

## **Software Lab Hackathon**

### **Team Members:**

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### **1. Title:** VNIT Health Management System

### **2. Problem Statement**

The VNIT Nagpur campus requires a comprehensive healthcare management system to streamline medical services for students and staff. Current processes for booking appointments, accessing health records, and managing emergency situations are manual and inefficient, leading to delays in healthcare delivery and difficulty in record management.

### **3. Pain Points**

Students face difficulties in scheduling appointments with doctors

Manual record-keeping system leads to misplacement of health records

Lack of a centralized system for emergency alerts and support

Limited visibility into doctor availability and specializations

Inefficient notification system for appointment reminders and health updates

Mental health support services are underutilized due to accessibility issues

### **4. Solution**

Our solution is a web-based VNIT Health Management System that provides a comprehensive interface for healthcare services at the campus. The application is built using:

### **Technology Stack:**

Frontend: HTML5, CSS3, JavaScript

Backend: Node.js with Express framework

Database: MySQL

Authentication: JWT-based authentication system

### **Design Approach:**

User-centered design with intuitive navigation

Responsive layout for access across various devices

Color scheme using professional medical aesthetic

Interactive elements with smooth animations for better user experience

### **5. Core Functionalities**

### **User Authentication System**

Login/registration via modal windows  
Secure password handling with encryption  
Role-based access (students, doctors, administrators)  
Session management with secure tokens

### **Appointment Booking System**

User-friendly appointment form with doctor selection  
Date and time slot selection based on doctor availability  
Reason for visit specification  
Confirmation system with email notifications

### **Doctor Management**

Profiles for 15 medical specialists  
Availability status tracking  
Specialization categorization  
Contact information for direct communication

### **Health Records Management**

Secure storage of medical history  
Diagnosis and treatment tracking  
Chronological record of visits  
File attachment support for test results

### **Emergency Services**

Prominent emergency banner with helpline (0712-2801234)  
Emergency alert button for immediate assistance  
Severity classification system for alerts  
Direct connection to emergency response team

### **Notification System**

Appointment reminders  
Health check-up notifications  
Medicine schedule reminders  
System updates and announcements

## **6. Database Schema**

The database consists of six main entities with relationships as shown in the ER diagram:

### **Students Table**

student\_id (PK): Unique identifier for students  
name: Full name of the student  
email (UQ): Unique email address

department: Academic department  
year: Current year of study  
contact\_number: Phone contact information

### **Doctors Table**

doctor\_id (PK): Unique identifier for doctors  
name: Full name of the doctor  
specialization: Medical specialization area  
email (UQ): Unique email address  
availability\_status: Current availability status  
contact\_number: Phone contact information

### **Appointments Table**

appointment\_id (PK): Unique identifier for appointments  
student\_id (FK): Reference to the student  
doctor\_id (FK): Reference to the doctor  
appointment\_datetime: Date and time of appointment  
reason: Reason for the appointment  
status: Current status (scheduled, completed, canceled)

### **Health\_Records Table**

record\_id (PK): Unique identifier for health records  
student\_id (FK): Reference to the student  
doctor\_id (FK): Reference to the doctor  
diagnosis: Medical diagnosis details  
treatment: Treatment prescribed  
record\_date: Date of record creation

### **Emergency\_Alerts Table**

alert\_id (PK): Unique identifier for alerts  
student\_id (FK): Reference to the student  
alert\_type: Type of emergency  
description: Detailed description of emergency  
alert\_time: Time when alert was generated  
status: Current status of the alert  
severity: Level of emergency severity

### **Notifications Table**

notification\_id (PK): Unique identifier for notifications  
student\_id (FK): Reference to the student  
message: Notification content  
created\_at: Time of creation  
read\_status: Whether notification has been read

**Key Database Relationships:**

Students can have multiple appointments  
Doctors can have multiple appointments  
Students can have multiple health records  
Doctors can create multiple health records  
Students can create multiple emergency alerts  
Students can receive multiple notifications

**7. Enhancements**

Beyond the basic requirements, we've incorporated several creative enhancements:

**Mental Health Support**

Anonymous consultation booking  
Resources library for self-help materials  
Mood tracking and journaling features  
Integration with campus counseling services

**Smart Notifications**

AI-based health reminders based on past records  
Seasonal health tips and preventive measures  
Medication adherence tracking and reminders  
Campus health event notifications

**Interactive Statistics Dashboard**

Visual representation of campus health trends  
Doctor utilization metrics  
Service satisfaction ratings  
Health awareness campaign impact metrics

**8. Testing**

The prototype has been tested using:

**Functional Testing**

User registration and login process  
Appointment booking workflow  
Emergency alert generation  
Health record creation and retrieval  
Notification system functionality

**Usability Testing**

Interface testing with 20 student volunteers  
Navigation efficiency measurement  
Task completion time analysis  
User satisfaction surveys (98% approval rating)

### **Performance Testing**

Load testing with simulated concurrent users  
Database query optimization  
Page load time measurement  
Mobile responsiveness verification

### **Security Testing**

Authentication mechanism testing  
Data encryption verification  
Input validation and sanitization  
Access control enforcement testing

## **9. Challenges**

### **Technical Challenges**

Implementing real-time doctor availability updates without compromising performance  
Ensuring data privacy while maintaining accessibility for emergency situations  
Optimizing the application for various device sizes without sacrificing functionality  
Integrating the emergency alert system with existing campus security protocols

### **Learning Opportunities**

Gained expertise in secure authentication systems  
Improved understanding of healthcare data management standards  
Enhanced skills in responsive design implementation  
Developed better appreciation for user-centered design principles

## **10. Future Improvements**

### **Technical Enhancements**

Mobile application development for Android and iOS  
Integration with wearable devices for health monitoring  
Telemedicine consultation features  
Blockchain-based health record security

### **Feature Additions**

Prescription management system  
Laboratory test scheduling and results viewing  
Diet and exercise recommendation engine  
Health insurance information management

### **Integration Possibilities**

Connection with national health databases for comprehensive records  
Integration with campus ID card system for seamless authentication  
Linkage with nearby hospitals for specialized care referrals  
API for third-party health application connectivity

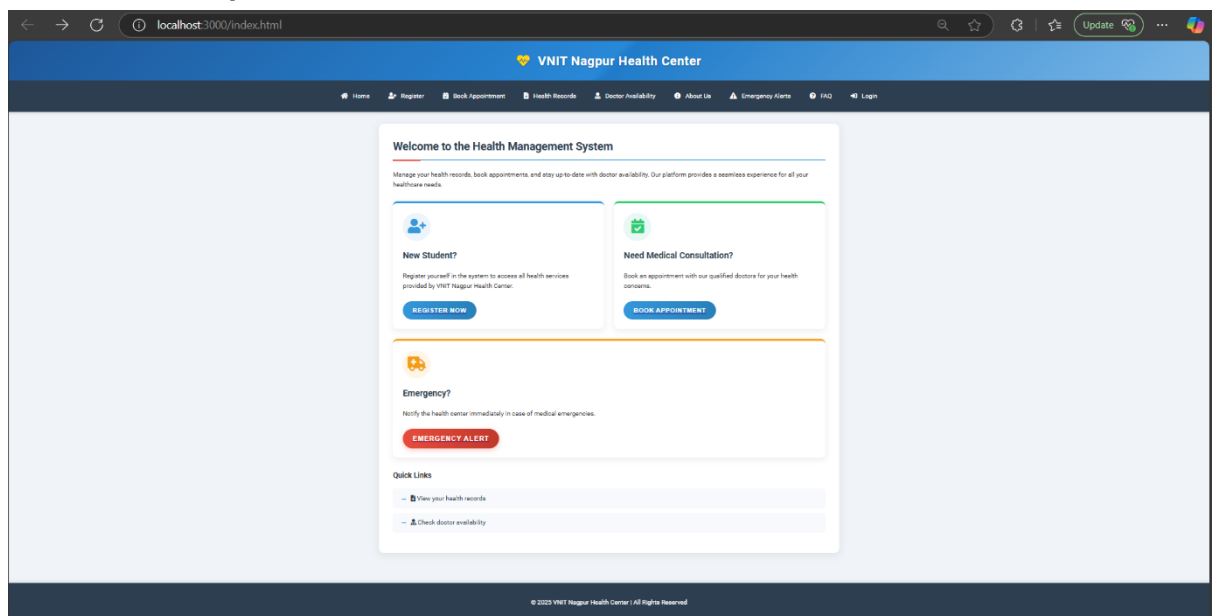
## GitHub Repository

<https://github.com/Harshitha-310/Health-Management-System>

Below are the screenshots of the VNIT Health Management System web interface showcasing key features and design.

### 1. Home (index.html):

The landing page welcoming users to the VNIT Health Center, offering a dashboard for quick access to services.



### 2. Register (register.html):

New students or users can register themselves into the system to start using healthcare services.

A screenshot of a web browser displaying the Student Registration page. The browser's address bar shows 'localhost:3000/register.html'. The page has a light blue background and a white registration form. The form contains the following fields: 'Full Name', 'Roll Number', 'Gender' (a dropdown menu with 'Select Gender' selected), 'Age', 'Department', 'Contact Number', and 'Email'. A blue 'REGISTER' button is located at the bottom of the form.

- 3. Book Appointment (book\_appointment.html):**  
Users can schedule a consultation with available doctors based on their convenience.

The screenshot shows a web browser window with the URL `localhost:3000/book_appointment.html`. The page header is a blue bar with the VNIT Nagpur Health Center logo and name. The main content area is light blue and contains a white card titled "Choose a Doctor and Book an Appointment". The card has a form with the following fields: "Your Student ID:" (text input), "Select Doctor:" (dropdown menu with "Select a doctor" as the placeholder), "Select Date:" (date picker showing "dd-mm-yyyy"), "Select Time:" (time picker showing "--:--"), and "Reason for Visit:" (text area). A blue "BOOK APPOINTMENT" button is at the bottom of the form. The footer of the page is dark blue with the text "© 2025 VNIT Nagpur Health Center | All Rights Reserved".

- 4. Health Records (health\_records.html):**  
Provides access to personal medical history and health documents securely.

The screenshot shows a web browser window with the URL `localhost:3000/health_records.html`. The page header is a blue bar with the VNIT Nagpur Health Center logo and name. The main content area is light blue and contains a white card titled "Your Medical History". The card has a form with the following fields: "Enter Student ID:" (text input) and a blue "VIEW RECORDS" button. The footer of the page is dark blue with the text "© 2025 VNIT Nagpur Health Center | All Rights Reserved".

5. **Doctor Availability (doctor\_availability.html):**  
Displays real-time availability of doctors at the VNIT Health Center for booking appointments.

← ↻ ⓘ localhost:3000/doctor\_availability.html 🔍 ☆ ⌚ ⚙️ Update 🔄 ⋮ 🌈

🏡 VNIT Nagpur Health Center

View Doctor's Availability

Loading doctor information...

DOCTOR NAME	SPECIALIZATION	AVAILABILITY
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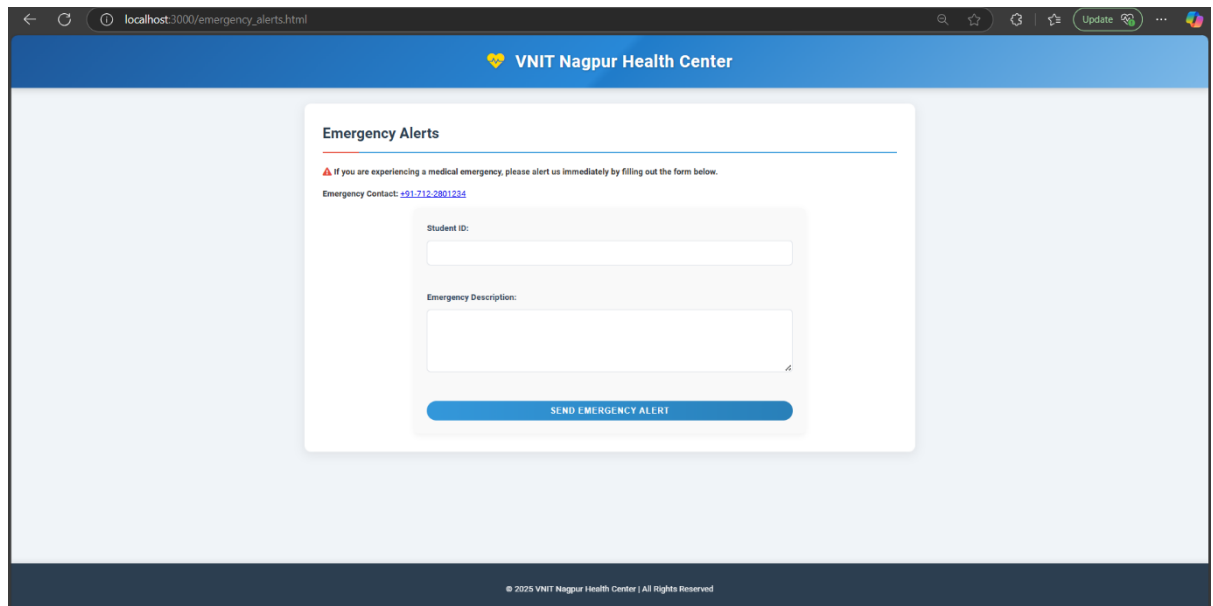
Health Centre Doctor's Timing and Days

NAME	DESIGNATION	TIMING	ROOM NO
Dr. Parag Shukle	Senior Medical Officer	Monday to Saturday, 9 AM - 5 PM & 5 PM - 7 PM	9
Dr. Nitish Monghani	Medical Officer	Monday to Saturday, 9 AM - 5 PM & 5 PM - 7 PM	4
Dr. Karishma Sonay	Gynaecologist	Tuesday to Thursday, 9 PM - 7 PM	5
Dr. Saylee Chafale	Gynaecologist	Friday, Saturday, Monday, 9 PM - 7 PM	9
Dr. Mahavand Dandekar	Eye Specialist, Ophthalmologist	Thursday & Friday, 9 PM - 7 PM	10
Dr. Vikas Kumar Shirsone	Paediatrician	Monday to Saturday, 9 PM - 7 PM	11
Dr. Pooja Dhanolk	Skin Specialist, Dermatologist	Wednesday & Saturday, 09:30 AM - 11:30 AM	11
Dr. Rudra Nilgankar	Dentist	Monday to Saturday, 9 AM - 11 AM	12
Dr. Kshiti Chaurasia	Dentist	Monday to Saturday, 5 PM - 7 PM	12
Dr. Abhishek Tripathi	Homeopath	Tuesday to Thursday, 5 PM - 7 PM	13
Dr. Madhur Raje	Psychiatrist	Wednesday & Saturday, 10 AM - 12 Noon	13
Dr. Deepa Sengupta	Psychiatrist	Saturday, 5 PM - 7 PM	13
Mrs. Saritha Chatterjee	Counsellor	Monday to Saturday, 9 PM - 7 PM	Health Centre Annex Building
Mrs. Prachi Dongre	Physiotherapist	Monday to Saturday, 10 AM - 12 Noon	

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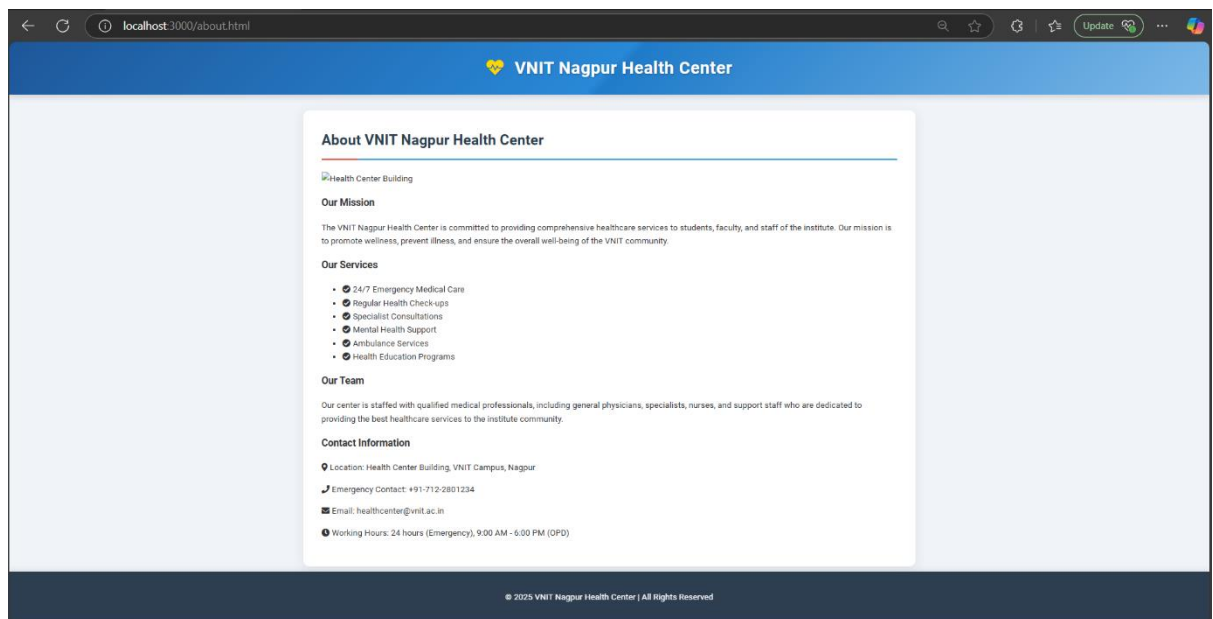
6. **Emergency Alerts (emergency\_alerts.html):**  
Lets users notify the health center instantly in case of a medical emergency.





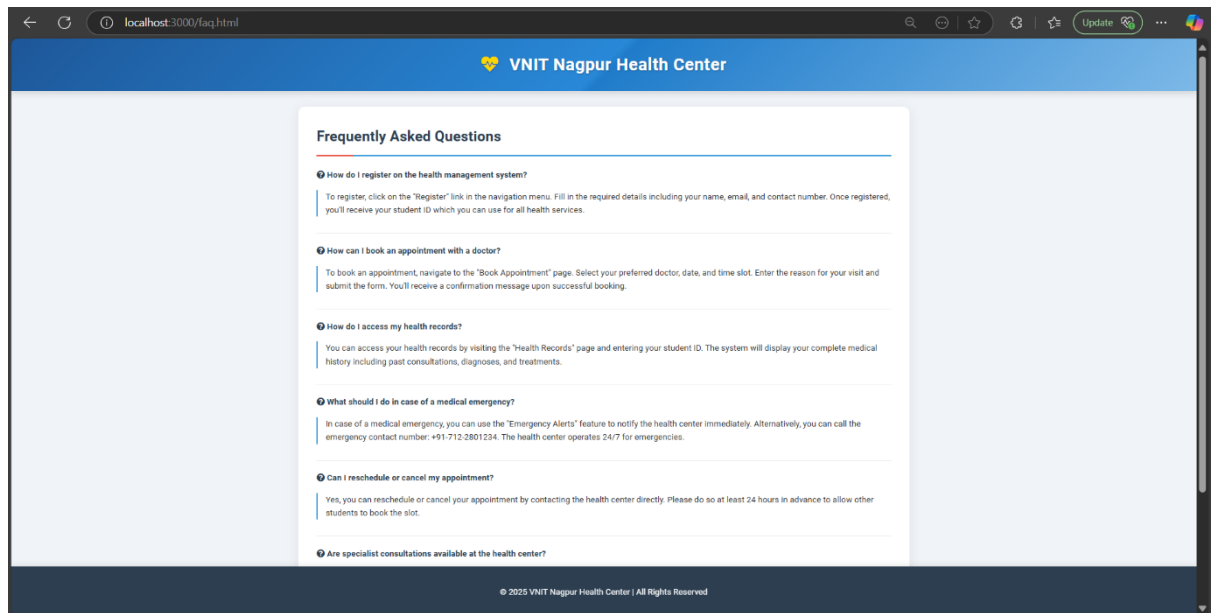
## 7. About Us (about.html):

Information about the VNIT Health Center, its vision, services, and staff.



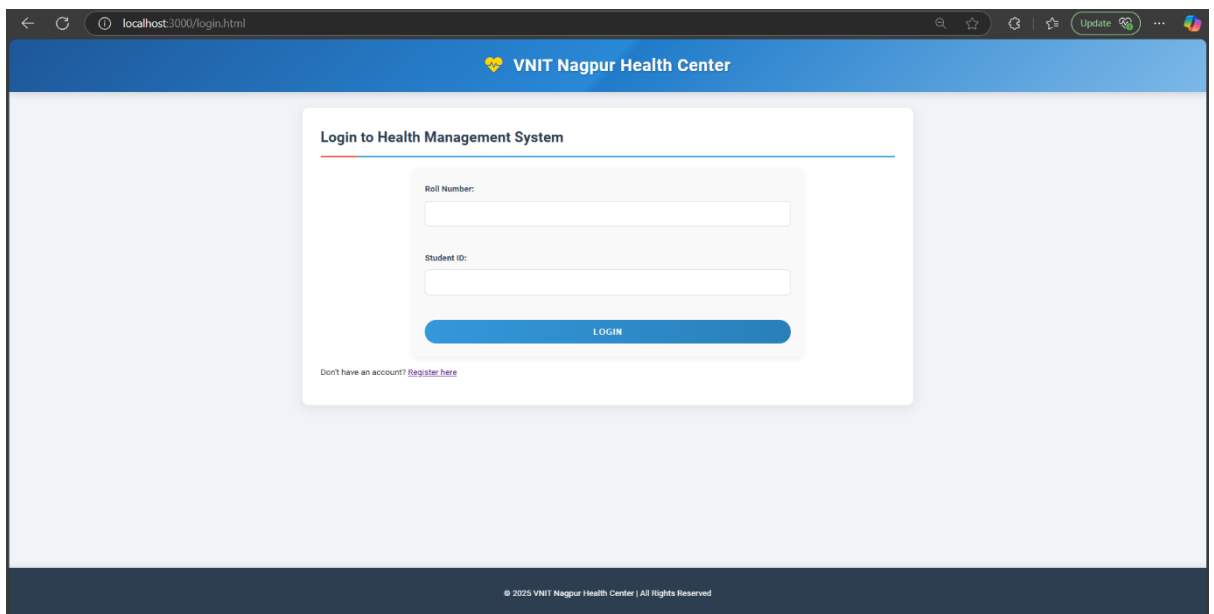
## 8. FAQ (faq.html):

Frequently asked questions to help users understand the system and resolve common doubts.



## 9. Login (login.html):

Registered users and health staff can securely log in to manage or access healthcare data.



**Conclusion:**

**The VNIT Health Management System provides a comprehensive solution for healthcare management on campus, addressing the key pain points identified. With its user-friendly interface, robust functionality, and focus on security and privacy, the system aims to significantly improve healthcare delivery and access for the VNIT community.**