
Software Requirements Specification

for
E-Vaidya

Version 1.0

Prepared by

Group 12:

Aman	210104
Aniket Suhas Borkar	210135
Deven Gangwani	210327
Goutam Das	210394
Kartik Soni	210496
Narendra Singh	210649
Prashant Kumar	210750
Shrey Bansal	210997
Shubham Patel	210709
Swastik Singhal	211090

Group Name: Debuggers

aman21@iitk.ac.in
aniketsb21@iitk.ac.in
devenaq21@iitk.ac.in
goutamd21@iitk.ac.in
kartiksoni21@iitk.ac.in
narendras21@iitk.ac.in
kprashant21@iitk.ac.in
shreyb21@iitk.ac.in
devang21@iitk.ac.in
sswastik21@iitk.ac.in

Course: CS253

Mentor TA: *Anuj Shrivastava*

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Revisions

Version	Primary Author(s)	Description of Version	Date Completed
Initial Draft (v1.0)	Debuggers	Initiated the document. Added all the necessary details.	27/01/23

1 Introduction

1.1 Product Scope

Our project aims to automate the working of the Health Center. Currently, the entire medical history of the students is maintained in their individual health booklets. Prescriptions of medicines and vitals' measurements are noted on the same. This entire record is handled manually and is paper based. Due to this, the students have to carry the health booklet each and every time he/she visits the HC. Apart from that the appointment system, even though currently accessible through the OA portal, lacks user-friendliness as well as an integrated system.

We aim to solve these problems through the software we are developing. Our software provides an intuitive and portable web-based interface which can be accessed from all devices. It allows patients to book appointments and view their medical records and eliminates the need to maintain a paper-based health booklet. It also provides an easy interface for doctors to view the entire medical history of the patient and easily prescribe treatment, thus simplifying and digitising the entire process of obtaining treatment at the HC.

1.2 Intended Audience and Document Overview

This document is intended to facilitate interested parties to get a detailed overview of the planned model for our software. It includes the user requirements as collected by the team through interviews conducted with doctors and receptionists of the HC. It also includes the corresponding specifications for the system to fulfill those requirements.

- Section 2 consists of an overall description of the design of our system. This section is mainly targeted towards the project managers and the developers as it specifies the design on a high level.
- Section 3 contains the technical requirements of our system. This section, which offers comprehensive information about the interfaces used in the system's creation, needs to be paid close attention by developers. The project managers might also find this section helpful for managing the project team. Additionally, the writers of the documentation should take additional care when crafting this section as even a small mismatch in the details can result in a poorly constructed product.
- Section 4 consists of all the other non-functional requirements and specifications of the software. This section is mainly aimed at the testers and users of the software so that they can understand the expected behaviour of the system in terms of non-functional requirements.

1.3 Definitions, Acronyms and Abbreviations

API	Application Programming Interface
CSS	Cascading Style Sheets

GUI	Graphical User Interface
HC	Health Centre, IIT Kanpur
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
IITK	Indian Institute of Technology, Kanpur
OA	Office Automation, IIT Kanpur
OPD	Outpatient Department
SRS	Software Requirement Specification

We have used student and patient interchangeably in the document

1.4 Document Conventions

- Arial font size 11 has been maintained throughout the text.
- The document text is single spaced and 1" margin has been maintained throughout the document.
- Italics have been used for writing comments.

1.5 References and Acknowledgments

- All the specific details regarding the appointment booking system currently in place at the HC were discussed with the HC Reception staff.
- The already existing features in the OA HC Management Software were discussed with the HC staff.
- We would like to thank Dr. Rakesh Mishra, Medical Officer at HC, who helped us with specifics regarding the doctor's interface and discussed the general idea of the software.
- We would like to acknowledge the help of our instructor Dr. Indranil Saha in guiding us through the process of making this document.

2 Overall Description

2.1 Product Overview

This is a standalone software which maintains its own database of patients and uses a pre-existing database of HC staff with option for login and registration. It is an improvement over the currently existing appointment booking system maintained by OA and can be considered as a healthy replacement of the currently running health booklet system. This software is not part of any larger system or will not be merged with any other larger software of similar functionality in the foreseeable future. The purpose of the product is to digitise many facets of the HC's operations as they are currently – including patient prescriptions and medical information (all contained in an all-too-easily misplaced booklet, currently), doctor appointment and scheduling systems (which, though already semi-digitised, are difficult to use and obscure).



2.2 Product Functionality

The major functions of the system being developed, sorted according to the type of user include:

1. Patient:
 - a. User registration
 - b. Users can schedule appointments and view previous appointments
 - c. The patient can view which Doctors are on duty
 - d. The Doctor and patient can view the patient's medical record which will be updated by the Doctor during the appointment
2. Doctor:
 - a. The Doctor can view all the scheduled appointments for the current shift/day and select an appointment and view the complete medical history of the patient.
 - b. He/she can also assign diagnostics and tests, as well as prescribe medicines to the patient.
3. Pharmacy:
 - a. The pharmacist can view the prescriptions received from the Doctor and issue necessary medicines to the patient.
4. Reception:
 - a. The receptionist can manage all appointment requests and allot the patients to doctors.
 - b. Has the ability to view schedules of all Doctors and assign Doctors to shifts.
 - c. Has the ability to upload medical reports of the patient.
5. Nurse:
 - a. The nurse can add the measured vitals.

2.3 Design and Implementation Constraints

- Memory Requirements:
As the user would have to upload medical reports, there needs to be a dedicated storage space in the server to store the necessary documents.
- Conventions and Programming Requirements:
Since the software would be maintained by people other than the developers, so Object Oriented Programming Paradigm is to be used to enhance the software's maintainability.
- Security Considerations:
 - Usage of IITK email-based authentication for user registration to ensure that only legitimate users can register into the system.
 - We will store the salted hash of the passwords of the users instead of storing the passwords directly to address security concerns.

- Depending on the type of user, different levels of privileges will be granted with respect to the ability to access the medical history and other sensitive personal information.
- Tools, Languages and Databases:
 - MongoDB is to be used to handle the large amount of data associated with the users.
 - jQuery is to be used to perform various logical decision-making operations associated with the backend.
 - We will be using Express.js to enhance performance and satisfy timing constraints.
 - We plan to use React, HTML, CSS and JavaScript to ensure that the website has a user-friendly, responsive and portable GUI.
- Communication Protocols:
 - We plan to use the HTTP protocol to communicate between servers.

2.4 Assumptions and Dependencies

The major assumptions and dependencies which may affect the design of our project include:

1. We assume that the smaller dummy database which we shall use to perform the testing and development of our project is sufficiently close to the actual database on which the product will depend.
2. We assume that the any valid requests for appointment are not rejected by the reception due to sufficient availability of doctors.
3. We assume that an already existing HC database of staff members can be accessed for profile management and regulating access control of HC staff, and to assign correct roles to different staff members.
4. We assume that all users of the software have a unique ID in the form of Roll number or PF number.

Software Dependencies:

1. We will be using Bootstrap v-5 for CSS styling.
2. We will be using some additional JavaScript libraries for adding animation to the website.
3. We will be using some REST APIs for sign-in
4. We plan to use JWT API for secure authentication.

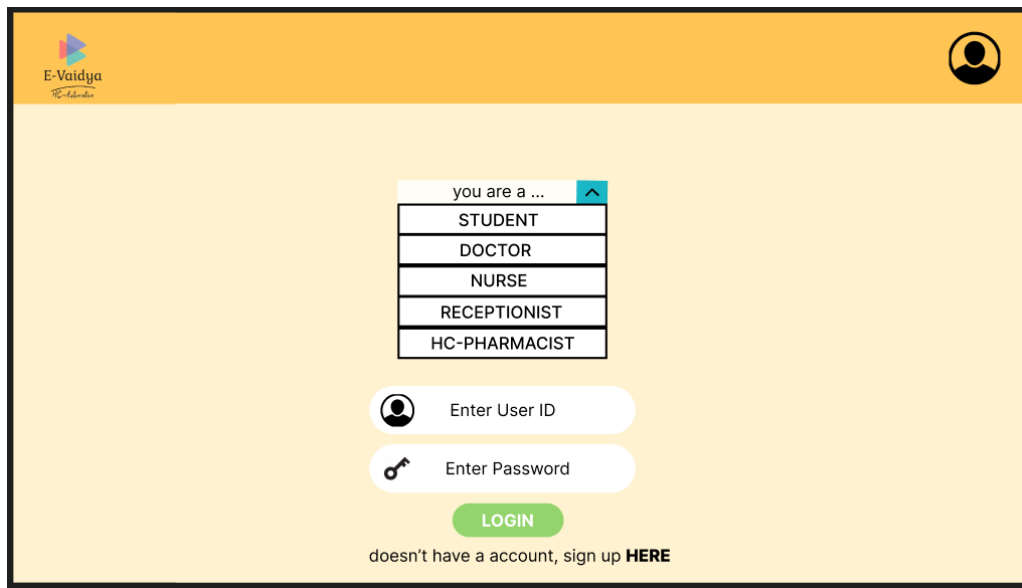
3 Specific Requirements

3.1 External Interface Requirements

3.1.1 User Interfaces

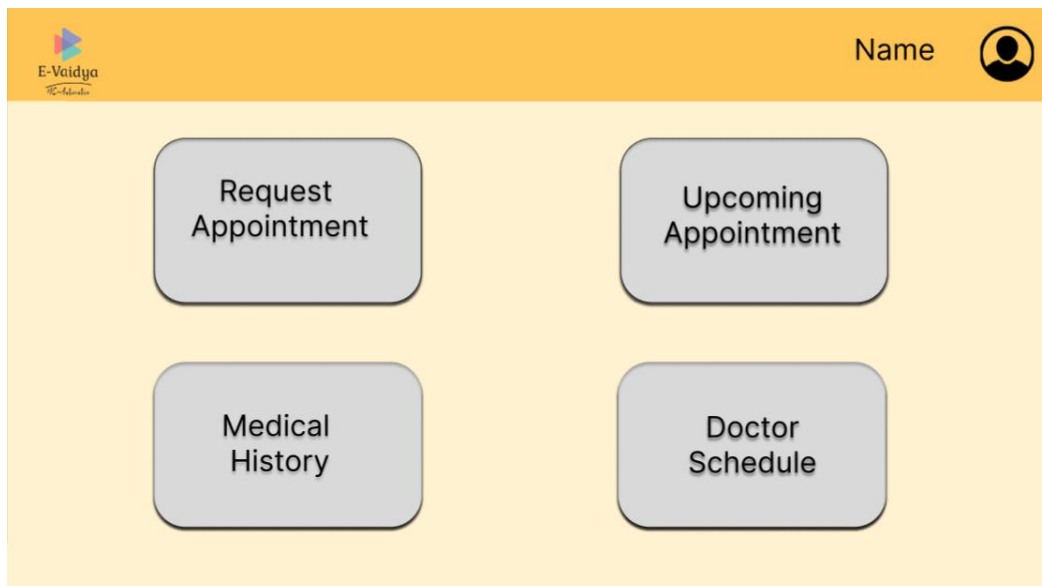
The system will be accessed by all users through one website – users will log in with their accounts and be shown different pages depending on whether their account is marked as Patient, Doctor, Reception or Pharmacy.

- The Login Page
The log-in page will have a simple log-in dialog and a sign-up button. The sign-up button will replace the log-in dialog with a sign-up dialog with which students can input their IITK emails and a password to register as patients. Doctor, Reception and Pharmacy users will have their accounts created for them by the development team.



The screenshot shows the E-Vaidya Login Page. At the top left is the E-Vaidya logo, and at the top right is a user profile icon. The main content area has a light yellow background. In the center, there is a dropdown menu labeled "you are a ..." with a blue upward arrow. The dropdown menu is open, showing five options: STUDENT, DOCTOR, NURSE, RECEPTIONIST, and HC-PHARMACIST. Below the dropdown menu are two input fields: "Enter User ID" with a user icon and "Enter Password" with a key icon. Below these fields is a green "LOGIN" button. At the bottom, there is a link that says "doesn't have a account, sign up **HERE**".

- The Patient Page
 - Initial Page



The screenshot shows the E-Vaidya Patient Initial Page. At the top left is the E-Vaidya logo, and at the top right is a user profile icon next to the text "Name". The main content area has a light yellow background. There are four large, rounded rectangular buttons arranged in a 2x2 grid. The buttons are labeled: "Request Appointment", "Upcoming Appointment", "Medical History", and "Doctor Schedule".

- Book Appointment Page

The screenshot shows the 'Request an Appointment' page. At the top left is the 'E-Vaidya' logo. At the top right are the 'HOME' link and a user profile icon. The page title 'Request an Appointment' is on the left, and the user's 'Roll no. 123456' is on the right. The form contains several sections: a 'Preferred Slot' section with 'OPD' and 'Specialist' buttons; a 'Preferred Doctor' section with 'Morning' and 'Evening' buttons; a 'Symptoms' section with a text input field; and a 'Request' button at the bottom. The 'Preferred Doctor' dropdown menu is open, showing options: 'Dr. AB', 'Dr. ABCDEF', 'Dr. ABVQOPEY', and 'Auto-assign'.

- View Doctor Schedule Page
- The Doctor's Page
 - Initial Page
 - View Appointments Page
 - Conduct Appointments Page
 - Prescription Page
- The Reception Page
 - Initial Page
 - Appointment Requests Page
 - Doctor Allotment Page

- Appointments of Doctor Page
 - Lab Reports Upload Page
- The Pharmacy Page
 - Initial Page
 - Prescription Page
 - Completed Prescriptions Page
- The Nurse Page
 - Initial Page
 - Vitals Page
 - Medical History

3.1.2 Hardware Interfaces

- Users will require a device that can open and use webpages to access the user interface. This can be a smartphone or a computer.
- Servers (i.e., dedicated computers) will be necessary for storing patient data.
- The website will send requests to the server for necessary data (such as the prescription of a certain patient) via API calls, using authorisation tokens to restrict access.

3.1.3 Software Interfaces

The software consists of three major components: the front-end, or the website that users will access, receive data from and send data to the server from; the back end, or the processing on the server to send data requested by users; and the database, used to store all patient information.

3.2 Functional Requirements

3.2.1 Patient Registration

All patients will have to initially register on the system, using their unique identification. They will have to enter their medical details like basic health information (blood group, height, weight etc.), current medical conditions, family history etc.

3.2.2 Patients can schedule appointments and view previous appointments

The patient will be able request an appointment on the portal in which they have to enter their preferred Doctor and time slot, as well as the symptoms they are showing. They can choose whether they wish to see a general OPD or a specialist. They will be assigned a token number based on the existing queue. They will also have an option to view their upcoming appointments.

3.2.3 The patient can view which doctors are on duty

The patients will be able to view the list of doctors who are on duty depending on the day and time slot. The list of specialist Doctors will also be available showing their weekly schedule.

3.2.4 The doctor and patient can view their medical record which will be updated by the doctor during the appointment

The patients will have an option to view their medical history which will display the diagnosis of the Doctor, the medication and tests prescribed as well as the lab reports of all the corresponding appointments. The appointments will have a time stamp. This history will also be visible to the Doctor during the duration of the appointment. The Doctor will write the current diagnosis and prescribe the medication, which will be appended to the medical history after the appointment.

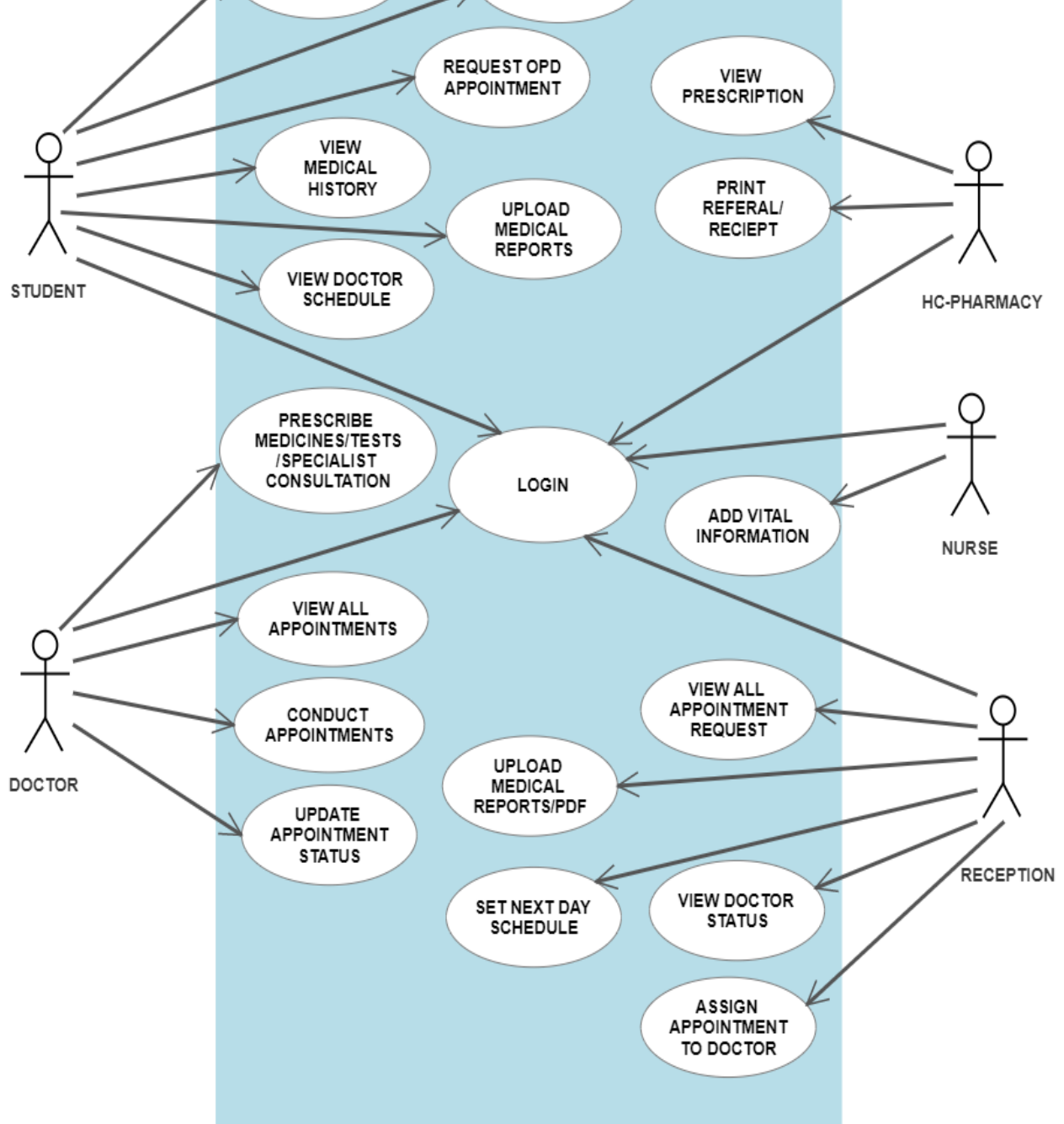
3.2.5 The doctor can view all the scheduled appointments for the current shift/day and select an appointment and view the complete medical history of the patient

A list of all the current scheduled appointments will be visible to the Doctor. The Doctor can click on any patients name to view the details of the patient including the medical history and lab reports of the patient. The vitals will also be visible which will be sorted according to the time stamp.

3.2.6 The doctor can also assign diagnostics and tests, as well as prescribe medicines to the patient

The Doctor will be able to write the current prescription and diagnosis in the same window while viewing the patient history. There will be different sections for each field input. This report will later be added to the medical history after the completion of the appointment.

3.2.7 The pharmacist can view the prescriptions received from the doctor and issue necessary medicines to the patient



3.3.1 U1 - Student views their medical history

Author – Swastik

Purpose - Student would be able to see his/her medical history which contains info regarding previous appointment that includes his/her vital info, Doctor's prescription and symptoms observed

Requirements Traceability – Student should be logged in to the system

Priority - MEDIUM

Preconditions – Student is registered with HC and is currently logged into the system

Post conditions – Nothing in the system will change but only student will see his/her medical history

Actors – Students clicks on the “View Medical History” tab on his/her dashboard

Exceptions – No medical history is there to be displayed

Includes - None

Notes/Issues - None

3.3.2 U2 – Request OPD appointment

Author – Aniket

Purpose – The patient can request an OPD appointment with a doctor of his/her choice, or request a doctor be assigned to him/her, provided s/he has provided the symptoms (by the reception).

Requirements Traceability – None

Priority – High

Preconditions - The patient is logged into the system.

Post conditions – A request to book an appointment for the patient is sent to the receptionist for further action.

Actors – Patient

Exceptions – None

Includes (other use case IDs) None

Notes/Issues - None

3.3.3 U3 – Request Specialist appointment

Author – Narendra

Purpose – The patient can request an appointment with a specialist Doctor, after describing the symptoms.

Requirements Traceability – The Doctor must be available for that appointment slot.

Priority – High

Preconditions – The patient must be logged into the system.

Post conditions – A request for an appointment with the specialist is sent to the receptionist for approval.

Actors – Patient

Exceptions – None

Includes (other use case IDs) None

Notes/Issues - None

3.3.4 U4 – View all prescriptions

Author – Shrey

Purpose – To allow the HC pharmacy to view all the prescriptions to be disbursed.

Requirements Traceability – HC Pharmacy should be logged in to the system

Priority - HIGH

Preconditions –The prescription must be approved by the doctor.

Post conditions – The HC pharmacy can view all the prescriptions.

Actors – HC Pharmacy

Exceptions - None

Includes (other use case IDs)

Notes/Issues - None

3.3.5 U5 - Vital Check input by nurse/medical worker

Author – Deven

Purpose –When the student reports at HC, his/her vital information like Oxygen level, temperature, Blood Pressure are required to assess his/her situation

Requirements Traceability – Roll no of the student is what required for this

Priority – MEDIUM

Preconditions – Student must be registered with HC

Post conditions – Student's medical history will be updated once the nurse sends POST request

Actors – Nurse who will check the vitals

Exceptions – None

Includes - None

Notes/Issues - None

3.3.6 U6 – Login

Author – Prashant

Purpose – Patients and HC Staff will be able to login/Sign Up on our website

Requirements Traceability – A pre-registered ID and a User preferred Password

Priority – High as system can't recognize anyone as personnel

Preconditions – user must be registered on CC

Post conditions – User will be accessing his/her profile and all given facilities

Actors – Patient, Doctor, Reception, HC Pharmacy, Nurse

Exceptions - If user gives wrong ID/Password, then an option to choose forgot password is given.

Includes - None

Notes/Issues - None

3.3.7 U7 – Conduct Appointment by Doctor

Author – Kartik

Purpose – Doctor can see the details of the patient of the appointment chosen.

Requirements Traceability – Doctor is logged in and is on the view all appointments page.

Priority - High

Preconditions – Appointment should have been successfully booked by the student and approved by the Receptionist. Patient should have arrived at the Doctor.

Post conditions – Medical History of the Patient is Updated. A medication prescription has been sent to the Pharmacy. Patient Card has been deleted from the list of upcoming patients of the Doctor. Tests have been prescribed to the Patient.

Actors – Doctor

Exceptions - None

Includes (other use case IDs)

Notes/Issues - None

3.3.8 U8 – View all appointments

Author – Swastik

Purpose – Doctor would be able to view the list of appointments in his/her current slot

Requirements Traceability – Doctor is logged in to the system, he/she clicks on “View Appointment”

Priority - High

Preconditions – Appointment made by student should be approved by reception.

Post conditions - Doctor would see the list of appointments.

Actors – Doctor

Exceptions – None

Includes – None

Notes/Issue - None

3.3.9 U9 – Appointment scheduling by Reception

Author – Goutam

Purpose - Reception can schedule appointments according to availability of doctors and the symptoms/preference of the patients.

Requirements Traceability – Receptionist is logged into the system

Priority – High

Preconditions – One or more appointment requests are pending with the system.

Post conditions – Pending requests are approved/rejected by the receptionist and approved appointments are added to the appointment list of the Doctors.

Actors – Reception

Exceptions – If a student has requested an appointment with an unavailable Doctor, the request must be rejected. If number of slots for an available Doctor is full, a further request should be rejected

Includes (other use case IDs)

Notes/Issues - None

3.3.10 U10 - Prescription Dispensing by Pharmacist at HC-Pharmacy

Author – Narendra

Purpose – HC-Pharmacist can view the Doctor's prescription to the student and can give the medicines available.

Requirements Traceability – Should be logged in to their account.

Priority - High

Preconditions – The Doctor has prescribed medication to the patient and the Prescription is present in the list of prescriptions of Pharmacist.

Post conditions – The prescription given will be checked with a green tick mark.

Actors – HC Pharmacist.

Exceptions - None

Includes - None

Notes/Issues - None

3.3.11 U11 – Upload medical reports

Author – Aman

Purpose – Receptionist can upload medical reports of the patient

Requirements Traceability – On the home page of the receptionist, they must go to “Upload medical reports” tab

Priority - High

Preconditions – Medical report for the patient has been obtained from the laboratory.

Post conditions – The medical report is added to the medical history of the patient.

Actors – Receptionist, Patient

Exceptions - None

Includes (other use case IDs) None

Notes/Issues - None

3.3.12 U12 – Assign Doctor Schedule for next day’s OPD

Author – Shubham

Purpose – Receptionist assigns Doctors to slots for the next day’s OPD.

Requirements Traceability – Receptionist is logged in to the system.

Priority – High

Preconditions – Doctor must not have been already assigned duty in the same slot.

Post conditions – Doctor’s name appears in the list of doctors for the corresponding slot. Doctor’s name is removed from list of un-assigned Doctors. List of Available Doctors on the Patient’s side are updated for the corresponding slot.

Actors – Receptionist

Exceptions - None

Includes (other use case IDs) None

Notes/Issues - None

3.3.13 U13 – View Doctors' status

Author – Swastik

Purpose – The user can view schedule of each doctor i.e., appointments assigned to him on the corresponding slot, and the status of the appointment (completed or not)

Requirements Traceability – User is logged in to the system

Priority – High

Preconditions – Doctors are assigned to the corresponding slot that day.

Post conditions - The status of the appointments is visible to the user.

Actors – Receptionist, Student, Doctor, Nurse, HC-Pharmacy

Exceptions – None.

Includes (other use case IDs)

Notes/Issues - None

3.3.14 U14 – Prescription of Medicines/Tests/Specialist Consultation

Author – Aniket

Purpose – This use case allows the Doctor to prescribe the necessary medication or tests to the patient or refer the patient to a specialist for further treatment.

Requirements Traceability – The Doctor is logged in and is on the conduct appointment page.

Priority – High

Preconditions - The Doctor has performed the diagnosis on the patient.

Post conditions – If medication has been prescribed, the same is appended to the patient's medical history with any remarks/comments related to the diagnosis. This prescription is added to the active prescriptions view of the HC Pharmacy. Any diagnostic tests/specialist referral assigned are also attached to the medical history.

Actors – Doctor who is conducting the appointment

Exceptions – None

Includes (other use case IDs) None

Notes/Issues - None

3.3.15 U15 – Printing referral receipt by pharmacist

Author – Swastik

Purpose – The pharmacist would print the list of medicines which are not available

Requirements Traceability – Doctor has prescribed the medicines and closed the appointment

Priority – High

Preconditions - The pharmacist should have selected the medicines which are available and then the unselected medicines in the prescription would be ready to print

Post conditions – The patient would be able to get remaining medicines from Apollo Pharmacy

Actors – HC-Pharmacist

Exceptions – None

Includes (other use case IDs)

Notes/Issues - Any relevant notes or issues that need to be resolved

3.3.16 U16 – Update appointment status

Author – Aman

Purpose – Doctor will update the appointment status of the patients

Requirements Traceability – Doctor has already conducted the appointment of the patient

Priority – High

Preconditions – Doctor should have conducted the appointment and prescribed the required medicines to the patients

Post conditions – The patient will be removed from the appointment list following the update of the appointment status.

Actors – Doctor who is conducting the appointment

Exceptions – None

Includes (other use case IDs) None

Notes/Issues - None

3.3.17 U17 – View all appointment requests

Author – Aniket Borkar

Purpose – The reception is able to view all the appointment requests and take further action.

Requirements Traceability – The receptionist is logged in and is on his/her home page.

Priority – High

Preconditions – The patients have placed appointment requests.

Post conditions – The appointment requests are visible to the receptionist, and can be searched by roll no.

Actors – Reception

Exceptions – None

Includes (other use case IDs) None

Notes/Issues - None

3.3.18 U18 – Doctor views student's history

Author – Narendra

Purpose – The Doctor can see students' previous appointments which include his/her vital information, Doctor's prescription and medical reports there.

Requirements Traceability – The Doctor must be logged in there

Priority - Medium

Preconditions – For medical reports, reception should have uploaded them

Post conditions – None

Actors – Doctor

Exceptions - None

Includes- None

Notes/Issues - None

4 Other Non-functional Requirements

4.1 Performance Requirements

Performance:

- (a) The software should be able to handle high traffic with low latency during peak hours
- (b) Student medical records will be updated in real time.
- (c) API request must return within 1000ms.

4.2 Safety and Security Requirements

Safety and Security

- (a) The IP Address of the end-users must be that of IITK.
- (b) Controlled access – Only the student and the Doctor with whom an appointment is scheduled can see their medical history.
- (c) Doctors will only be able to access the student medical history when the application is active.
- (d) Admin will be able to block student's account temporarily if found any suspicious activity.
- (e) Even developers would be unable to access students' personal records thus ensuring perfect privacy

4.3 Software Quality Attributes

4.3.1 Reliability

Student/Users can book appointments anytime from their convenience. The software will be able to handle and process a large amount of data in a reasonable time. It will provide an integrated platform for all medical needs.

4.3.2 Usability

The software will provide a one-stop solution to all the medical needs of the registered users. The process of prescription and medical history tracking will be made easier for doctors. All the functionalities like appointment scheduling, medical history tracking, pharmaceutical management etc. will be automated.

4.3.3 Portability

Our Web-Application will be fully responsive and interactive so that it will be portable and will function properly on any device of any size and shape.

5 Other Requirements

Appendix A – Data Dictionary

<Data dictionary is used to track all the different variables, states and functional requirements that you described in your document. Make sure to include the complete list of all constants, state variables (and their possible states), inputs and outputs in a table. In the table, include the description of these items as well as all related operations and requirements.>

Appendix B - Group Log