HOPE HOSPITAL MANAGEMENT SYSTEM

Project Analysis – OMIS 651

Team Patriots

A single stop mobile application for the Hospital management system

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Introduction:

Hope Hospitals is widely recognized as the pioneer of private healthcare in India, and was the country's first corporate hospital. The Hope Hospitals Group, which started as a 150-bed hospital and today, operates 9215 beds across 64 hospitals. A forerunner in integrated healthcare, Hope has a robust presence across the healthcare spectrum. The Group has emerged as the foremost integrated healthcare provider in Asia, with mature group companies that specialize in insurance, pharmacy, consultancy, clinics and many such key touch points of the ecosystem. The Hope Group has touched the lives of over 45 million patients, from 121 countries.

The first Hope Hospital opened in Chennai, in 1983. It was borne out of the determination to lead a complete transformation in Indian healthcare. Hope's Founder Chairman, was the driving force behind the inception. Credited as the architect of modern healthcare, He started Hope with the mission of bringing world-class healthcare to India, at a price point that Indians could afford! The backdrop to this development was the hopelessly inadequate healthcare infrastructure prevalent in the country, at that time.

Hope's first innovation was its business model itself; before Hope, only the very privileged had the access to quality treatment, as they could afford to travel abroad. Hope introduced healthcare that matched best-in-class outcomes, but cost only a fraction of the global prices. This led to a revolution with democratized treatment in our nation. This cost consciousness continues to be a key building block in our healthcare strategy. The Group is built on the bedrock of an enduring value system, and continues to drive unwavering focus on key touchstones like excellence, expertise, empathy and innovation.

Over the past three decades Hope Hospitals' transformative journey has forged a legacy of excellence in Indian healthcare. The Group has continuously set the agenda and led by example in the blossoming private healthcare space. One of Hope's significant contributions has been the adoption of clinical excellence as an industry standard. Hope pioneered the concept - the group was the first to invest in the pre-requisites that led to international quality accreditation like JCI and also developed Centre's of excellence in Cardiac Sciences, Orthopedics, Neurosciences, Emergency Care, Cancer and Organ Transplantation.

At Hope, healthcare systems leverage technology to build integrated healthcare delivery models, which facilitate seamless Hospital Information systems and telemedicine-based health outreach initiatives, for enhanced access to medical care. Another critical manifestation of widespread technology has been the amazing advancement in medical equipment and Hope has repeatedly pioneered the introduction of such innovations in India. From leveraging new age mobility, to getting futuristic equipment Hope has always been ahead of the curve. Currently, the group believes in the tremendous potential of robotics and is investing heavily in making it a real and robust option for all.

Hope Hospitals has taken the spirit of leadership well beyond business metrics. It has embraced the onus of keeping India, healthy. Taking cognizance of the undeniable fact that India is reeling under the onslaught of Non Communicable Diseases (NCD), the Hope Group has assumed the responsibility to educate, influence mindset. Increased focus on tactical initiatives like personalized preventive healthcare bears testimony to this new thrust. The Group has declared war on NCDs, and is leading the entire healthcare fraternity into this battle.

Current/Existing System:

This is a Mobile based application for the hospital management system for one of the top business hospitals in country. In this current system, we have the following features:

About Hospital:

In the about page, we have the brief history of the hospital with all the information of the founders and executive board members of the hospital with their information and their contact details with the established location in different parts of the country and world

Location of Hospital nearby:

We can search for the nearest location of the hospital by giving the zip code of the current location, which provides all the list of branches available near to that particular location

Departments in Hospital:

In this page, we can see the different departments available in the hospital, with the particular specialty in that field by the doctor and also the facilities available for that particular department.

Login Account information (Patient/Doctor):

User(Patient/Doctor) will be given with a User ID, with which can login to the hospital website, based on the type of user ID it enters into the dashboard of the patient or doctor.

Dashboard for patient:

In the patient dashboard, it has the basic information of the patient details and also has a link to take the appointment for the doctor through online.

Dashboard for Doctor:

In the doctor dashboard, it has the basic information of the doctor details and also shows the list of other doctors details information to contact.

Facilities in the hospital:

In this page we will have all the list of facilities available in the hospital, with the infrastructure provided and the diagnosis labs available in the hospital with the types of tests that can be done in the hospital.

Existing Application System Screens for the Hope Hospital Management system:
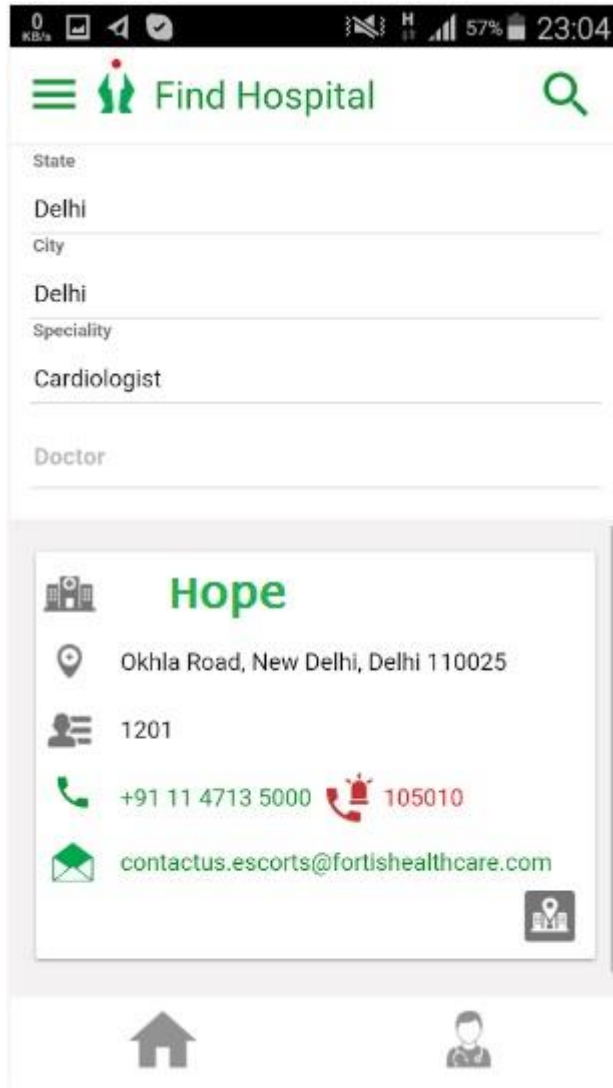
Problem /Opportunity Statements:

In the current system, the users are facing the following problems:

- When the users are trying to book an appointment with the doctor using the current system, there is no option for selection of a doctor. Based on the schedule and availability of a doctors, a doctor is being appointed automatically by the system.

- Currently, the patients are not able to view their diagnosis reports and old records for comparison. Though the patients are given hard copies of the reports, these are not saved for future references for the patients in form of soft copies.

Strength

1. Top business hospital in the country

2. Top class infrastructure with built in diagnosis labs

3. Information Technology integrated system.

4. Dashboard for Patient and Doctor

Weakness

1. Lack of availability of records and reports online

2. No cost estimator available for treatment.

3. Unable to select desired doctor for online appointment

4. No reminders or notifications for appointment

Opportunities

1. Imporved standards of the industry

2. Growing use of internet and smartphone technology

3. Increase in the ecnomic wealth

4. Innovation in mobile application development

Threats

1. Increment in the potential competition from other health care industries

2. New generation needing up to date technology might shift to other health care systems

3. Economic slowdown

R Responsible:
- Head Quarters HMS Team
- Hospital Administration Team

A Accountable:
- Architect Team
- Administrative Team

C Consulted:
- Doctors
- Hospital Administrative Team

I Informed:
- Doctora and Patients
- HMS Representative Team

Proposed System:

This mobile app will now allow a patient to schedule an online appointment with a choice of selecting the desired doctor, convenient time, desired branch and shows the reviews given written on the Doctor chosen.

Both the Patient and the Doctor get reminders or notifications about their appointment, the patients also get notifications regarding their medications and internal medicines so that the patients take the required on time. The push notifications are also delivered to the patient to let him know about the next appointment or any other information.

A Symptom Checker will be added to the dashboard which would help the patients to know about their health conditions based on the symptoms that they have, this would also help the patients while selecting a doctor for appointment.

A Cost Estimator will be added so that the patient can view the estimated cost for a particular treatment which would also ask for the insurance details so that it shows how much the patient needs to pay and how much the insurance company would cover. The cost estimator also gives estimate for all the list of all plans available. This helps the patient to select the perfect plan available in his budget.

The patients can get online diagnosis based on the degree of symptoms provided which would save a lot of time for the patients. Small health issues which don't need an doctor's appointment can be sorted out here.

After the health tests are done, the doctor and the patient can view reports and records of the test's performed with a detailed explanation about them by the doctor, he can also prescribe the appropriate medicines too.

Videos regarding the Health and wellness program would be made available to the patient from which patient can know how to maintain a good health, diet etc.

Bibliography:

https://www.apollohospitals.com/corporate/company-overview

CURRENT SYSTEM CONTEXT LEVEL:

CURRENT LEVEL CONTEXT LEVEL:

CURRENT SYSTEM LEVEL 0:

Team Patriots

Project Deliverable II
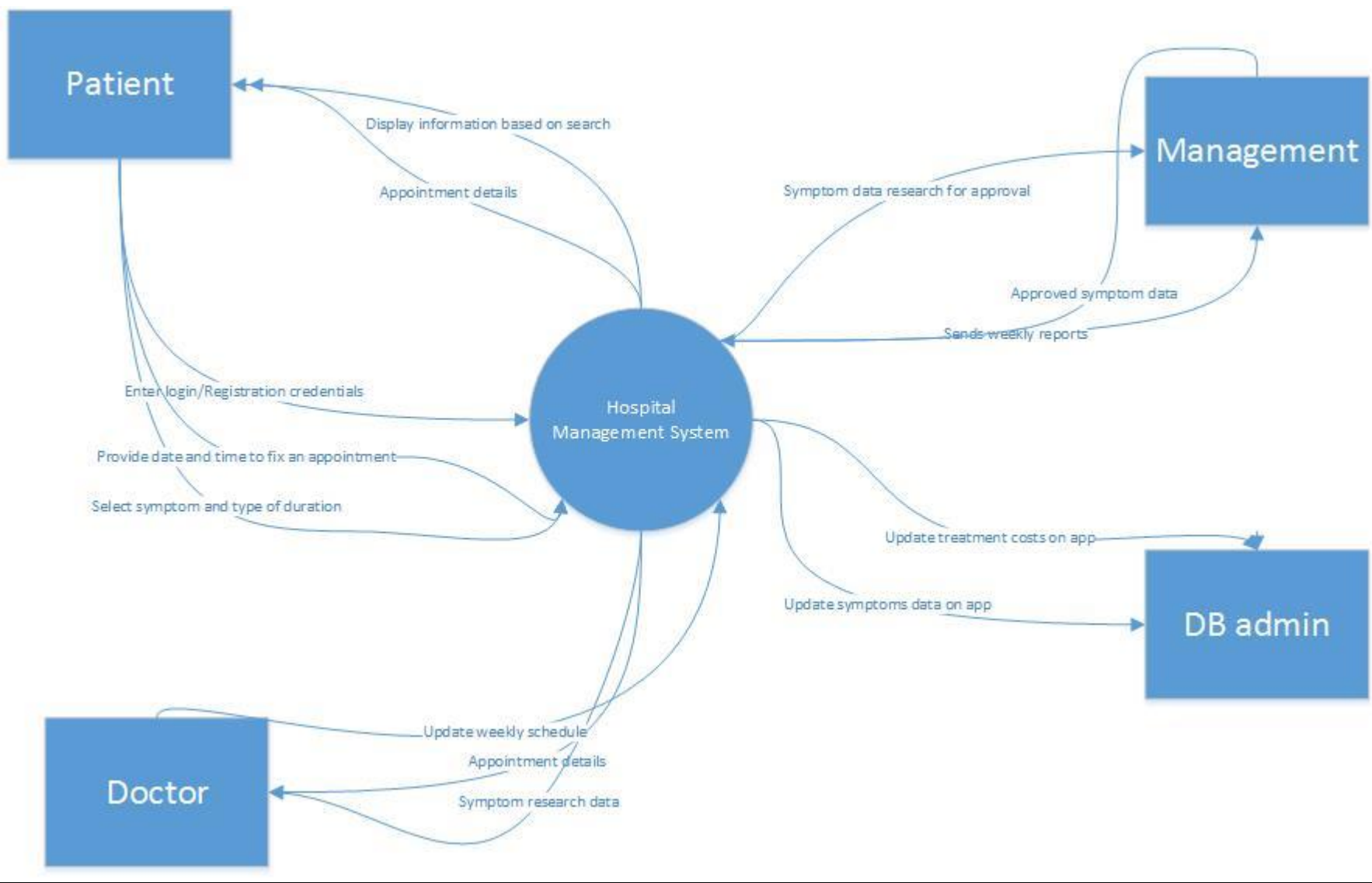
OM&IS

Patient

Provide details for appointment

1.Provide details for appointment

Store patient details

Patient File

Login credentials/new registration

Appointment details

Appointment details are stored

Appointment file

Doctor

Update weekly schedule

2.Update schedule

Update weekly schedule

Doctor file

Research on symptoms

3.Research on data

Symptom research data for approval

Management

Approved symptom data

Send weekly reports

Approved symptom data for update

DB Admin

Send weekly reports

5.Hospital reports

Access to produce reports

Appointment file

Select symptom with type and duration

Display Symptom Information

4.Check Symptom

Update the symptom data

Research file

Search as per the details provided by the patient

Receive information about the symptom

PROPOSED SYSTEM – CONTEXT LEVEL

PROPOSED SYSTEM - LEVEL 0

Team Patriots   Project Deliverable II   OM&IS

Patient — Search for doctor based on location → 1.Search Doctor
1.Search Doctor — Doctor details based on search → Patient
Patient — Enter login credentials/Registration details → 2.Schedule Appointment
Patient — Provide data and time to fix appointment → 2.Schedule Appointment
2.Schedule Appointment — Appointment confirmation details → Patient
Doctor File — Available doctor details → 1.Search Doctor
1.Search Doctor — Update the doctor's schedule → Doctor File
Doctor File — Update weekly schedule
2.Schedule Appointment — New patient details are updated → Patient File
2.Schedule Appointment — Appointment details are stored → Appointment's file
2.Schedule Appointment — Appointment confirmation details → Doctor

Doctor — System research data → 4.Research Symptoms
4.Research Symptoms — System research data for approval → Management
Management — Approved symptom's data → 4.Research Symptoms
4.Research Symptoms — Approved symptom's data → DB Admin
DB Admin — Update research file → Research file

Patient — Select symptom with type and duration → 5.Check Symptom's
5.Check Symptom's — Display information based on search → Patient
5.Check Symptom's — Search for user input data → DB Admin
DB Admin — Details about treatment cost
Management — Provide or update treatment cost → 6.Fix Cost

Patient — Enter type of symptom and location details → 7.Calculate Cost
7.Calculate Cost — Estimated cost for the treatment → Patient
7.Calculate Cost — Request for treatment cost details → Accounting file
Accounting file — Cost details based on search → 7.Calculate Cost
Research file — Updates treatment costs

3.Update schedule
Doctor — Update weekly schedule → 3.Update schedule
11.Push Notification — Automate push notifications → Doctor
11.Push Notification — Automate push notification → Patient
11.Push Notification — Uses to send notification → Appointment file

8.Required Checkups — Send patient details to lab technician
8.Required Checkups — Patient details are forwarded → Lab Technician
9.Update Reports — Update patient reports → Patient File
9.Update Reports — Update patient reports → Report's file
9.Update Reports — Update patient reports
9.Update Reports — To generate reports
10.Hospital Reports — To generate reports → Report's file
10.Hospital Reports — Sends weekly reports → Management

User Stories:

- As a HMS management, we need to see the HMS system available and the patients and doctor's dashboards without any issues, the website should respond quickly and the functions like report generation, symptom checker and push notification should work efficiently

- As a Doctor of HMS, I need to get the details of the patients that are taking appointments and I need to have the online diagnosis report access and should be able to access the patient dashboard and send push notifications to patient

- As a patient of HMS, I need to know the doctor's availability and should be able to access the symptom checker and can evaluate the cost estimator access of my doctor visit and can access the push notifications sent by doctor and HMS.

- As a HMS Database Administrator of DB server, I need to access the data of the doctors and patients with the reports of the patient's diagnosis and the symptom checker details of the patient, should be able to upgrade the database and needs to be notified if there is system down or Database breakdown.

- As a HMS Tester I need to be able to check the performance of the HMS system and should check the report generation of the patient and doctor, need to check the functionalities of the system, also need to check the software and hardware used in the system with installation and their process

- As a HMS developer, I need to know the current system features and the issues in the system and should be able to gather the functional requirements from the management and fulfill that in the proposed system with fixing the issues in the current system, also need to check the software and hardware used and specify the management if need of change or upgrade of the software or hardware

- User Story Test Cases:

- Story: As a patient of HMS, I need to know the doctor's availability and book appointment should be able to access the symptom checker and can evaluate the cost estimator access of my doctor visit and can access the push notifications sent by doctor and HMS.

TC1 Check Doctors availability and book appointment

- TC1.1 Verify the ability to search for the doctor

- TC1.2 Verify the ability to check the doctors schedule

- TC1.3 Verify the ability to book an appointment with the doctor

- TC1.4 Verify the ability to check the appointment in the dashboard

TC2 Evaluate the cost estimator

- TC2.1 Verify the ability to search for the disease by a patient

- TC2.2 Verify the ability to check the details and diagnosis of disease by patient

- TC2.3 Verify the ability to generate cost of diagnosis for the disease

- TC2.4 Verify the estimation of the cost for disease by Cost estimator for a patient

Story: As a Doctor of HMS, I need to get the details of the patients that are taking appointments and I need to have the online diagnosis report access and should be able to access the patient dashboard and send push notifications to patient

- TC1 Doctor Dashboard

- TC1.1 Verify the Login Credentials of a doctor

- TC1.2 Verify the doctor dashboard functionalities for a doctor

- TC1.3 Verify the details of the patient by checking the ID for a patient

- TC 1.4 Verify the push notifications functionality sent from the system to patient mobile

TC2 Report Generation

- TC2.1 Verify the Login Credentials

- TC2.2 Verify the generating report for a particular patient by doctor

- TC2.3 Verify the process of sending the report to patient thorough email

- TC 2.4 verify the report generation performance of the system

As a HMS Tester I need to be able to check the performance of the HMS system and should check the report generation of the patient and doctor, need to check the functionalities of the system, also need to check the software and hardware used in the system with installation and their process

TC1 Functionalities of HMS

- TC1.1 Verify Login credentials of HMS

- TC1.2 Verify online diagnosis functionality to patient

- TC1.3 verify doctor access to patient dashboard

- TC1.4 verify patient access to cost estimator

- TC1.5 verify patient access to symptom checker

TC2 Hardware and Software

- TC2.1 Verify the software upgrade of the existing to a new system

- TC2.2 Verify the hardware used is supported for the proposed system

- TC2.3 Verify the system is standard and no break downs

- TC2.4 verify there is a backup data, if the system crashes
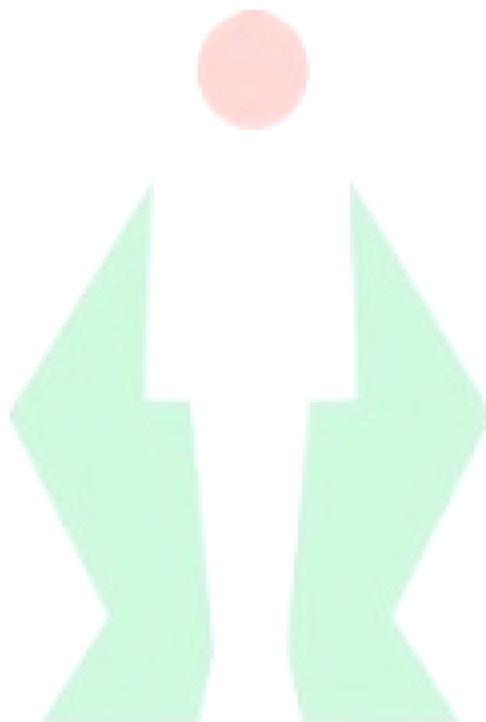
- **User Story**: As a patient of HMS, I need to know the doctor's availability and should be able to access the symptom checker and can evaluate the cost estimator access of my doctor visit and can access the push notifications sent by doctor and HMS.
- **Internal constraints/factors :**
    - Resources required: *1 UI Designer, 1 Database Engineer, 2 Software Developers, 2 Software Test Engineers and 1 Project Manager*
    - Time required (in hours, days, or week): *1 UI Designer (20 hrs.), 1 Database Engineer (40 hrs.), 2 Software developer (40 hrs.), 2 Software Test Engineer (20 hrs. each) and 1 Project Manager (20 hrs.)*
    - Any budget constraint (if money outside of the factored expenses is needed): *no external licensing required, no additional budget constraints.*

External Constraints: *Approval from Director of IT*

Specify Testing Standard	Specify Acceptance Standard
(a) A patient should be able to login to the HMS site with Valid Credentials as per the validations	*(a) A patient should be able to login to the HMS site with Valid Credentials*
(b)Patient should be able to search the doctor availability and book an appointment by within the available time	*(b)Patient should be able to search the doctor availability and book an appointment*
(c)Patient should be able to check the disease symptom's by using symptom checker from the available data	*(c)Patient should be able to check the disease symptom's by using symptom checker*
(d) Patient should be able to estimate the cost for the doctor visit by using cost estimator from the data available	*(d) Patient should be able to estimate the cost for the doctor visit by using cost estimator*
(e)Patient should be able to receive push notifications from the doctor and HMS to his mobile within 24hours	*(e)Patient should be able to receive push notifications from the doctor and HMS to his mobile*

- **User Story**: As a Doctor of HMS, I need to get the details of the patients that are taking appointments and I need to have the online diagnosis report access and should be able to access the patient dashboard and send push notifications to patient and receive notifications after patient booking an appointment
- **Internal constraints/factors :**
    - Resources required: *1 UI Designer, 1 Database Engineer, 2 Software Developers, 2 Software Test Engineers and 1 Project Manager*
    - Time required (in hours, days, or week): *1 UI Designer (20 hrs.), 1 Database Engineer (40 hrs.), 2 Software developer (40 hrs.), 2 Software Test Engineer (20 hrs. each) and 1 Project Manager (20 hrs.)*
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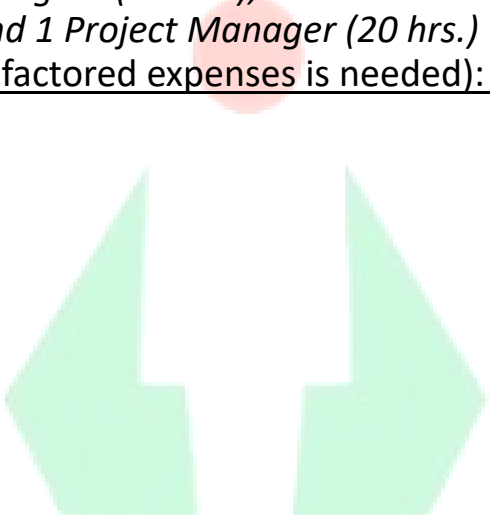
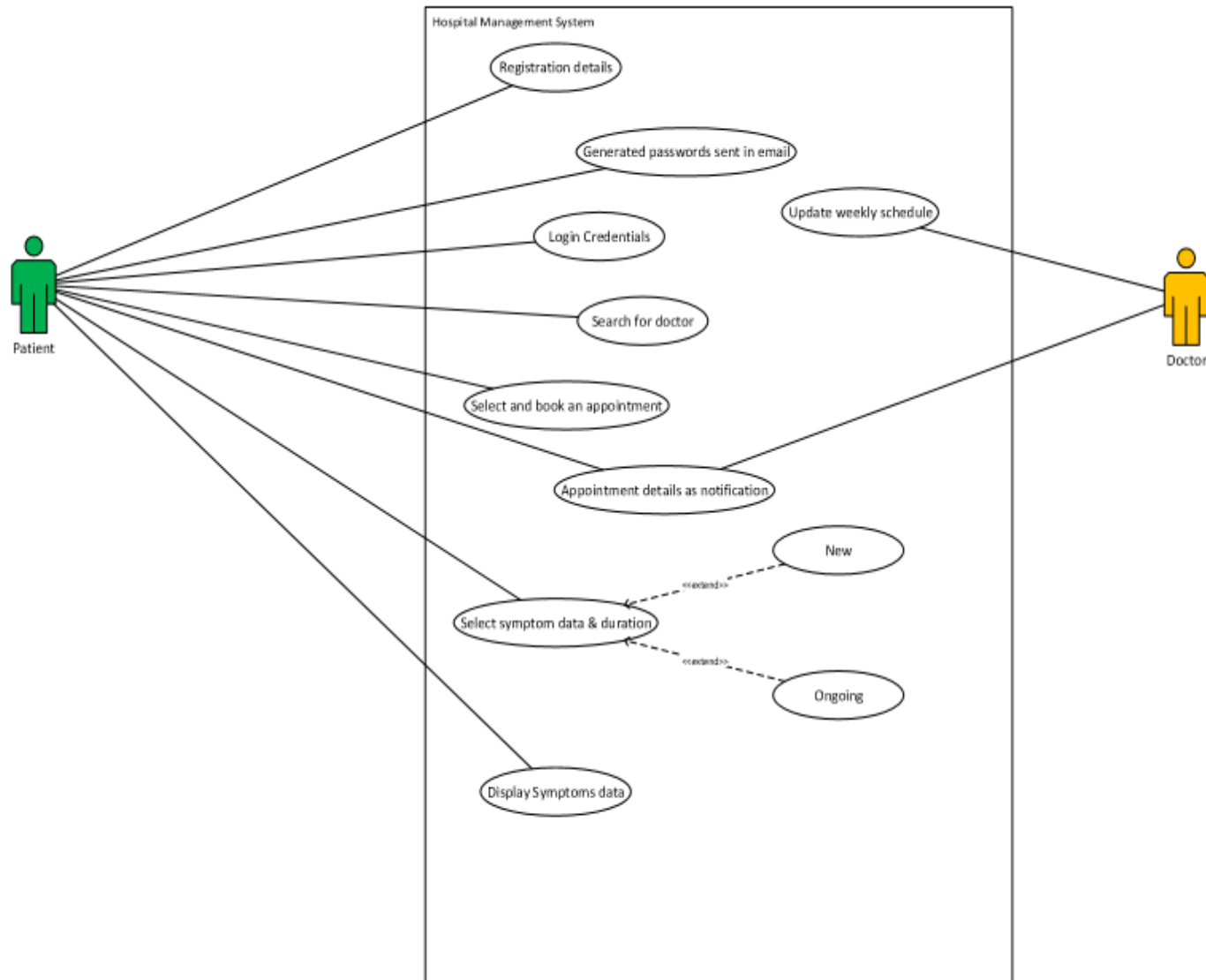| Specify Testing Standard	Specify Acceptance Standard
(a) A doctor should be able to login to the HMS site with Valid Credentials as per the validations	(a) A doctor should be able to login to the HMS site with Valid Credentials as per the validations
(b)Doctor should be able to view the patients appointments in the doctor dashboard as per the time availability	(b)Doctor should be able to view the patients appointments in the doctor dashboard as per the time availability
(c)Doctor should be able to provide the online diagnosis for the patient by logging into patient dashboard	(c)Doctor should be able to provide the online diagnosis for the patient by logging into patient dashboard
(d) Doctor should be able to generate the report for the patient and able to send it as an email or notification as per standards	(d) Doctor should be able to generate the report for the patient and able to send it as an email or notification as per standards
(e)Doctor should be able to receive push notifications from the patient dashboard and send the notifications to patient	(e)Doctor should be able to receive push notifications from the patient dashboard and send the notifications to patient

- **User Story**: As a HMS management, we need to see the HMS system available and the patients and doctors dashboards without any issues, the website should respond quickly and the functions like report generation, symptom checker and push notification should work efficiently
- **Internal constraints/factors :**
  - Resources required: *2 Software Developers, 2 Software Test Engineers and 1 Project Manager*
  - Time required (in hours, days, or week: *2 Software developer (80 hrs.), 2 Software Test Engineer (80 hrs. each) and 1 Project Manager (40 hrs.)*
  - Any budget constraint (if money outside of the factored expenses is needed): *no external licensing required, no additional budget constraints.*
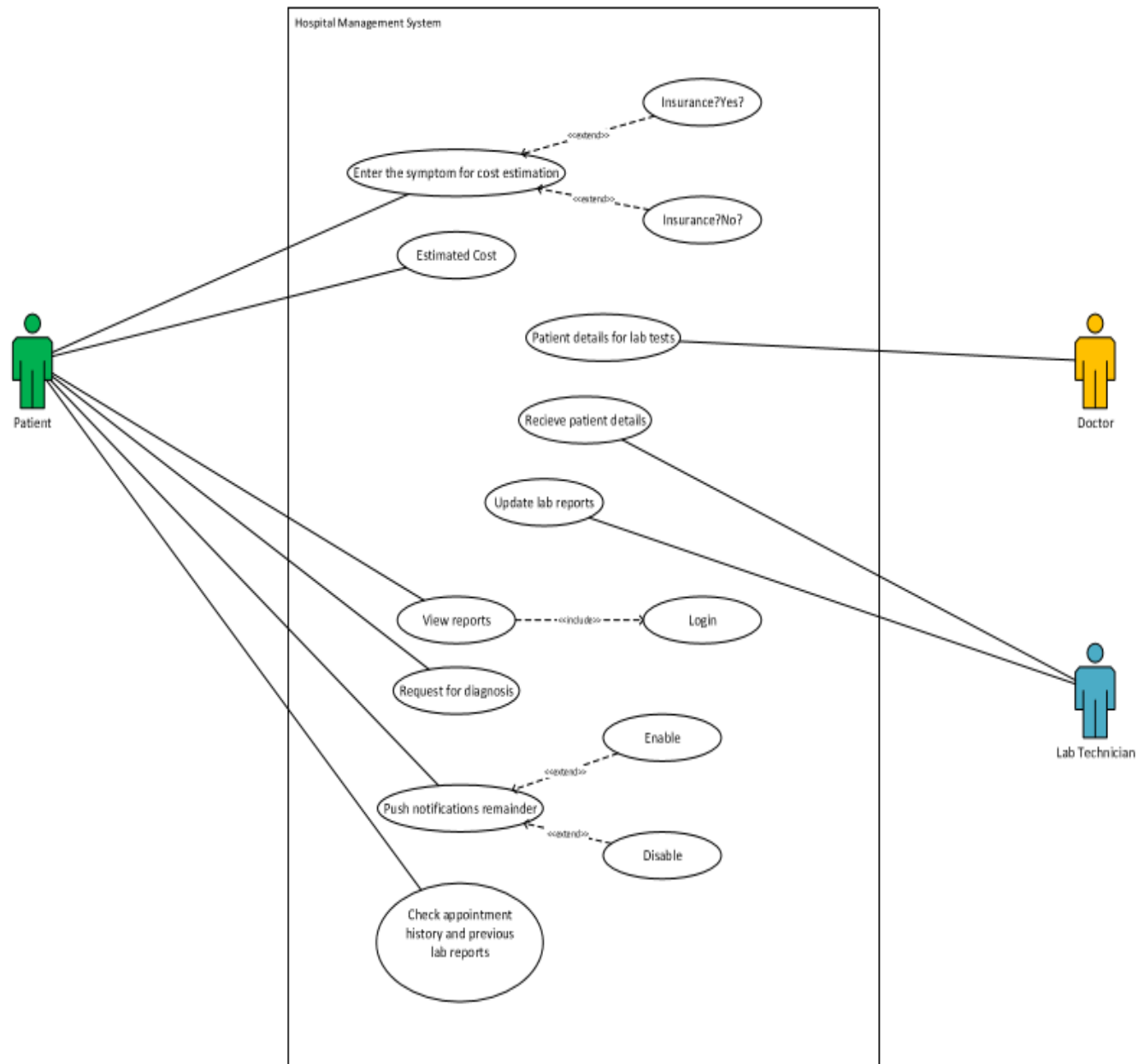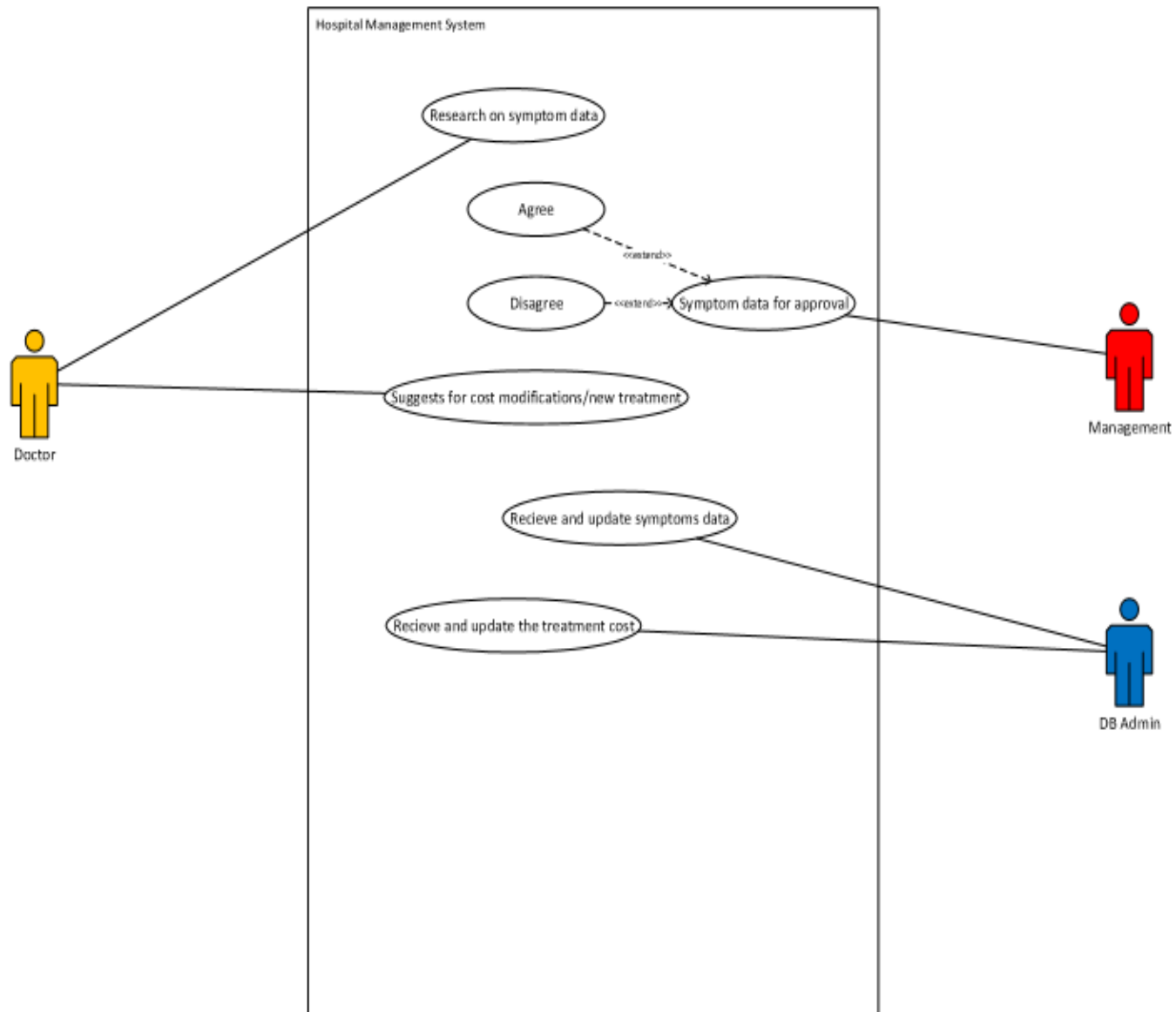
External Constraints: *Approval from Senior VP of IT*
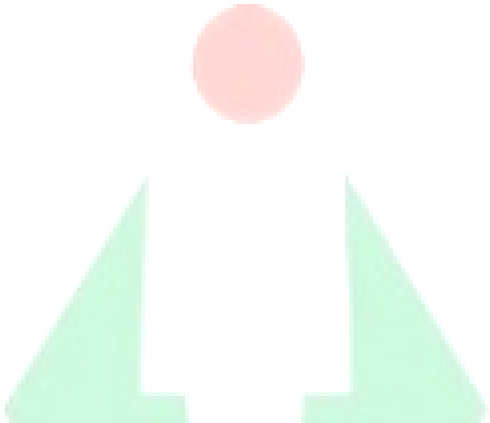
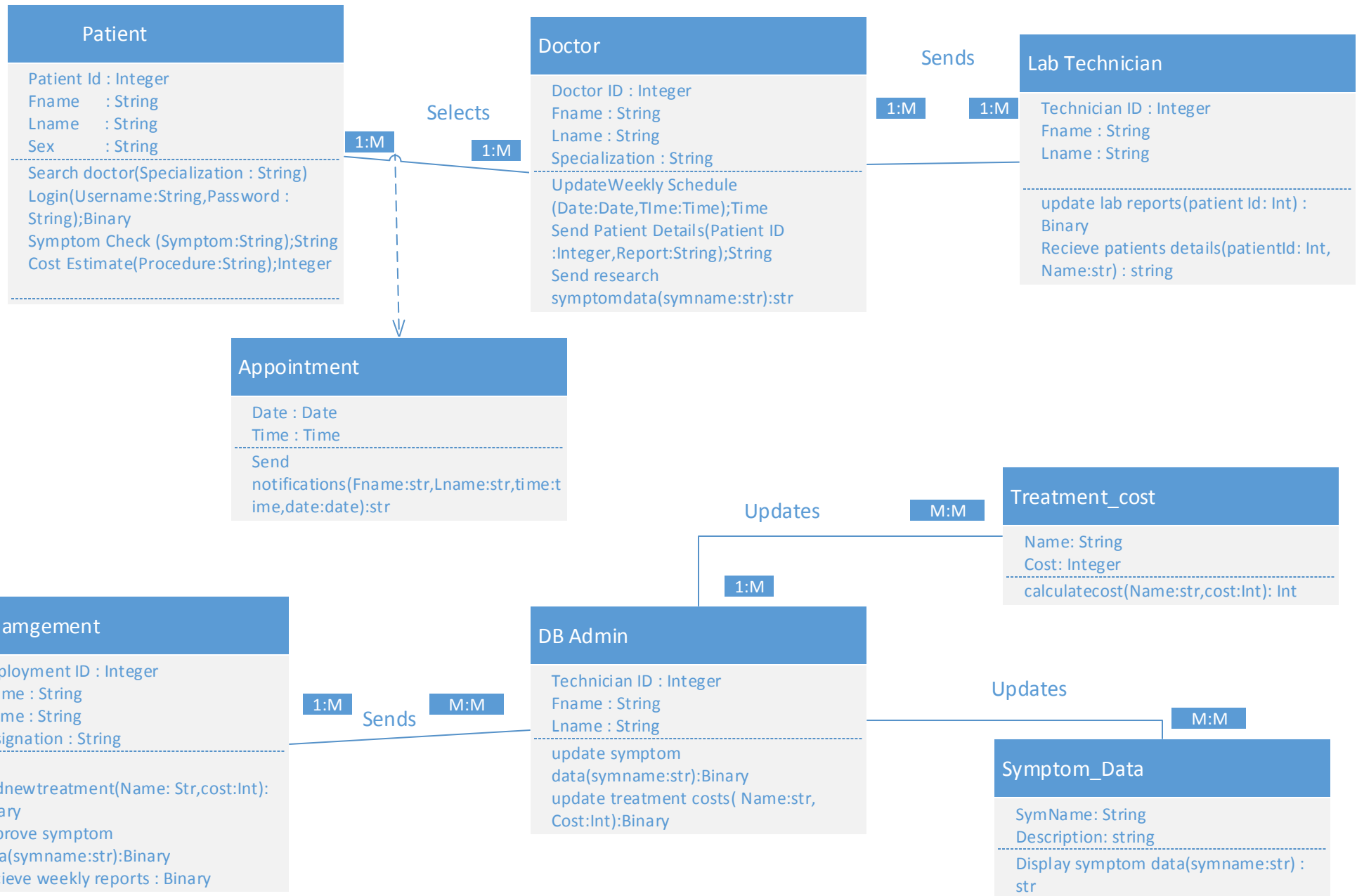| Specify Testing Standard	Specify Acceptance Standard
(a) As a management should be able to login to the HMS site with Valid Credentials as per the validations	*(a) A management should be able to login to the HMS site with Valid Credentials*
(b) Management should be able to check the patient and doctor dashboards without any issues and access their data	*(b) Management should be able to check the patient and doctor dashboards without any issues and access their data*
(c) Management should be able to generate the reports of the patients and doctors and send it them through an email or as a notification	*(c) Management should be able to generate the reports of the patients and doctors and send it them through an email or as a notification*
(d) Management should be able to check the system maintenance and upgrade of the system if there are any new enhancements or changes to the existing system	*(d) Management should be able to check the system maintenance and upgrade of the system if there are any new enhancements or changes to the existing system*

Use Case Diagram:

Hospital Management System

Insurance?Yes?

<<extend>>

Enter the symptom for cost estimation

<<extend>>

Insurance?No?

Estimated Cost

Patient details for lab tests

Recieve patient details

Update lab reports

View reports

<<includes>>

Login

Request for diagnosis

Enable

Push notifications remainder

<<extend>>

<<extend>>

Disable

Check appointment history and previous lab reports

Patient

Doctor

Lab Technician

Hospital Management System

Research on symptom data

Agree

Disagree <<extend>> Symptom data for approval

<<extend>>

Suggests for cost modifications/new treatment

Doctor

Management

Recieve and update symptoms data

Recieve and update the treatment cost

DB Admin

Use Case Name: Book Appointment		ID: __1_	Importance Level: High

Primary Actor:
Patient

Description:
Patient selects the doctor to complete appointment

Trigger: Patient selects the doctor

Type (Circle One): External / Temporal

Major Steps Performed	**Information for Steps**
1. Open the Hope hospitals mobile app. 2. Enter the login credentials (patient ID, Password). 3. Search for a doctor using zip code, specialization and date 4. Select the doctor from the displayed results. 5. Receive appointment details with date, time and doctor details	1. Mobile app 2. Login credentials 3. Search Doctor 4. Select doctor 5. Appointment Notification.

Inputs	Source	Outputs	Destination
Text data (patient ID, password, zip code, Specialization and date)	**Patient**	**Appointment details**	**System(Database)**

Use Case Name: Request for online diagnosis		ID: _1_	Importance Level: High

Primary Actor:
Patient

Description:
Patient select the report and request for online diagnosis

Trigger: Patient select the report

Type (Circle One):   External / Temporal

Major Steps Performed	Information for Steps
1. Open Hope Hospitals Mobile app. 2. Enter login credentials (Patient Id, password) 3. View the available reports in chronological order. 4. Select the report and request for diagnosis.	1. Mobile app 2. Login credentials 3. View reports 4. Request diagnosis.

Inputs	Source	Outputs	Destination
Report selection	Patient	Notification about request is sent to doctor	System

Use Case Name: Calculate estimated cost	ID: __1__	Importance Level: High

Primary Actor:
System

Description:

Estimated cost is calculated based on the patient's type of selection

Trigger: system

Type (Circle One):   External / Temporal

Major Steps Performed	Information for Steps
1. Get type of injury, price 2. Get details of insurance 3. Calculate total amount by calculating injury type to price 4. Add multiple treatments as selected by patient 5. Add tax details to the total bill	1. Type of Injury 2. Cost for treatment 3. Tax

Inputs	Source	Outputs	Destination
Text data, numerical value for cost of treatment	**System**	**Total estimated cost**	**System**

Patient

Patient Id : Integer
Fname : String
Lname : String
Sex : String

Search doctor(Specialization : String)
Login(Username:String,Password : String);Binary
Symptom Check (Symptom:String);String
Cost Estimate(Procedure:String);Integer

Doctor

Doctor ID : Integer
Fname : String
Lname : String
Specialization : String

UpdateWeekly Schedule
(Date:Date,TIme:Time);Time
Send Patient Details(Patient ID :Integer,Report:String);String
Send research
symptomdata(symname:str):str

Lab Technician

Technician ID : Integer
Fname : String
Lname : String

update lab reports(patient Id: Int) : Binary
Recieve patients details(patientId: Int, Name:str) : string

Sends 1:M 1:M

Selects 1:M 1:M

Appointment

Date : Date
Time : Time

Send
notifications(Fname:str,Lname:str,time:time,date:date):str

Treatment_cost

Name: String
Cost: Integer

calculatecost(Name:str,cost:Int): Int

Updates M:M

1:M

Manamgement

Employment ID : Integer
Fname : String
Lname : String
Designation : String

Addnewtreatment(Name: Str,cost:Int): Binary
Approve symptom
data(symname:str):Binary
Recieve weekly reports : Binary

DB Admin

Technician ID : Integer
Fname : String
Lname : String

update symptom
data(symname:str):Binary
update treatment costs(Name:str, Cost:Int):Binary

Sends 1:M M:M

Updates

Symptom_Data

SymName: String
Description: string

Display symptom data(symname:str) : str

M:M

Prototype (Input\Output Designs) with Steps:

1)Once the Patient\Doctor logs into the system,This Hope Hospital Management Dashaboard is displayed
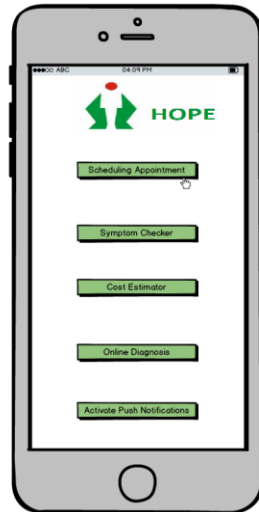

2)When Patient clicks on the Scheduling Appointment in dashboard, this screen is displayed, Patient needs to select the Zip code, type of specialization and Date of appointment and click next
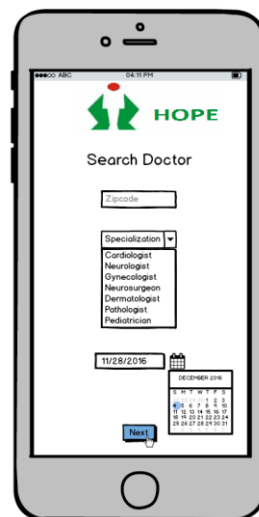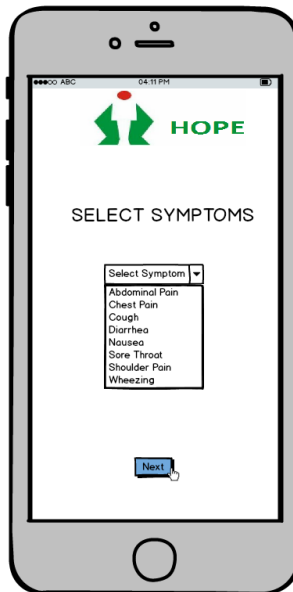
3)Once this screen is displayed, patient selects the type of specialization and date, clicked Next

Name	Date	Time	Select
Kaushik	11/28/2016	5 AM	○
Raviteja B	11/28/2016	9 PM	⦿
Mohammed Jaffer	11/29/2016	3 PM	○
Deepak K	11/30/2016	5 AM	○
Sreekanth A	11/30/2016	6 PM	○
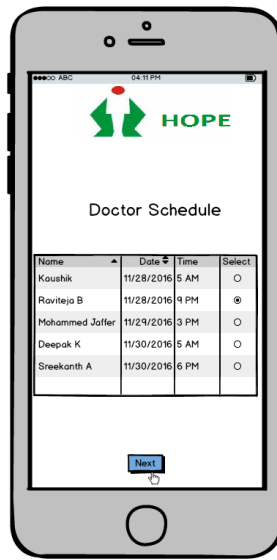
4)Once the patient selects the Doctor and clicked Next this screen is displayed showing confirmation

Confirmation

Dr. Raviteja B
11-28-2016
9:00 PM

CONFIRM
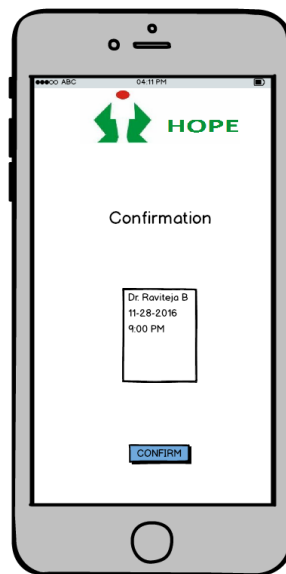
5)When patient clicks on the symptom checker on dashboard and clicked Next this screen is displayed, Patient needs to select the disease type and click next

6)When patient selects the disease type and clicked Next this screen is displayed, Patient needs to update the symptoms of the disease and click on next

7)When patient selects the disease symptoms and clicked Next this screen is displayed with predictions of disease
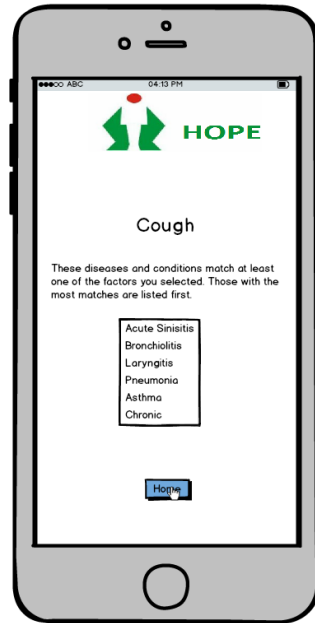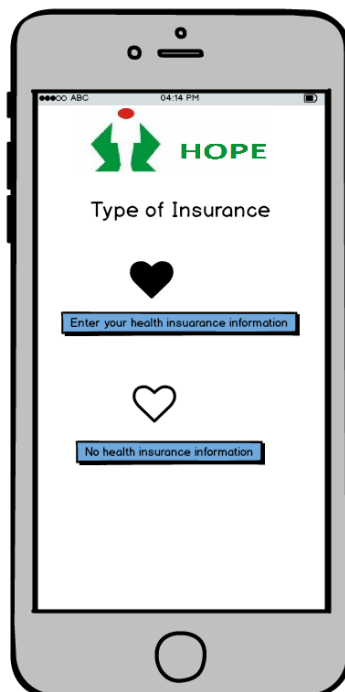
8)When patient clicks on cost estimator on the dashboard this screen is displayed, when patient selects the area of body\type of treatment and click next
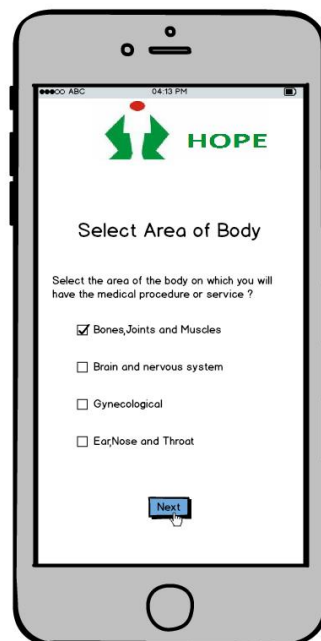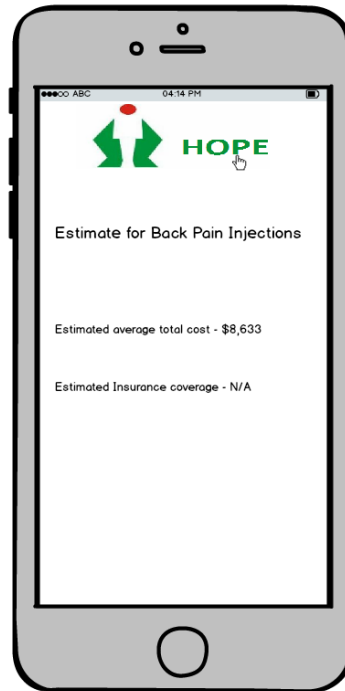

9)When patient selects the Type of treatment and clicked Next this screen is displayed, then patient selects the type of procedure\diagnosis and clicks next
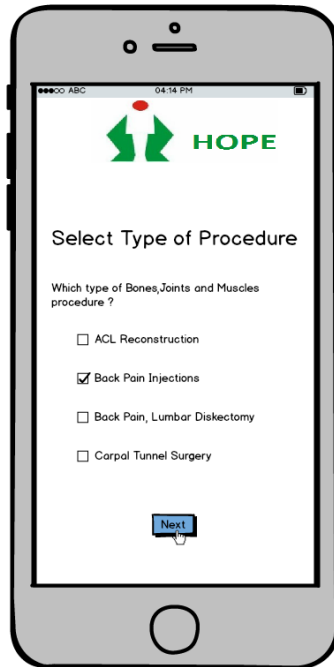
10)When patient selects the type of diagnosis and clicked Next this screen is displayed, then patient needs to select the type of insurance and click next

11)When patient selects the insurance type and clicked Next this screen is displayed with the cost estimated

Estimate for Back Pain Injections

Estimated average total cost - $8,633

Estimated Insurance coverage - N/A

12)When patient clicks on online diagnosis this screen is displayed,Patient needs to upload the reports and click on Request for Diagnosis

User's Report

Request for diagnosis
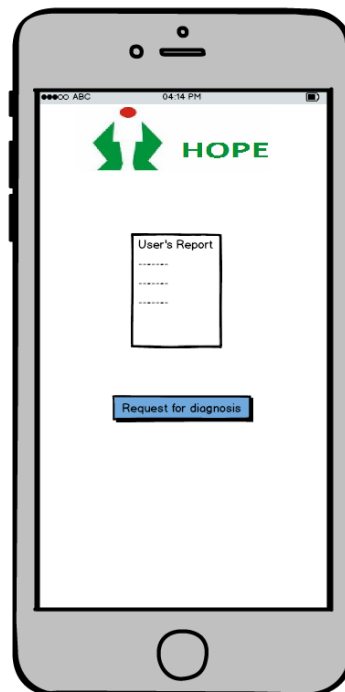
13)When patient click on request for diagnosis and sends it doctor,then doctor updates and gives the feedback.This screen is displayed after doctor giving feedback
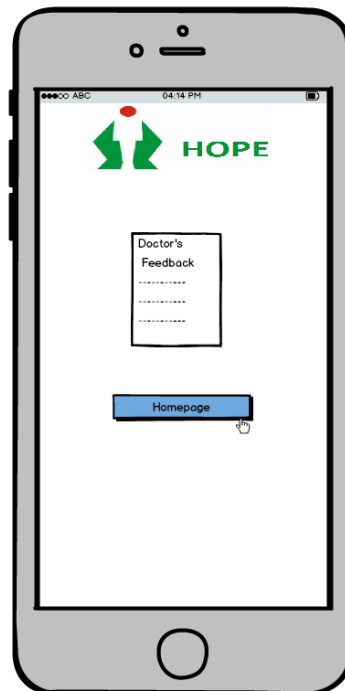
14)when Patient clicks on Push notifications on Dashboard this screen is displayed,Patient can customize the pushnotifications and clickk on confirm

15)If the Patient wants to switch on the pushnotification,this pop up is displayed after clicking on confirm to activate the push notifications by clicking on Yes