Software Requirements Specification

for

Online Doctor Appointment System

Version 1.0 approved

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Revision History

Name	Date	Reason For Changes	Version
Team26	24-8-2025	Initial Version	1.0

1. Introduction

1.1 Purpose

This document explains what our "Online Doctor Appointment System" will do and how it will work. Think of it as a complete guide that tells everyone involved in the project exactly what we are building.

The purpose of this SRS is to:
- Provide a detailed specification of the Online Doctor Appointment System software requirements
- To make sure everyone understands the project the same way
- To help programmers, doctors, and managers know what to expect
- Ensure all parties have a clear understanding of what the system will accomplish

1.2 Product Scope

What is our software called and what does it do:
Our software is called "Online Doctor Appointment System." It's a website that helps patients book appointments with doctors online, just like booking a movie ticket or ordering food online, but for healthcare.

What our system WILL do:
- Let patients create accounts with their health information
- Let doctors create profiles showing their specialties and when they're available
- Help patients search for doctors by their medical specialty (like heart doctor, skin doctor, etc.)
- Allow patients to book appointments during doctors' available time slots
- Let users reschedule or cancel appointments when needed
- Keep records of all appointments and medical history
- Provide a special admin area where managers can see how the system is being used

What our system will NOT do:
- No video calling , instant messaging between patients and doctors (we decided not to include this)
- Won't connect to hospital computer systems (maybe in the future)
- Won't give medical advice or diagnose diseases (only doctors do that)
- Won't replace emergency medical services

Objectives:
- Digitize Healthcare Scheduling: Replace traditional phone-based appointment booking with efficient, user-friendly online scheduling system Optimize Healthcare Resource
- Utilization: Maximize doctor availability usage and reduce appointment no-shows through better scheduling management
- Enhance Patient-Provider Communication: Facilitate seamless information exchange through comprehensive digital profiles and appointment management tools

Relevant Benefits:
- Enhanced Healthcare Accessibility: Patients can book appointments 24/7 from anywhere, eliminating geographical and time barriers to healthcare access
- Operational Efficiency: Automated scheduling reduces administrative burden for healthcare providers while optimizing appointment slot utilization

- Improved Care Coordination: Centralized patient medical records and appointment history enable better continuity of care and informed medical decisions

1.3 Definitions, Acronyms, and Abbreviations

Here are the important terms used in this document, explained in simple language:

DEFINITIONS:

Admin Portal: A special part of our system where managers manage users, monitor system activity, and analyze usage patterns.
Appointment: A scheduled meeting between a patient and doctor at a specific date and time.
Healthcare Professional: A licensed doctor who can provide medical services through our system.
Patient: A person who wants to see a doctor and uses our system to book appointments.
User Profile: An account that contains personal information (different for patients, doctors, and admins).
System Log: Automatic records of what users do in the system for monitoring purposes.

ACRONYMS AND ABBREVIATIONS:

API - Application Programming Interface
HTTP - Hypertext Transfer Protocol
HTTPS - Hypertext Transfer Protocol Secure
IEEE - Institute of Electrical and Electronics Engineers
JSON - JavaScript Object Notation
JWT - JSON Web Token
OTP - One Time Password
SRS - Software Requirements Specification
W3C - World Wide Web Consortium

1.4 References

This document is based on several other documents and standards:
Industry Standards and Guidelines:

1. IEEE Standard for Software Requirements Specifications
Title: "IEEE Recommended Practice for Software Requirements Specifications".
Report Number: IEEE Std 830-1998.
Publishing Organization: Institute of Electrical and Electronics Engineers (IEEE).
Source: https://ieeexplore.ieee.org/document/720574
Date of access: 24-08-2025.

2. Web Development Standards
Title: "W3C Web Content Accessibility Guidelines (WCAG) 2.1"
Publishing Organization: World Wide Web Consortium (W3C)
Source: https://www.w3.org/WAI/WCAG21/
Date of access: 24-08-2025.

3. Reactjs documentation
Title: React — Learn
Publishing Organization: Meta Platforms, Inc.
Source: https://react.dev/learn
Date of access: 24-08-2025.

1.5 Overview

a) Description of SRS Content:
This document gives a complete description of our Online Doctor Appointment System. It starts with general concepts and then gets more specific about technical details, so everyone can understand it at the right level.

The rest of this document has these main parts:
Section 2 - Overall Description: A general overview of our system, including how it works, who uses it, what environment it runs in, and what limitations we have.
Section 3 - Specific Requirements: Detailed description of what each part of the system must do, including:
- External interface requirements explaining how our system connects with users, hardware, other software, and networks
- Functional requirements describing what each feature must accomplish
- Performance requirements covering system speed and efficiency standards
- Database requirements for data storage and management
- Design constraints including technology standards and limitations
- Software system attributes covering reliability, security, and quality aspects

b) SRS Organization and Reading Sequence:
Recommended Reading Sequence by Audience:

For Students and Academic Reviewers:
- Read the entire document from beginning to end
- Use the reference and term clarification

2. Overall Description

This section provides an overview of the Online Doctor Appointment System, including its main functions, users, and operating environment.

2.1 Product Perspective

The Online Doctor Appointment System is a standalone web application that connects patients with healthcare professionals for appointment scheduling.

System Components:
- Web-based user interface for patients, doctors, and administrators
- Application server for processing requests
- MongoDB database for data storage
- Admin management portal

System Interfaces:
- User Interface: Web browsers (Chrome, Firefox, Safari, Edge)
- Software Interface: MongoDB database
- Communication Interface: HTTPS for secure web communication

2.2 Product Functions

Main system functions include:
1. User Management: Account creation, login, and profile management for patients and doctors
2. Appointment Booking: Patients can search for doctors and book available time slots
3. Schedule Management: Doctors can set availability and manage their appointment calendar
4. Appointment Management: Users can view, cancel appointments
5. Administrative Tools: User management, system monitoring, and reporting
6. Medical Records: Secure storage and retrieval of patient information

2.3 User Characteristics

Three main user types:
1. Patients: General public who need medical appointments
2. Doctors: Healthcare professionals who manage their schedules and patient appointments
3. Administrators: Who manage the system, user accounts, and generate reports

2.4 Constraints

C001 Technical: Browser compatibility, internet dependency, mobile responsiveness
C002 Security: Data encryption, access control, session management
C003 Operational: 24/7 availability, performance requirements (500+ users), maintenance windows.

2.5 Assumptions and Dependencies

Assumptions:
- Users have modern web browsers and internet access
- Healthcare professionals maintain valid licenses

Dependencies:
- Web hosting services for system availability
- Internet infrastructure stability
- Database system reliability

3. Specific Requirements

This section describes all software requirements in detail. Every requirement listed here can be tested and verified by users or testers.

3.1 External Interface Requirements

3.1.1 User Interface Requirements

IR-001: Patient Interface:
- Login/Registration screen with email and password fields
- Dashboard showing upcoming appointments and quick booking options
- Doctor search page with filters for specialty and availability
- Appointment booking with date/time selection
- Profile management page for personal and medical information
- Appointment history page showing past and upcoming bookings

IR-002: Doctor Interface:
- Professional login screen with credential verification
- Dashboard showing daily schedule and patient appointments
- Schedule management page for setting availability
- Patient information view (limited to scheduled patients only)
- Profile management for professional credentials and specialties

IR-003: Administrator Interface:
- Secure admin login with authentication
- User management dashboard for patients and doctors
- System monitoring page showing usage statistics

3.1.2 Hardware Interface Requirements

IR-04: system requirements
- Work on any device with minimum 4GB RAM and internet connection
- Display properly on screen resolutions from 320px to 1920px wide
- Function on Windows, macOS, Linux operating systems

3.1.3 Software Interface Requirements

IR-005: Web Browser Interface:
- Chrome 90+, Firefox 88+ , Edge 90+ for full system functionality

IR-006: Operating System Interface:
- Windows 10+, macOS 10.14+ and Linux for desktop access

3.2 Functional Requirements

FR-001 Authentication
User identity verification and session management with enhanced security measures including multi-factor authentication and device restrictions.

FR-1.1 Patient Registration with Security Enhancement
Input: Full name, email address, phone number, date of birth, secure password (8+ characters with numbers and special characters)
Output: Patient account created, email OTP sent for verification, account activation confirmation

FR-1.2 Doctor Registration with Credential Verification
Input: Specialization, biography, photo, phone number, consultation hours, secure password

Output: Doctor account created pending admin approval

FR-1.3 Multi-Factor Authentication Login
Input: Email, password, email OTP for verification
Output: Authenticated session token, login timestamp recorded, device registration

FR-1.4 Single Device Login Enforcement
Input: User login credentials, device identifier
Output: Active session on new device, automatic logout from previous device, session conflict notification

FR-1.5 Last Login/Logout Information Display
Input: User authentication request
Output: Display of last login timestamp, last logout timestamp, login location/device info

FR-1.6 Password Reset with OTP (One-time Only)
Input: Email address for password reset request
Output: OTP sent to email, password reset token (single use), password reset confirmation

FR-002 Authorization Level
Role-based access control ensuring appropriate permissions for patients, doctors, and administrators.

FR-2.1 Patient Access Control
Input: Patient authentication token, requested resource
Output: Access granted to patient-specific features (search doctors, book appointments, view own medical history)

FR-2.2 Doctor Access Control
Input: Doctor authentication token, requested resource
Output: Access granted to doctor-specific features (schedule management, patient appointment details, medical record updates)

FR-2.3 Administrator Access Control
Input: Admin authentication token, requested resource
Output: Access granted to admin-specific features (user management, system monitoring, doctor approval)

FR-003 Data Processing
Core business logic for appointment management, user profile handling, and medical record processing.

FR-3.1 Doctor Search and Filtering
Input: Search criteria (specialty, name, experience, availability)
Output: Filtered list of doctors with profiles, availability status, ratings

FR-3.2 Appointment Booking Processing
Input: Patient ID, doctor ID, selected time slot, appointment reason
Output: Appointment created with pending status, confirmation notification, calendar update

FR-3.3 Schedule Management Processing
Input: Doctor ID, weekly availability pattern, appointment duration settings

Output: Updated doctor schedule, available time slots, calendar synchronization

FR-3.4 Patient Medical History Management
Input: Patient ID, medical history updates, emergency contact information
Output: Updated patient profile, medical record timestamp, data encryption confirmation

FR-004 Session Management
Session handling with timeout controls and security monitoring.

FR-4.1 Session Timeout Implementation
Input: User activity timestamp, session duration settings (2 hours inactivity)
Output: Session expiry warning, automatic logout, session cleanup
FR-4.2 Active Session Monitoring
Input: User session token, activity tracking
Output: Session status, activity log, concurrent session detection

FR-005 Transaction Handling
Secure processing of appointment bookings, cancellations, and status updates.

FR-5.1 Appointment Booking Transaction
Input: Appointment details, confirmation data
Output: Transaction confirmation, appointment confirmation, notification dispatch

FR-5.2 Appointment Status Update Transaction
Input: Appointment ID, status change (completed, cancelled, no-show), doctor notes
Output: Updated appointment status, notification to patient, medical record update

FR-006 Error Handling and Recovery
Comprehensive error management and system recovery mechanisms.

FR-6.1 Authentication Error Handling
Input: Failed login attempts, invalid credentials, expired sessions
Output: Error messages, account lockout after multiple failures, security alerts

FR-6.2 System Error Recovery
Input: System failures, database connection issues, service interruptions
Output: Error logging, automatic retry mechanisms, user-friendly error messages, system recovery actions

FR-6.3 Data Validation and Error Prevention
Input: User input data, form submissions, API requests
Output: Validation results, sanitized data, error messages for invalid inputs

FR-007 Administrative Functions
Administrative management including user account control, system monitoring, and credential verification.

FR-7.1 Admin Authentication with Activity Logging
Input: Admin credentials, login request
Output: Secure admin session, detailed activity logs, admin access confirmation

FR-7.2 User Account Management
Input: User account details, activation/deactivation requests, password reset requests
Output: User account status updates, account activation/deactivation confirmation, password reset completion

FR-7.3 Doctor Credential Verification and Approval
Input: Doctor registration data, credential documents
Output: Doctor account approval/rejection, admin approval notification

FR-7.4 System Monitoring and User Activity Tracking
Input: User login activities, failed login attempts, system performance metrics
Output: Login activity reports, failed attempt tracking, system performance monitoring data

FR-008 Patient Appointment Management
Comprehensive appointment viewing and management functionality for patients.

FR-8.1 Patient Appointment History View
Input: Patient ID, date range filters
Output: Complete appointment history with doctor names, dates, and appointment status

FR-8.2 Upcoming Appointment Management
Input: Patient ID, appointment filters
Output: List of upcoming appointments with doctor details and appointment times

FR-009 Doctor Patient Management
Doctor access to patient information and appointment management capabilities.

FR-9.1 Doctor Appointment Schedule View
Input: Doctor ID, date range, appointment filters
Output: Complete appointment schedule with patient information and time slots

FR-9.2 Patient Information Access (Limited)
Input: Doctor ID, scheduled appointment ID
Output: Basic patient contact details and relevant medical history for scheduled appointments only

FR-9.3 Appointment Status Management
Input: Appointment ID, status change (completed, no-show, cancelled), doctor notes
Output: Updated appointment status, patient notification, appointment record update

3.3 Performance Requirements

NFR-001: Response Time
- User login shall complete within 3 seconds
- Page loading shall complete within 5 seconds
- Database queries shall return results within 2 seconds

NFR-002: Data Capacity
- System shall store maximum capacity of user profiles set by admin
- System shall handle 1,000 appointments per day

3.4 Database Requirements

DR-001: User Data Storage
The system shall store:
- Patient profiles (personal, medical, contact information)
- Doctor profiles (credentials, specialties, schedule preferences)
- Administrator accounts (login credentials, access levels)

DR-002: Appointment Data
The system shall maintain:
- Appointment records (date, time, patient, doctor, status)
- Schedule availability for all doctors
- Cancellation and rescheduling logs

DR-003: Data Integrity
The system shall:
- Prevent duplicate appointments for the same time slot.
- Validate all input data before database storage
- Maintain referential integrity between related records

3.5 Design Constraints

Technology Standards
- Frontend development using React.js and TypeScript
- Backend development using Node.js and Express.js
- MongoDB database for data storage
- RESTful API architecture for client-server communication

Security Standards
- All passwords must be encrypted using bcrypt hashing.
- HTTPS protocol required for all communications.
- JWT tokens for session management.

Browser Compatibility
- Support for Chrome 90+, Firefox 88+, Edge 90+.
- No plugins or special software installation required.

3.6 Software System Attributes

3.6.1 Security Requirements

SR–001: Authentication:
- Password complexity requirements (minimum 8 characters, uppercase, lowercase, numbers, special characters).
- Account lockout after 5 failed login attempts.
- Session timeout after 2 hours of inactivity.

SR-002: Data Protection:
- All sensitive data encrypted using encryption.
- Medical information accessible only to authorized users.

- Audit logs for all data access and modifications.

SR-003: Access Control:
- Role-based access control for different user types.
- Patients can only access their own information.
- Doctors can only view information for their scheduled patients.
- Administrators have limited access based on assigned permissions.

3.6.2 Maintainability Requirements
- Modular code structure for easy updates and maintenance.
- Version control for all code changes.

Appendix A

Block Diagram: