AetherZen

Full Stack Developer (Intern)
SKILL ASSESSMENT TASK

Project Overview: Develop a comprehensive **Hospital Management System (HMS)** using Next.js, TypeScript, Prisma, and PostgreSQL featuring JWT authentication with access/refresh tokens, real-time video consultations via WebRTC and Socket.io, appointment scheduling with calendar UI and conflict detection, electronic health records (EHR) for prescription and medical history tracking, role-based access control (Admin/Doctor/Patient), secure patient-doctor messaging, bulk SMS/email notifications (Twilio/Nodemailer), responsive UI built with Tailwind CSS and Shadcn, and an admin dashboard for analytics, user management, and reporting—all managed through Redux/RTK Query for state management, with CRUD operations for patient and staff management, WebRTC integration for video calls, automated reminders, and secure data handling compliant with healthcare standards.

Technology Stack

- ❖ **Programming Language:** TypeScript
- ❖ **Web Framework:** Next.js
- ❖ **ORM:** Prisma with PostgreSQL
- ❖ **Authentication:** JWT (JSON Web Tokens)
- ❖ **State Management:** Redux, RTK Query,Axios
- ❖ **Email Service:** Nodemailer
- ❖ **Styling:** Tailwind CSS, Shadcn OR MUI
- ❖ **SMS Service**   Twilio / Local SMS Gateway
- ❖ **Notification:** React Toastify
- ❖ **Modal:** React Portal
- ❖ **Payment Gateway:** SSL Commerce

Core Features

1. **User Interface Components**
   ❖ **1.1 Navigation & Role-Based Views**
   - ➢ **Role-Specific Dashboards:**
     - Patients: Appointments, prescriptions, video call access
     - Doctors: Patient queue, EHR access, video call interface
     - Admin: Analytics, user management, billing
     - Responsive Sidebar: Collapsible menu with quick-access links
   ❖ **1.2 Appointment Management**
   - ➢ **Interactive Calendar:**
     - Drag-and-drop scheduling
     - Conflict detection (doctor availability)
     - Automated reminders (SMS/Email)
   - ➢ **Video Call Integration:**
     - WebRTC with Socket.io for signaling
     - Waiting room for patients
     - Call recording (optional, with patient consent)

2. **Patient & Doctor Workflow**
   ❖ **2.1 Patient Registration & EHR**
   - ➢ Secure Signup: OTP verification (email/SMS)
   - ➢ Medical History Form: Allergies, past treatments, uploads (PDF/X-ray scans)
   - ➢ Prescription Management:
   - ➢ Digital prescriptions (PDF generation)
   - ➢ Medication reminders
   ❖ **2.2 Doctor's Portal**
   - ➢ **Real-Time Patient Queue:**
     - Video call initiation button
     - Priority-based sorting (emergency cases)
   - ➢ **EHR Access:**
     - Search patient records
     - Add diagnosis/treatment notes

3. **Video Consultation System**
   - ➢ **WebRTC Implementation:**
     - Peer-to-peer video/audio calls
     - Screen sharing (for diagnostics)
     - Text chat during calls (Socket.io)
   - ➢ **Post-Call Actions:**

> ➢ Automatically generate consultation summary
> ➢ Option to prescribe medication

4. Admin & Analytics

❖ **4.1 Admin Dashboard**
> ➢ **User Management:**
>> ■ Add/remove doctors, patients, staff
>> ■ Role permissions (RBAC)
>> ■ Reports:
>> ■ Appointment statistics
>> ■ Revenue tracking (if paid consultations)

❖ **4.2 Security & Compliance**
> ➢ **HIPAA/GDPR Considerations:**
>> ■ Data encryption (at rest & in transit)
>> ■ Audit logs for sensitive actions

Note

❖ 100% Redux state management (no Context API)
❖ TypeScript typing for all variables
❖ Comprehensive error handling (100% coverage)
❖ Reusable component architecture
❖ Industry-standard file structure:
❖ .env file with all required variables
❖ Meaningful code comments
❖ Pagination on all tables and product pages