Software Requirement Specification

For

Healthcare Management System

Version 1.0 approved

Prepared by: Anamika Patel

HCL Training

Date: 15/01/2026

Submitted in partial fulfillment

of the requirements of

Software Engineering (Agile Methodology)

TABLE OF CONTENTS

List Of Figures

LIST OF TABLES

1. Abstract

A **Healthcare Management System (HMS)** is a web-based application designed to automate and streamline hospital and clinical operations such as patient registration, appointment scheduling, medical records management, doctor consultation, billing, and pharmacy services. In today's digital healthcare environment, hospitals and clinics require fast, secure, and efficient systems to manage large volumes of patient data while ensuring quality healthcare services. This project focuses on the design and development of a **Healthcare Management System using Agile methodology**, which emphasizes **flexibility, iterative development, continuous feedback, and rapid delivery**.

The proposed system provides a centralized platform where patients, doctors, and hospital administrators can interact digitally. Patients can register online, book appointments, view medical reports, and manage prescriptions. Doctors can access patient records, update diagnosis details, and manage treatment plans. Administrators can manage staff, appointments, billing, and hospital resources efficiently.

Traditional healthcare systems rely heavily on paper-based records, manual appointment scheduling, and physical documentation. These methods are time-consuming, prone to errors, and difficult to manage. Manual record keeping can lead to **data loss, duplication, misdiagnosis risks, delayed treatment, and inefficient hospital operations**. The proposed Healthcare Management System overcomes these challenges by automating healthcare workflows and providing real-time access to patient information.

The system includes essential modules such as **patient registration, appointment management, doctor consultation, electronic medical records (EMR), billing, and pharmacy management**. It ensures data security using authentication and role-based access control. Patients receive instant appointment confirmations and reminders, while doctors get access to complete patient history for accurate diagnosis.

The project follows the **Agile Software Development Model**, where development is divided into multiple **sprints**. Each sprint delivers a working module such as patient management, appointment scheduling, or billing. Agile practices such as **sprint planning, daily stand-up meetings, sprint reviews, and retrospectives** ensure continuous improvement, faster development, and high software quality.

The Healthcare Management System is designed using a **modular and scalable architecture**, allowing future enhancements such as telemedicine, AI-based diagnosis, wearable health data integration, and mobile app support. The system improves hospital efficiency, enhances patient experience, and ensures accurate healthcare delivery.

Overall, this project demonstrates how a **modern Healthcare Management System combined with Agile methodology** can significantly improve healthcare services, reduce operational workload, enhance patient care, and provide a reliable digital healthcare solution for hospitals and clinics.

2. Introduction

2.1 Introduction

The healthcare industry is rapidly transforming with the adoption of digital technologies. Hospitals and clinics need efficient systems to manage patient records, appointments, billing, and treatment processes. A Healthcare Management System provides a digital solution for managing healthcare services efficiently.

This project aims to develop a modern Healthcare Management System that automates hospital operations and improves patient care. The system is developed using Agile methodology to ensure flexibility, fast development, and continuous enhancement.

2.2. Problem Identification

Traditional healthcare systems rely on paper-based records and manual appointment scheduling. This leads to long waiting times, misplaced records, data duplication, and inefficiency in hospital operations. Doctors often face difficulty accessing complete patient history, which may affect diagnosis and treatment.

Hospitals also struggle with managing billing, pharmacy, and staff records manually. Patients face difficulties in booking appointments, accessing reports, and tracking treatment history. These problems highlight the need for a fully automated digital healthcare system.

2.3. Need of the Project

With the increasing number of patients and growing healthcare demands, hospitals require an efficient and reliable system to manage healthcare operations digitally. A Healthcare Management System provides faster access to patient data, quick appointment scheduling, and better coordination between departments.

The system improves patient experience by reducing waiting time and providing easy access to medical records. It also helps hospitals reduce paperwork, minimize errors, and improve healthcare service quality.

2.4 .Project Scheduling

The Healthcare Management System is developed using the Agile Software Development Methodology. In Agile, the entire project is divided into small development cycles called **sprints**. Each sprint focuses on building and delivering a specific functional module of the system. This approach ensures faster development, continuous feedback, and high-quality output.

The Agile model allows the development team to adapt easily to changing healthcare requirements and improve system features based on user feedback from doctors, patients, and hospital administrators. Regular sprint reviews and testing ensure that each module works correctly before moving to the next phase.

The following table shows the sprint-wise project schedule:

Sprint No.	Duration	Sprint Goal	Activities	Deliverables
Sprint 1	Week 1	Requirement Analysis	Requirement gathering, user stories, backlog creation	Requirement document
Sprint 2	Week 2	System Design	UI design, database design, architecture planning	Design diagrams
Sprint 3	Week 3	Core Module Development	Patient registration, doctor module	Working modules
Sprint 4	Week 4	Appointment & EMR	Appointment scheduling, medical records	Integrated features
Sprint 5	Week 5	Billing & Pharmacy	Billing system, pharmacy management	Functional system
Sprint 6	Week 6	Testing & Deployment	Testing, bug fixing, deployment	Live system

2.5 Objectives

The main objective of this project is to design and develop a modern Healthcare Management System that automates hospital operations and improves patient care through digital technology.

The specific objectives of the project are as follows:

- To develop a centralized digital platform for managing healthcare services
- To automate patient registration and appointment scheduling
- To maintain electronic medical records (EMR) for accurate diagnosis and treatment
- To improve coordination between doctors, patients, and hospital staff
- To reduce paperwork and manual record keeping
- To enhance patient experience by reducing waiting time
- To ensure data security and privacy of medical records
- To provide real-time access to patient information for doctors
- To improve hospital efficiency and service quality
- To implement Agile methodology for continuous development and improvement

3. Software Requirement Specification

The Software Requirement Specification defines the functional and non-functional requirements of the Healthcare Management System. It describes the purpose, scope, hardware requirements, software requirements, tools used, and the software development process model followed for building the system.

This section provides a clear understanding of system functionality, performance expectations, and technical requirements.

3.1 Purpose

The purpose of this project is to design and develop a secure, reliable, and user-friendly Healthcare Management System that automates hospital and clinical operations. The system aims to provide digital healthcare services such as patient registration, appointment scheduling, doctor consultation, electronic medical records, billing, and pharmacy management through a single platform.

The system reduces dependency on paper-based records and manual processes, thereby minimizing errors, improving efficiency, and enhancing patient care. It enables hospitals to deliver faster services, maintain accurate medical records, and improve overall healthcare quality.

3.2 Scope

The scope of this project includes the development of a web-based Healthcare Management System that supports the following features:

- Patient registration and profile management
- Appointment booking and scheduling
- Doctor consultation management
- Electronic Medical Records (EMR)
- Billing and payment management
- Pharmacy and prescription management
- Report generation and record maintenance

The system allows patients to access their medical records online and book appointments easily. Doctors can view patient history, update diagnosis, and prescribe medicines digitally. Hospital administrators can manage staff, billing, and hospital resources efficiently.

The system is designed to be scalable, allowing future enhancements such as telemedicine services, AI-based diagnosis, wearable health data integration, and mobile application support.

3.3 Hardware Requirements

The following hardware components are required for the development and execution of the Healthcare Management System:

Component	Specification	Description
Processor	Intel Core i3 or above	Required for smooth application execution

Component	Specification	Description
RAM	Minimum 4 GB (8 GB recommended)	Ensures efficient system performance
Hard Disk	Minimum 250 GB free space	Stores application and database
System Type	64-bit Architecture	Supports modern operating systems
Input Devices	Keyboard, Mouse	User interaction
Output Devices	Monitor, Printer (optional)	Display and reports
Internet Connection	Required	Online healthcare operations

3.4 Software Requirements

The following software components are required for the development and execution of the Healthcare Management System:

Software Component	Specification	Description
Operating System	Windows 10 / Linux / macOS	Platform for application
Programming Language	Java / Python	Backend development
Frontend Technologies	HTML, CSS, JavaScript	User interface
Database	MySQL	Data storage
Server	Apache Tomcat	Web application server
IDE	Visual Studio Code / Eclipse	Development environment
Version Control	Git & GitHub	Code management
Testing Tool	Selenium	Automated testing
Documentation Tool	MS Word / Google Docs	Project documentation

3.5 Tools

The following tools are used during development, testing, and documentation of the Healthcare Management System:

Tool	Purpose
Visual Studio Code / Eclipse	Application development
MySQL Workbench	Database design
Apache Tomcat	Application deployment
Git & GitHub	Version control
Selenium	Automated testing
Postman	API testing
Figma	UI/UX design
Draw.io	System diagrams
Google Chrome / Firefox	Browser testing

3.6 Software Process Model

The Agile Software Process Model is used for the development of the Healthcare Management System. Agile is an iterative and incremental development approach that focuses on flexibility, continuous feedback, and rapid delivery of working software.

The project is divided into multiple development cycles called **sprints**. Each sprint delivers a functional healthcare module such as patient management, appointment scheduling, or billing. Requirements are collected in the form of user stories and maintained in a product backlog.

Agile practices such as sprint planning, daily stand-up meetings, sprint reviews, and retrospectives are followed throughout the development lifecycle. This approach ensures high software quality, faster development, and continuous improvement of the system.

4 System Design

System design defines the overall architecture of the Healthcare Management System and explains how different modules interact with each other. It describes the database structure, data flow, and user interactions within the system. The system is designed using a modular approach to ensure scalability, security, and ease of maintenance.

The major modules of the system include:

- Patient Management
- Doctor Management
- Appointment Scheduling
- Electronic Medical Records (EMR)
- Billing and Pharmacy

The database stores patient details, doctor information, appointment schedules, and medical records. Secure authentication and role-based access control ensure data privacy and system security.

4.1 Data Dictionary

The Data Dictionary defines the main data elements used in the Healthcare Management System. It describes the structure of the core tables required for managing patients, doctors, and appointments.

Patient Table

Field Name	Data Type	Description
patient_id	INT (PK)	Unique patient ID
name	VARCHAR(100)	Patient name
age	INT	Patient age
gender	VARCHAR(10)	Patient gender
phone	VARCHAR(15)	Contact number

Doctor Table

Field Name	Data Type	Description
doctor_id	INT (PK)	Unique doctor ID
name	VARCHAR(100)	Doctor name
specialization	VARCHAR(100)	Medical specialization
phone	VARCHAR(15)	Contact number

Appointment Table

Field Name	Data Type	Description
appointment_id	INT (PK)	Appointment ID
patient_id	INT (FK)	Reference to Patient table
doctor_id	INT (FK)	Reference to Doctor table
appointment_date	DATE	Appointment date
status	VARCHAR(20)	Appointment status

4.2 ER Diagram

The ER Diagram represents the relationship between Patient, Doctor, and Appointment entities. A patient can book multiple appointments, and a doctor can attend multiple patients.

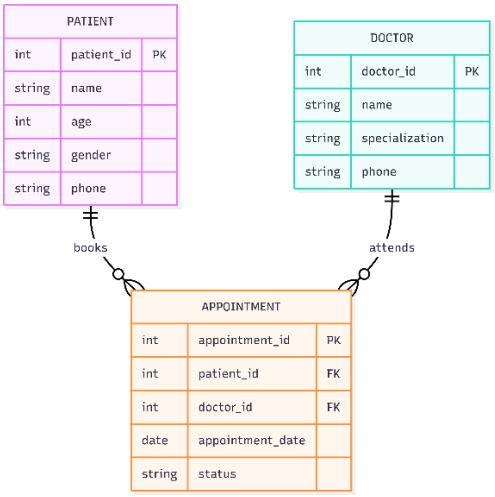

Fig 4.2 ER DIAGRAM

4.3 Data Flow Diagram (DFD)

The Data Flow Diagram shows how data flows between patients, doctors, system processes, and the healthcare database. It illustrates appointment booking, medical record management, and report generation.

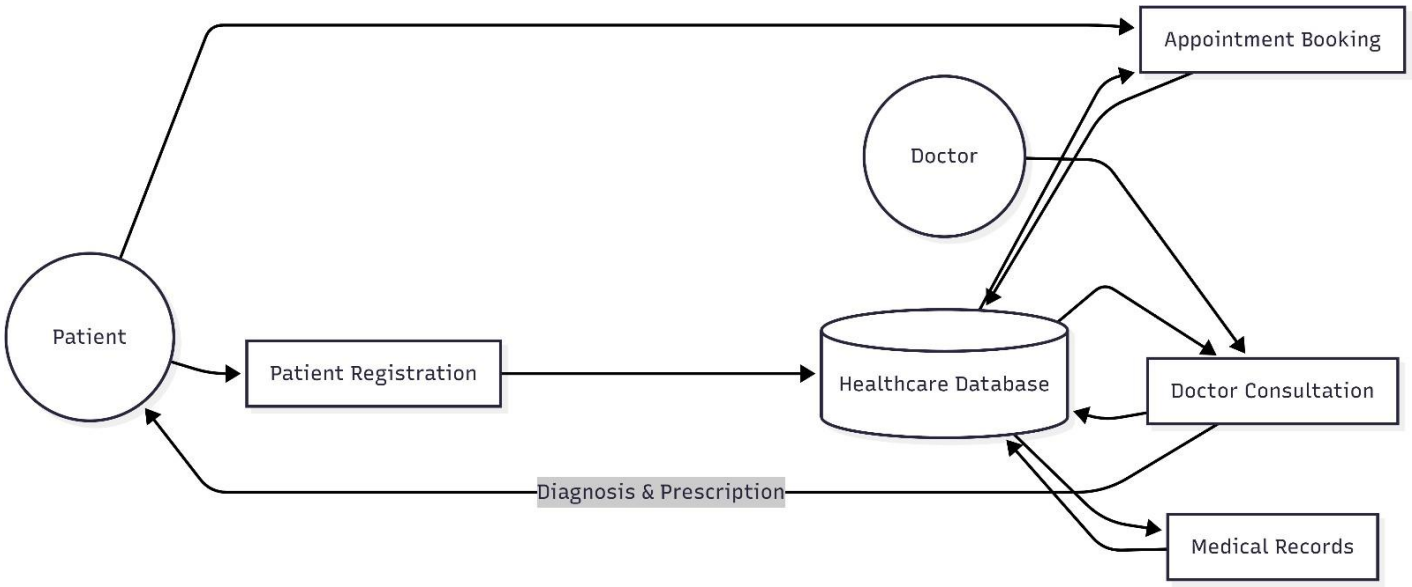

FIG 4.3 DATA FLOW DIAGRAM

4.4 Use Case Diagram

The Use Case Diagram represents the interaction between users and the Healthcare Management System. It shows how patients and doctors perform healthcare operations digitally.

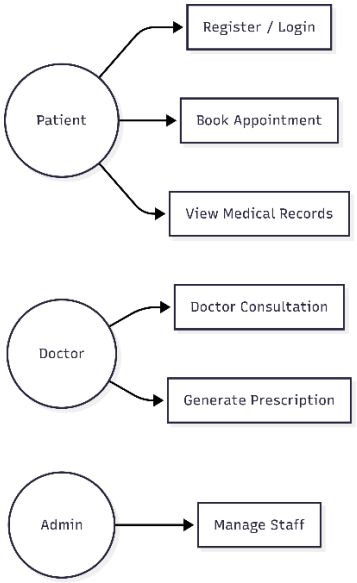

FIG 4.4 USE CASE DIAGRAM

5 Implementation

The implementation phase focuses on converting the system design into a fully functional Healthcare Management System. The application is developed using modern web technologies for the frontend and a secure backend for managing healthcare operations and database transactions. The system follows a modular architecture to ensure easy maintenance, scalability, and high security.

The Healthcare Management System is implemented with separate modules for patient management, doctor management, appointment scheduling, electronic medical records (EMR), billing, and pharmacy. Each module is developed independently and later integrated into the main system. This modular approach improves system reliability and allows easy future enhancement.

The frontend of the system is designed using HTML, CSS, and JavaScript to provide a responsive and user-friendly interface. The backend is developed using Java/Python to handle business logic such as user authentication, appointment processing, medical record management, and billing operations. The database is implemented using MySQL to store patient information, doctor details, appointment schedules, and treatment records securely.

Security is a major focus during implementation. User authentication is handled using encrypted passwords and role-based access control. Medical data privacy is ensured by restricting access to authorized users only. All sensitive operations such as updating medical records and billing transactions are validated before execution.

Exception handling and input validation mechanisms are implemented to prevent system crashes and incorrect data entry. Each appointment booking and medical update generates instant confirmation messages. The system maintains a complete patient history for reference.

During development, each module is tested individually and then integrated with other modules to ensure smooth functioning. The final system is deployed on a web server, making it accessible to hospitals and clinics through internet-enabled devices.

Overall, the implementation ensures that the Healthcare Management System is secure, reliable, efficient, and capable of delivering seamless digital healthcare services.

6 Testing

Testing is carried out to ensure that the Healthcare Management System works correctly and meets all functional, performance, and security requirements. The main objective of testing is to identify errors, verify system behavior, and ensure that patient data, appointment scheduling, and medical records are processed accurately and securely.

Different modules such as patient registration, appointment booking, doctor consultation, medical records, and billing are tested using valid and invalid inputs. Functional testing ensures that each module performs its intended task correctly, while security testing ensures that patient data is protected from unauthorized access. Testing improves system reliability, accuracy, and overall performance before deployment.

6.1 Test Data

Test data is used to validate the correctness of healthcare operations. Sample patient records, doctor details, and appointment data are entered into the system to verify database storage, retrieval, and system responses.

TEST DATA TABLE

Test Case ID	Patient Name	Doctor Name	Appointment Date	Expected Result
TC01	Rahul	Dr. Sharma	12-05-2026	Appointment booked
TC02	Anjali	Dr. Mehta	14-05-2026	Appointment booked
TC03	Karan	Dr. Verma	16-05-2026	Appointment booked
TC04	Priya	Dr. Singh	18-05-2026	Appointment booked
TC05	Amit	Dr. Gupta	20-05-2026	Appointment booked

6.2 Test Result

The test results show that all test cases were executed successfully and the system performed as expected. Patient registration was completed without errors, and appointment bookings were processed instantly. Doctor consultation records were stored correctly in the database, and medical reports were generated accurately.

The system validated user inputs properly and prevented duplicate or invalid entries. Secure authentication ensured that only authorized users could access patient records. Billing operations were performed accurately, and receipts were generated successfully. Based on the test execution, the Healthcare Management System is stable, secure, and ready for deployment.

TEST RESULT TABLE

Test Case ID	**Module**	**Test Scenario**	**Expected Result**	**Actual Result**	**Status**
TC01	Login	Login with valid credentials	Login successful	Login successful	Pass
TC02	Appointment	Book appointment	Appointment booked	Appointment booked	Pass
TC03	Records	View medical records	Records displayed	Records displayed	Pass
TC04	Billing	Generate bill	Bill generated	Bill generated	Pass
TC05	Pharmacy	Issue medicines	Medicines issued	Medicines issued	Pass

7 User Manual

The User Manual provides detailed instructions to help users operate the Healthcare Management System efficiently. The system is designed with a simple and user-friendly interface so that patients, doctors, and hospital staff can use it without technical difficulty.

The Healthcare Management System allows patients to book appointments online, view medical reports, and manage their healthcare records. Doctors can access patient history, update diagnosis, and prescribe medicines digitally. Hospital administrators can manage staff, appointments, billing, and hospital resources efficiently.

7.1 How to Use Project Guidelines

Follow the steps below to use the Healthcare Management System:

- Open the Healthcare Management System in a web browser.
- Register a new account or log in using valid credentials.
- After login, the dashboard will display available healthcare services.
- Patients can book appointments by selecting a doctor and preferred date.
- Doctors can view appointment schedules and patient records.
- Doctors update diagnosis and prescribe medicines digitally.
- Patients can view medical reports and prescriptions.
- Billing and pharmacy services can be accessed from the dashboard.
- Log out securely after completing your work.

7.2 Screen Layouts and Description

The Healthcare Management System consists of the following main screens:

- **Login/Register Screen:** Allows users to create an account and log in securely.
- **Dashboard Screen:** Displays all system modules and services.
- **Patient Registration Screen:** For registering new patients.
- **Appointment Booking Screen:** Allows patients to book appointments with doctors.
- **Doctor Consultation Screen:** For updating diagnosis and prescriptions.
- **Medical Records Screen:** Displays patient medical history.
- **Billing Screen:** Generates bills and receipts.

- **Pharmacy Screen:** Manages medicine distribution.

8 Project Applications and Limitations

8.1 Applications

The Healthcare Management System can be used in hospitals, clinics, and diagnostic centers to manage healthcare operations efficiently. It provides a digital platform for patient registration, appointment scheduling, doctor consultation, electronic medical records, billing, and pharmacy management.

The system helps healthcare providers reduce paperwork, minimize manual errors, and improve service quality. Doctors can access patient medical history instantly, leading to accurate diagnosis and better treatment planning. Patients benefit from quick appointment booking, easy access to medical reports, and faster billing services.

The platform is also useful for medical colleges and research centers for managing patient data and clinical records. It supports digital healthcare services and contributes to the modernization of the healthcare sector.

8.2 Limitations

The current version of the Healthcare Management System requires a stable internet connection to access healthcare services. Hospitals in remote areas with limited internet connectivity may face difficulty in using the system.

The system does not support telemedicine and video consultation in the current phase. Mobile application support and wearable health data integration are not included. Advanced AI-based diagnosis and predictive analytics are also not available in the present version.

The platform depends on server availability and may be affected by technical issues such as downtime or maintenance. Multi-language support is not implemented and can be added in future upgrades.

9 Conclusion and Future Enhancement

9.1 Conclusion

The Healthcare Management System project successfully delivers a secure, efficient, and user-friendly digital platform for managing hospital and clinical operations. The system automates patient registration, appointment scheduling, doctor consultation, electronic medical records, billing, and pharmacy services, thereby reducing manual workload and paperwork.

The application improves healthcare service delivery by enabling quick access to patient information, faster appointment booking, and accurate medical record management. Doctors can view complete patient history, which helps in better diagnosis and treatment planning. Patients benefit from reduced waiting time, easy access to reports, and faster billing services.

The system ensures data security and privacy through secure authentication and controlled access. Testing confirms that all modules function correctly and provide reliable output. Overall, this project demonstrates how a modern digital healthcare system can significantly improve hospital efficiency, service quality, and patient satisfaction.

9.2 Future Enhancement

The following enhancements can be implemented in future versions of the Healthcare Management System:

- Integration of telemedicine and video consultation services
- Development of mobile applications for Android and iOS
- AI-based diagnosis and health prediction system
- Integration with wearable health monitoring devices
- Multi-language support for wider accessibility
- Voice-based appointment booking and report access
- Online pharmacy ordering and home delivery
- Cloud-based deployment for scalability and reliability
- Integration with national health databases and insurance services

10 Bibliography

1. Pressman, R. S., *Software Engineering: A Practitioner's Approach*, McGraw-Hill Education
2. Sommerville, I., *Software Engineering*, Pearson Education
3. Kendall, K. E., & Kendall, J. E., *Systems Analysis and Design*, Pearson Education
4. Laudon, K. C., & Laudon, J. P., *Management Information Systems*, Pearson Education
5. Agile Alliance – Agile Methodology Guide
6. Scrum.org – Scrum Framework Documentation
7. Oracle Java Documentation – Official Website
8. MySQL Reference Manual – MySQL Official Documentation
9. W3Schools – Web Development Tutorials (HTML, CSS, JavaScript)
10. GeeksforGeeks – Programming and Database Tutorials
11. TutorialsPoint – Software Development and Database Tutorials