Ural Federal University

named after the first President of Russia B.N.Yeltsin

Second Semester Report

Web application development

Professor : -Mohd. Saif Mujahid Abudullah Khael

Student Name:- Anshul Diwakar

Group: RIM-140930

Project Overview: Simple Life – Hospital Management System

Table of Contents

1. Introduction

This report presents a full-stack web application titled **"Simple Life - Hospital Management System"**, developed as a course project for *Web Application Development*. The aim of this system is to facilitate smooth communication between patients and doctors by providing a digital platform for profile management, appointment booking, and resume uploads.

---

2. Project Objective

The primary objective of this project is to build a scalable, secure, and user-friendly hospital management system that enables:

- Patients to register and book appointments with doctors.
- Doctors to register, upload their resumes, photos, and set consultation prices.
- Admins to manage users and content.
- Real-time functionality and responsive design.

---

3. Technologies Used

- **Frontend**: React.js, Material UI, Axios
- **Backend**: Django, Django REST Framework
- **Database**: PostgreSQL
- **Caching**: Redis
- **Containerization**: Docker, Docker Compose
- **Authentication**: Token-based using Django and DRF
- **Deployment Tools**: Nginx (used via Docker for frontend), Gunicorn (optional for production)

---

4. System Architecture

The system follows a modular microservice-based architecture with the following components:

- **Frontend (React App)**:
  - Runs on port 3000
  - Handles routing, form validation, UI rendering
- **Backend (Django + DRF)**:
  - Runs on port 8000
  - Manages APIs, database operations, authentication, and appointment logic
- **Database (PostgreSQL)**:
  - Stores all persistent data including users, appointments, doctor profiles
- **Redis**:
  - Used for caching and potential queue management
- **Dockerized Environment**:
  - All components containerized and orchestrated using Docker Compose

---

5. Features and Functionality

For Patients:

- User registration and login
- View list of doctors with specialty, photo, and price
- Book appointments with doctors
- View their own profile and appointment history

For Doctors:

- Register as a doctor with additional fields (specialty, consultation price)
- Upload resume and profile photo
- Manage their own profiles

Admin Panel:

- Provided by Django Admin for managing users, appointments, and messages

---

6. Implementation Details

- **Frontend**:
  - Built using React with reusable components
  - Material UI for styling and layout
  - API calls via Axios
- **Backend**:
  - Django models: User, DoctorProfile, PatientProfile, Appointment, Contact
  - DRF Serializers for validation and transformation
  - Viewsets and Routers for RESTful API structure

- **Authentication**:
  - JWT or Token authentication to maintain sessions
  - Role-based profile rendering based on login

---

7. Deployment and Dockerization

Each major component (frontend, backend, PostgreSQL, Redis) is placed in separate containers using Docker Compose.

- **Frontend Dockerfile** builds React app and serves via Nginx.
- **Backend Dockerfile** handles Django server with migrations and static/media separation.
- **docker-compose.yml** links all services, defines environment variables, and shared volumes.

Deployment is simplified through:

- .env management for secrets
- Static/media file management
- Live preview accessible via browser at localhost:3000

---

8. Conclusion

The Simple Life project showcases a complete, secure, and efficient hospital management system tailored for modern healthcare interaction. It demonstrates practical knowledge of frontend/backend integration, RESTful APIs, authentication, and containerized deployment.

---

9. Future Improvements

- Add email/SMS notification system for appointment reminders
- Implement online payment system for doctor consultations
- Add calendar view for scheduling
- Add admin dashboard with analytics
- Deploy to cloud hosting platforms like AWS or Heroku

Git- https://github.com/AnshulDiwakar/AnshulDiwakar-Simple-Life-Hospital-Management-System.git