SOFTWARE REQUIREMENTS SPECIFICATION

Hospital Management System

Roshani Thapa
Nirjala Shrestha
Leah KC
Parash Neupane

Abstract

The Hospital Management System (HMS) is a computerized system designed to manage the day-to-day operations and administrative tasks of a hospital. This system provides a platform for efficient and effective management of patient data, medical records, appointment scheduling, and inventory control. It also includes features for managing hospital finances, billing, and insurance claims processing. The HMS ensures seamless coordination between different departments, such as laboratory, pharmacy, and radiology, and facilitates communication among doctors, nurses, and other hospital staff. With the help of this system, hospital administrators can make informed decisions based on real-time data and analytics, improving patient outcomes and optimizing resource utilization.

Acknowledgement

I would like to express my heartfelt gratitude to all those who have contributed to the successful completion of this Hospital Management System project. Firstly, I extend my sincere thanks to the hospital management and administration for providing me with the opportunity to work on this project. I also want to thank the doctors, nurses, and other medical staff who provided valuable insights and suggestions that helped shape the system. I am grateful to my colleagues who supported and encouraged me throughout the development process, as well as my family and friends who provided me with unwavering support and motivation. Lastly, I would like to acknowledge the open-source technologies and libraries that were used in building this system. Thank you all for your contributions and support towards the successful completion of this Hospital Management System project.

Table of Contents

1. Introduction

1.1 Purpose

If the SRS is written well it will serve the following purposes. SRS is the agreement documentbetween the client and the Software developer.

Feedback to the Customer-This software requirement specification assures the project management stakeholders and client that the development team has really understood the business requirements documentation properly. This also provides confidence that the teamwill develop the functionality which has been detailed.

Breaking the Requirements Down-This document is documented in such a way that it breaksthe deliverables into smaller components which makes the participants in this project to understand what is to be done clearly.

The information is organized in such a way that all the developers within the team will not only understand the boundaries within which we need to work, but also what functionality needs to be developed and in what order.

Understanding what order, the functionality will be developed in means that we, the developers will have the "big picture" view of the development. This gives us an opportunity to plan ahead which saves both project time and cost.

Facilitating other Documentation-The SRS forms the basis for a load of other important documents such as the Software Design Specification.

Product Validation-It basically helps in validating with the client that the product which is being delivered, meets what they asked for.

Which means that the product we have output is Equal to the standards of the documentation in the SRS which the client satisfied and agreed on.

Characteristics of a Software Requirement Specification

1.1.1 Accuracy

We will ensure the accuracy of the software and the data entered to the database

1.1.2 Clarity

This SRS will be clearly stating what the user wants in the software.

1.1.3 Completeness

The software requirement specification contains all the requirements stated in the business requirements documentation that the user specified.

1.1.4 Consistency

The document is consistent from beginning till the end. It helps the readers understand the requirements well.

1.1.5 Prioritizations of Requirements

The requirements will be full filled according to the order of priority and preference.

1.1.6 Verifiability

At the end of the project, the user/client will be able to verify that all that all the agreed deliverables have in fact been produced and meet the project management requirements specified.

1.1.7 Modifiability

The SRS can be modified when the development team and user feel the need.

1.1.8 Traceability

Each requirement stated in the SRS is uniquely associated to a source such as a use case or interaction document etc.

1.2 Document Conventions

The document is prepared using Microsoft Word 2019 and has used the font type 'Times New Roman'. The fixed font size that has been used to type this document is 12pt with 1.5 line spacing. It has used the bold property to set the headings of the document. All pages except the cover page are numbered, the numbers appear on the lower right-hand corner of the page. Every image and data table are numbered and referred to the in the main text

Standard IEEE template is the template used to organize the appearance of the document and its flow.

1.3 Intended Audience and Reading Suggestions

The intended audience of this document would be the client and specific employees like Manager and Receptionist, consultants and System Operators hospital, and Development Team, supervisor with the objective to refer and analyse the information. The SRS document can be used in any case regarding the requirements of the project and the solutions that have beentaken. The document would final provide a clear idea about the system that is building.

1.4 Product Scope

Currently many hospitals are using a manual system to handle the hospital process. When patients arrive, they make an appointment at the reception to consult a Doctor. These are being recorded in a file. Then again, the patients diagnosed symptoms related disease details, ward details and other necessary details are being recorded and those files are being stored in special locations. Calculation of bills and inventory are done manually.

As the current system is a file based one, management of the hospital has to put much effort on securing the files. They can be easily damaged by fire, insects and natural disasters. Also, could be misplaced by losing data and information.

Limited storage space of the files is another issue that they currently face when the management is manually done.

If we want to check a previous record of a patient or other detail. Management will be in a great problem. It’s a tough and time taking process to search for a record in a file.

Keeping files takes much time and waste much precious man hours.

We plan to overcome the above-mentioned problems through a standalone application, to manage the major functions of the Hospital System.

The hospital management system we are going to implement will be covering all basic processes done in the hospital. It would handle Employee and Salary management, Patient, Theatre and ward Management, Laboratory management, Transport Management, Pharmacy Management, OPD management and emergency management.

2. Overall Description

2.1 Product Perspective

Many hospitals follow manual procedures to keep track of its day to day activities. When scenarios such as patient information handling, employee handling, stock handling, financial analysis and report generation is taken into consideration there exists many issues with regard to efficiency, security, accuracy and reliability. Due to improperly managed details hospitals faces quite a lot of difficulties in accessing past data as well as managing present data. The manual file systems which are being used at present require storage facilities which is also another overhead. The fully functional automated hospital management system which will be developed through this project will eliminate the disadvantages caused by the manual system by improvingthe reliability, efficiency and performance. The usage of a database to store patient, employee,stock details etc. will accommodate easy access, retrieval, search and manipulation of data. Theaccess limitations provided through access privilege levels will enhance the security of thesystem. The system will facilitate concurrent access and convenient management of activities of the hospitals.

2.2 Product Functions

OPD and Consultation Management

- Recording patient details
- Issuing numbers according to doctor channeled
- Updating the record with medical prescription
- Printing bill of doctor charges

Employee and Salary Management System

- Attendance and schedule of employees
- Holiday approvals
- Salary of doctors
- Salary of employees

OT and Ward Management

- Details of surgeon
- Surgery success/failure details
- Complications of the patient, patient history and other details

- Bill calculation and reports

Vehicle and Transport Management

- Ambulances management
- Vehicle deployment handling
- Time management
- Drivers and employee details
- Billing calculations

Patient Management

- Patient details
- Patient's medical history
- Progress report
- Medicine's details

Emergency Treatment and Equipment Management

- Emergency patient Details
- Issue ECG reports
- Lab equipment stock management

Pharmacy Stock Management

- Drug stock management
- Expiry notification
- Searching
- Billing calculation

Lab Management

- Record sample collection details
- Lab resources management
- Lab report conclusion generation
- Lab equipment stock management
- Bill calculation

2.3 User Classes and Characteristics

- **Admin**

  Admin has the full access to the system which means he is able to manage any activity with regard to the system. He is the highest privileged user who can access to the system.

  Key functions

  - ✓ Manage employees, patients and equipment
  - ✓ Allocate resources
  - ✓ Administer the charges
  - ✓ Generate reports
  - ✓ Manage ambulances
  - ✓ Manage doctors
  - ✓ Manage salaries

- **Employee**

  Interacts with the systems most often to supply service to customers

  Key functions

  - ✓ Keep track of patient details
  - ✓ Keep track of test details
  - ✓ Make ambulance reservations
  - ✓ Keep track of progress of patients
  - ✓ Manage inventory
  - ✓ Maintain bill details

2.4 Operating Environment

Software requirements

- Windows 7 or above operating system
- JRE 1.8
- MySQL server

Hardware Requirements

- Core i5 processor
- 4GB Ram
- 20GB of hard disk space in terminal machines
- 1TB hard disk space in Server Machine

2.5 Design and Implementation Constraints

- System is wirelessly networked with an encryption
- System is only accessible within the hospital premises only.
- Database is password protected.
- Should use less RAM and processing power.
- Each user should have individual ID and password.
- Only administrator can access the whole system.

2.6 Project Documentation

Software Life Cycle Phase	Documentation	Intended Activities
Requirement Gathering, Analysis and Specification	● Project charter ● Project proposal ● Software Requirement and Specification (SRS) which includes ● Entity relational diagram ● Data flow diagrams ● Use case diagrams ● Use case scenarios	Includes the customer expected software features, constraints, interfaces and other attributes. Moreover, the objectives and the benefits gained through the system are clearly specified
Software Design	● Software Design Description (SDD)	Describes the logical basis of design decisions taken and how it will pave way in acquiring the requirements of the customer through the software
Implementation	● Technical Documentation	Contains information regarding the implementations of the system using the programming concepts
Software Testing	● Software Test Documentation (STD)	Includes information regarding testing procedures to validate and verify the software results. Main types of testing techniques are unit testing, integration testing, system testing and acceptance testing
Maintenance	● User Documentation	Includes manuals for the end users according to their position of access levels

2.7 User Documentation

As a part of the system itself a user documentation is provided to the customers which gives an overview of the system. It will include the full description about the product and complete orderly followed steps to install the software. The users will get the opportunity to use the system without having any trouble. The user manual will include the email addresses to contact us in need. Tasks are listed alphabetically or logically grouped often using cross referenced indexes which helps the users to know exactly what sort of information they are looking for.

2.8 Assumptions and Dependencies

- Each user must have a valid user id and password
- Server must be running for the system to function
- Users must log in to the system to access any record.
- Only the Administrator can delete records.

3. External Interface Requirements

3.1 Hardware Interfaces

Figure 3.2 1

Laptop/Desktop PC

- core i5 processor
- 4GB RAM
- 500GB HDD

Purpose of this pc is to give information when Patients ask information about doctors, medicine available lab tests etc. To perform such Action, it needs very efficient computer otherwise due to that reason patients have to wait for a long time to get what they ask for.

Display Unit (LED/LCD Monitor/TV)

This unit is for display the channel number when the patients come to see their consultants. It will avoid chaos. And also display Hospital welcome screen, video, information etc.

Figure 3.2 2

- **Laser Printer (B/W)**
  Simply this device is for printing bills and view reports.

Figure 3.2 3

- **Wi-Fi router**
  Wi-Fi router is used to for internetwork operations inside of a
  hospital and simply data transmission from pcs to sever.

Figure 3.2 4

3.2 Software Interfaces

Developing End

- JDK 1.8 - Java is fast, secure, and reliable. From laptops to datacentres, game consoles to scientific supercomputers, cell phones tothe Internet.
- NetBeans 8.1 - IDE for Java developing.
- MySQL server - Database connectivity and management
- Adobe Photoshop cs4 - Logo and other designing such as User interfaces

Client End

- OS – Windows 8.1/10 -Very user friendly and common OS
- JRE 1.8 -JAVA Runtime Environment for run Java Application and System
- MySQL server - Database connectivity

3.3 Communications Interfaces

- WIFI module - It is a computer hardware component that allows a computer to connect to a network.
- CAT 5 network cable- for high signal integrity
- TCP/IP protocol- Internet service provider to access and share information over the Internet
- Ethernet Communications Interface- Ethernet is a frame-based computer network technology for local area networks (LANs).

4. System Features

1. Login:

The user and administrator can login, logout. Once the admin or user logout from the system, they need to login again.

2. Patient Management:

This feature helps in managing the patient records, registration, admission, discharge, and transfer within the hospital. It also helps in scheduling appointments, managing patient visits, and generating reports.

3. Staff Management:

The staff management feature helps in managing the hospital staff, including doctors, nurses, technicians, and administrative personnel. It also helps in managing their schedules, work shifts, and payroll.

4. Electronic Medical Records (EMR):

This feature helps in storing and managing the medical records of patients electronically, including their diagnosis, treatments, and medications.

5. Billing and Insurance Management:

This feature helps in managing billing and insurance processes, including creating invoices, managing payments, and processing insurance claims.

6. Inventory Management:

This feature helps in managing the hospital inventory, including medical supplies, equipment, and drugs. It also helps in tracking the usage of these items and managing their stock levels.

7. Laboratory Management:

The laboratory management feature helps in managing the laboratory tests, including ordering tests, tracking the results, and managing the laboratory inventory.

8. Radiology Management:

This feature helps in managing the radiology tests, including scheduling appointments, tracking results, and managing the radiology equipment.

9. Pharmacy Management:

The pharmacy management feature helps in managing the medication dispensing process, including ordering, dispensing, and tracking medications.

10. Reporting and Analytics:

The reporting and analytics feature helps in generating reports and analyzing data related to patient care, staff productivity, financial performance, and other key metrics.

5. Other Non-functional Requirements

5.1 Performance Requirements

- Response time-The system will give responses within 1 second after checking the patient information and other information.
- Capacity-The system must support 1000 people at a time
- User interface- User interface screen will response within 5 seconds.
- Conformity –The system must conform to the Microsoft accessibility

5.2 Safety Requirements

If there is extensive damage to a wide portion of the database due to catastrophic failure, such as a disk crash, the recovery method restores a past copy of the database that was backed up to archival storage and reconstructs a more current state by reapplying or redoing theoperations of committed transactions from the backed-up log, up to the time of failure.

5.3 Security Requirements

All the administrative and data entry operators have unique logins so system can understand who is login in to system right now no intruders allowed except system administrative nobody cannot change record and valuable data.

5.4 Software Quality Attributes

- AVAILABILITY: The system shall be available all the time.
- CORRECTNESS: A bug free software which fulfil the correct requirements of the client.
- MAINTAINABILITY: The ability to maintain, modify information and fix problems of the system
- USABILITY: software can be used again and again without distortion.
- ACCESSIBILITY: Administrator and many other users can access the system but the access level is controlled for each user according to their work scope.
- ACCURACY: The reliability on the information/output. Can depend-on/be sure of the outcome.
- STABILITY: The system output won’t change time to time. Same output will be given always for a given input.

5.5 Business Rules

- Want take the responsibility of failures due to hardware malfunctioning.
- Warranty period of maintaining the software would be one year.
- Additional payments will be analysed and charged for further maintenance
- If any error occurs due to a user's improper use. Warranty will not be allocated to it.
- No money back returns for the software.
- Trust bond placement should be done before designing and coding. An advance or an Agreement.

References

[1] Lauesen, S, (2003), *Task Descriptions as Functional Requirements*, IEEE Computer Society. http://www.itu.dk/~slauesen/Papers/IEEEtasks.pdf

[2] https://www.lucidchart.com

[3] https://www.slideshare.net

[4] https://www.scribd.com/doc

[5] https://stackoverflow.com