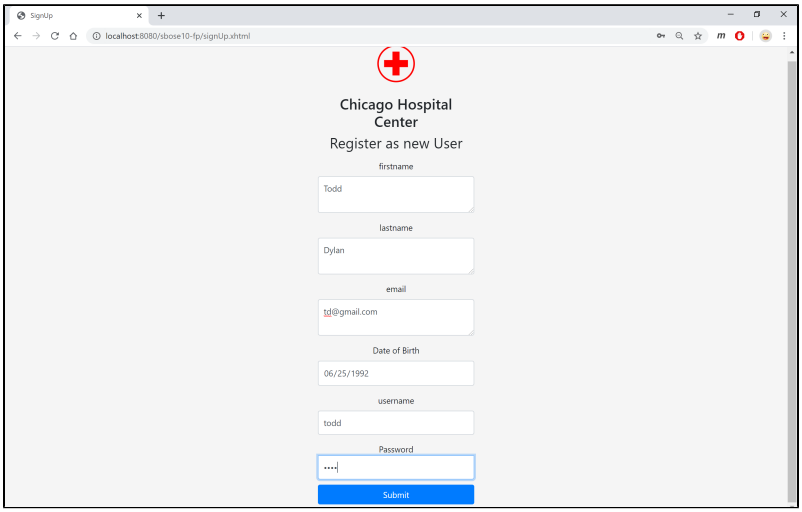
Click on Sign up tab



Sign Up Form

- The patient can create a username and password
- The date of birth field has a date picker
- The password is invisible and hashed in the database

Registered Todd Dylan



Database screenshot

```
mysql> select * from security_user;
+----------+---------+-----------------------------------------------------------------------------------------------------------------------------------+
| USERNAME | ENABLED | PASSWORD                                                                                                                          |
+----------+---------+-----------------------------------------------------------------------------------------------------------------------------------+
| admin    |       1 | PBKDF2WithHmacSHA256:2048:8Kf2Kn3XCUmQmgN2ix3MkKn1slUvCzPlK+3vzoHqeCQ=:qE0mAKDD5rnUNhC0uiXXszvg1pRdbzole7zMAVMFrwY= |
| doctor1  |       1 | PBKDF2WithHmacSHA256:2048:TpL/18vp0yqM11JbUQre4gWRkxpMQLAi1hzTQGr1HPI=:Ttp3+pq/NrOqlipQKNoZcxhmXejHK++ukySh6zcb9jo= |
| doctor2  |       1 | PBKDF2WithHmacSHA256:2048:PmjRxkFsoBuaVjUN6obgjSuo6QHx6awx1WwBE68N7Ew=:DN4BlQ7ZqVWUTYYMp/7G+XM7VB0eFR16WEZsbESB2gQ= |
| doctor3  |       1 | PBKDF2WithHmacSHA256:2048:0Pq607y5UXuWEMHuKobNU1/Njk2cOekMvBJHQdod/AQ=:N5smXzwVcYWYIG9KSd2gumygvEQ+NQFqXaz5yGlkN1g= |
| doctor4  |       1 | PBKDF2WithHmacSHA256:2048:tSi+nojBczXqOvZwW47aJi05H9+SjTQDL+Rf0YsxIeM=:jpbet3/1xPaEeX8e5OtvDLKdl4wrU+qpSK2yuH8u/Kc= |
| doctor5  |       1 | PBKDF2WithHmacSHA256:2048:fXOOPtN5X/kpuvMuVBa0SlKPa99zLrRYCyia0NruLZY=:6gnj1oJFHm+kBfzYaodgC57xaaYGgTkqUk6HM5lAkcA= |
| patient1 |       1 | PBKDF2WithHmacSHA256:2048:TEEVEpz+cPlM45o2KPRrl7RS4RjBc6nwRNW8uTgu2WQ=:JEPOha/xnlYuVEus3k9Wtv7l/4QIOzx6Z2Hpr9SVE1U= |
| patient2 |       1 | PBKDF2WithHmacSHA256:2048:wHeQwi8EfPIMCaFj/mabWsuTC8HLTjUIhpVHS8n3j0w=:6yj3/NziW2VM+Tugtj7nLfW9lOoAkzEhwL8ulvIRJUw= |
| patient3 |       1 | PBKDF2WithHmacSHA256:2048:+2gYzhphRctYip7cFLWQHrCrizZmExZMd9D3sbOp2uU=:aGecXM+9vVIig+e9zgAsaFi4r7VrbU115EaN4nq261k= |
| patient4 |       1 | PBKDF2WithHmacSHA256:2048:QRelQJ/ApCqLj7sJTELFMIEf/PwBRv5FBBoeYbBt+RI=:USD1bMVAlqO6pZvaYbsry3mwomLl6DzFddtNJy8KelE= |
| todd     |    NULL | PBKDF2WithHmacSHA256:2048:ANltP+7OHGM1lne5pXwNQTaq8ta5LGYAJ0BGVqTLoFk=:M4+ugG5oCV5RBxMx8c0Jsv6GlbLgAH65ReLhx9KOTPU= |
+----------+---------+-----------------------------------------------------------------------------------------------------------------------------------+
11 rows in set (0.00 sec)
```

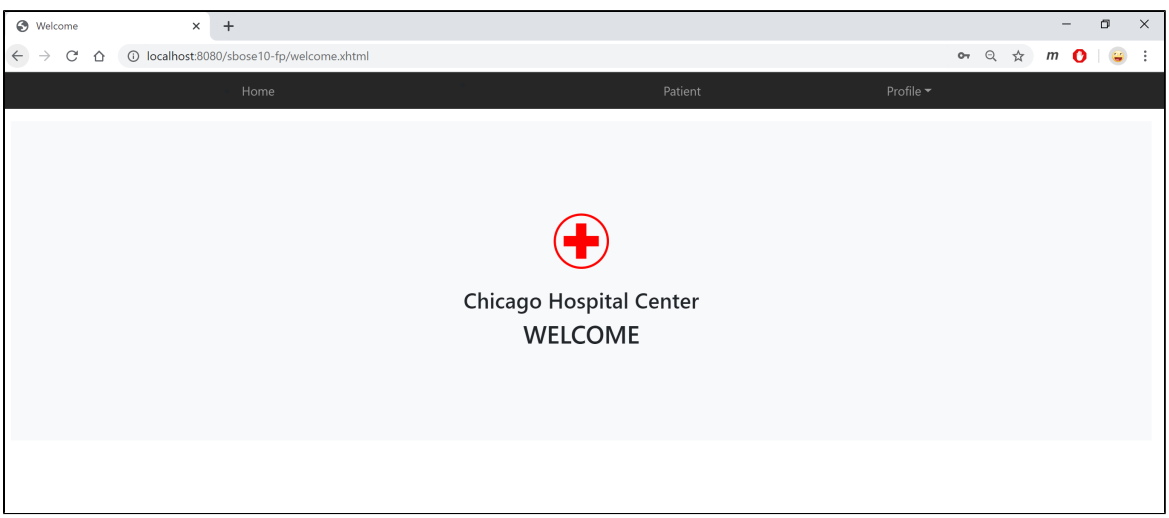
Signed in as Patient

Please note the list of patients on this web page of welcomePatient.xhtml is from the values persisted from the StartUpDatabaseLoader.service , which was part of one of the deliverable of lab 8/9.

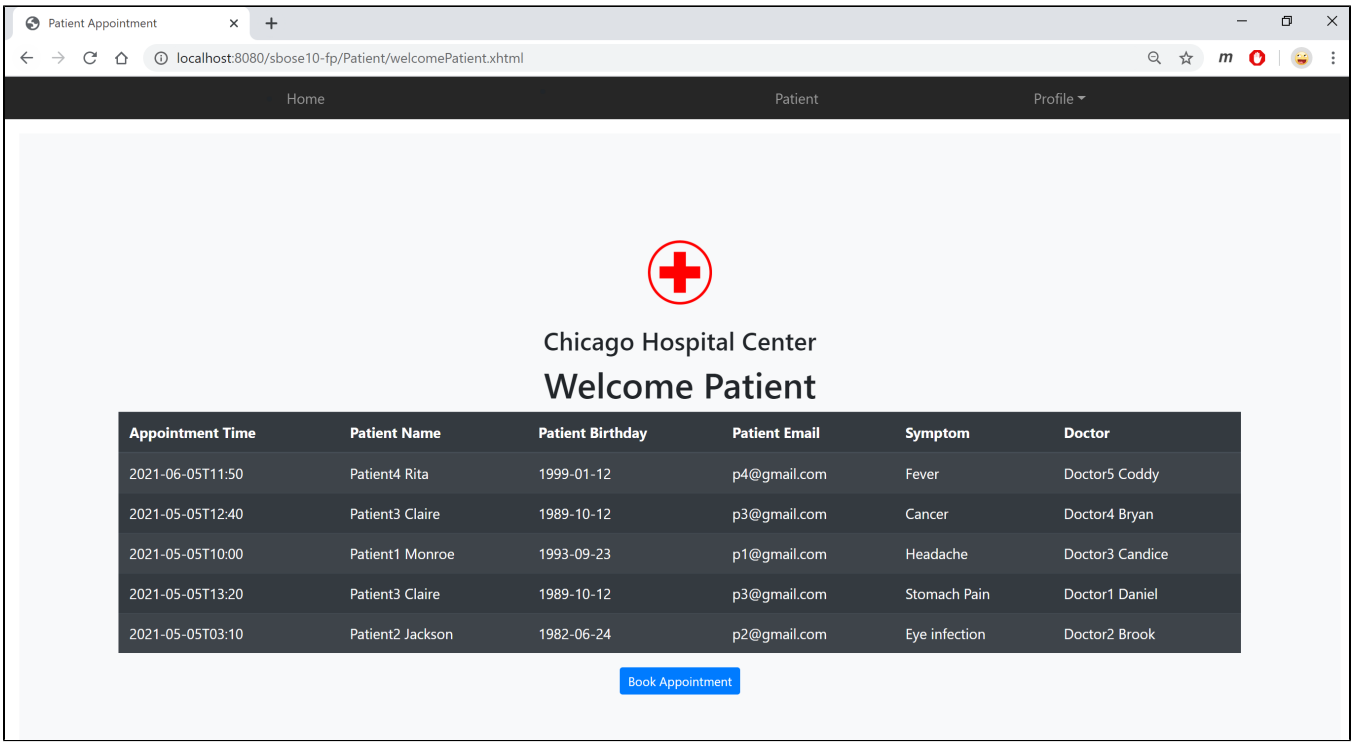
A patient after registering can book an appointment from the Book Appointment Link. After booking an appointment the patient would be able to see the appointment entry on this page.

Only a patient is allowed to book an appointment. A doctor role or admin role cannot book an appointment on behalf of the patient.

The landing page of Patient

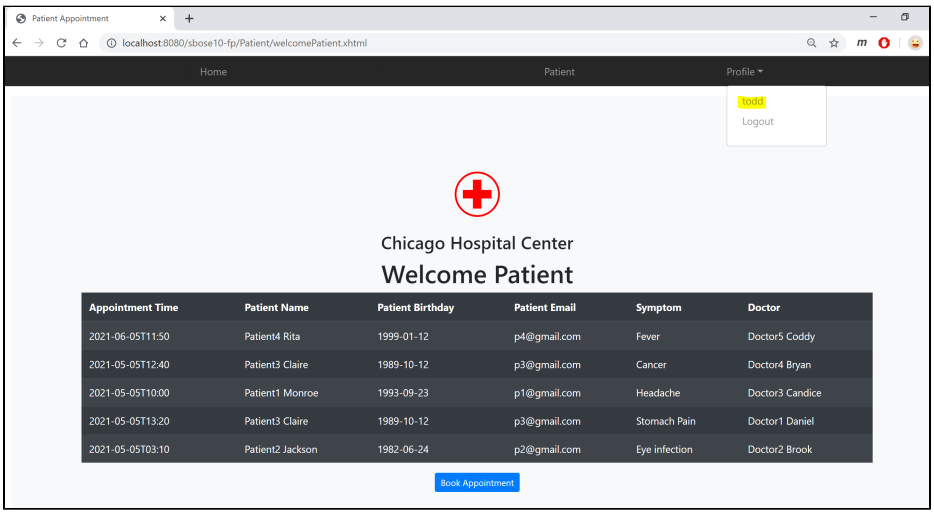


Patient has to click on the patient Tab



After Clicking on "Book Appointment"

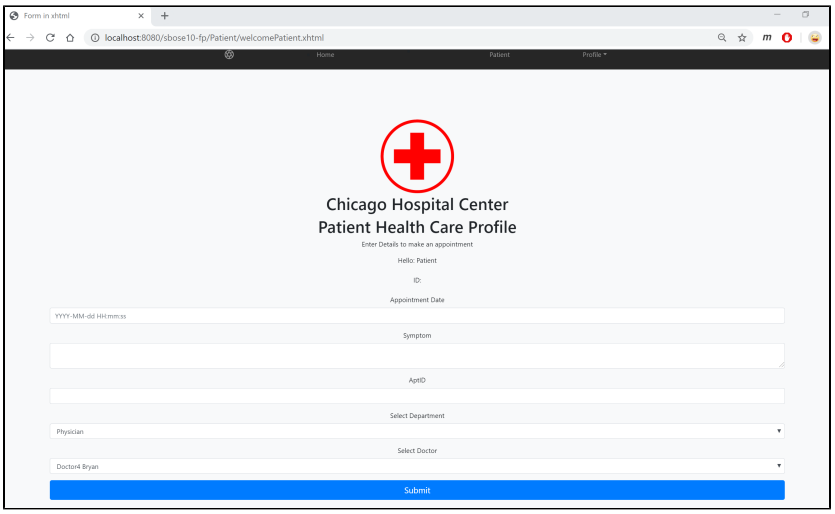
Signed in as Todd Dylan



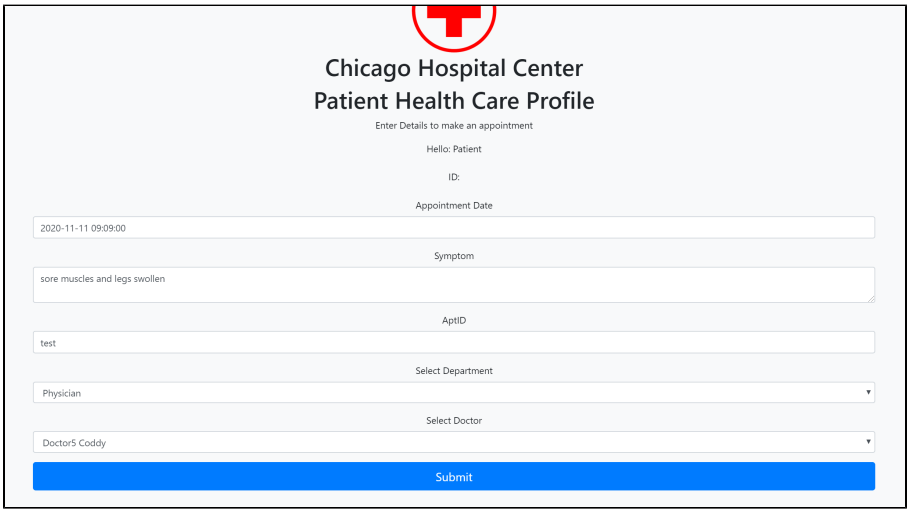
Patient must enter the details :

- **Appointment date should be " 2020-11-11 09:09:00" in this format. Only future Date should be used**
- **Symptom is a string**
- **Apt ID is also a string**
- **Doctor can be chosen from the drop down**

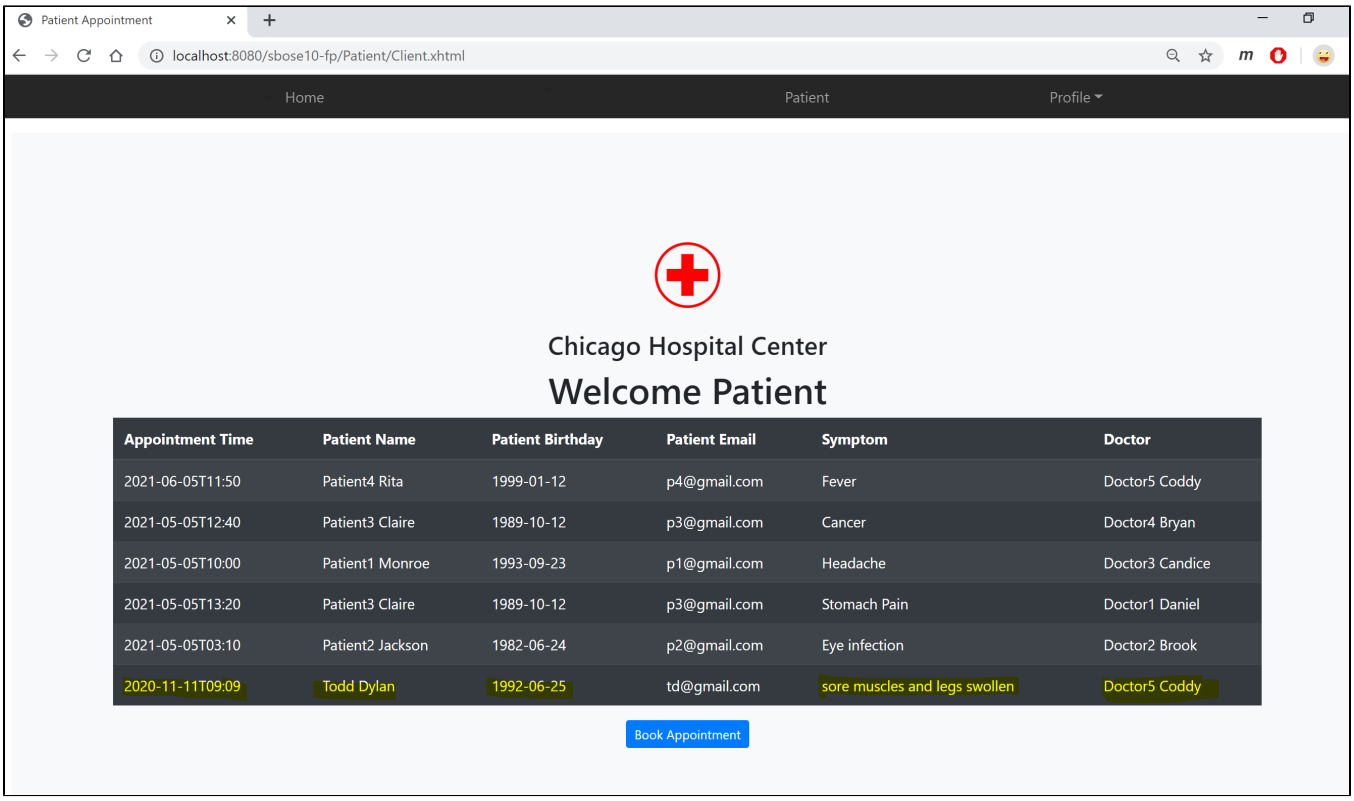
The form



Details entered by Todd

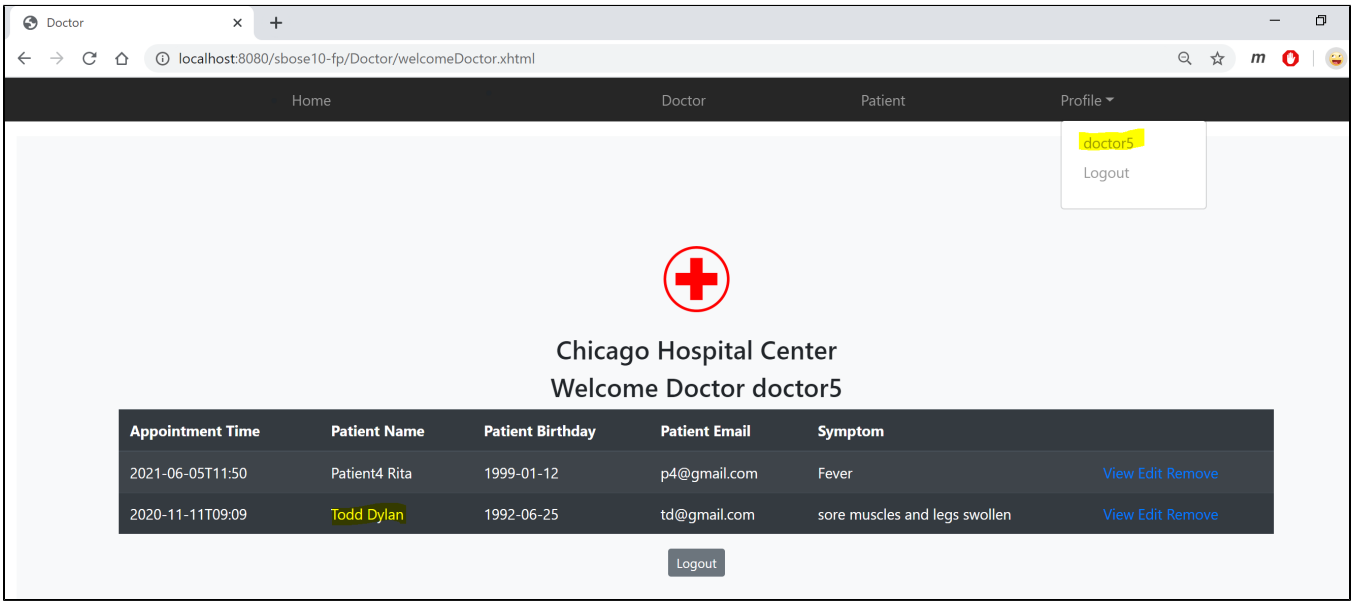


On submitting, Todd is redirected to the first page where he can view his appointment



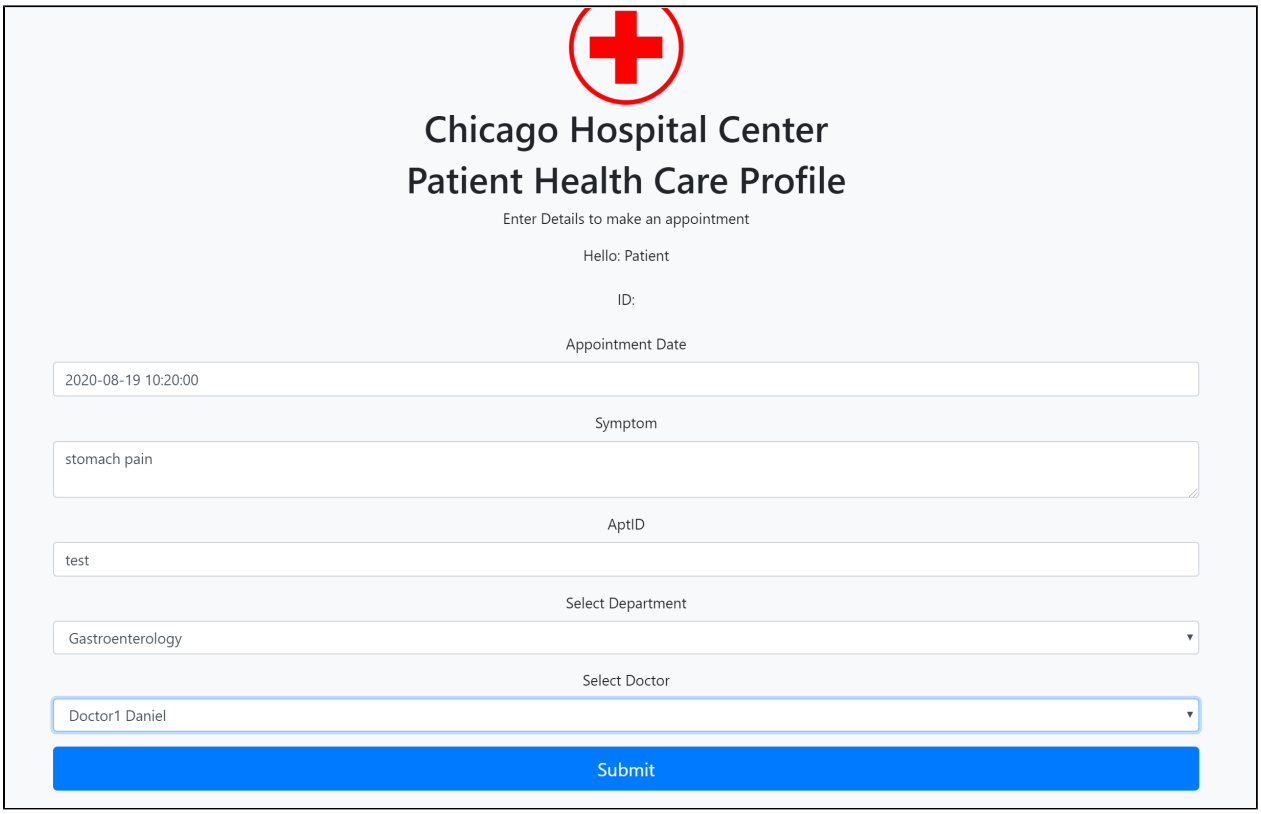
Todd has chosen Doctor 5 Coddy to treat sore muscles.

Now Doctor 5 Coddy would be able to see Todd as an appointment when he logs in



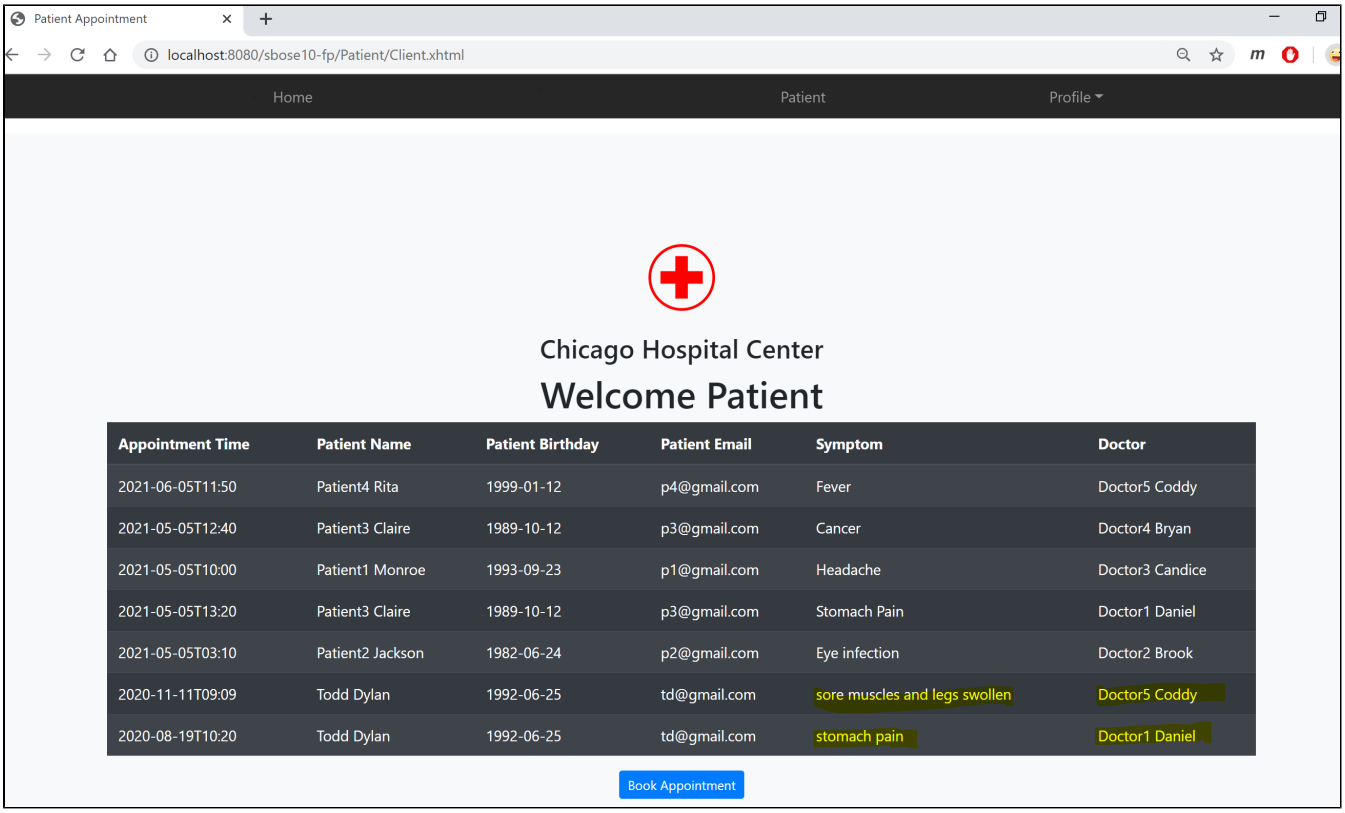
Todd can also book another appointment

Now Todd has chosen Doctor 1 for his stomach pain.



On submitting, the patient can see the appointment he can view both the appointments.

Now Todd has two appointments. One with Doctor 5 and one with Doctor 1



Appointment Time	Patient Name	Patient Birthday	Patient Email	Symptom	Doctor
2021-06-05T11:50	Patient4 Rita	1999-01-12	p4@gmail.com	Fever	Doctor5 Coddy
2021-05-05T12:40	Patient3 Claire	1989-10-12	p3@gmail.com	Cancer	Doctor4 Bryan
2021-05-05T10:00	Patient1 Monroe	1993-09-23	p1@gmail.com	Headache	Doctor3 Candice
2021-05-05T13:20	Patient3 Claire	1989-10-12	p3@gmail.com	Stomach Pain	Doctor1 Daniel
2021-05-05T03:10	Patient2 Jackson	1982-06-24	p2@gmail.com	Eye infection	Doctor2 Brook
2020-11-11T09:09	Todd Dylan	1992-06-25	td@gmail.com	sore muscles and legs swollen	Doctor5 Coddy
2020-08-19T10:20	Todd Dylan	1992-06-25	td@gmail.com	stomach pain	Doctor1 Daniel

Database Screenshot of the above transaction

```
mysql> select * from doctor
    -> ;
+----+------------+----------------------+-----------+-----------+---------+---------------+----------+
| ID | DOB        | EMAIL                | FIRSTNAME | LASTNAME  | VERSION | DEPARTMENT_ID | USERNAME |
+----+------------+----------------------+-----------+-----------+---------+---------------+----------+
|  1 | 1990-12-01 | d4@gmail.com         | Doctor4   | Bryan     |       1 |             3 | doctor4  |
|  2 | 1990-12-01 | d5@gmail.com         | Doctor5   | Coddy     |       1 |             2 | doctor5  |
|  3 | 1990-12-01 | d3@gmail.com         | Doctor3   | Candice   |       1 |             1 | doctor3  |
|  4 | 1994-03-01 | d2@gmail.com         | Doctor2   | Brook     |       1 |             5 | doctor2  |
|  5 | 2000-01-01 | d1@gmail.com         | Doctor1   | Daniel    |       1 |             4 | doctor1  |
|  6 | 1987-05-01 | Krochester@gmail.com | Kelly     | Rochester |       1 |          NULL | NULL     |
+----+------------+----------------------+-----------+-----------+---------+---------------+----------+
6 rows in set (0.00 sec)

mysql> select * from appointment;
+----+-------------------------+-------------------------+------------------------------+---------+-----------+------------+
| ID | APTTIME                 | APTUPDATEDTIME          | SYMPTOM                      | VERSION | DOCTOR_ID | PATIENT_ID |
+----+-------------------------+-------------------------+------------------------------+---------+-----------+------------+
|  1 | 2021-06-05 11:50:00.000 | 2020-04-09 10:00:00.000 | Fever                        |       1 |         2 |          4 |
|  2 | 2021-05-05 12:40:00.000 | 2020-05-09 10:00:00.000 | Cancer                       |       1 |         1 |          1 |
|  3 | 2021-05-05 10:00:00.000 | 2020-06-30 10:00:00.000 | Headache                     |       1 |         3 |          2 |
|  4 | 2021-05-05 13:20:00.000 | 2020-05-09 10:00:00.000 | Stomach Pain                 |       1 |         5 |          1 |
|  5 | 2021-05-05 03:10:00.000 | 2020-05-09 10:00:00.000 | Eye infection                |       1 |         4 |          3 |
|  6 | 2020-11-11 09:09:00.000 | NULL                    | sore muscles and legs swollen |       1 |         2 |          5 |
|  7 | 2020-08-19 10:20:00.000 | NULL                    | stomach pain                 |       1 |         5 |          5 |
+----+-------------------------+-------------------------+------------------------------+---------+-----------+------------+
7 rows in set (0.00 sec)

mysql> select * from patient;
+----+------------+--------------+-----------+----------+---------+----------+
| ID | DOB        | EMAIL        | FIRSTNAME | LASTNAME | VERSION | USERNAME |
+----+------------+--------------+-----------+----------+---------+----------+
|  1 | 1989-10-12 | p3@gmail.com | Patient3  | Claire   |       1 | patient3 |
|  2 | 1993-09-23 | p1@gmail.com | Patient1  | Monroe   |       1 | patient1 |
|  3 | 1982-06-24 | p2@gmail.com | Patient2  | Jackson  |       1 | patient2 |
|  4 | 1999-01-12 | p4@gmail.com | Patient4  | Rita     |       1 | patient4 |
|  5 | 1992-06-25 | td@gmail.com | Todd      | Dylan    |       1 | todd     |
+----+------------+--------------+-----------+----------+---------+----------+
5 rows in set (0.00 sec)
```

Covid19 functionality

If the patient enters fever and cough, the application will send an alert that he has symptoms similar with Covid19 and should call prior to visiting.

Chicago Hospital Center
Patient Health Care Profile

Enter Details to make an appointment

Hello: Patient

ID:

Appointment Date

2020-08-08 09:09:00

Symptom

cough fever

AptID

anything

Select Department

Physician

Select Doctor

Doctor5 Coddy

Submit

On Submitting the form user received the following alert !

Client-Confirmation

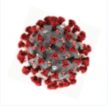
localhost:8080/sbose10-fp/Patient/Client.xhtml

Home Patient Profile

Chicago Hospital Center

Welcome Patient

Your appointment has been created, as your symptoms are similar to COVID19 please call 1111111111 before arriving



Appointment Time	Patient Name	Patient Birthday	Patient Email	Symptom
2021-06-05T11:50	Patient4 Rita	1999-01-12	p4@gmail.com	Fever
2021-05-05T12:40	Patient3 Claire	1989-10-12	p3@gmail.com	Cancer
2021-05-05T10:00	Patient1 Monroe	1993-09-23	p1@gmail.com	Headache
2021-05-05T13:20	Patient3 Claire	1989-10-12	p3@gmail.com	Stomach Pain
2021-05-05T03:10	Patient2 Jackson	1982-06-24	p2@gmail.com	Eye infection
2020-11-11T09:09	Todd Dylan	1992-06-25	td@gmail.com	sore muscles and legs swollen
2020-08-19T10:20	Todd Dylan	1992-06-25	td@gmail.com	stomach pain
2020-08-08T09:09	Todd Dylan	1992-06-25	td@gmail.com	cough fever

Book Appointment

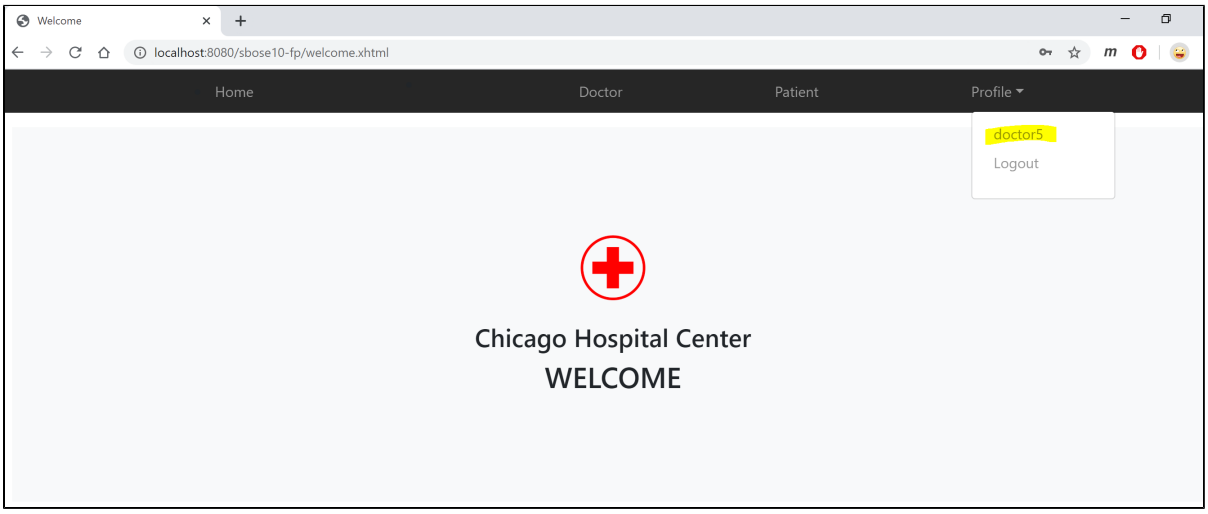
Signed in as Doctor

Doctor has three tabs

Home

Doctor

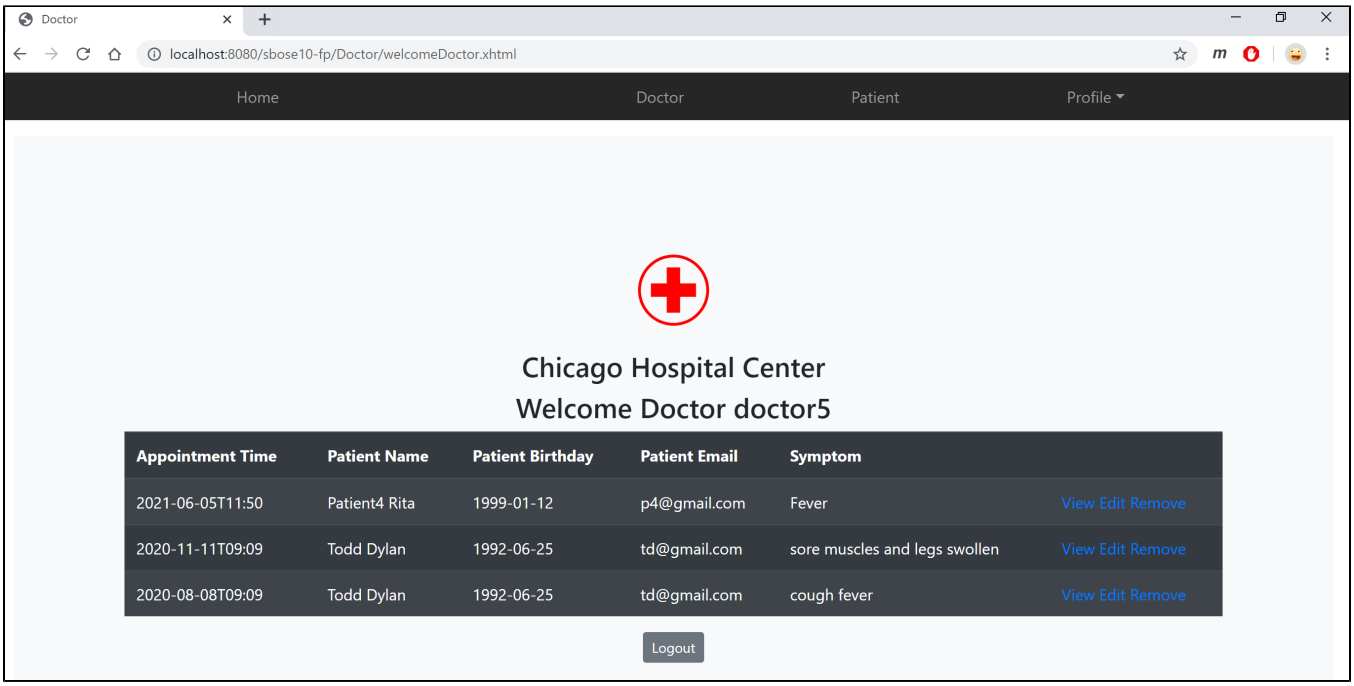
Patient - he will only be allowed to view and not be able to book an appointment



On Clicking on Doctor Tab , the doctor can see the list of his appointments. "My Appointments" tab

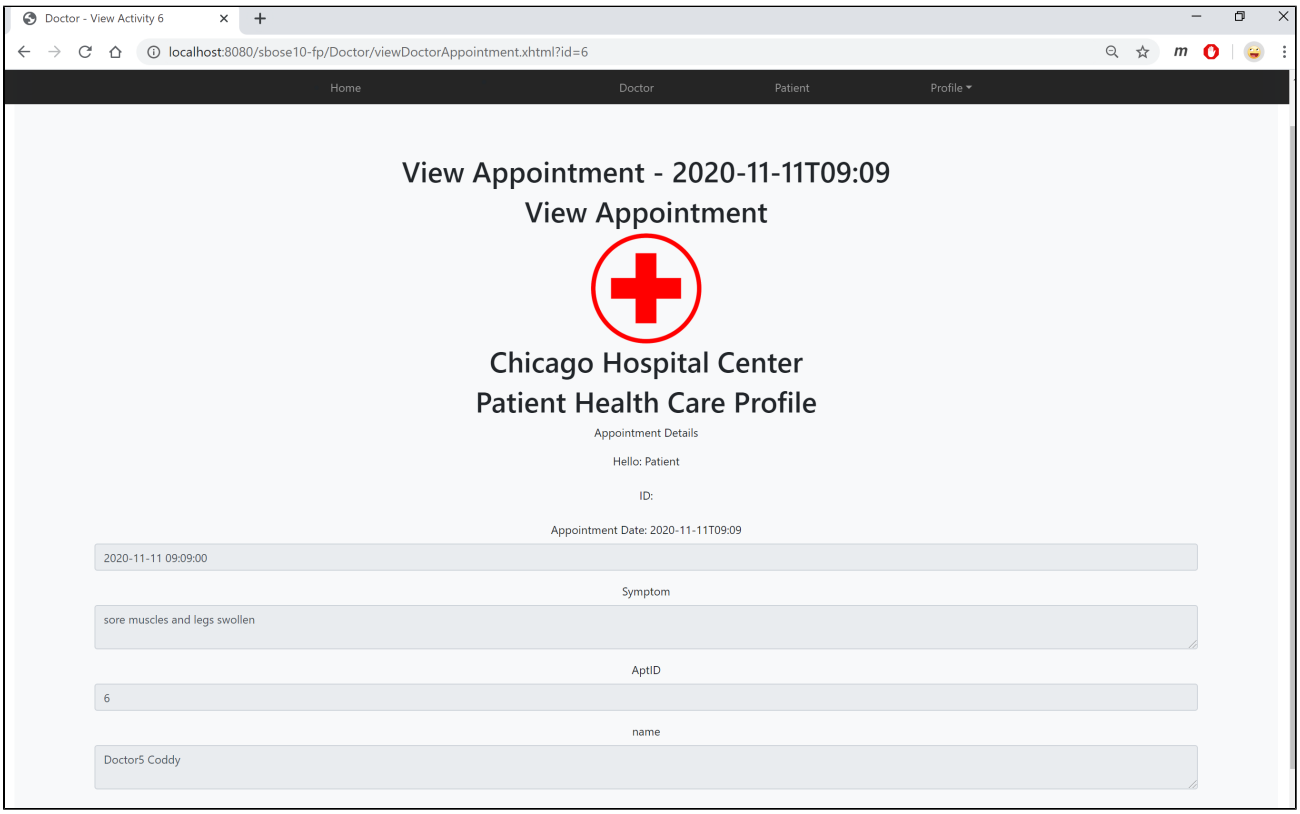
Doctor can

- **View an appointment**
- **Edit an appointment**
- **Delete an appointment**



On clicking View Link

He can only view the appointment

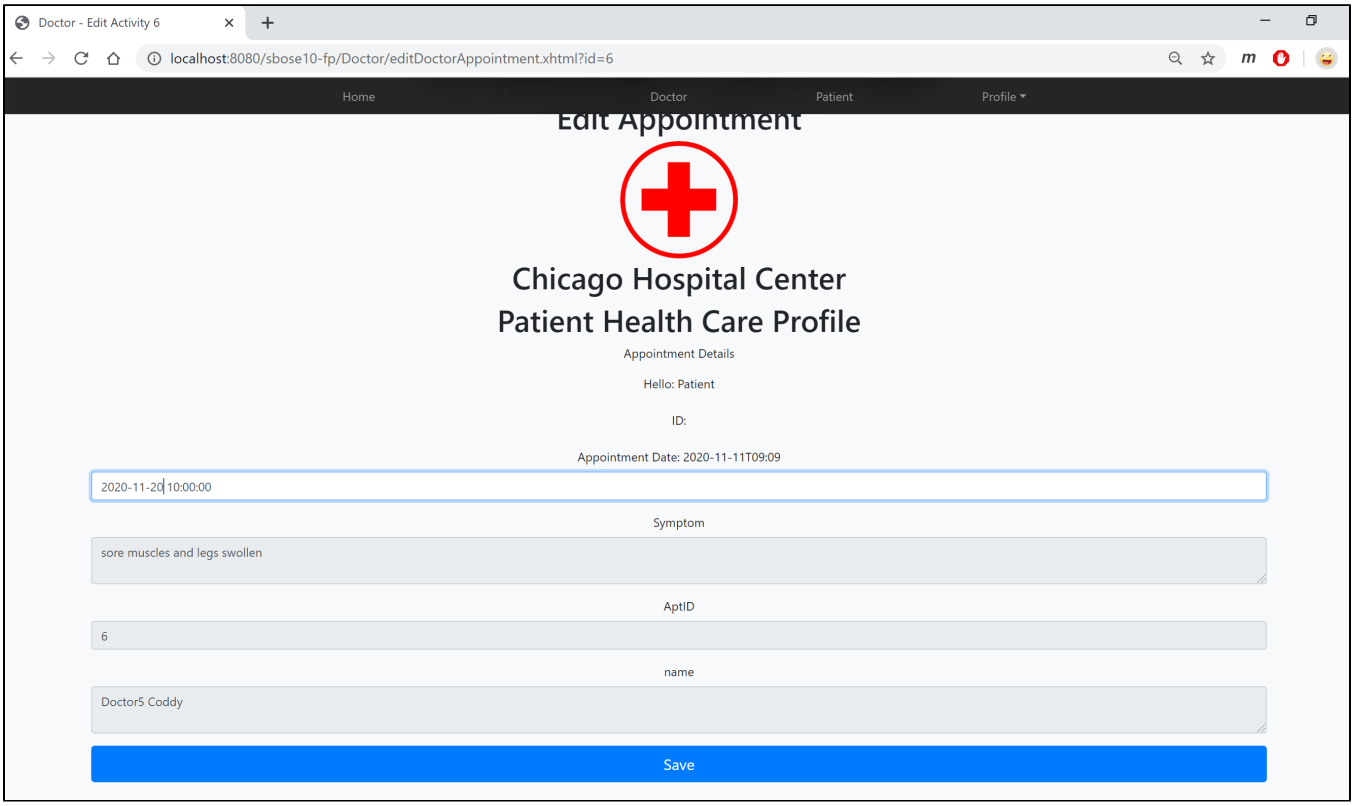


On clicking on Edit

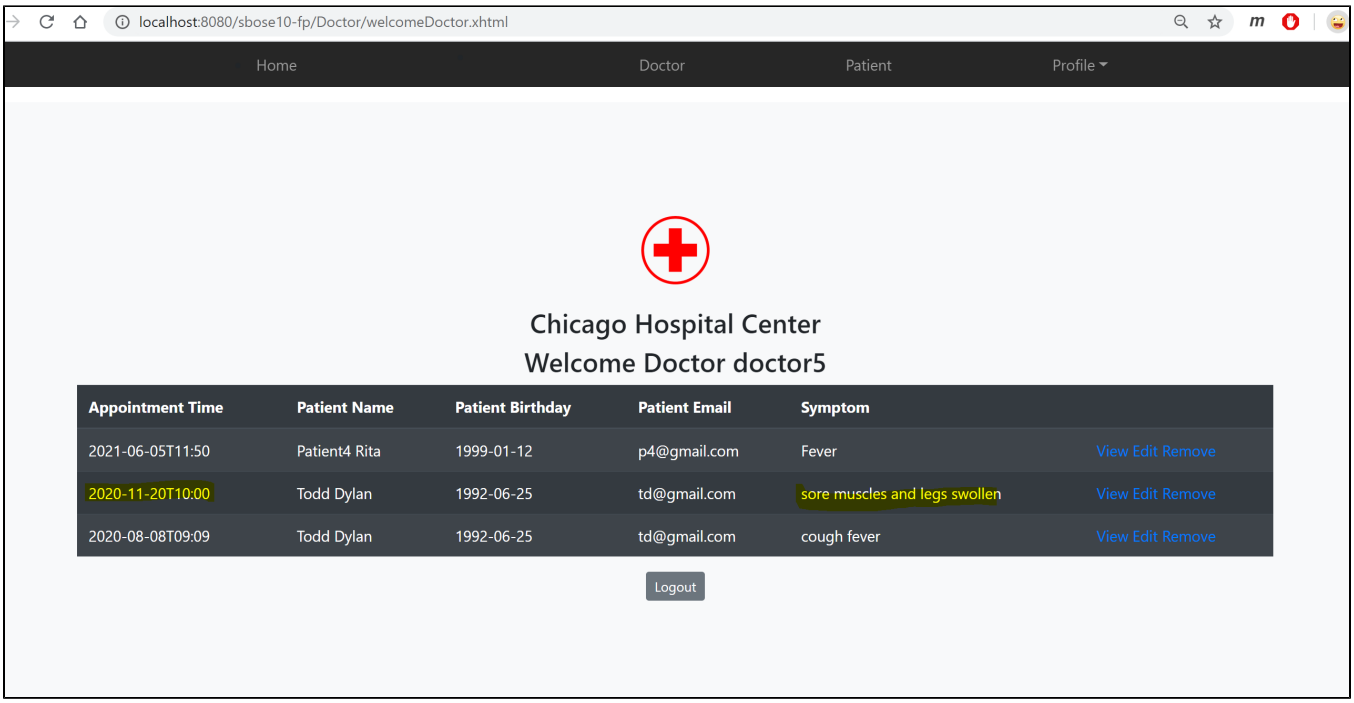
He can only edit the appointment time.

From the View tab, doctor has to click on doctor tab and then view appointments to edit the appointment.

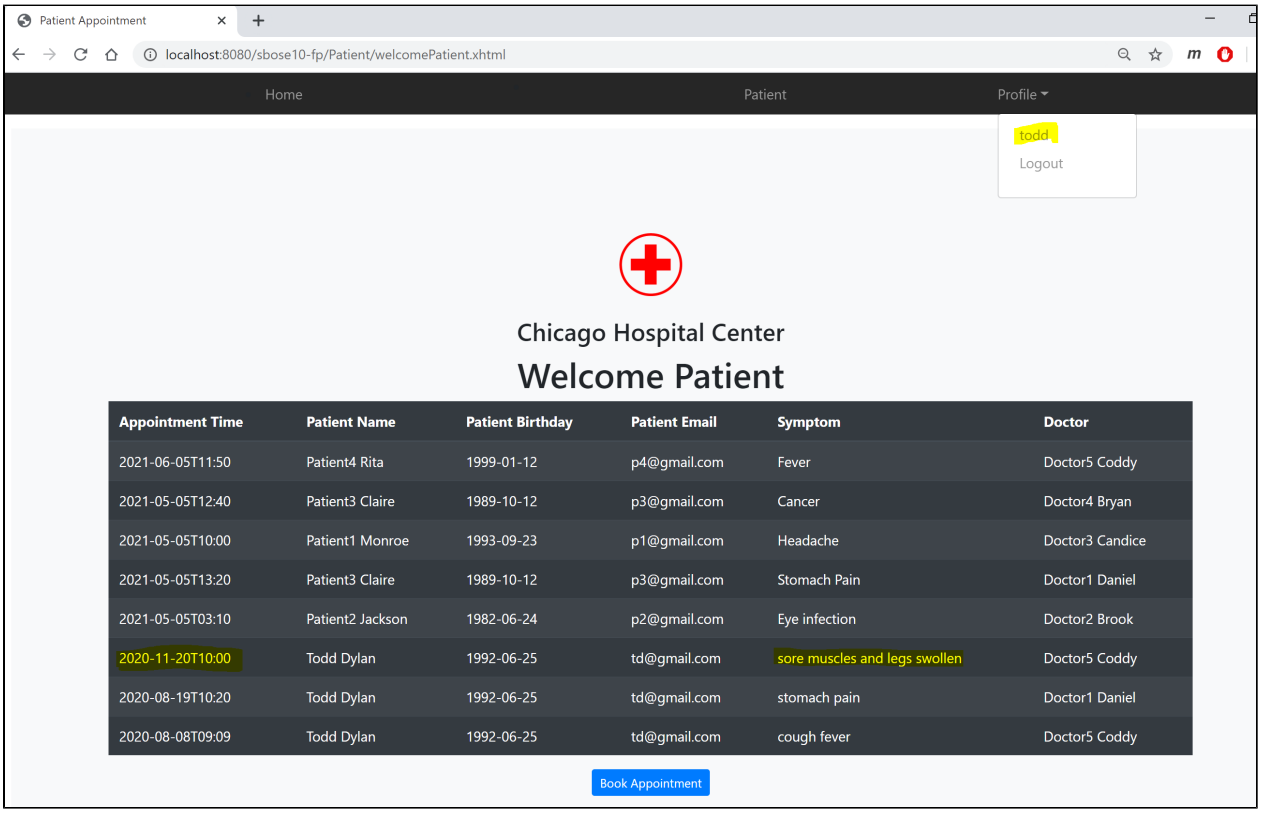
To edit the time



Doctor can now view the updated time.



If Todd Logs in , he will be able to view the updated time too.

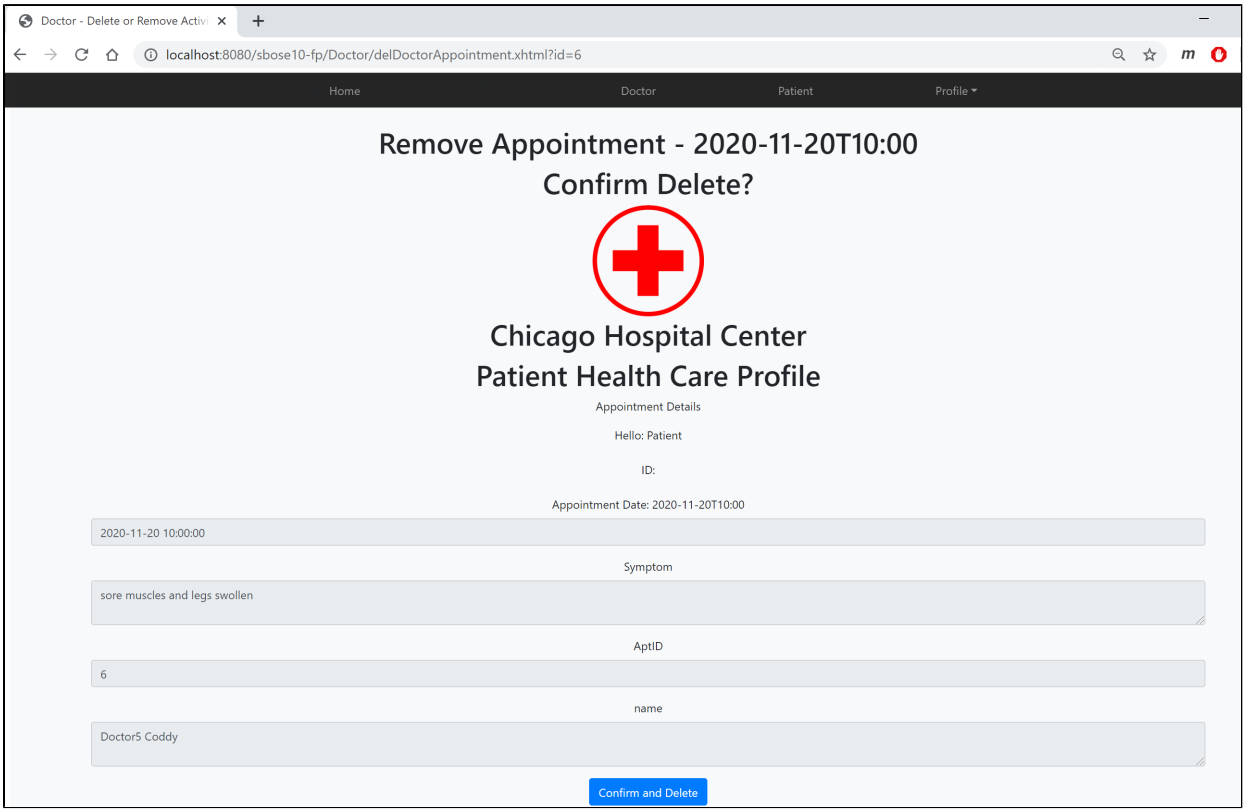


Database updated time entry

```
mysql> select * from appointment;
+----+-------------------------+-------------------------+------------------------------+---------+-----------+------------+
| ID | APTTIME                 | APTUPDATEDTIME          | SYMPTOM                      | VERSION | DOCTOR_ID | PATIENT_ID |
+----+-------------------------+-------------------------+------------------------------+---------+-----------+------------+
|  1 | 2021-06-05 11:50:00.000 | 2020-04-09 10:00:00.000 | Fever                        |       1 |         2 |          4 |
|  2 | 2021-05-05 12:40:00.000 | 2020-05-09 10:00:00.000 | Cancer                       |       1 |         1 |          1 |
|  3 | 2021-05-05 10:00:00.000 | 2020-06-30 10:00:00.000 | Headache                     |       1 |         3 |          2 |
|  4 | 2021-05-05 13:20:00.000 | 2020-05-09 10:00:00.000 | Stomach Pain                 |       1 |         5 |          1 |
|  5 | 2021-05-05 03:10:00.000 | 2020-05-09 10:00:00.000 | Eye infection                |       1 |         4 |          3 |
|  6 | 2020-11-20 10:00:00.000 | 2020-05-06 12:58:38.031 | sore muscles and legs swollen |       2 |         2 |          5 |
|  7 | 2020-08-19 10:20:00.000 | NULL                    | stomach pain                 |       1 |         5 |          5 |
|  8 | 2020-08-08 09:09:00.000 | NULL                    | cough fever                  |       1 |         2 |          5 |
+----+-------------------------+-------------------------+------------------------------+---------+-----------+------------+
8 rows in set (0.00 sec)
```

On clicking on Remove

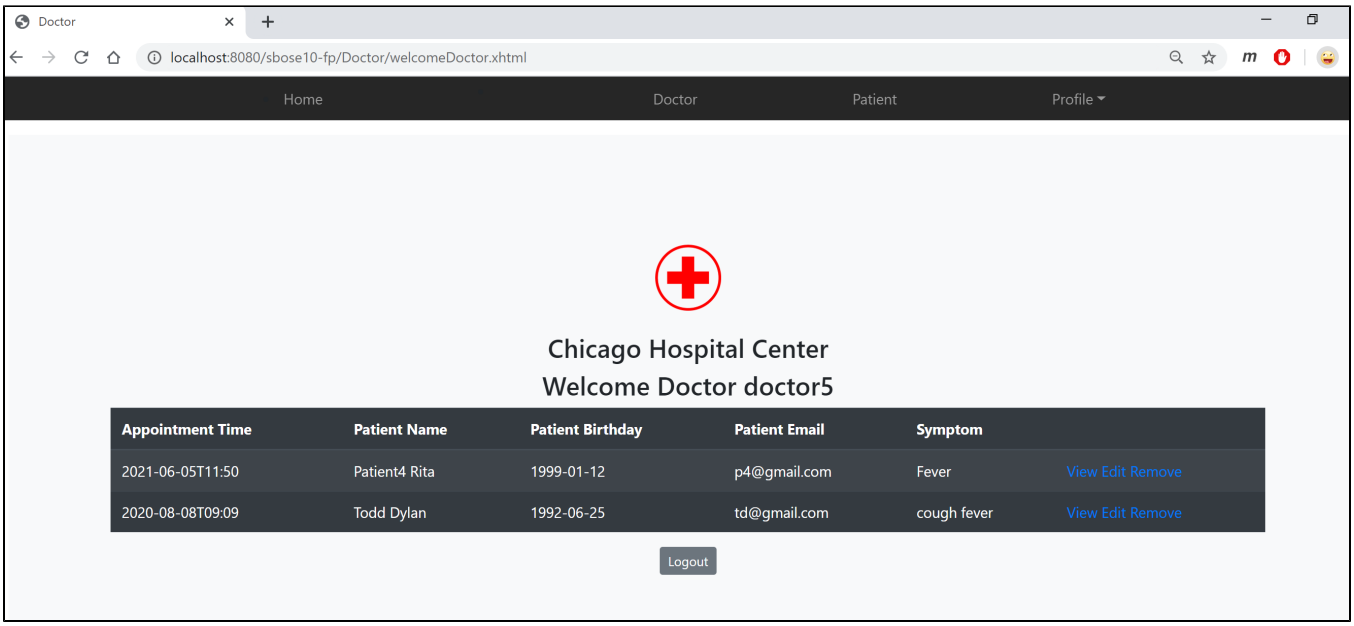
None of the tabs can be edited , the entire appointment will be deleted



After confirm and delete

Navigation >Doctor>View Appointments

The Appointment is not listed any longer.

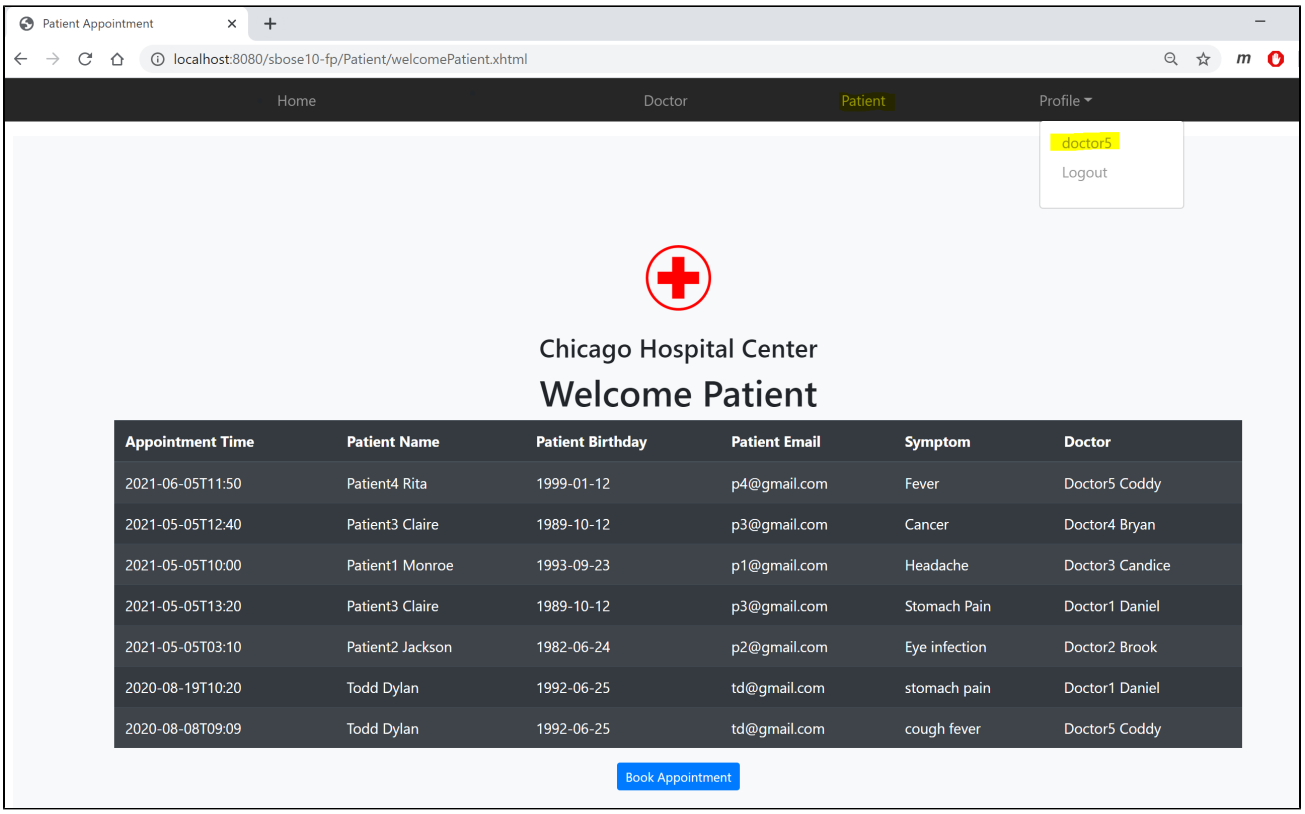


The appointments are not listed in the appointment in the database either

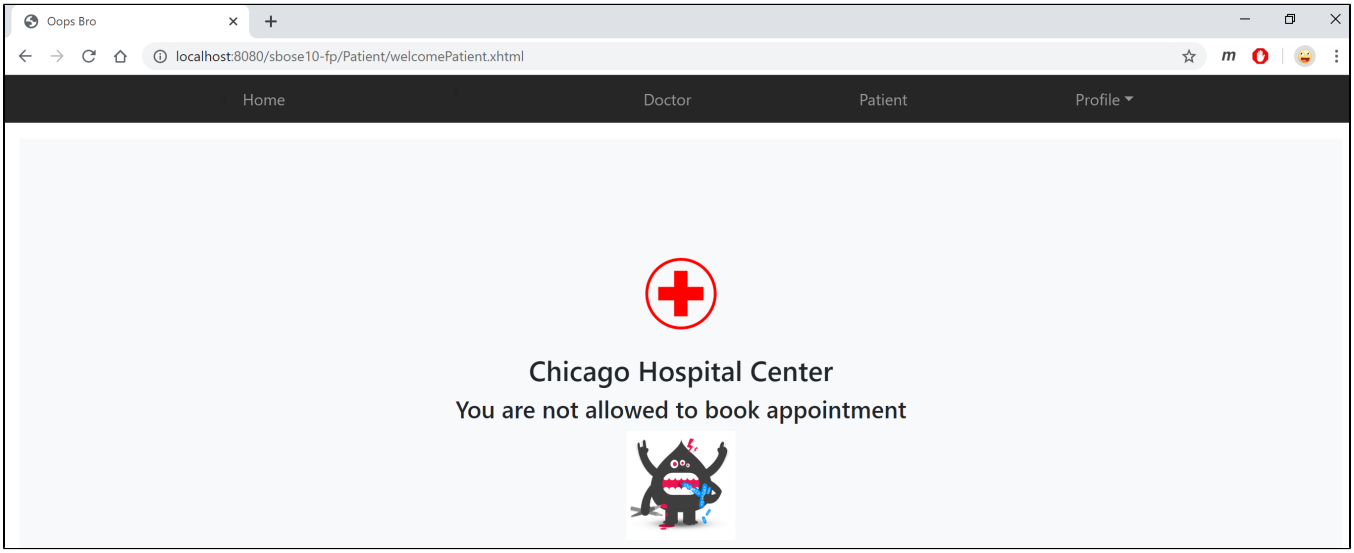
```
mysql> select * from appointment;
+----+-------------------------+-------------------------+------------------------------+---------+-----------+------------+
| ID | APTTIME                 | APTUPDATEDTIME          | SYMPTOM                      | VERSION | DOCTOR_ID | PATIENT_ID |
+----+-------------------------+-------------------------+------------------------------+---------+-----------+------------+
|  1 | 2021-06-05 11:50:00.000 | 2020-04-09 10:00:00.000 | Fever                        |       1 |         2 |          4 |
|  2 | 2021-05-05 12:40:00.000 | 2020-05-09 10:00:00.000 | Cancer                       |       1 |         1 |          1 |
|  3 | 2021-05-05 10:00:00.000 | 2020-06-30 10:00:00.000 | Headache                     |       1 |         3 |          2 |
|  4 | 2021-05-05 13:20:00.000 | 2020-05-09 10:00:00.000 | Stomach Pain                 |       1 |         5 |          1 |
|  5 | 2021-05-05 03:10:00.000 | 2020-05-09 10:00:00.000 | Eye infection                |       1 |         4 |          3 |
|  6 | 2020-11-20 10:00:00.000 | 2020-05-06 12:58:38.031 | sore muscles and legs swollen |       2 |         2 |          5 |
|  7 | 2020-08-19 10:20:00.000 | NULL                    | stomach pain                 |       1 |         5 |          5 |
|  8 | 2020-08-08 09:09:00.000 | NULL                    | cough fever                  |       1 |         2 |          5 |
+----+-------------------------+-------------------------+------------------------------+---------+-----------+------------+
8 rows in set (0.00 sec)

mysql> select * from appointment;
+----+-------------------------+-------------------------+---------------+---------+-----------+------------+
| ID | APTTIME                 | APTUPDATEDTIME          | SYMPTOM       | VERSION | DOCTOR_ID | PATIENT_ID |
+----+-------------------------+-------------------------+---------------+---------+-----------+------------+
|  1 | 2021-06-05 11:50:00.000 | 2020-04-09 10:00:00.000 | Fever         |       1 |         2 |          4 |
|  2 | 2021-05-05 12:40:00.000 | 2020-05-09 10:00:00.000 | Cancer        |       1 |         1 |          1 |
|  3 | 2021-05-05 10:00:00.000 | 2020-06-30 10:00:00.000 | Headache      |       1 |         3 |          2 |
|  4 | 2021-05-05 13:20:00.000 | 2020-05-09 10:00:00.000 | Stomach Pain  |       1 |         5 |          1 |
|  5 | 2021-05-05 03:10:00.000 | 2020-05-09 10:00:00.000 | Eye infection |       1 |         4 |          3 |
|  7 | 2020-08-19 10:20:00.000 | NULL                    | stomach pain  |       1 |         5 |          5 |
|  8 | 2020-08-08 09:09:00.000 | NULL                    | cough fever   |       1 |         2 |          5 |
+----+-------------------------+-------------------------+---------------+---------+-----------+------------+
7 rows in set (0.00 sec)
```

Doctor clicks on Patient Tab and he can list all the appointments



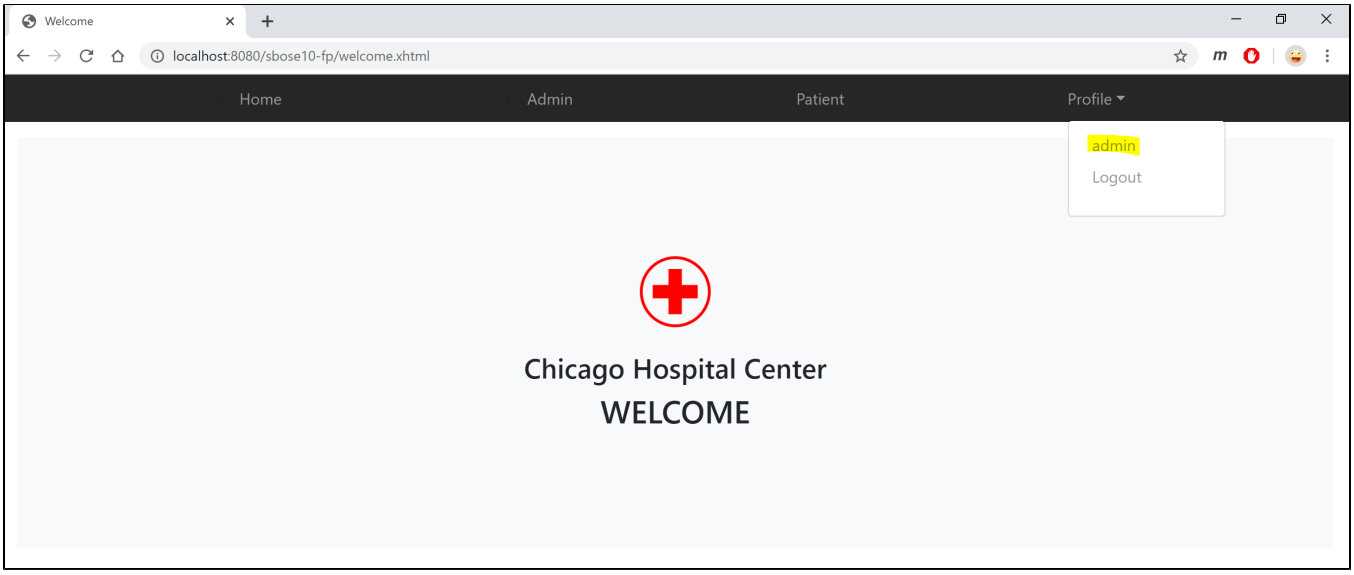
If the Doctor tries to click on the Book Appointment Tab , an alert message will appear.



Signed in as Admin

Admin Welcome Page

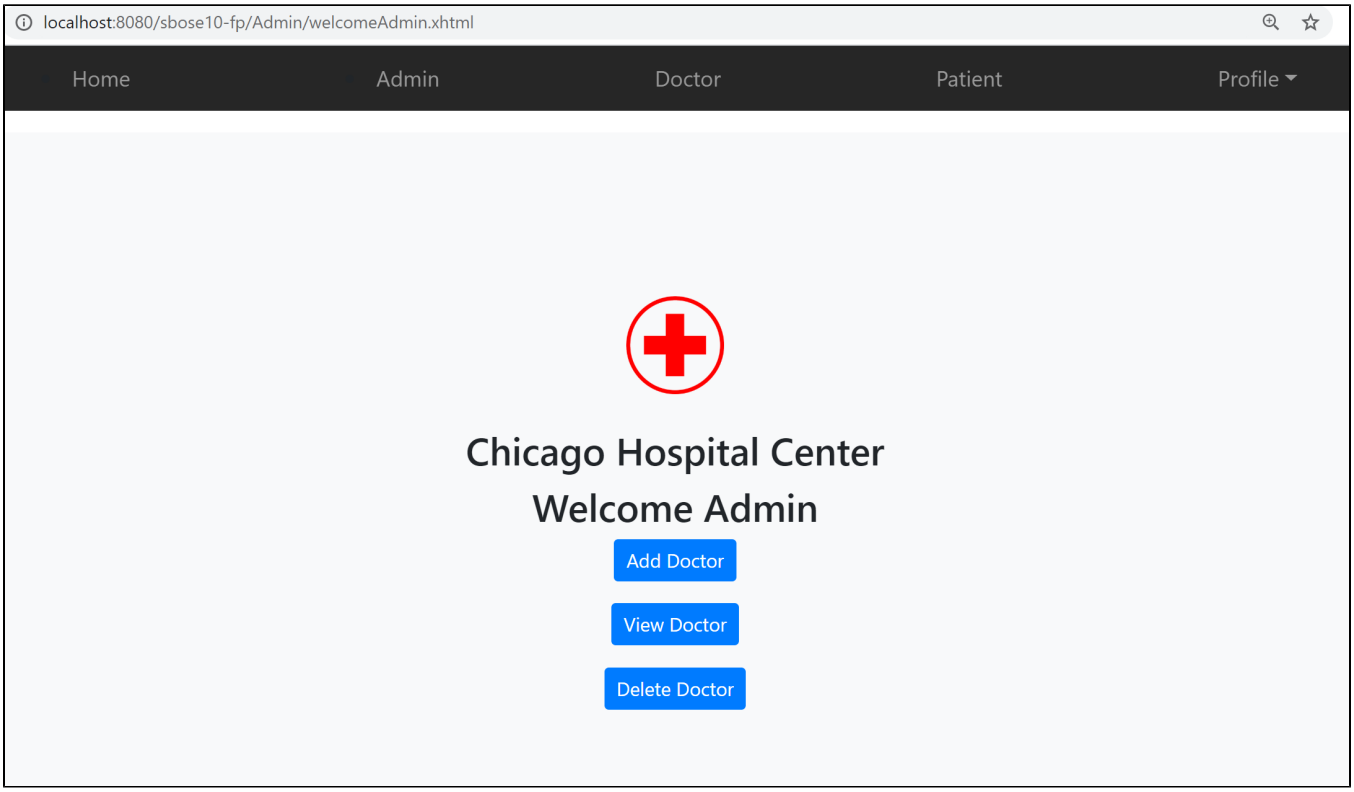
Admin can view Admin and Patient tab



After Clicking on Admin Tab

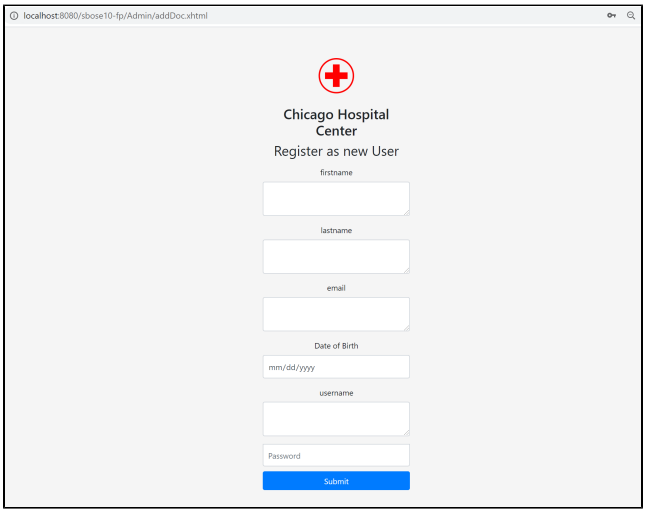
Admin can

- **Add Doctor**
- **View Doctor**
- **Delete Doctor**

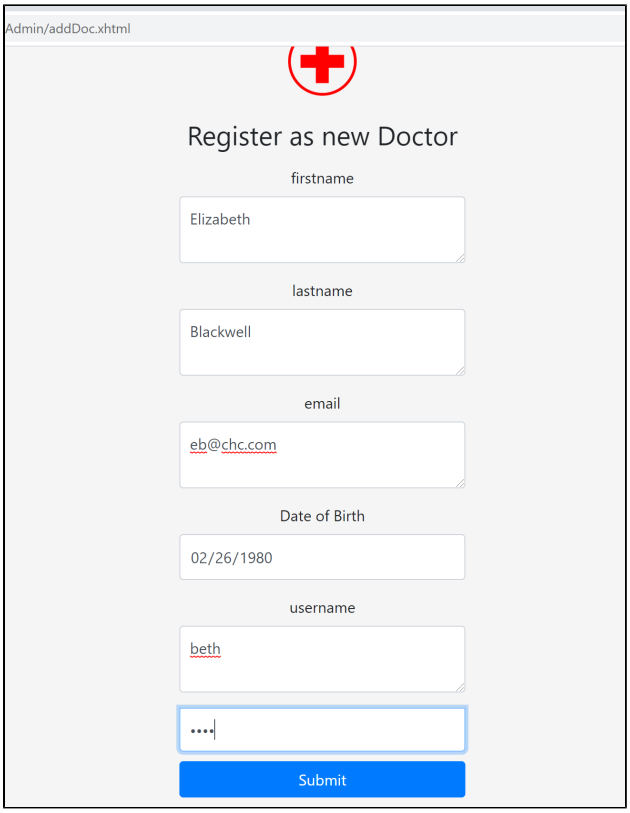


On Clicking Add Doctor

A form appears to fill the details of the new Doctor

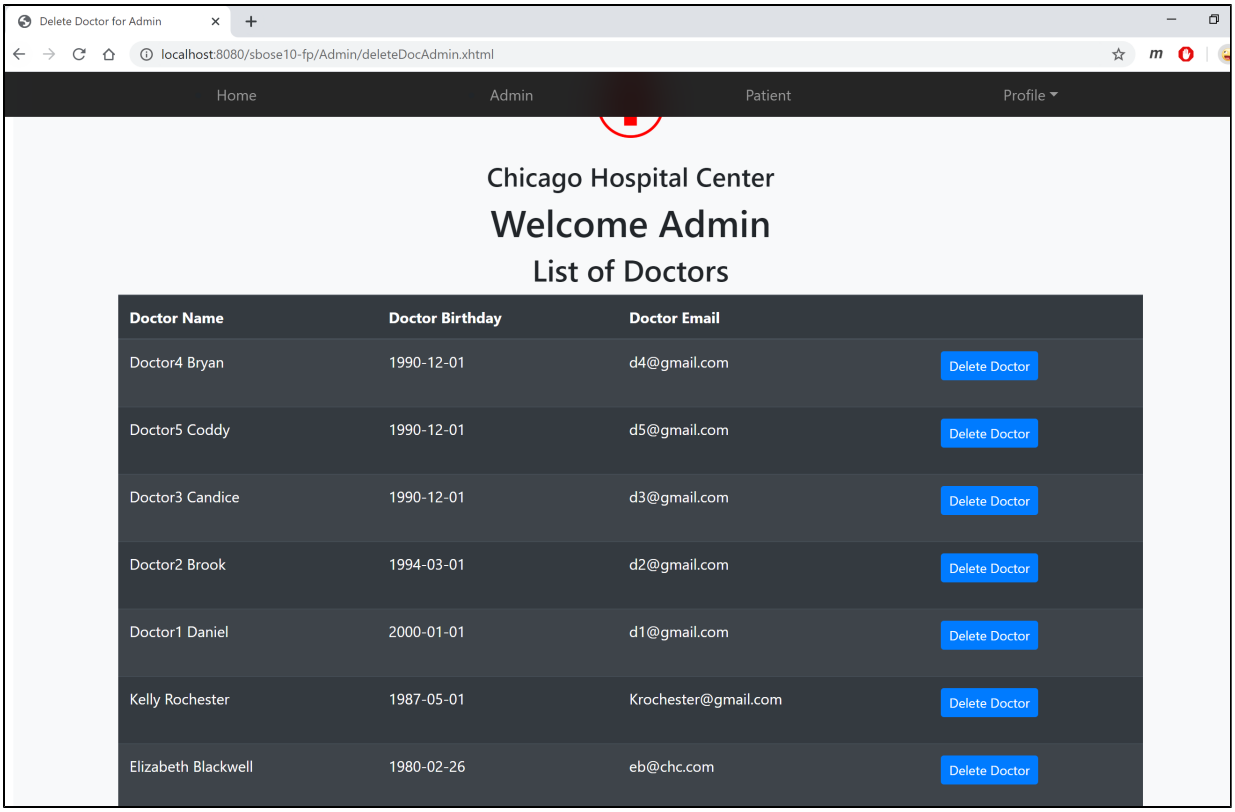


Entered details of Elizabeth Blackwell



Database Entry screenshot

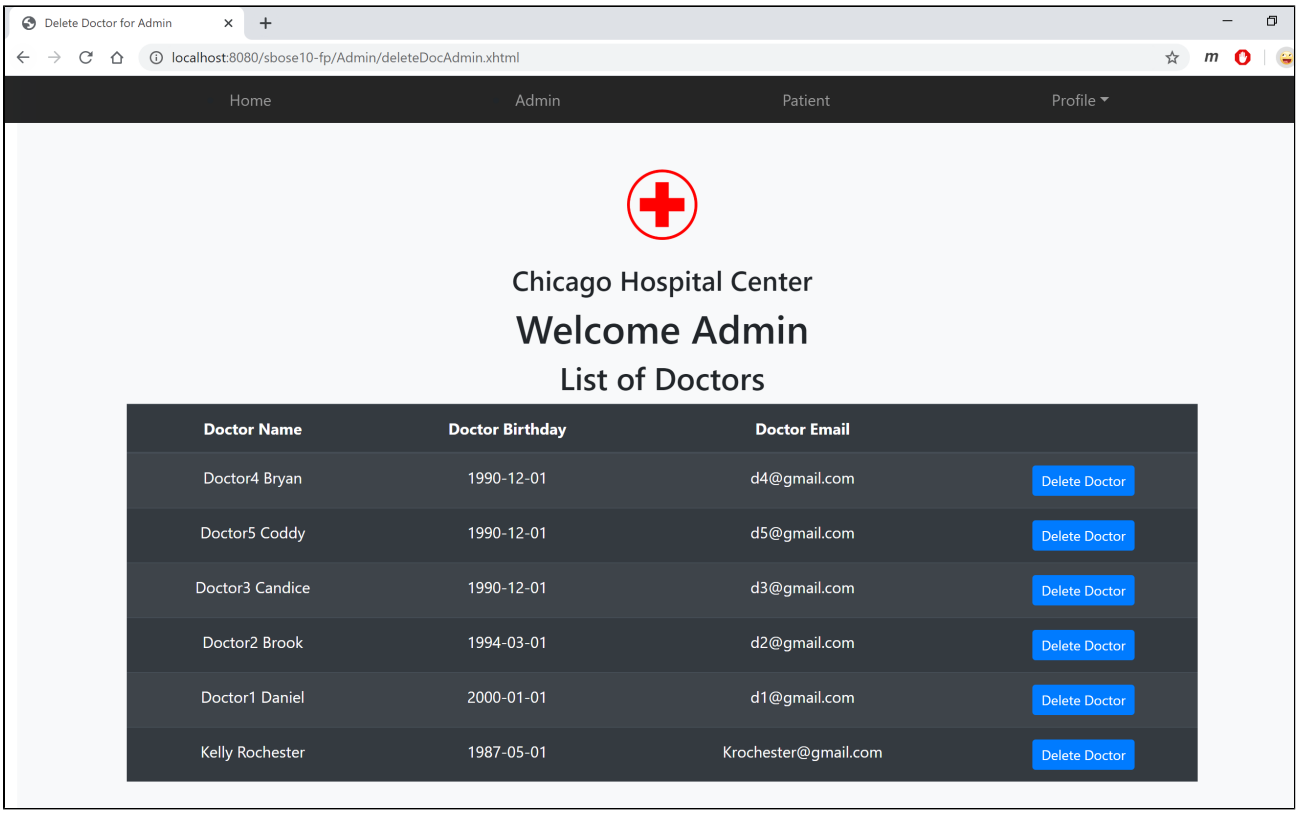
```
mysql> select * from security_user;
+----------+---------+-----------------------
```



Deleted Elizabeth Doctor

Doctor deleted

Doctors can only be deleted when they have no appointments.

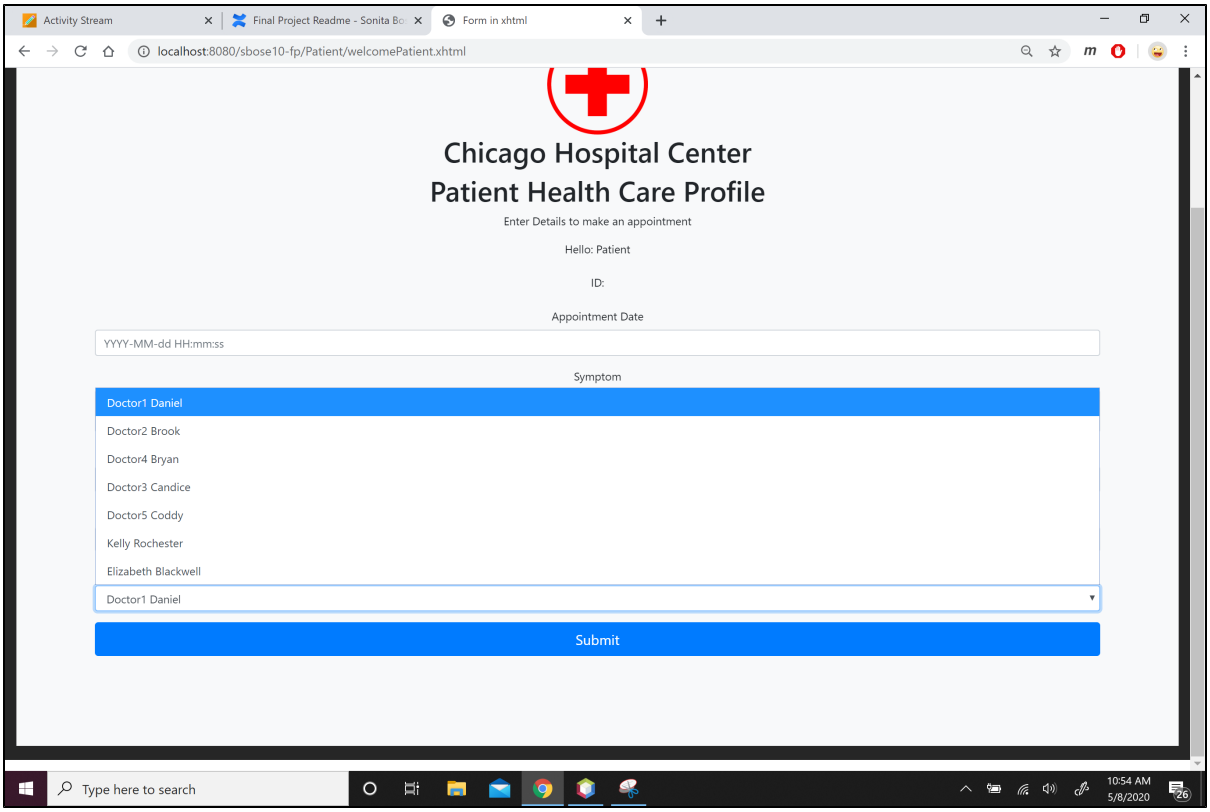


Database does not have Elizabeth anymore

```
mysql> select * from doctor;
+----+------------+----------------------+-----------+-----------+---------+---------------+----------+
| ID | DOB        | EMAIL                | FIRSTNAME | LASTNAME  | VERSION | DEPARTMENT_ID | USERNAME |
+----+------------+----------------------+-----------+-----------+---------+---------------+----------+
|  1 | 1990-12-01 | d4@gmail.com         | Doctor4   | Bryan     |       1 |             3 | doctor4  |
|  2 | 1990-12-01 | d5@gmail.com         | Doctor5   | Coddy     |       1 |             2 | doctor5  |
|  3 | 1990-12-01 | d3@gmail.com         | Doctor3   | Candice   |       1 |             1 | doctor3  |
|  4 | 1994-03-01 | d2@gmail.com         | Doctor2   | Brook     |       1 |             5 | doctor2  |
|  5 | 2000-01-01 | d1@gmail.com         | Doctor1   | Daniel    |       1 |             4 | doctor1  |
|  6 | 1987-05-01 | Krochester@gmail.com | Kelly     | Rochester |       1 |          NULL | NULL     |
|  7 | 1980-02-26 | eb@chc.com           | Elizabeth | Blackwell |       1 |          NULL | beth     |
+----+------------+----------------------+-----------+-----------+---------+---------------+----------+
7 rows in set (0.00 sec)

mysql> select * from doctor;
+----+------------+----------------------+-----------+-----------+---------+---------------+----------+
| ID | DOB        | EMAIL                | FIRSTNAME | LASTNAME  | VERSION | DEPARTMENT_ID | USERNAME |
+----+------------+----------------------+-----------+-----------+---------+---------------+----------+
|  1 | 1990-12-01 | d4@gmail.com         | Doctor4   | Bryan     |       1 |             3 | doctor4  |
|  2 | 1990-12-01 | d5@gmail.com         | Doctor5   | Coddy     |       1 |             2 | doctor5  |
|  3 | 1990-12-01 | d3@gmail.com         | Doctor3   | Candice   |       1 |             1 | doctor3  |
|  4 | 1994-03-01 | d2@gmail.com         | Doctor2   | Brook     |       1 |             5 | doctor2  |
|  5 | 2000-01-01 | d1@gmail.com         | Doctor1   | Daniel    |       1 |             4 | doctor1  |
|  6 | 1987-05-01 | Krochester@gmail.com | Kelly     | Rochester |       1 |          NULL | NULL     |
+----+------------+----------------------+-----------+-----------+---------+---------------+----------+
6 rows in set (0.00 sec)
```

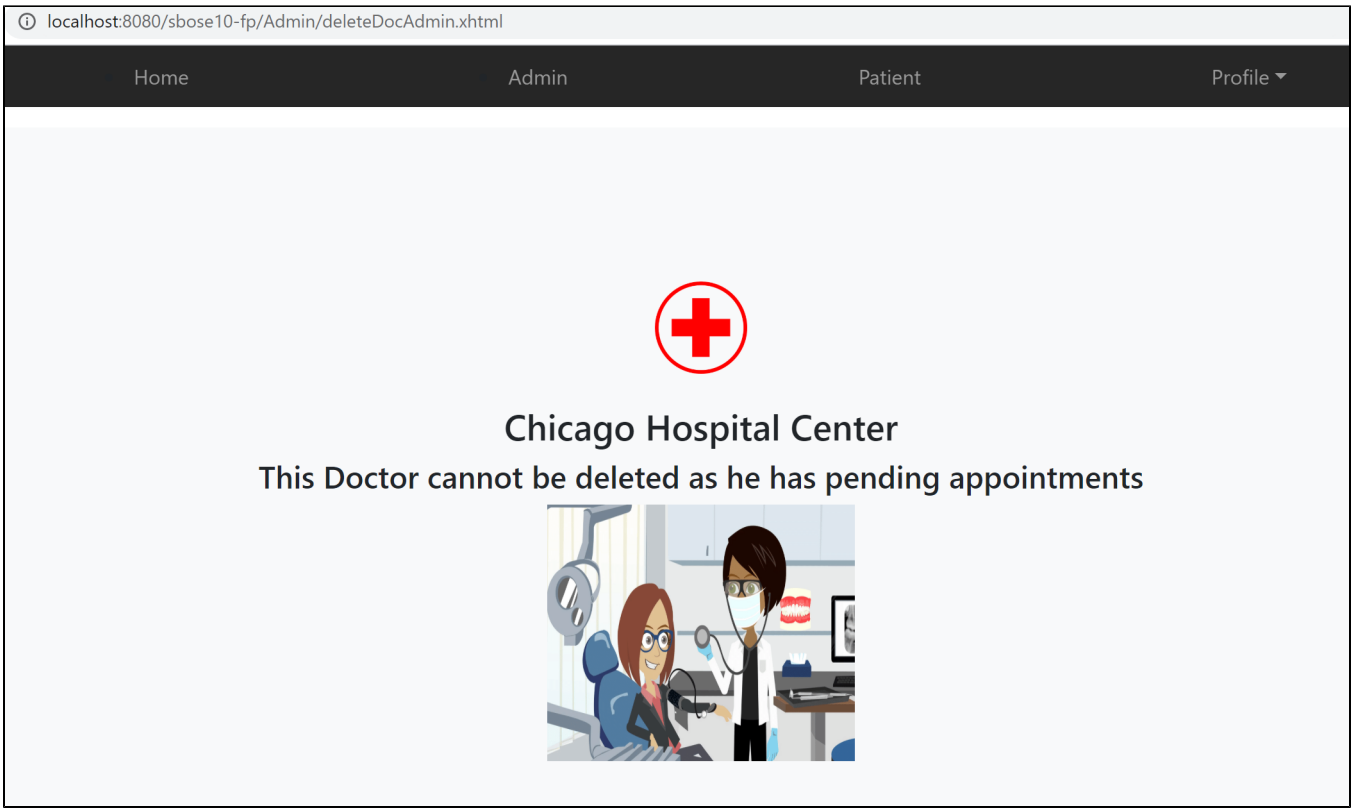
When you login as a patient, elizabeth will be one of the doctors to select from after Admin adds the doctor.



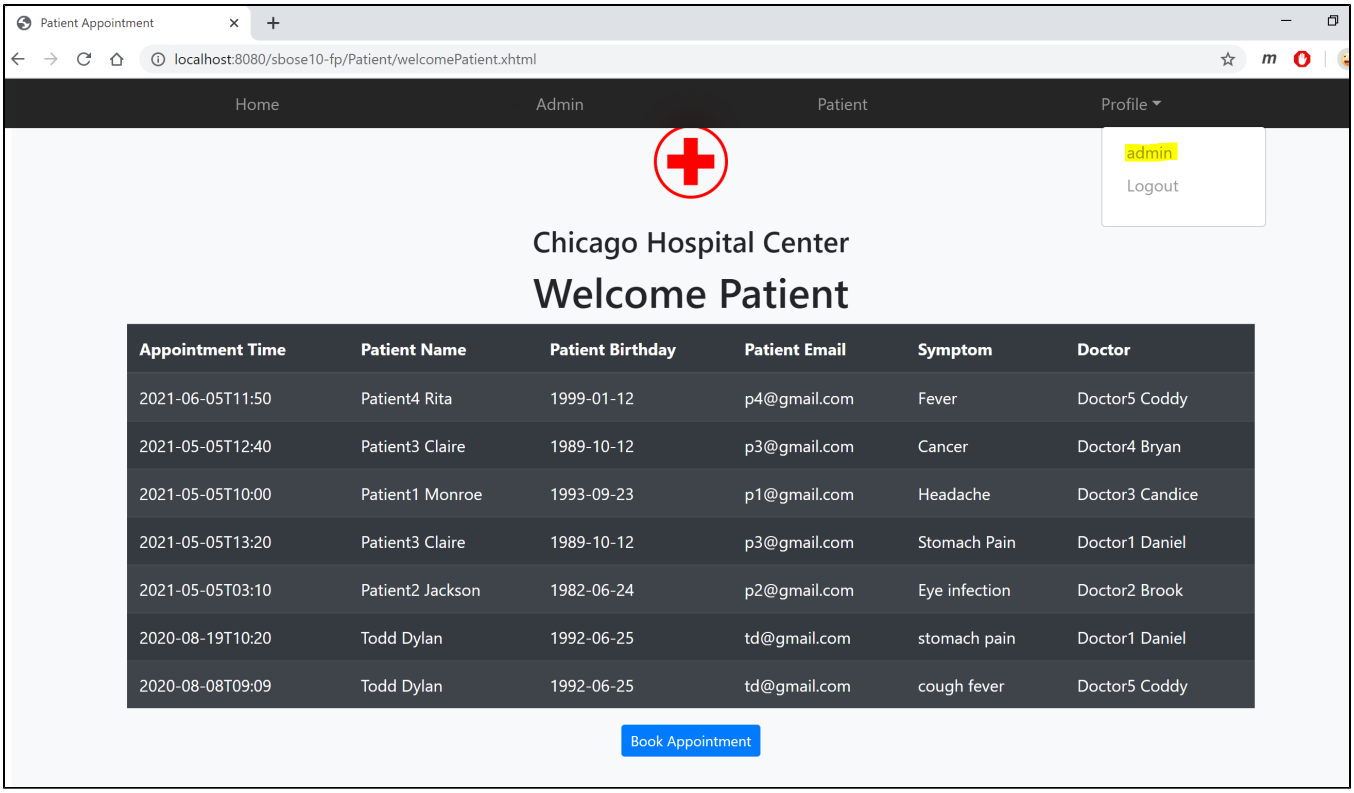
If the admin tries to delete an existing doctor with an appointment, he will be redirected to the "unauthorized" page.

It is not possible to delete a doctor when there is an appointment because doctor ID is a foreign key in the appointment table and without deleting the entire appointment, doctor cannot be deleted.

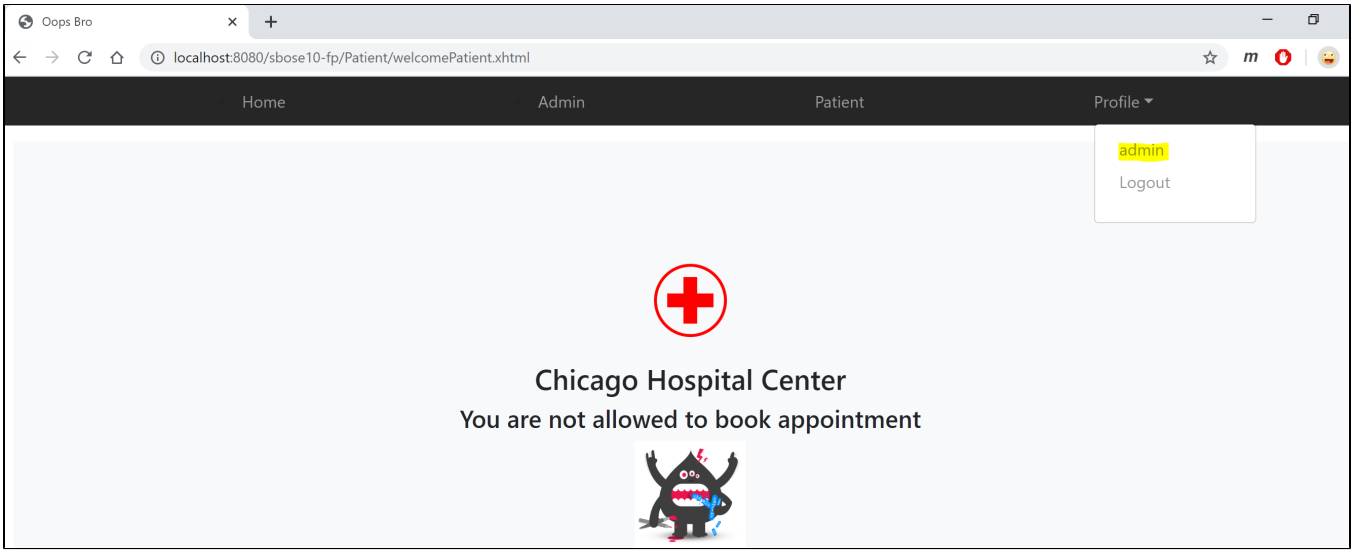
Only doctors with no appointments can be deleted.



On clicking on Patient Tab as Admin

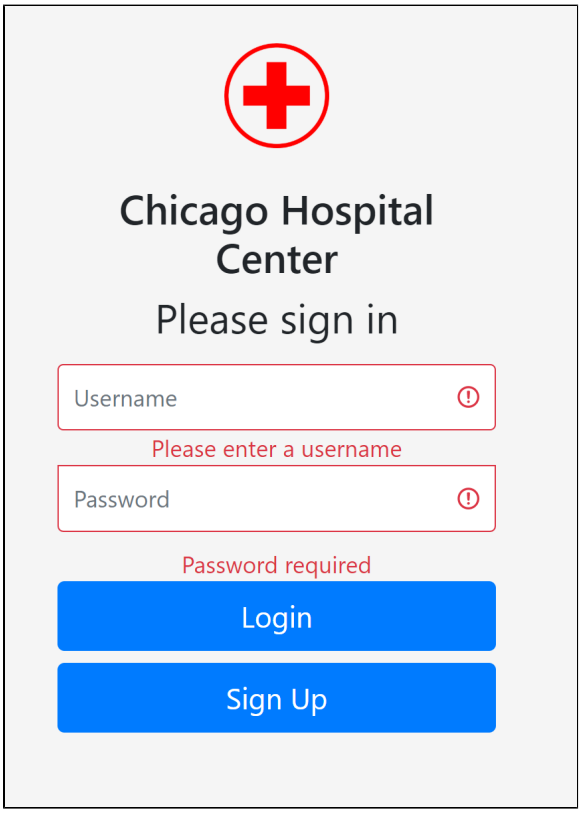


If Admin tries to click on Book Appointment, admin will be redirected to an alert page

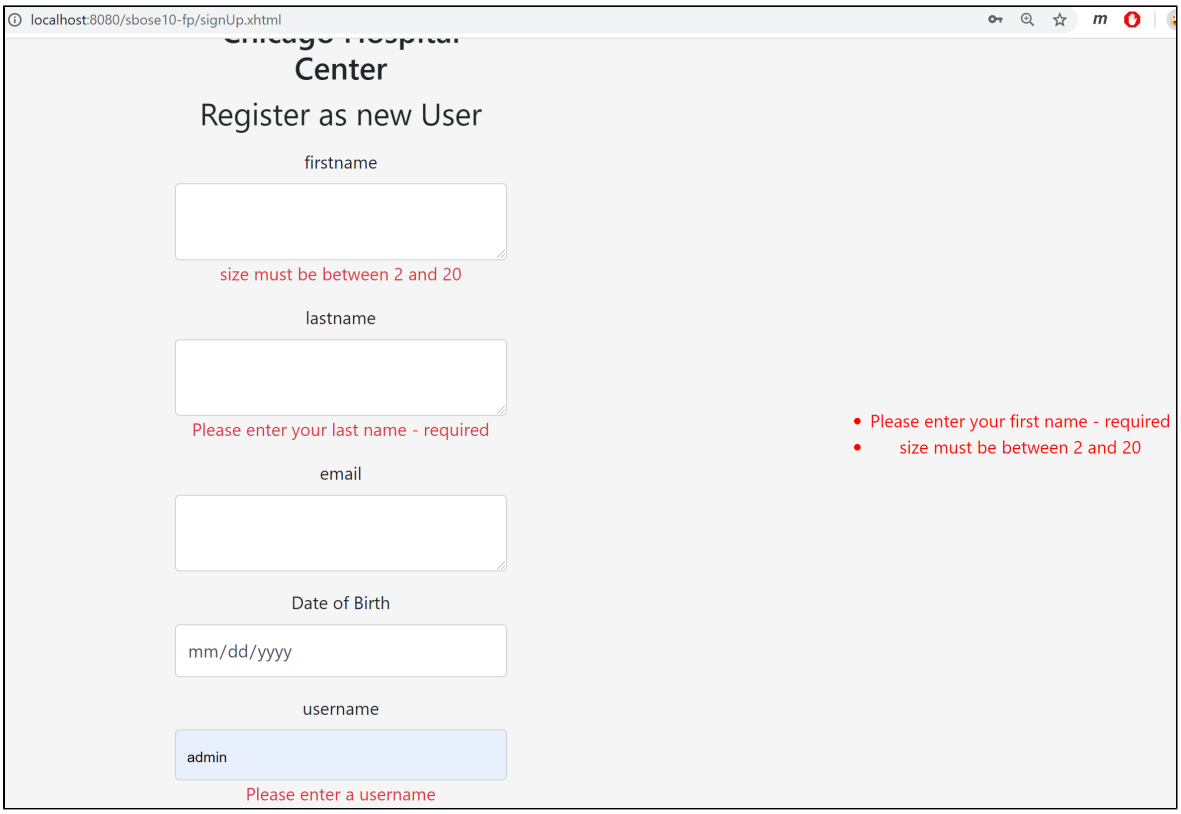


Validations

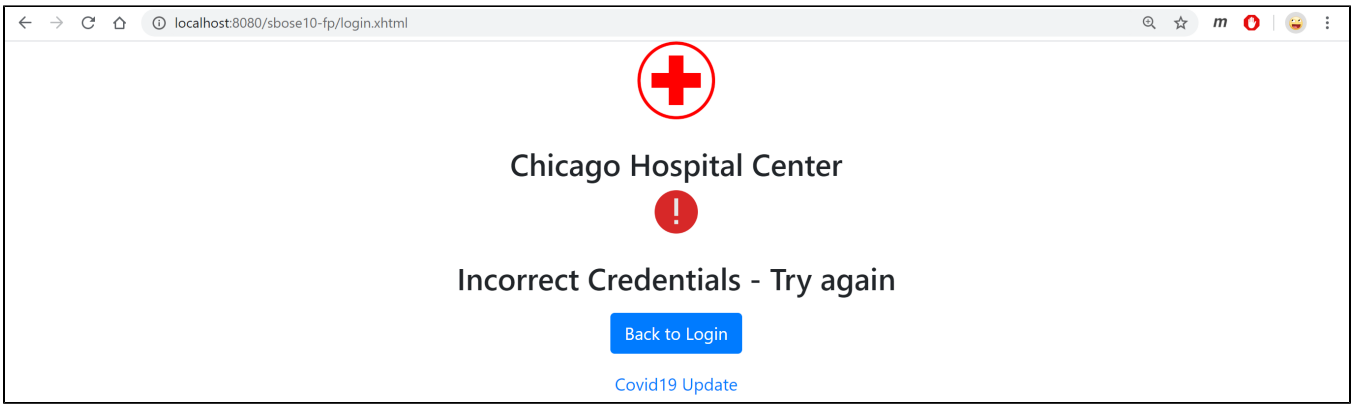
Login Page Validation



Sign Up Page Validation



Incorrect Credentials



Development Insights

This project gave me an all round experience of designing and developing a enterprise level application. I could understand how the underlying entity relationships are the
basic building blocks of the application design. I did go back and forth a few times with the entity relationships during the initial phase, but once that was solidified
it was very helpful for me to make decisions regarding the flow of the application.
The use of backing beans to facilitate the view layer made it very easy to access and
render the data.
I would like to explore the use of jquery to create dynamic UI components/effects. I will probably enhance my application during my summer break.

Acknowledgements/References:
ITMD 515 Class Lectures by Proff Scott Spyrison