Hospital Management System Documentation

Implemented by

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1. Project Overview

- **Project Title:** Hospital Management System
- **Objective:** To create a scalable, user-friendly, and secure system for managing hospital operations with distinct interfaces for administrators and patients.
- **Technology Stack:** ASP.NET Core, SQL Server, Bootstrap, jQuery, OAuth (for external login), and SOLID design principles.
- **Key Features:**
  - Administrator Interface: Manage doctors, reports, rooms, roles, and all patient features.
  - Patient Interface: Profile management, appointment booking, report viewing, and online bill payment.
- **Impact:** This system streamlines hospital management processes, making it easier for administrators to handle day-to-day operations and for patients to manage their healthcare experience online.

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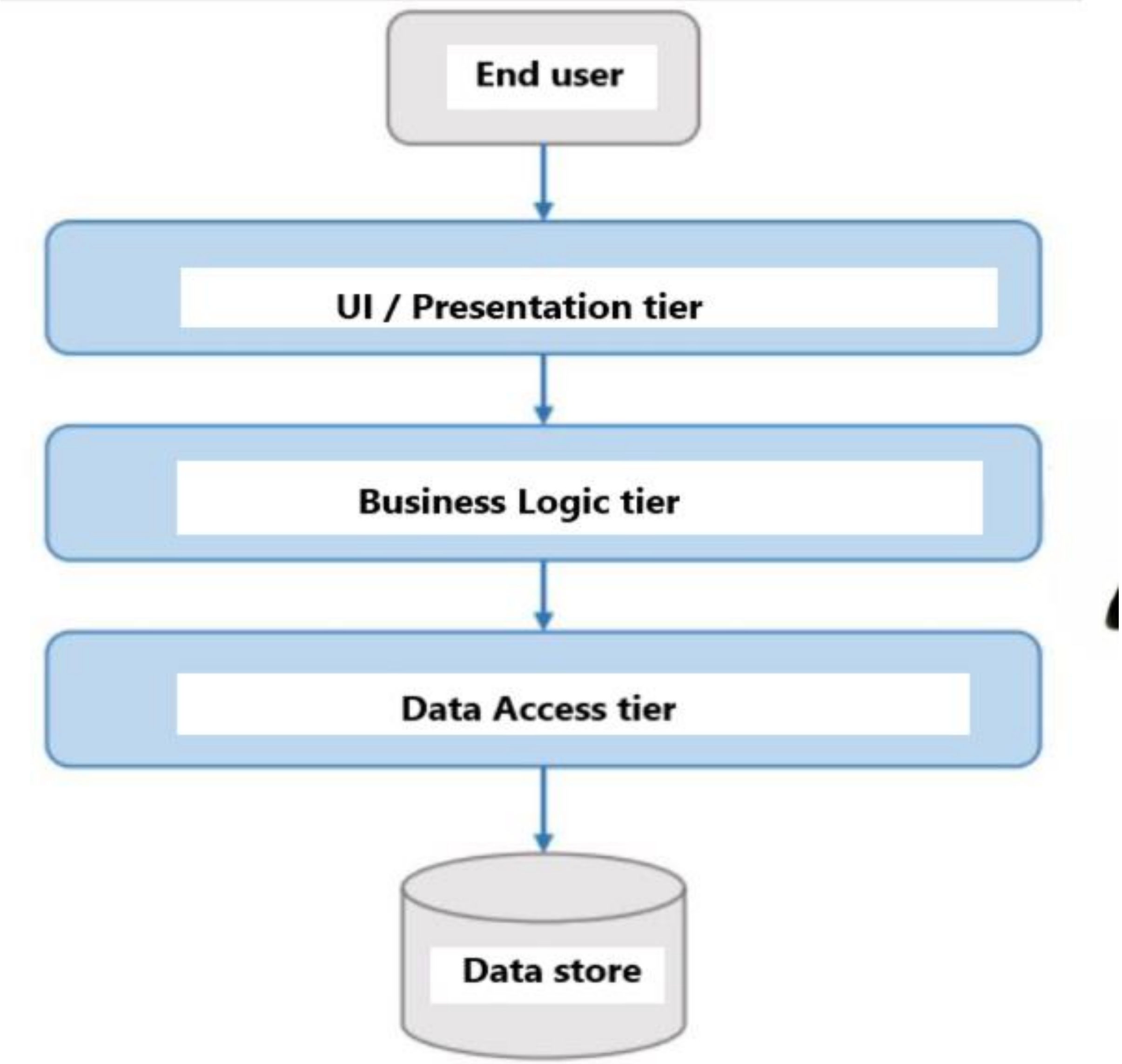
2. System Design

2.1 Architectural Design

- **Architecture:** Multi-tier architecture with separation of concerns.
  - **Presentation Layer:** Implements the user interface with Bootstrap for responsive design and ASP.NET MVC for routing and views.
  - **Business Logic Layer:** Core logic and service classes designed following SOLID principles to ensure scalability and maintainability.

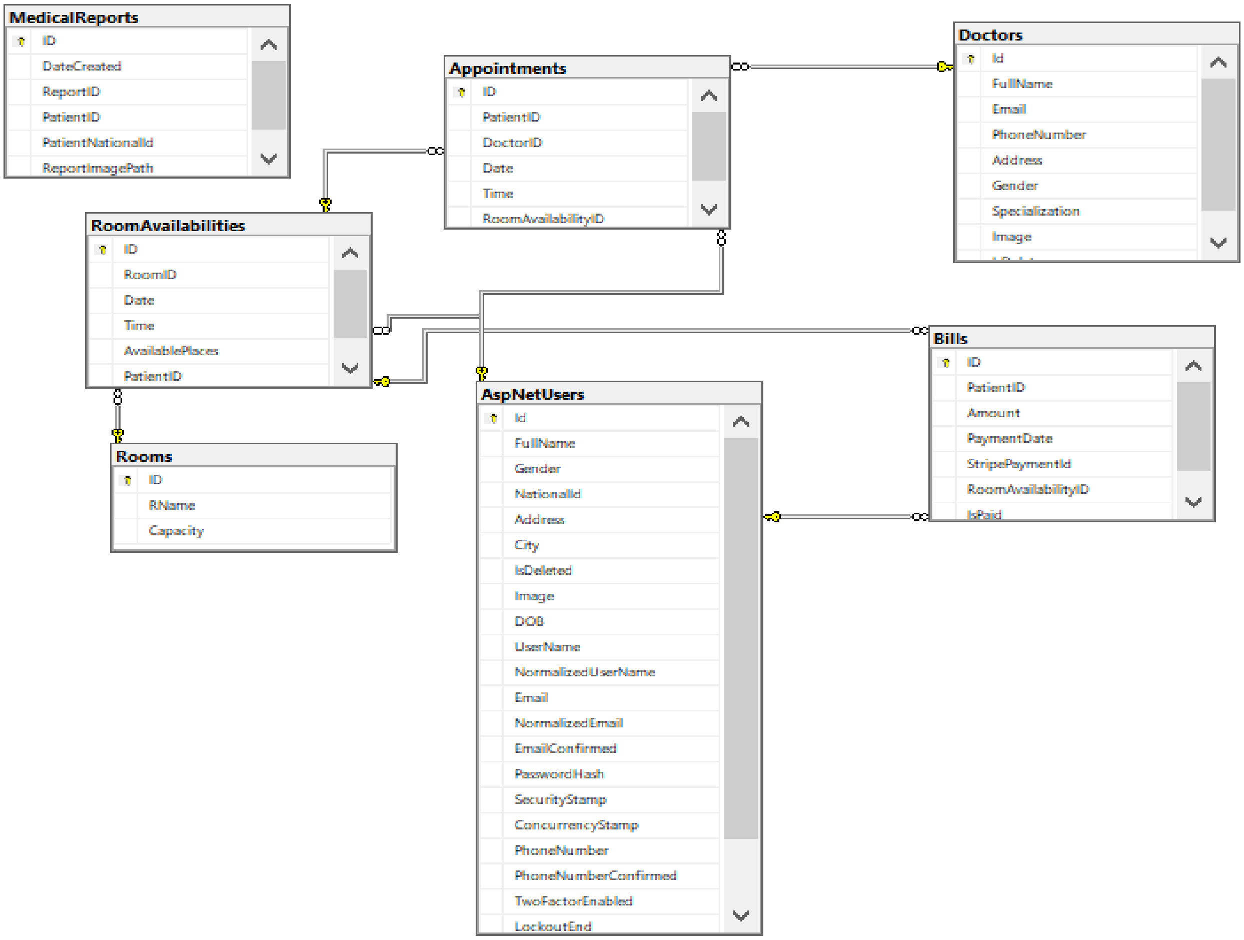
  - **Data Access Layer:** Entity Framework with SQL Server for data handling.

- **Diagram:**
  - A flow diagram of the architecture, showing interactions between the Presentation Layer, Business Logic Layer, and Data Access Layer.



2.2 Database Design

- **Database Management:** SQL Server
- **Key Tables and Relationships:**
  - Tables for users, doctors, appointments, rooms, reports, and bills, including details on primary/foreign keys and relationships.
- **ER Diagram:** An entity-relationship diagram displaying tables, fields, and relationships.



3. Features and Functionalities

3.1 Patient Interface

- **Authentication:** Registration, login, and password management with email confirmation and password reset.
- **Profile Management:** View, edit, and delete profile information.
- **Doctor Search and Appointment Management:** Browse doctors, book appointments, and view details.
- **Reports and Bills:** Access past medical reports and billing details.
- **Payments:** Integration with a payment gateway for online bill settlement.

3.2 Administrator Interface

- **User and Role Management:** Assign and manage user roles, including doctor and patient roles.
- **Doctor and Room Management:** Add, update, and remove doctor profiles and hospital room details.
- **Patient Management:** Access all patient-related features, including the ability to manage appointments, reports, and bills.
- **Report Generation:** Generate, view, and manage patient reports.

4. Implementation Details

4.1 Security and Authentication

- **Password Reset Functionality:** Implements secure password reset through email.

4.2 Client-Side Validation

- **Bootstrap Forms:** Form validation to ensure data integrity and improve user experience.

4.3 Payment Gateway Integration

- **Implementation:** Step-by-step process of integrating the payment gateway, handling payment success and failure, and ensuring transaction security.

4.4 Code Design with SOLID Principles

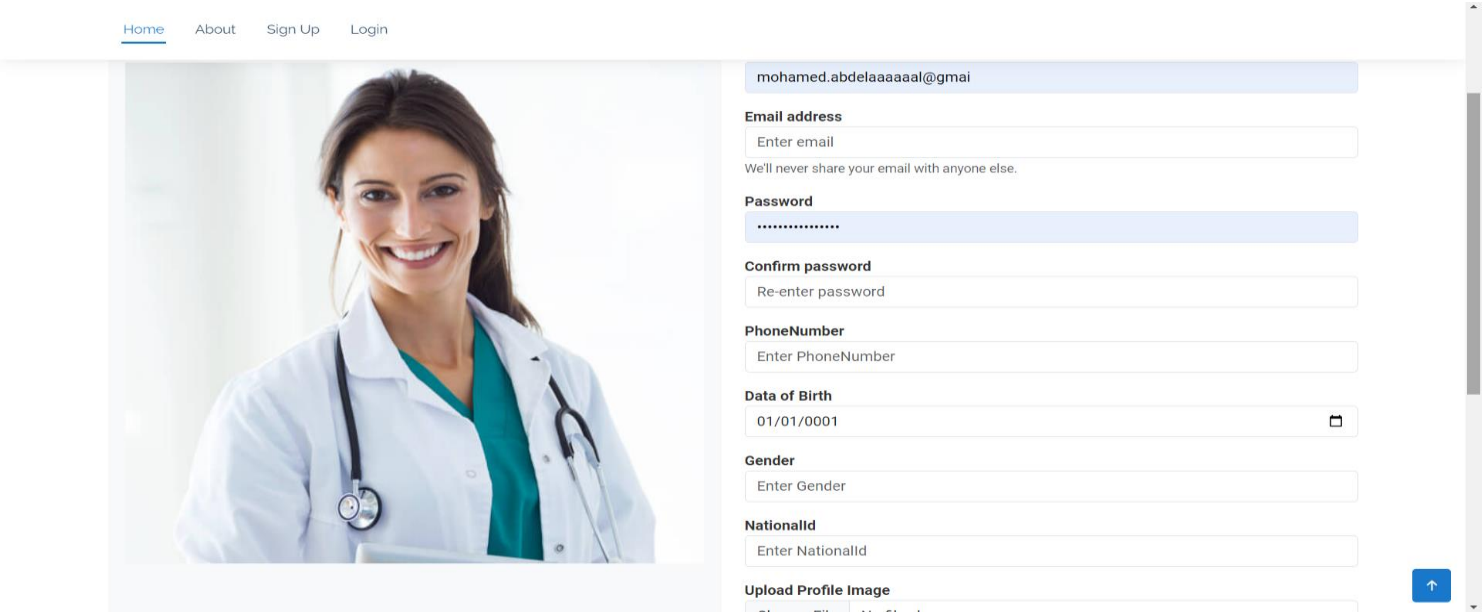
- **Separation of Concerns:** Clear demarcation between different responsibilities within the codebase.
- **Class and Interface Design:** How classes and interfaces adhere to SOLID principles, ensuring a scalable and maintainable code structure.

5. User Interface Design

5.1 UI Overview

- **Admin Interface:** Responsive dashboard using Bootstrap for managing system operations.
- **Patient Interface:** Clean, user-friendly pages for profile management, appointments, and billing.

5.2 Wireframes and Mockups



mohamed.abdelaaaaaal@gmai

Email address

Enter email

We'll never share your email with anyone else.

Password

•••••••••••••••••

Confirm password

Re-enter password

PhoneNumber

Enter PhoneNumber

Data of Birth

01/01/0001

Gender

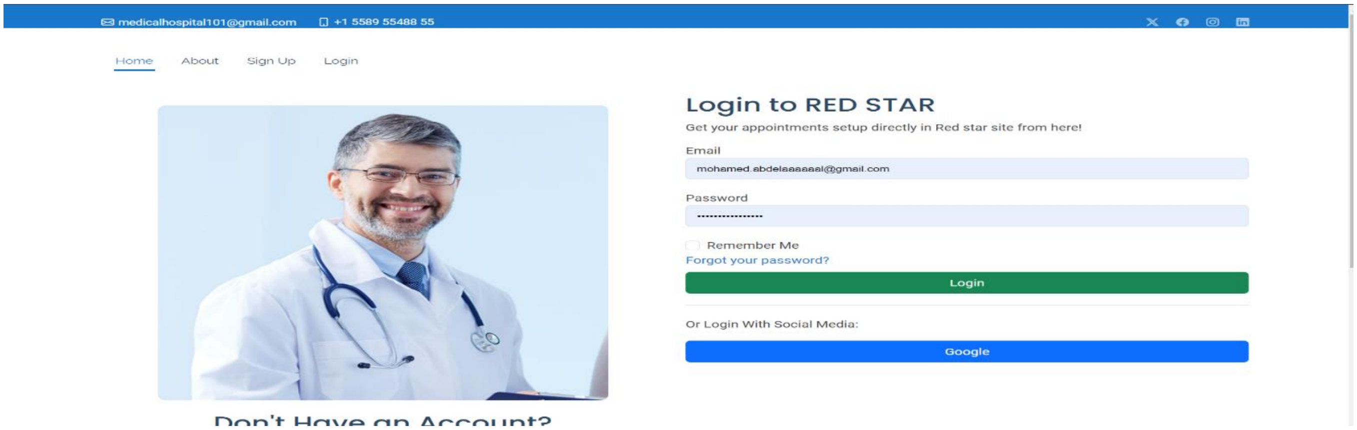
Enter Gender

NationalId

Enter NationalId

Upload Profile Image

Figure 1Register



Login to RED STAR

Get your appointments setup directly in Red star site from here!

Email

mohamed.abdelaaaaaal@gmail.com

Password

•••••••••••••••••

□ Remember Me

Forgot your password?

Figure 2 Login

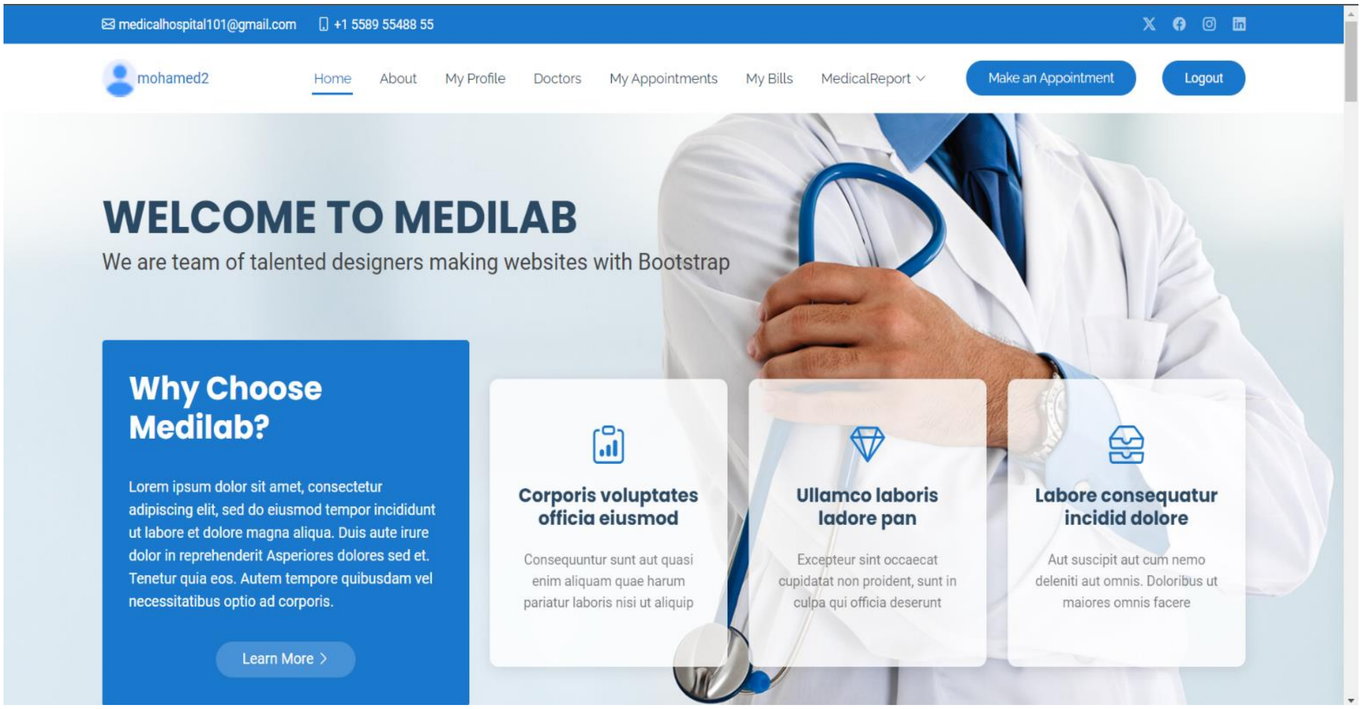


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Figure 3 Home

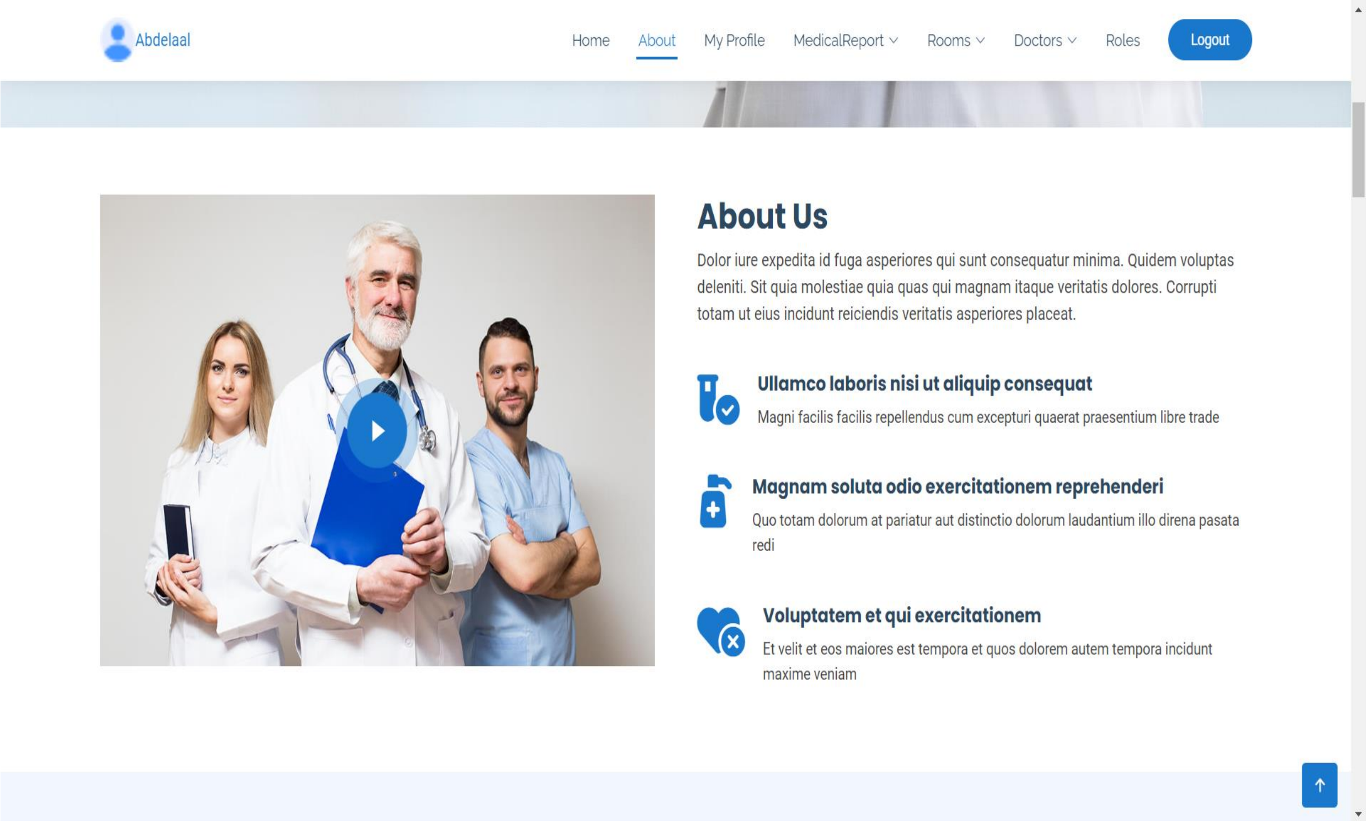

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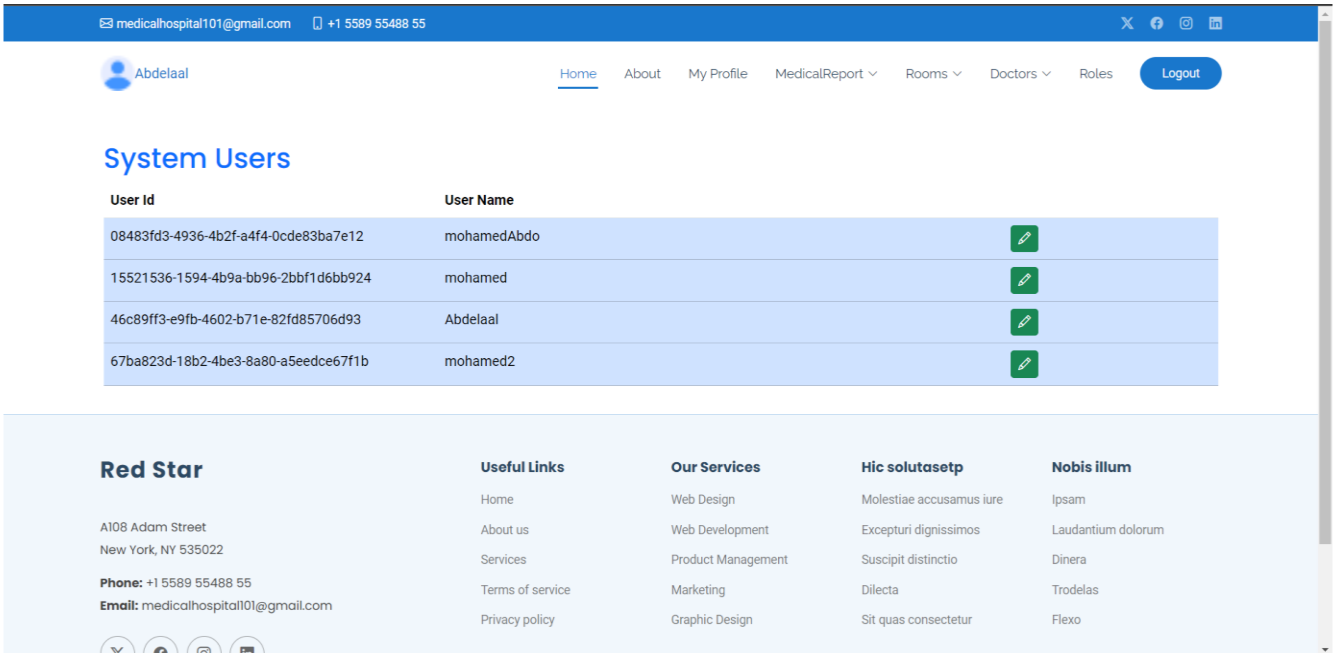
Figure 4 About

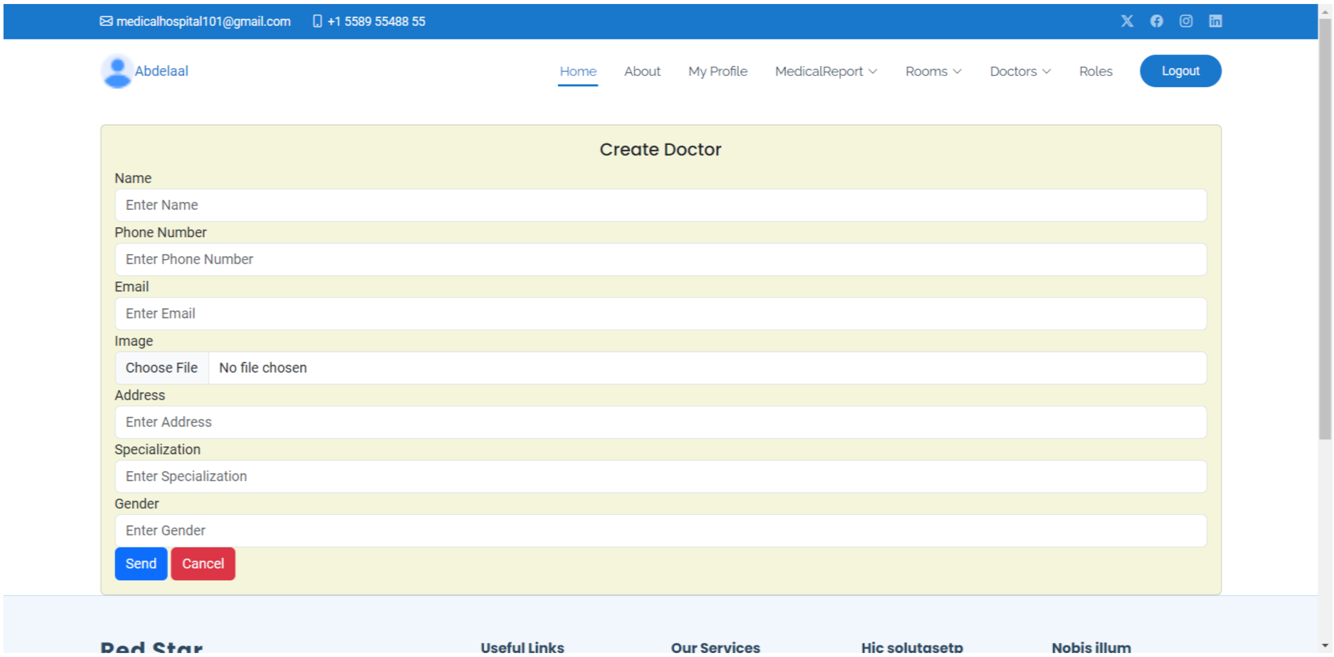
- Admin



System Users

User Id	User Name	
08483fd3-4936-4b2f-a4f4-0cde83ba7e12	mohamedAbdo	✎
15521536-1594-4b9a-bb96-2bbf1d6bb924	mohamed	✎
46c89ff3-e9fb-4602-b71e-82fd85706d93	Abdelaal	✎
67ba823d-18b2-4be3-8a80-a5eedce67f1b	mohamed2	✎

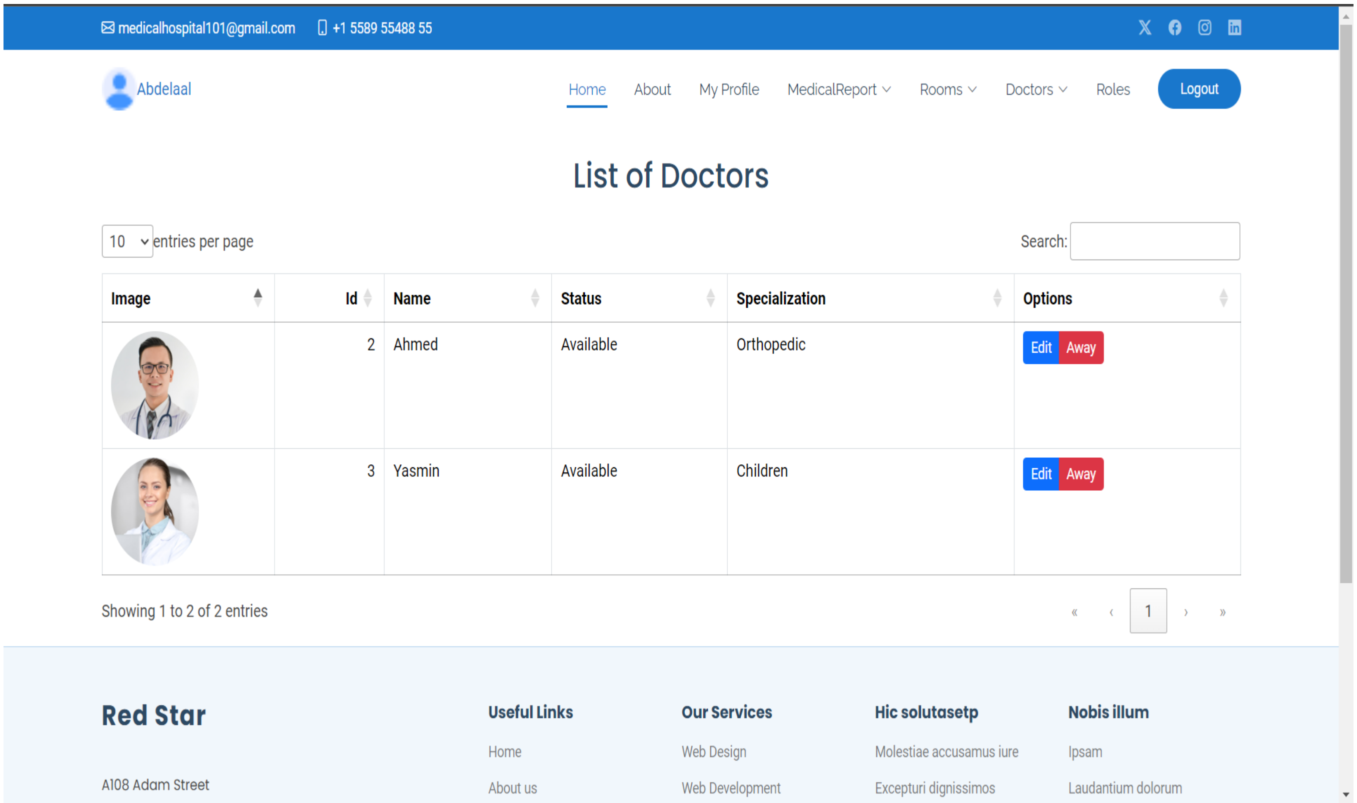
Figure 5 Admin Manage Users



Create Doctor

Name
Enter Name
Phone Number
Enter Phone Number
Email
Enter Email
Image
Choose File No file chosen
Address
Enter Address
Specialization
Enter Specialization
Gender
Enter Gender

Figure 6 Admin Create Doctor



✉ medicalhospital101@gmail.com ▯ +1 5589 55488 55

Abdelaal

List of Doctors

10 entries per page

Search:

Image	Id	Name	Status	Specialization	Options
	2	Ahmed	Available	Orthopedic	Edit Away
	3	Yasmin	Available	Children	Edit Away

Showing 1 to 2 of 2 entries

« ‹ 1 › »

Red Star

A108 Adam Street

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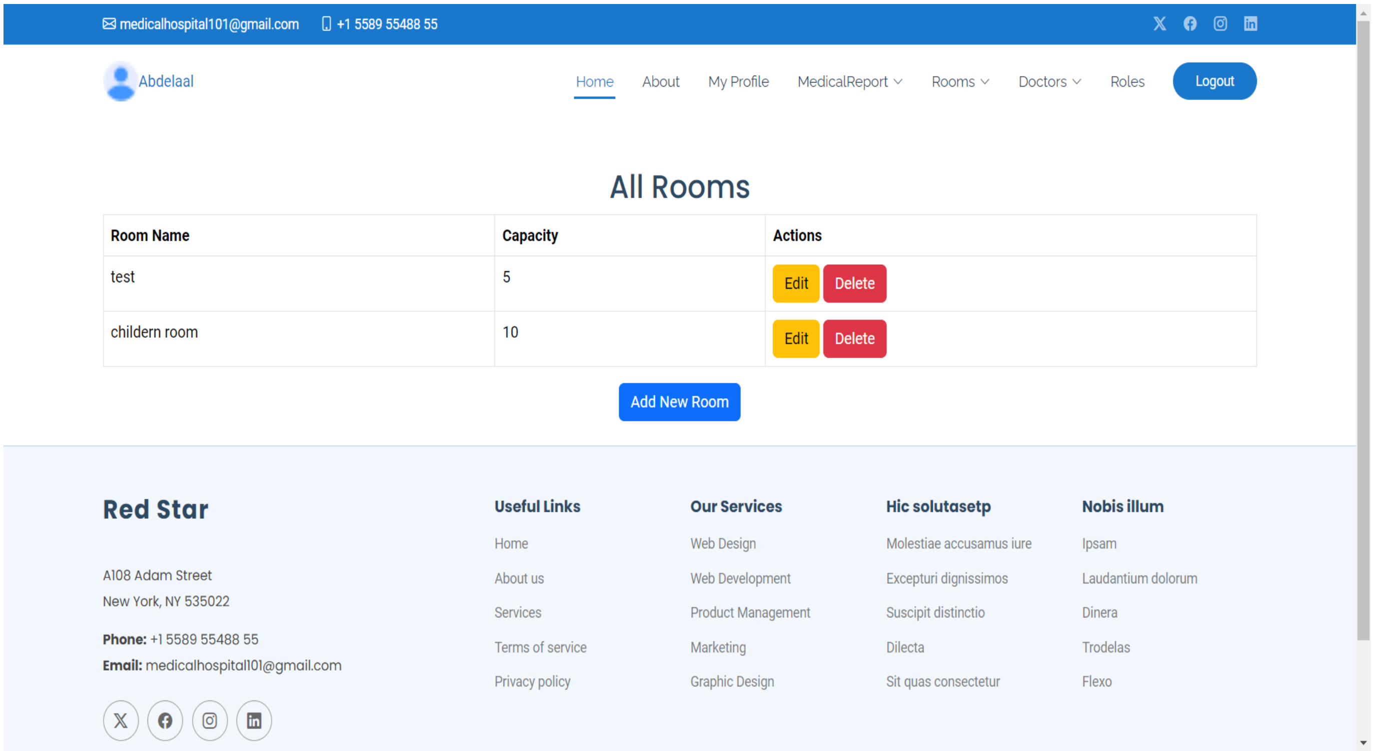
Figure 7 Admin Manage Doctors



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All Rooms

Room Name	Capacity	Actions
test	5	Edit Delete
childern room	10	Edit Delete

Add New Room

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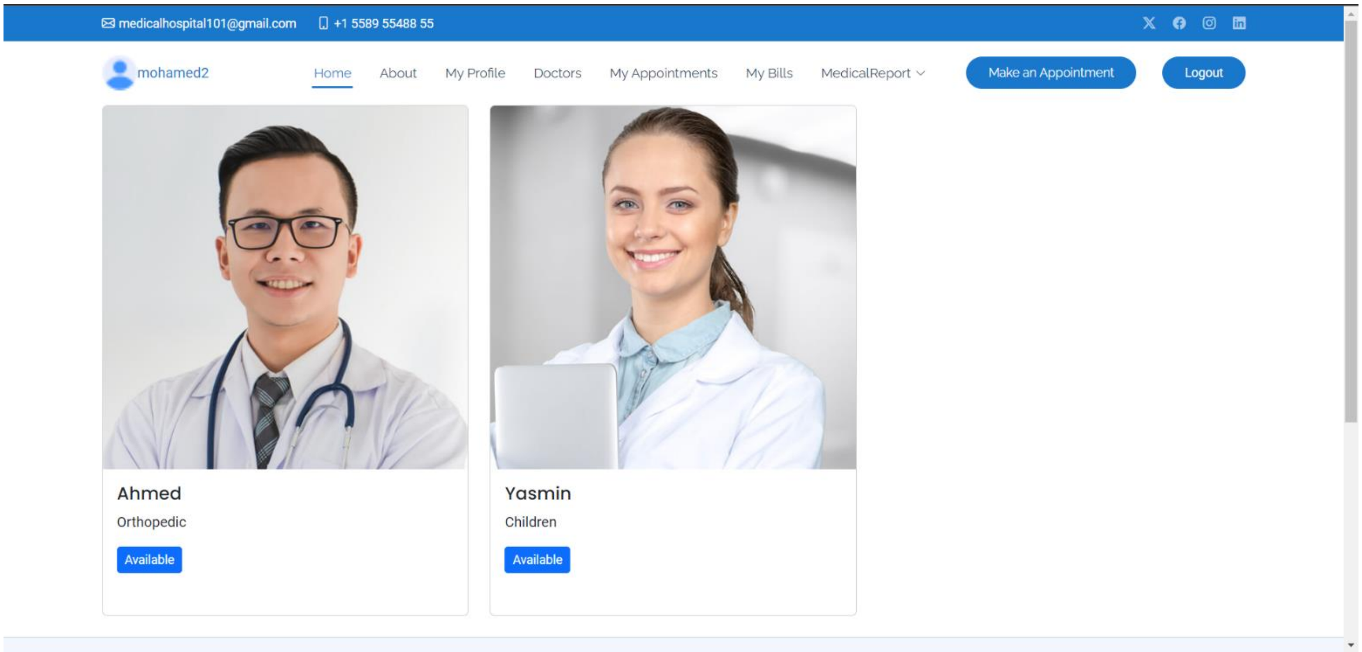
Terms of service	Marketing	Dilecta	Trodelas
Privacy policy	Graphic Design	Sit quas consectetur	Flexo

Figure 8 Admin Manage Rooms

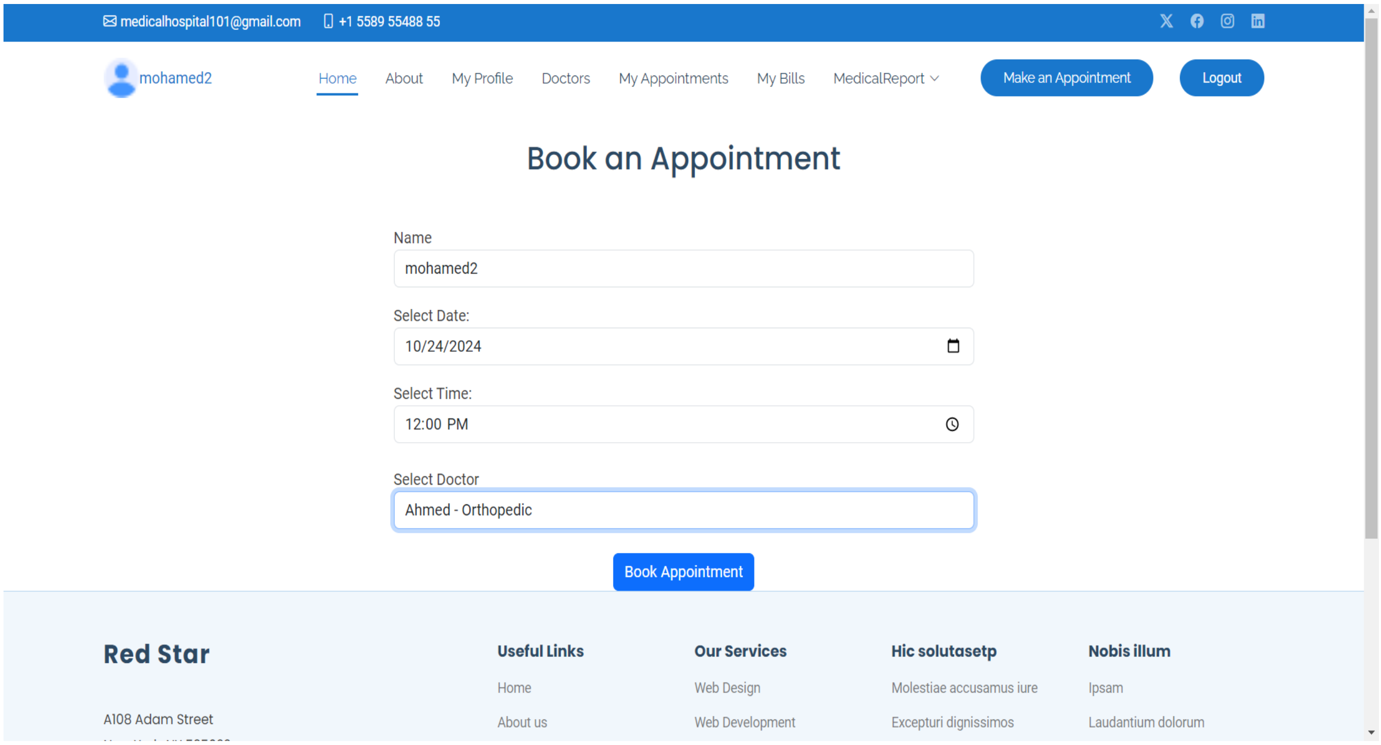
- Patient



Ahmed
Orthopedic
Available

Yasmin
Children
Available

Figure 9 Patient Show Doctors



Book an Appointment

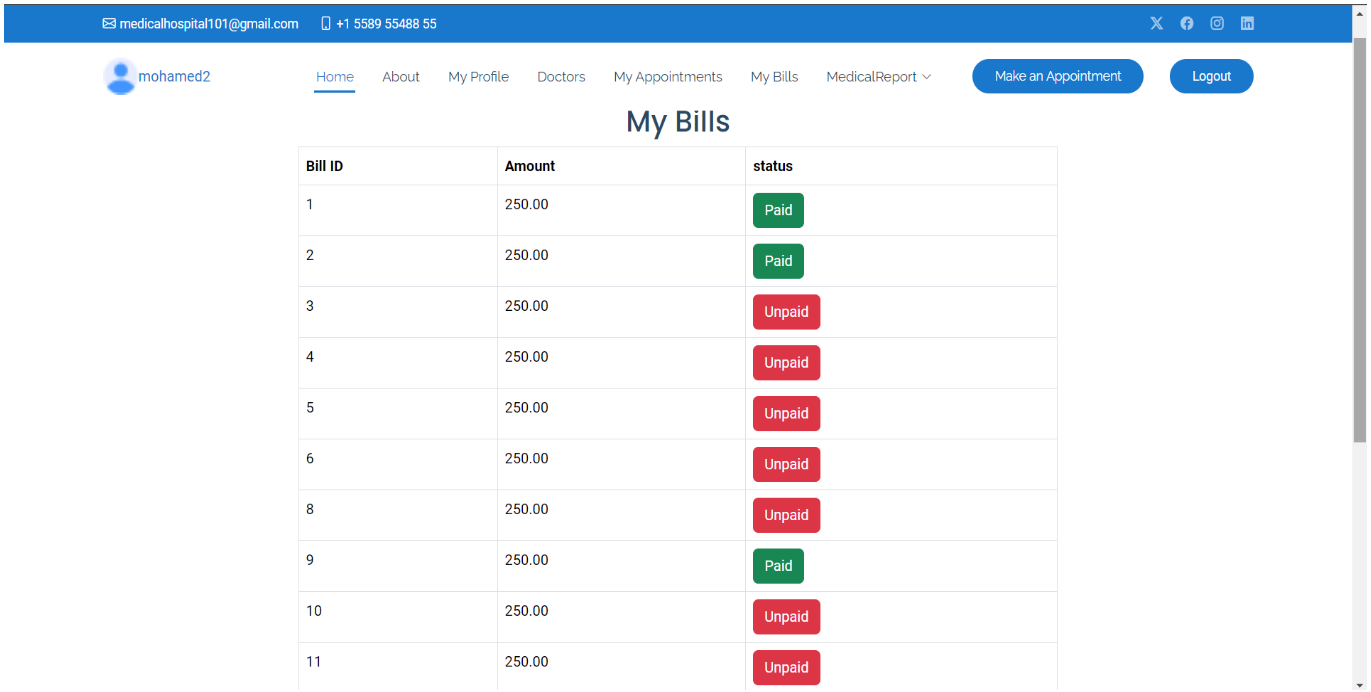
Name: mohamed2

Select Date: 10/24/2024

Select Time: 12:00 PM

Select Doctor: Ahmed - Orthopedic

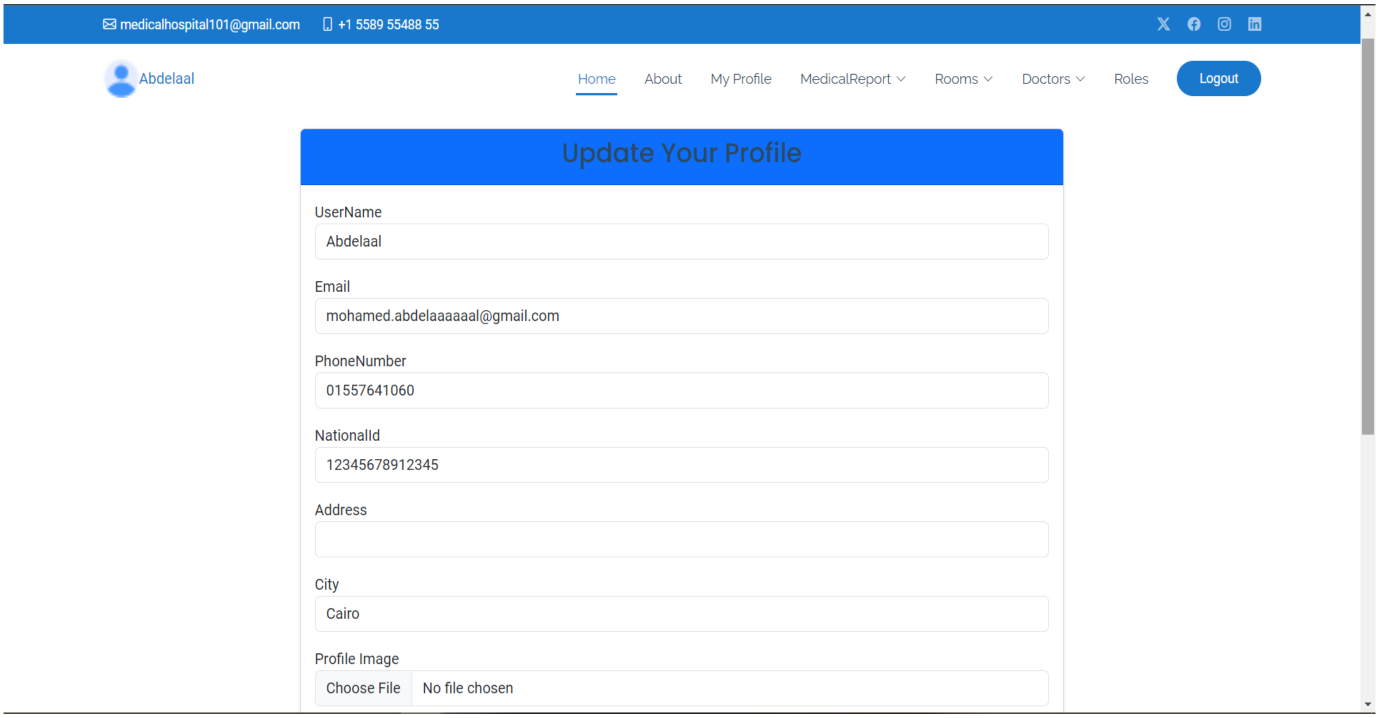
Figure 10 Patient Book an Appointment



My Bills

Bill ID	Amount	status
1	250.00	Paid
2	250.00	Paid
3	250.00	Unpaid
4	250.00	Unpaid
5	250.00	Unpaid
6	250.00	Unpaid
8	250.00	Unpaid
9	250.00	Paid
10	250.00	Unpaid
11	250.00	Unpaid

Figure 11 Patient` s Bills



Update Your Profile

UserName
Abdelaal

Email
mohamed.abdelaaaaaal@gmail.com

PhoneNumber
01557641060

NationalId
12345678912345

Address

City
Cairo

Profile Image
Choose File No file chosen

Figure 12 Update Profile

6. Testing and Quality Assurance

6.1 Testing Strategy

- **Unit Testing:** Explanation of the tests written for business logic components.
- **Integration Testing:** Validation of end-to-end workflows between modules, especially for payment and authentication.
- **User Acceptance Testing (UAT):** Process and outcomes of testing the system with actual users.

6.2 Error Handling and Logging

- **Error Handling Mechanisms:** How common errors are managed within the system.
- **Logging:** Overview of logging practices for debugging and performance monitoring.

7. Deployment

7.1 Environment Setup

- **Local Deployment:**
  - **Requirements:** Ensure that you have the following installed:
    - Microsoft Visual Studio Code
    - .NET Core SDK
    - SQL Server (or SQL Server Express for local testing)
    - Git (for version control)
- **Production Deployment (Using IIS):**
  - **Server Requirements:**
    - Windows Server with IIS installed.
    - .NET Core Hosting Bundle installed on the server.
    - SQL Server (accessible from the production environment).

7.2 Continuous Integration/Continuous Deployment (CI/CD)

- **Pipeline Configuration:**

  Version Control: Use GitHub for source control, with branches for development, testing, and production.

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8. Future Enhancements

- Potential features to enhance functionality, such as automated scheduling, detailed analytics for hospital management, and telemedicine integration.

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9. References

1.https://learn.microsoft.com/enus/aspnet/core/mvc/overview?view=aspnetcore-8.0

2. https://learn.microsoft.com/en-us/aspnet/core/security/authentication/identity?view=aspnetcore-8.0&tabs=visual-studio

3. https://docs.stripe.com/get-started/development-environment?lang=dotnet