Software Requirements Specification

for

HOSPITAL MANAGEMENT SYSTEM

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1. Introduction

1.1 Purpose

Because of the covid-19, hospitals refused to provide treatment to covid positive patients who have other unrelated ailments due to lack of supporting infrastructure. This is a very serious issue affecting patient care and causing problems that could be avoidable. Therefore, the development of a covid specific health management system that complements existing systems is the need of the hour.

1.2 Document Conventions

We are using the IEEE format for writing the SRS document. The IEEE framework is used to clearly and precisely describe each of the essential requirements (functions, performance, design constraints and quality attributes) of the software and the external interfaces.

1.3 Intended Audience and Reading Suggestions

The end-user here is the hospital. This software will benefit both the hospital staff and the patients. The staff will have a streamlined channel of segregation which reduces occupational hazards while the patients can get access to the care they need at a quicker pace.

1.4 Product Scope

Because of the covid-19, hospitals refused to provide treatment to covid positive patients who have other unrelated ailments due to lack of supporting infrastructure. Thus, the development of a covid specific health management system will allow hospitals to better manage such patients and not cause any hindrance in the treatment provided to these patients.

1.5 References

- https://www.academia.edu/7149341/HOSPITAL_MANAGEMENT_SYSTEM_A_PROJECT_REPORT_Submitted_in_Partial_Fulfillment_of_the_requirements_for_the_Award_of_the

- https://www.apollohospitals.com/

- https://www.behance.net/gallery/3431329/Hospital-Management-(HMS)-UI-Design

- https://artoftesting.com/hospitalmanagement

2. Overall Description

2.1 Product Perspective

With the outbreak of the Covid-19 pandemic, finding health care that allowed for easy and hassle-free treatment to patients who tested positive for the virus and were suffering from other ailments proved to be extremely challenging. So, we decided that it was about time that someone came up with a model which offered clear segregation of covid positive and negative patients seeking treatment in the hospital.

2.2 Product Functions

The users of a hospital management system may be generally divided into three categories:

- Hospital administration
  The hospital administration has the following functionalities:
  1. General Administration
     - Fetch Patient details,
     - Get test details and
     - Details of doctors and nurses
     - Allows registering a patient who comes to the clinic in order to obtain a Personal   Health Record provided by this person or his family member.

  2. Accounts and Billing
     - Keeps track of Finance
     - Get test details

   3. Logistics and inventory control
      - Keeps track of inventory like syringes, bandages, and various other medical items.
      - Orders them from appropriate suppliers and ensures that supply doesn't run out.

   4. Maintenance of all heavy machinery

- The hospital has multiple types of equipment and heavy machinery which requires maintenance. Thus, the admin department is responsible to ensure that it is properly serviced by the appropriate personnel.

- Doctors and other authorized employees
The above points can be further divided into 2 parts.

  1. Doctors
     Doctors have the following functionalities:
       - Performing Tests
       - Consulting patients
       - Prescribing tests
  2. Nurses
     Nurses have the following functionalities:
       - Generate/update patient records
       - Laboratory tests, X-rays etc.
       - Provide assistance to a doctor or patient (if required) //in case it doesn't fit here, remove it

- Patients:
  - Book an appointment
  - Facility to pay the bill
  - Pharmacy information, booking and purchase for patients.
  - Allows a patient to buy a particular drug immediately or order it in advance.
  - Covid -19 Patient Services

2.3 User Classes and Characteristics

1. **General Administration**
   - Fetch Patient details,
   - Get test details
   - Details of doctors and nurses
   - Patient Registration
   - Logistics and inventory control
   - Maintenance of all heavy machinery

2. **Accounts**
   - Keeps track of Finance
   - Get test details

3. Doctors
- Performing Tests
- Consulting patients
- Prescribing tests

4. Nurses
- Generate/update patient records
- Laboratory tests, X-rays etc.
- Provide assistance to a doctor or patient

5. Patients:
- Book appointment
- Pay bills
- Pharmacy information, booking and purchase for patients.
- Allows a buy a particular drug immediately or order it in advance.

2.4 Operating Environment

Software requirements
- Windows 7 or above operating system
- CSS, HTML
- Back End- MySQL

Hardware Requirements
- Core i5 processor
- 4GB Ram
- 20GB of hard disk space in terminal machines
- 50GB hard disk space in Server Machine

Geographical Requirements
- The server should be kept in a cool and dry place.
- Proper ventilation is important.
- No major requirement at the user end.

2.5 Design and Implementation Constraints

- The system is wirelessly networked with back-to-back encryption.
- The database is password protected.
- Should use less RAM and processing power.
- Each user should have an individual ID and password.
- Only the administrator can access the whole system.

2.6 User Documentation

- The user will be provided with a detailed book manual.

- We have also uploaded "Getting started" videos on our official YouTube channel.

- We have 24 hrs online service and toll-free number 02288843434. For any services, contact gethelp.software@gmail.com.

2.7 Assumptions and Dependencies

- Each user must have a valid user id and password
- The 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.

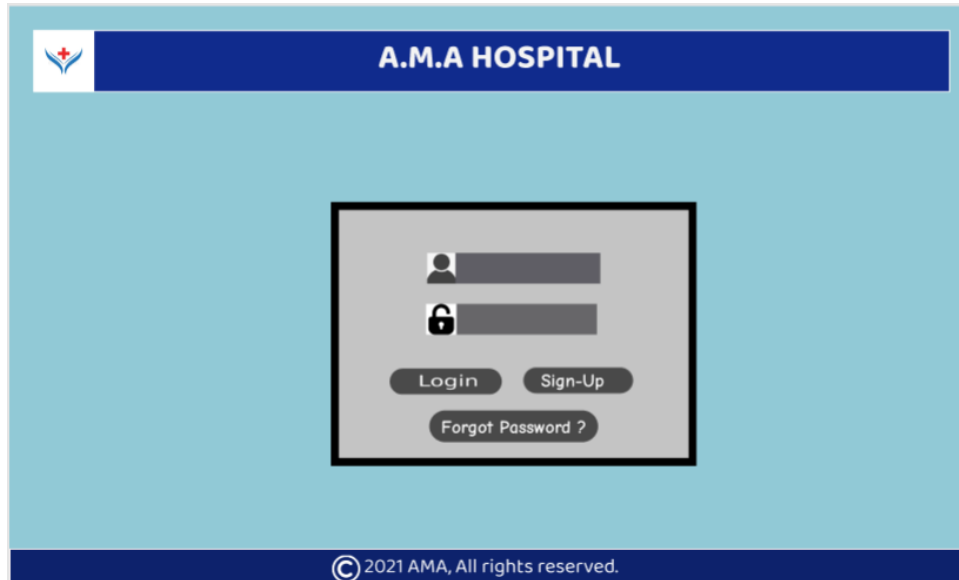# 3. External Interface Requirements

## 3.1 User Interfaces

1. Home Screen

This is the home screen displayed to the user when he/she opens the website. There is a central information screen and various buttons like Home, About, Department etc. Clicking on any button will take the user to the relevant section.

2. Login Page

If the user wants to do certain things like taking an appointment, etc, then the user needs to log in. In case of a first-time user, the option to sign-up is provided. A forgot password option is also present to assist those who do not remember their password.

3. Dashboard
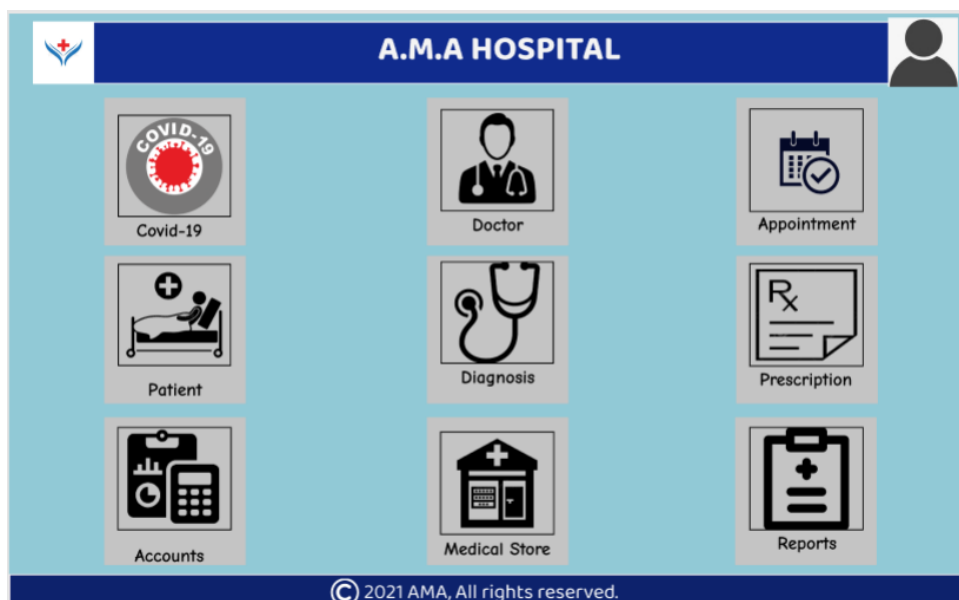
On logging-in, the user has various options at their disposal. They can choose whether to access the dedicated covid-19 tab, or to take an appointment. They can also look at any diagnosis/prescriptions/reports which have been issued to them. They can also order their medicines from the medical store.

4.   Accounts

On clicking the accounts tab, the above screen is displayed. The user can see their details, the details of the doctor they consulted and the fees and charges to be paid. On clicking Pay Now, the user is redirected to the payment gateway.

3.2 Hardware Interfaces

Laptop/Desktop PC

- Users can run/install the software in their laptops and computers of Windows 8 or above & Linux.
- The system should work with 128MB RAM.
- It will work on https & IP protocols with efficiency.

Printer:

Simply this device is for printing bills and view reports.

Wi-Fi router:

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

3.3 Software Interfaces

Backend

- Python 3.9 - Python is easy to use, secure, and reliable. From laptops to data centres, game consoles to scientific supercomputers, cell phones to the Internet, are running on Python.
- VS Code - IDE for Python development.
- MySQL server - Database connectivity and management
- Figma - Logo and other designing such as User interfaces

Client End

- OS – Windows 7/8/10, Mac OS, Linux
- Web Browser
- MySQL server - Database connectivity

4. System Features

4.1 Booking an Appointment

4.1.1   Description and Priority

This is the utmost important feature that is followed in any hospital management. It is a high priority task. This will help the management and the user to have a smooth entry into the management process. It will include a minimal fee.

4.1.2   Stimulus/Response Sequences

STIMULUS: Firstly, the user will have to log in into an account or create a new account.

RESPONSE: It will successfully login. If failed, it will ask you to enter the credentials again. It will take you to the dashboard.

STIMULUS: User goes to the Appointment tab.

RESPONSE: It will open the page and ask you to enter the details like patient's name, address, date and time of appointment, search doctor by name, profession etc and more.

STIMULUS: User will enter the following details and click on 'confirm'.

RESPONSE: Users will be displayed with a confirmation message that their appointment has been confirmed.

4.1.3   Functional Requirements

- Mandatory fields should be filled compulsorily while registering.
- The database should be updated frequently to reflect the changes in the portal.
- If the doctor is unavailable or busy, a cancellation message should be automatically sent to the user's phone number.

4.2 Covid-19

4.2.1   Description and Priority

This feature is newly introduced in a few of the hospitals. It is a high priority task for getting emergency access to the patients. This will help the management to easily differentiate between Covid and Non-Covid patient and provide the treatment as required.

4.2.2   Stimulus/Response Sequences

STIMULUS: Firstly, the user will have to log in into an account or create a new account.

RESPONSE: It will successfully login. If failed, it will ask you to enter the credentials again. It will take you to the dashboard.

STIMULUS: User goes to the COVID-19 tab.

RESPONSE: It will open the page and ask you to enter the details like patient's name, address, date and time of appointment, search doctor by name, profession etc and more.

STIMULUS: User will enter the following details and click on 'next'.

RESPONSE: User will be directed to a new page to upload their scanned copy RT-PCR test.

STIMULUS: User will upload the document and click on 'verify and confirm'.

RESPONSE: Once verified on the management's side, users will receive a confirmation message that their appointment has been confirmed.

4.2.3 Functional Requirements

- Mandatory fields should be filled compulsorily while registering.
- Management system will cross check the RT-PCR test with the Govt. database through the patient's Aadhar number.
- The database should be updated frequently to reflect the changes in the portal.
- If the doctor is unavailable or busy, a cancellation message should be automatically sent to the user's phone number.

4.3 Ordering Medicine

4.3.1 Description and Priority

This feature helps in ordering medicine to the patients in the vicinity of the hospital's medical store from the comfort of their home. It is a low priority task. This will help the management to keep track of the orders and help the people in need, especially senior citizens. It will include a minimal delivery fee.

4.3.2 Stimulus/Response Sequences

STIMULUS: Firstly, the user will have to log in into an account or create a new account.

RESPONSE: It will successfully login. If failed, it will ask you to enter the credentials again. It will take you to the dashboard.

STIMULUS: User goes to the Medicines tab.

RESPONSE: It will open the page and ask you to enter the details like medicine name, quantity, company's name, date and time of delivery etc or will also provide you the option of scanning and uploading a prescription.

STIMULUS: User will enter the following details and click on 'confirm'.

RESPONSE: Users will be displayed with a confirmation message that their medicines will be delivered.

4.3.3 Functional Requirements

- Mandatory fields should be filled compulsorily while registering.
- The database should be updated frequently to reflect the changes in the portal.
- If the delivery is delayed or cannot be done in the particular time period, a message should be automatically sent to the user's phone number stating the following situation.
- If the patient enters invalid address or the prescription uploaded is blurry, the user will be sent a link to again update the necessary details.

4.4 Finance

4.4.1 Description and Priority

This is another important feature that is followed in hospitals. It is a medium priority task. This will help the user to have this hectic process done easily on the tip of their hands.

4.4.2 Stimulus/Response Sequences

STIMULUS: Firstly, the user will have to log in into an account or create a new account.

RESPONSE: It will successfully login. If failed, it will ask you to enter the credentials again. It will take you to the dashboard.

STIMULUS: User goes to the Finances tab.

RESPONSE: It will open the page showing the payment due along with the detailed invoice and ask you to choose the payment method.

STIMULUS: User will choose their bank preference and one option: Credit card, Debit card, Net-banking, UPI, Wallets and click on 'confirm'.

RESPONSE: Users will be redirected to a new page and be asked to enter the required details.

STIMULUS: User will enter the required details and pay the amount on their convenience.

RESPONSE: The transaction result will be displayed to the user after which it will display the receipt and the Payment due details will get updated.

4.4.3 Functional Requirements

- Mandatory fields should be filled compulsorily while registering.
- The database should be updated frequently to reflect the changes in the portal.
- The transaction progress should be mailed to the user along with the receipt (if successful)
- Network failure can be an issue faced.
- If payment is due after the due date, a penalty will be imposed and added in the Payment due amount.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

- Response time- The system will give responses within 3.5 seconds after checking the patient information and other information.
- Capacity- The system must support 2500 people at a time.
- User interface- The user interface screen will respond within 4 seconds.
- Conformity- The system must conform to MYSQL.
- The system is interactive and the delays involved are fewer.
- Connection to the server is dependent on good internet speed. So, a delay of not more than 15 seconds while loading the data is acceptable.

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 the operations of committed transactions from the backed-up log, up to the time of failure.
- All the administrative and data entry operators have unique logins so the system can understand who is login into the system right now no intruders are allowed except system administrative nobody cannot change records and valuable data.
- Thinking about all aspects, there is a possibility of the database getting crashed at any time due to a virus or maybe an operating system failure. Therefore, a database backup is a must. Hacking can also be a threat to the system, thus the user id and password and must be hidden by the user.

5.3 Security Requirements

- The system uses SSL (secured socket layer) in all transactions that include any confidential customer information.
- The system must automatically log out all customers after a period of inactivity.
- Since only authenticated users can have access to the server, it is highly secure.
- The 3 aspects covered are:
    - o Confidentiality: The user shall ensure who gets to see their information.
    - o Integrity: Editing data shall be authorized only by the owners of the accounts.
    - o Availability: The application shall be available at all times.

5.4 Software Quality Attributes

Ambiguities:

In user requirements, it is mentioned 'Appointment/ Scheduling'. It leads to an ambiguity as to whether only staff will be able to book appointments to patients or will patients be able to schedule them directly without contacting staff.

Inconsistencies:

In user requirements, it is mentioned 'Ability to access and maintain patient reports and charts with ease.' One of the parties of significance said that these records should be accessible to only doctors and nurses. Another party of significance insisted that other hospital administration staff should also be able to access these files, thereby creating an inconsistency between the two parties of significance.

Incompleteness:

If a doctor is unavailable, the software should provide appropriate messages like alternative days or time for the appointment. If it is an emergency, it can also provide a reference to alternative doctors.
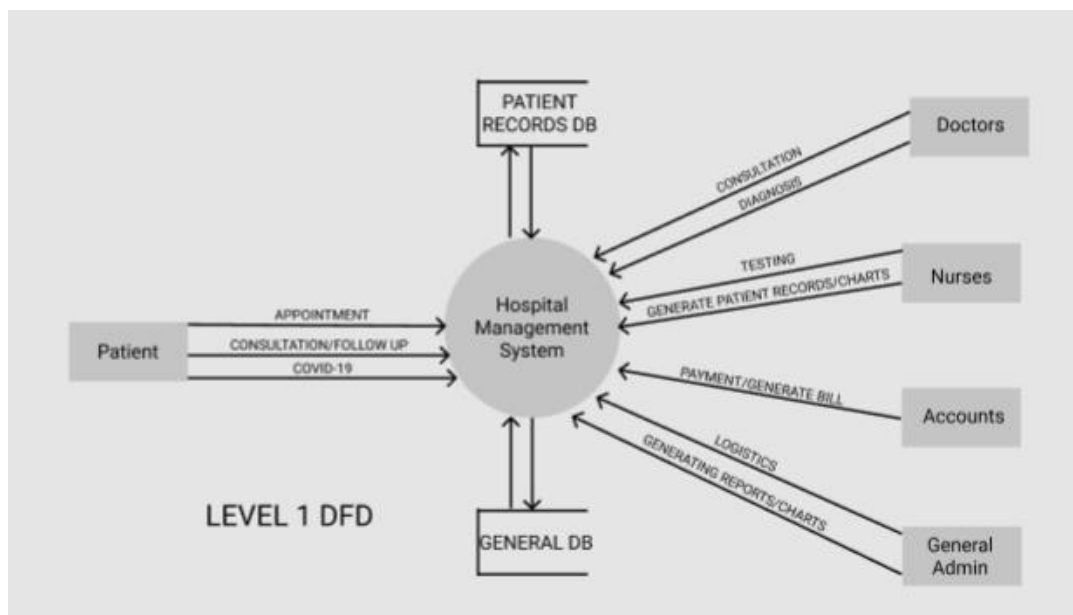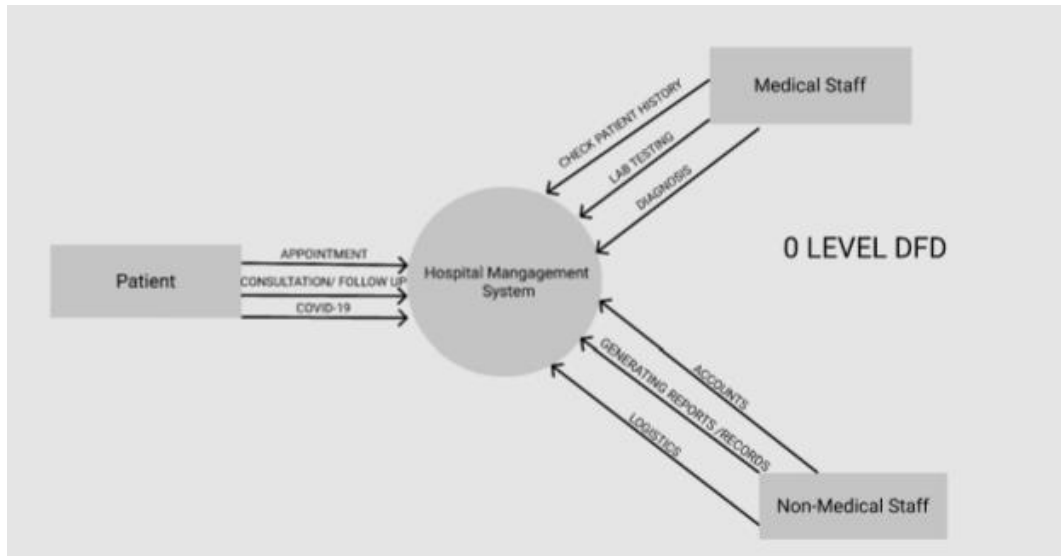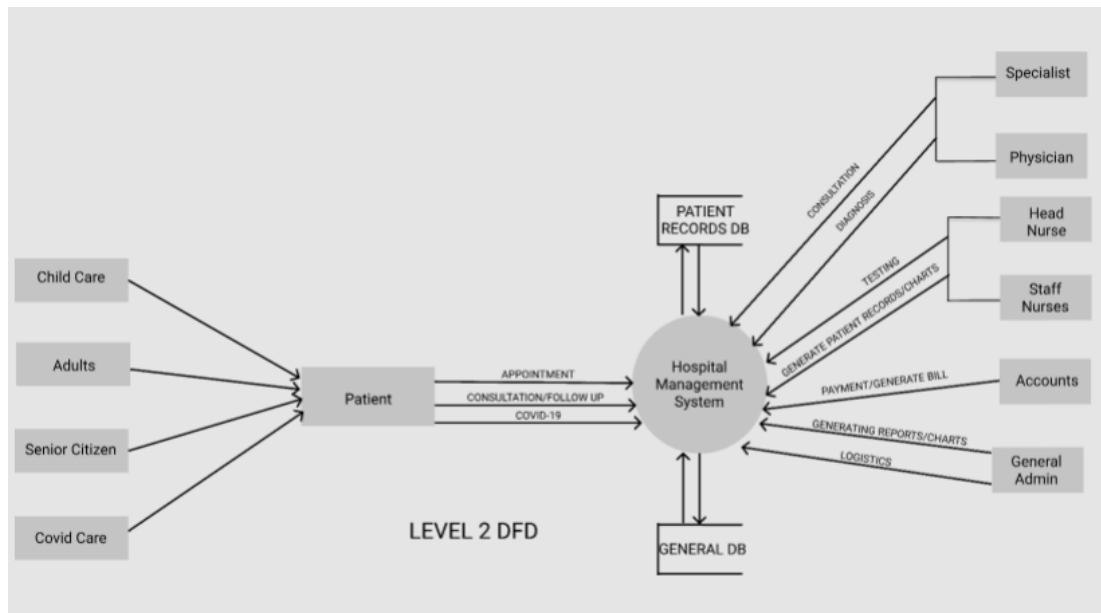
6. Other Requirements

Different modules for nurses, doctors, and staff will be made in detail with their entries, availability. Along with it, the details of the patients with their medical history, prescriptions, payment, etc. will be present in the database. Hospital administration will also be able to book appointments for patients. Doctors will be able to tele-consult with patients in case of emergency and prescribe medicines. Nurses will be able to maintain charts of admitted patients and monitor their conditions.

The system should have a quick response time with the ability to prioritize the situation by the keywords. The administrator should be able to synchronize the modified data from time to time. The system should offer efficient backups and error logs for improvement.

Appendix B: Analysis Models

1) Data Flow Diagrams

LEVEL 2 DFD

2) Class Diagrams