Business Requirements Document (BRD)

Project: Hospital Appointment Management System

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Course: Software Engineering

1. Project Overview

1.1 Project Purpose

The purpose of the Hospital Appointment Management System (HAMS) is to modernize and optimize the process of booking, managing, and tracking medical appointments within a hospital environment. The system provides a centralized digital platform for patients, doctors, and administrative staff to coordinate schedules efficiently. By automating manual operations and enabling secure access to appointment data, the system seeks to improve healthcare service delivery, reduce administrative workload, and enhance patient satisfaction.

1.2 Project Objectives

• Facilitate seamless appointment scheduling, modification, and cancellation for patients.

• Provide doctors and staff with an efficient system for managing availability and patient appointments.

• Reduce administrative delays and scheduling conflicts through automation.

• Enhance communication through automatic notifications and reminders.

• Ensure the confidentiality and integrity of patient information in compliance with data protection regulations .

1.3 Business Goals

• Improved Patient Accessibility: Offer an intuitive platform where patients can book appointments anytime.

• Operational Efficiency: Minimize manual intervention by automating scheduling, reminders, and reporting.

• Data Accuracy and Transparency: Centralize appointment and availability information to avoid duplication or conflicts.

• Enhanced Communication: Provide real-time notifications to patients and practitioners regarding changes or updates.

1.4 Scope

• User Authentication and Role Management: Secure registration and access control for patients, doctors, and administrative staff.

• Availability Management: Management of practitioner schedules, recurring time slots, and exceptions.

• Appointment Scheduling: Creation, modification, and cancellation of appointments with real-time availability validation.

• Notification System: Automated communication of confirmations, reminders, and cancellations via email/SMS.

• Administrative Dashboard: Tools for manual scheduling, reporting, and user management.

2. Stakeholder Analysis

2.1 Key Stakeholders

• Hospital Management: Oversees system deployment, monitors performance, and ensures compliance with institutional policies.

• Doctors and Practitioners: Manage their own schedules and access patient appointment information.

• Administrative Staff: Handle manual bookings, resolve scheduling issues, and generate reports.

• Patients: Utilize the web portal to search for doctors, book appointments, and receive notifications.

• IT and Support Team: Maintain the platform, ensure uptime, and manage data security.

2.2 Stakeholder Needs

• Hospital Management: Requires accurate analytics and dashboards for operational decisions.

• Doctors and Practitioners: Need a user-friendly interface to manage appointments efficiently.

• Administrative Staff: Expect automation of repetitive tasks to reduce workload and human error.

• Patients: Desire an intuitive and reliable portal for booking and managing appointments.

• IT Team: Needs clear documentation, stable architecture, and secure infrastructure.

3. Business Requirements

3.1 Functional Business Requirements

1. User Authentication and Access Control: The system must support registration, login, and password recovery . Authentication shall use encrypted credentials and token-based sessions.
2. Availability Management: Practitioners must be able to define recurring schedules, specify working hours, and set exceptions . The system should prevent overlapping time slots.
3. Appointment Scheduling: Patients should be able to search for available doctors by specialty, location, or date. Appointments can be created, modified, or canceled subject to hospital policy . The system must check availability before confirming any booking.
4. Notification Management: Automatic notifications (confirmation, reminders, cancellations) shall be sent via email or sms. Reminders should be configurable .
5. Administrative Dashboard: Administrative staff must have access to view all appointments and export reports. The dashboard should support filtering by doctor, department, or date range.

3.2 Non-Functional Business Requirements

1. Usability: The system must provide a clear and intuitive interface accessible on both desktop and mobile devices.
2. Performance: Average system response time should be below 300 milliseconds under normal load and support at least 500 concurrent users.
3. Scalability: The system must allow the addition of new modules without major redesign.
4. Security: The system must enforce HTTPS communication and store sensitive data with encryption. Compliance with GDPR and hospital data protection policies is mandatory.
5. Availability: The system should maintain a minimum uptime of 98%.

3.3 Compliance Requirements

• Must comply with GDPR for data protection and privacy.

• Must use secure authentication standards (OAuth2/JWT).

• The system must comply with healthcare standards such as HL7 for data exchange and HIPAA/GDPR for data privacy

4. Functional Requirements Mapping

4.1 Mapping Business Requirements to Functional Requirements

• User Authentication and Access Control is linked to the SDD Section 5.1.

• Availability Management is linked to the SDD Section 5.2.

• Appointment Scheduling is linked to the SDD Section 5.3.

• Notification Management is linked to the SDD Section 5.4.

• Administrative Dashboard is linked to the SDD Section 5.3..

5. Business Process Flow

5.1 Appointment Booking Process

1. Process: The patient logs into the system, selects a doctor or medical specialty, views available time slots, and books an appointment.

2. Inputs: Patient login credentials, selected doctor or specialty, desired appointment date and time.

3. Outputs: Confirmed appointment record in the system, with a confirmation notification sent to both patient and doctor.

5.2 Appointment Modification and Cancellation Process

1. Process: The patient or administrative staff modifies or cancels an existing appointment, subject to hospital policies (e.g., cancellation must occur at least 24 hours in advance).

2. Inputs: Appointment ID, modification or cancellation request, updated details (if applicable).

3. Outputs: Updated or canceled appointment record and corresponding notification to the patient and doctor.

5.3 Practitioner Availability Management Process

1. Process: The doctor or administrative staff defines available working hours, recurring schedules, and exceptions such as vacations or public holidays.

2. Inputs:Practitioner ID, time slots, recurrence rules, and exception periods.

3. Outputs: Updated availability data stored in the system and visible to patients for appointment selection.

5.4 Notification and Reminder Process

1. Process: The system automatically sends notifications for appointment confirmations, cancellations, and reminders.

2. Inputs: Appointment data, communication preferences, patient contact details.

3. Outputs: Emails or SMS messages confirming or reminding patients of their appointments.

6. Risks and Assumptions

6.1 Risks:

• Data Privacy Risk: Unauthorized access or misuse of patient information.

• System Downtime: Interruptions could delay or cancel appointments.

• User Adoption Risk: Staff or patients may resist transitioning from manual systems.

6.2 Assumptions:

• All hospital staff and practitioners will undergo training before deployment.

• The hospital's IT infrastructure can support the system's deployment and scalability.

• Patients have access to the internet and valid contact information for notifications.

7. Implementation Strategy

1. Phase 1: Develop core modules — Authentication, Appointment Scheduling, and Availability Management.
2. Phase 2: Add Notifications and Administrative Dashboard.
3. Phase 3: Integrate monitoring, reporting, and multilingual support.

Training and Support: Conduct training sessions, provide manuals, and maintain a helpdesk.

8. Success Criteria

• Patient Satisfaction: At least 85% of patients report satisfaction with the booking process.

• Operational Efficiency: Reduction of manual scheduling time by at least 50%.

- System Reliability: Maintain uptime above 98%.
- Compliance: Full adherence to GDPR and hospital IT policies.