# The Mayo Clinic


**PGP-Business Analysis |April 2022 - Cohort 1|**

**Project 4**

**Submitted by: Shubham**

Contents



# Overview:

The Mayo Clinic is an American nonprofit academic medical center currently based in three major locations, Rochester, Minnesota; Jacksonville, Florida; and Scottsdale, Arizona focused on integrated patient care, education, and research. Mayo Clinic holds the number 1 rank among hospitals in the United States.

It was opened on the 30th of September 1889. Over the years it grew in size and facilities. It increased the size of its premises and also the number of doctors it employs.

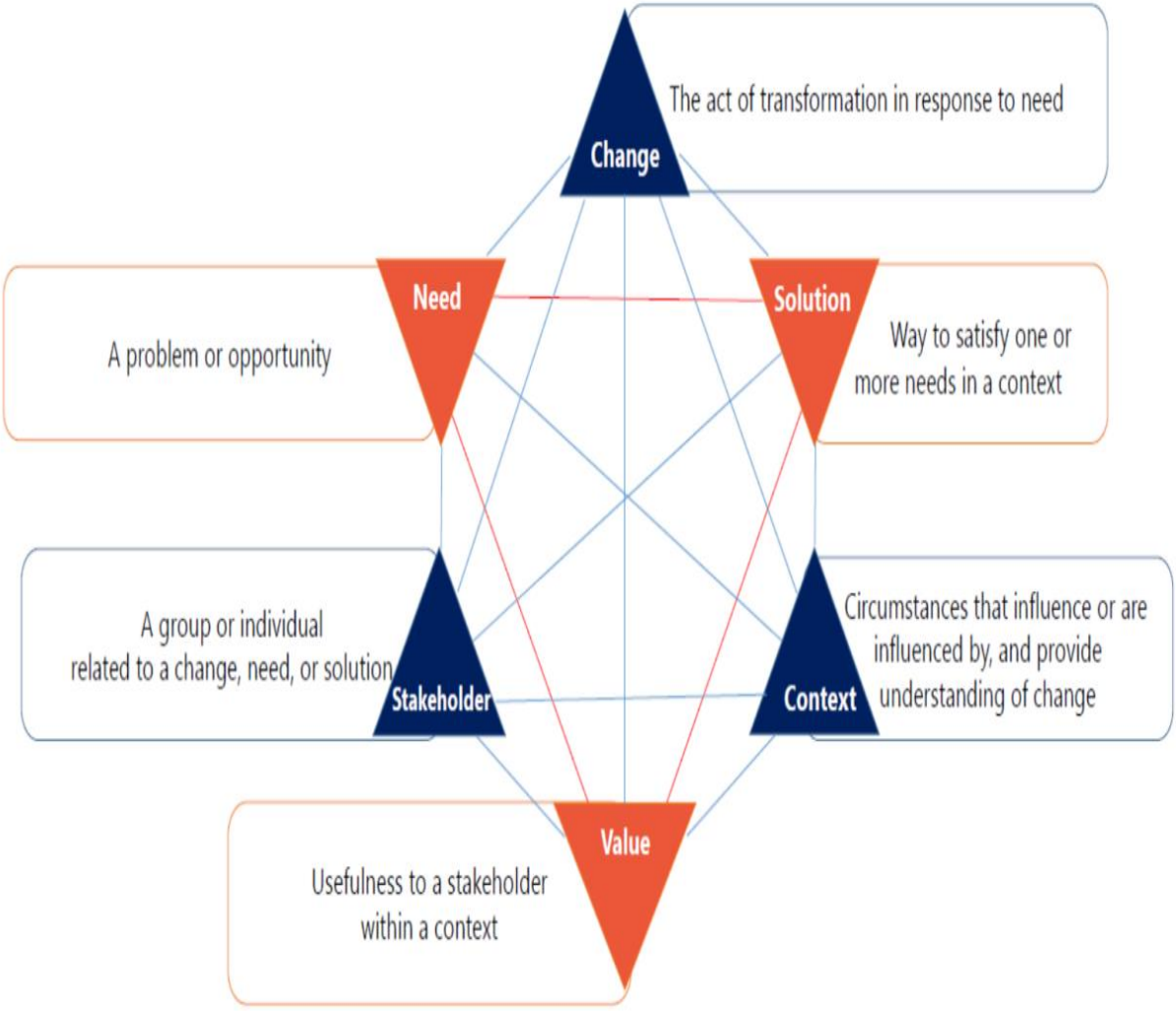
# Mayo Clinic Mission:

The vast number of patients it treated made management of such a huge hospital an arduous task. The paperwork and storing of all patients' records was becoming unmanageable. It was then the management of the hospital decided to invest money in a

hospital management software. The Hospital Management System is designed to manage all hospital operations.

The 1980s initiated transformative changes that set the course for the modern Mayo Clinic. As an early adopter of the Internet, Mayo Clinic has been recognized for its online communications to patients.

## BACCM: Business Analysis Core Concept Model



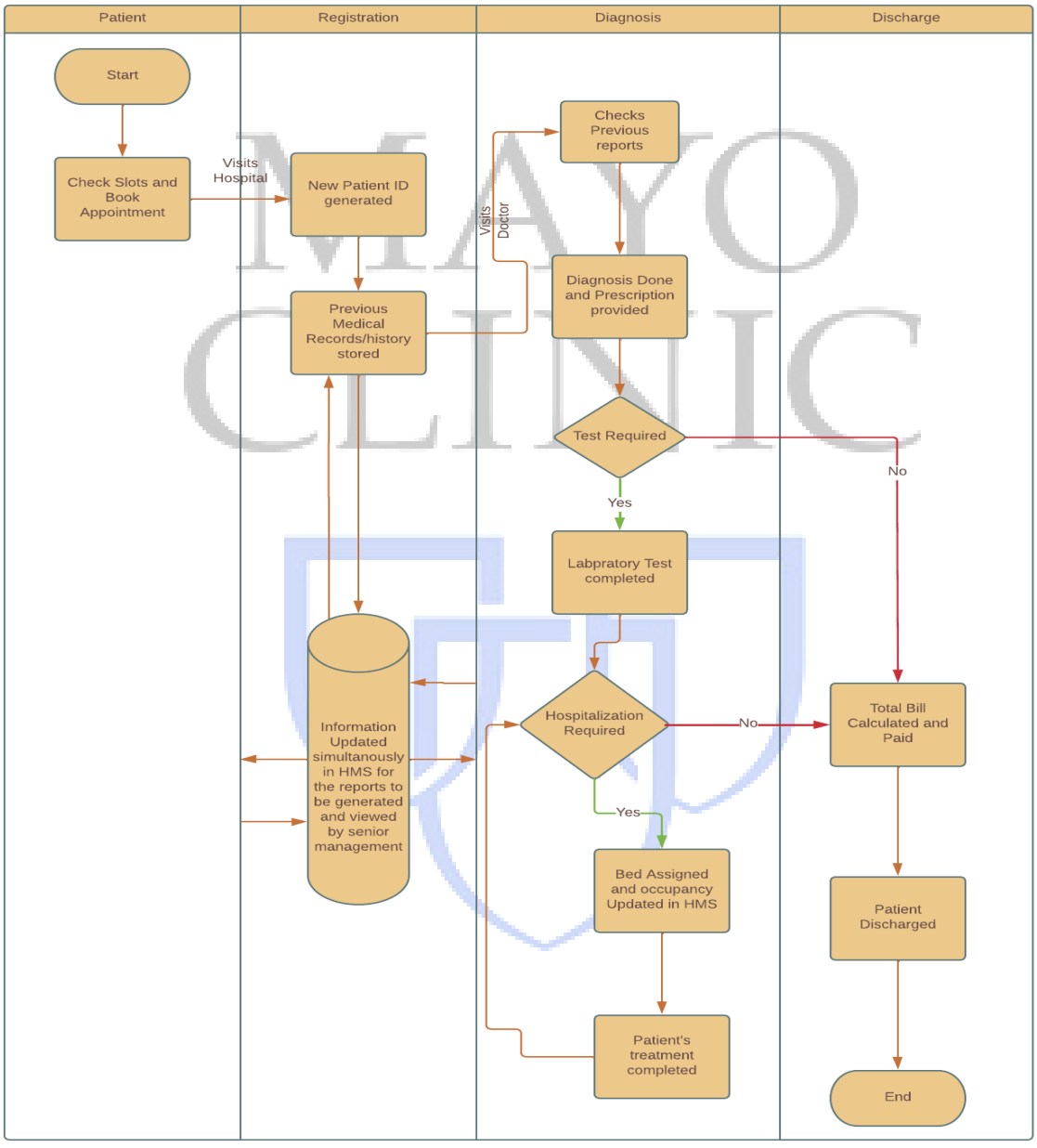
# BACCM Table:

<table>
<tr><td>Need</td><td colspan="3">It has been found that manual handling of records of large number of patients handled by Mayo Clinic is becoming an arduous task. It is also discovered that details regarding to no. of available beds, available hospital, reports of tests also not manageable due to large number of patients.</td></tr>
<tr><td>Change</td><td colspan="3">Stakeholders decided to change the manual management stem to online system referred as Hospital Management system to make it easy and convenient.</td></tr>
<tr><td>Solution</td><td colspan="3">It was chosen to develop a hospital management system which will be a web-based application and accessible to all patients, doctors and clinic's staff as per the authority assigned to check and update information.</td></tr>
<tr><td>Context</td><td colspan="3">Advancement of technology, more manpower required to manage manual data and possibility of human error influenced the stakeholders to think about bringing a change to management system in hospital.</td></tr>
<tr><td>Value</td><td colspan="3">This will bring a lot of value to stakeholders like:<ul><li>Reduce operating costs of the hospital</li><li>Provide reports to senior management for better decision-making</li><li>Saves patients’ time</li><li>Keeps patients’ medical records secure and stored in cloud</li><li>Keeps track of empty and filled beds in the hospital</li><li>Easy access to patient data</li><li>Reduces documentation in the hospital</li></ul></td></tr>
<tr><td rowspan="2">Stakeholders</td><td>Internal</td><td rowspan="2">Business Analyst</td><td>External</td></tr>
<tr><td><ul><li>Testers</li><li>Implementation SME’s</li><li>Operational Support</li><li>Project Manager</li><li>Domain SME</li></ul></td><td><ul><li>Administrative Staff</li><li>Doctors</li><li>Nurses</li><li>Senior Management (Sponsors)</li><li>Regulators</li><li>Patients (End User)</li></ul></td></tr>
</table>

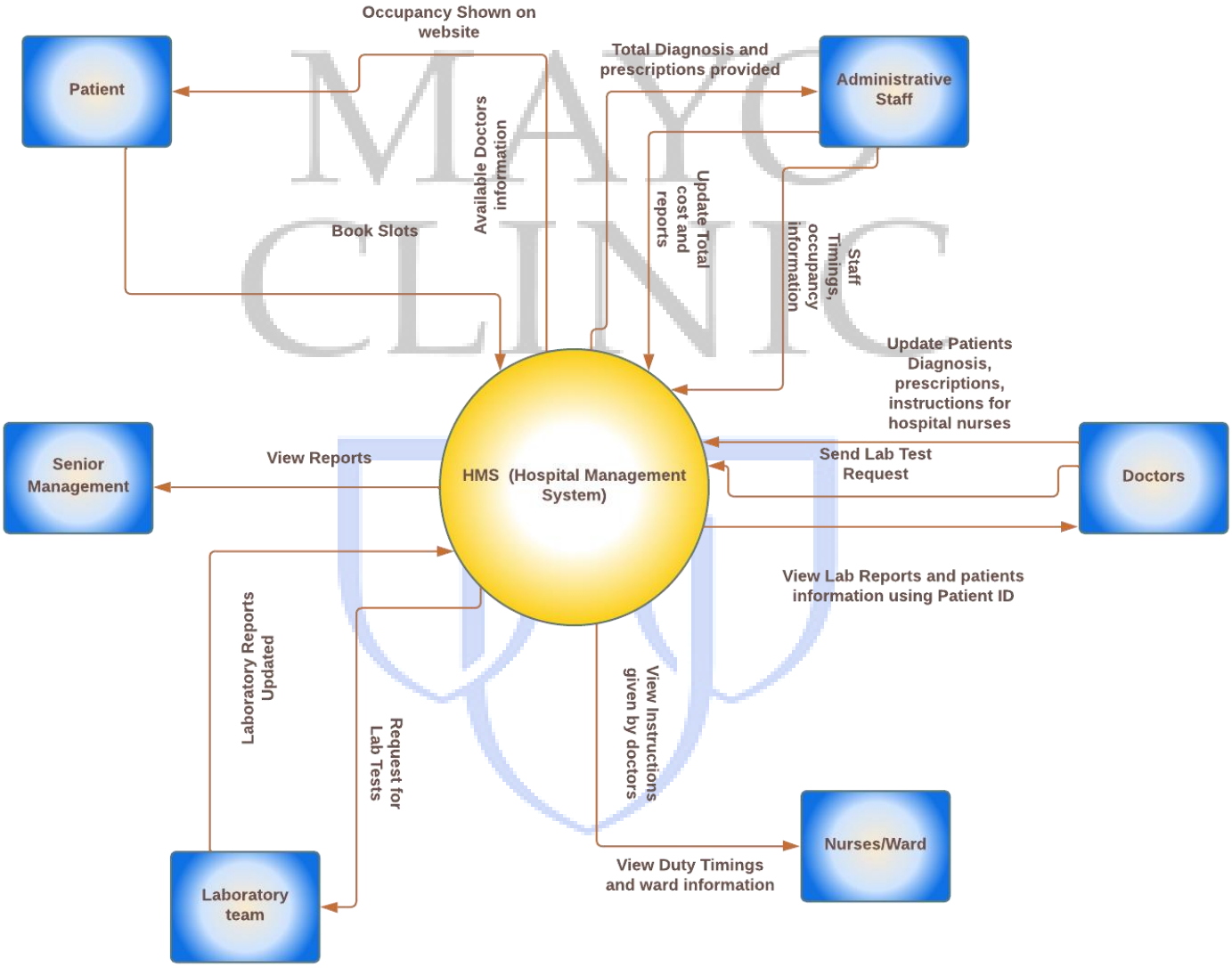
## Stakeholder RACI Matrix:

| Stakeholders | Responsible | Accountable | Consulted | Informed |
|---|---|---|---|---|
| Administrative Staff | | | | I |
| Doctors | | | | I |
| Nurses | | | | I |
| Senior Management | | | | I |
| Regulators | | | C | |
| Patients | | | | I |
| Testers | | | C | |
| Implementation SME | R | | | |
| Domain SME | | | C | |
| Operational Support | R | | | |
| Project Manager | | A | | |
| Business Analyst | R | | | |

# WORKFLOW OF THE PROPOSED SYSTEM



## SCOPE using Context Diagram:




## Main Features to be developed:

1. **Patients' appointment management:** The timings of all the hospital doctors to be displayed on the website. Patients can select the doctor they would like to visit based on the appointment slot available for that doctor. The system shall book the appointment for that patient with the doctor selected

2. **Appointment Reminders:** System shall send email and SMS reminders to the patient one day prior to the appointment date to remind the patient of the appointment.

3. **Patient registration:** When a new patient comes to the hospital, they are registered in the system. The system can store all medical records of the patient and their medical history. The registration staff will give each patient a patient ID. This ID will be used by the patient throughout their stay in hospital. The patient ID will be deleted from the system when the patient checks out.

4. **Bed occupancy:** It keeps tracks of all the beds in the hospital. It will show the list of all the occupied and unoccupied beds in the hospital. Every 6 hours, the person in charge for the hospital floor will update the bed occupancy.

5. **Billing:** HMS will total up all the expenses of a patient at one time and produce a complete bill at the end of the consultation or at discharge. This will save time and effort for each department as they need not produce separate bills for a single patient.

6. **Laboratory, blood bank, and radiation departments to be managed:** If a doctor needs to prescribe any tests for any patient, he will enter the same in HMS. This will be received by the laboratory or radiation department directly. The patient's tests are done, and the reports are uploaded by the department in the HMS. The doctor can log in the system and enter the patient ID and view them directly. This eliminates the need of paper reports and retrieval is also easy.

7. **Reports:** Reports are generated from the HMS for senior management to have a clear understanding on the hospital's revenue, expenses, bed occupancy, and other details.

8. **Staff Management:** It stores the names and timings of the nurses and ward boys on duty with their respective ward numbers.

9. **Instructions for patients:** All the instructions given by the doctors for the nurse to follow for each patient are entered in the system. While conducting patient care the nurse just looks up the system to understand which medicine or what line of treatment, they need to give the patients.

10. **Insurance:** In case of patients that have insurance, all the insurance details are to be stored in the system for claim processing.

11. **Management would like the following reports:**

- Bed occupancy for each day
- Doctors' appointments and revenue generated through OPDs.
- Total number of OPD patients and admitted patients
- Which doctors generate the maximum revenue
- Total amount of earnings through OPD and admitted patients
- Total amount of earnings generated through laboratory and radiology

## In Scope:

For Patients:

- View available doctors, timelines and available occupancy of beds.
- Book appointments.
- One day prior remainders for appointment

For Clinic Staff:

- Update the information of available beds after every 6 hours.
- Registration of new patient.
- Create/read/update/delete patient health record information.
- Prescribe tests, perform same (by laboratory team) and update results in same portal which can be viewed using Unique Patient ID.
- Cumulative billing for all tests, reports and medical healthcare assistance taken by patient.
- Store details of ward and nurses assigned to patients at particular time.
- Submit instructions for nurses to give appropriate treatment care to particular patient.
- Submit insurance details for easy processing of claim.

For Senior Management:

- View Reports created by HMS (Hospital management system)

## Out of Scope:

For Patients:

- Hospital occupancy information can only be viewed from HMS website.
- Can't view senior management information or staff personal information.

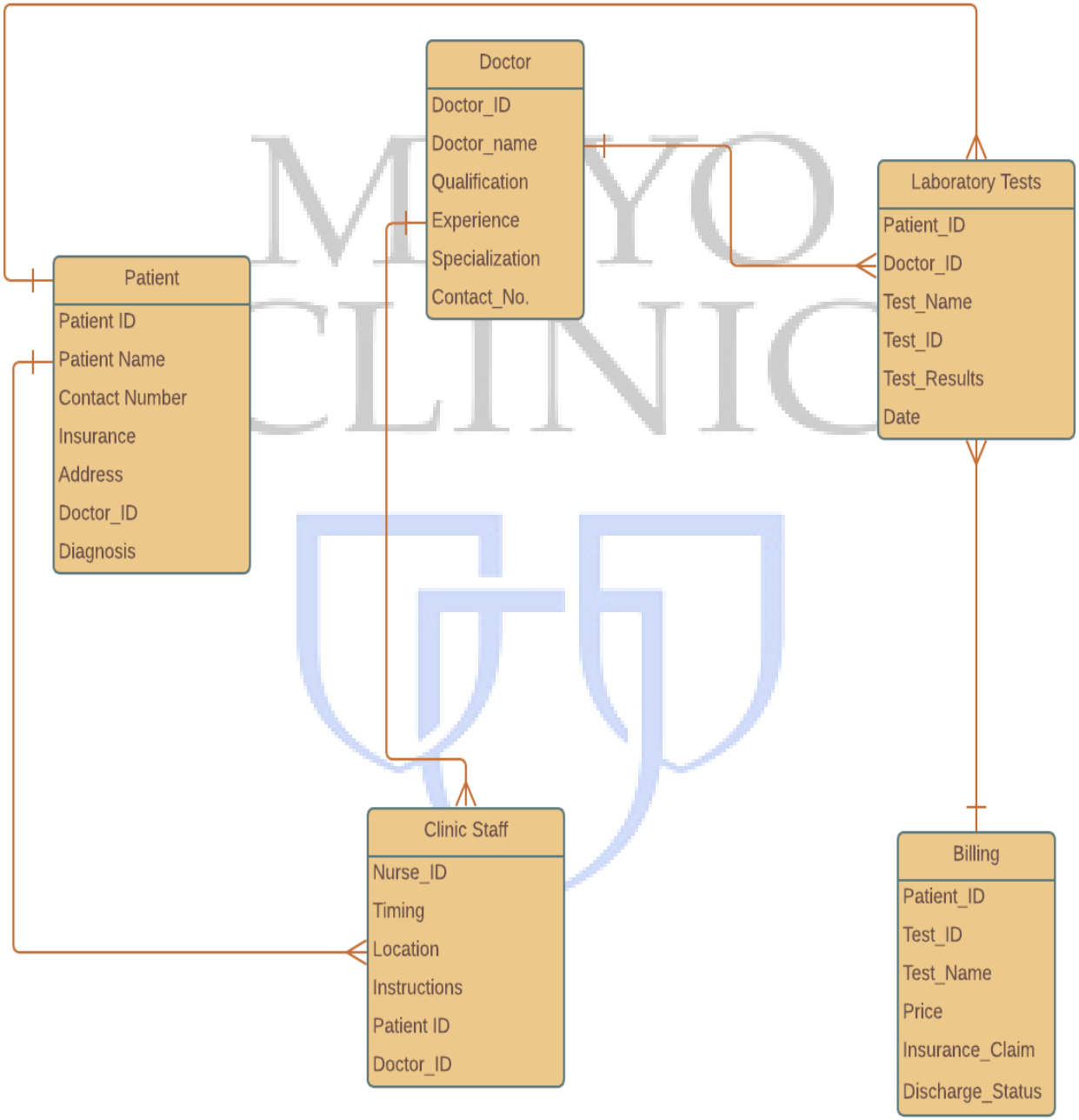
For Clinic Staff:

- View patient details after discharge.
- View reports.
- View patients' personal information.
- Updating bed information before 6 hours.
- Can't view patient information if Patient ID is not created.

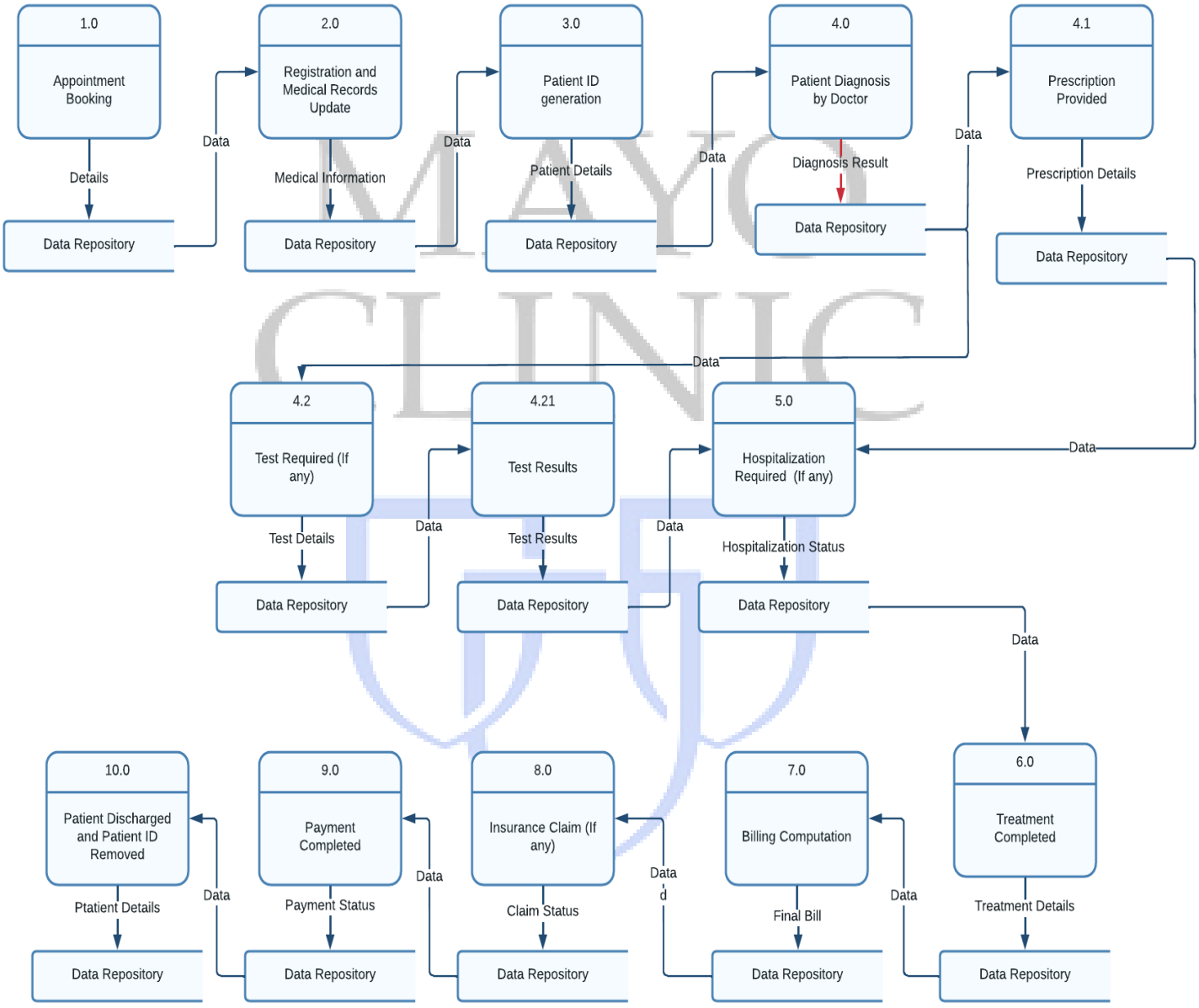
For Senior Management:

- View patients' confidential information.

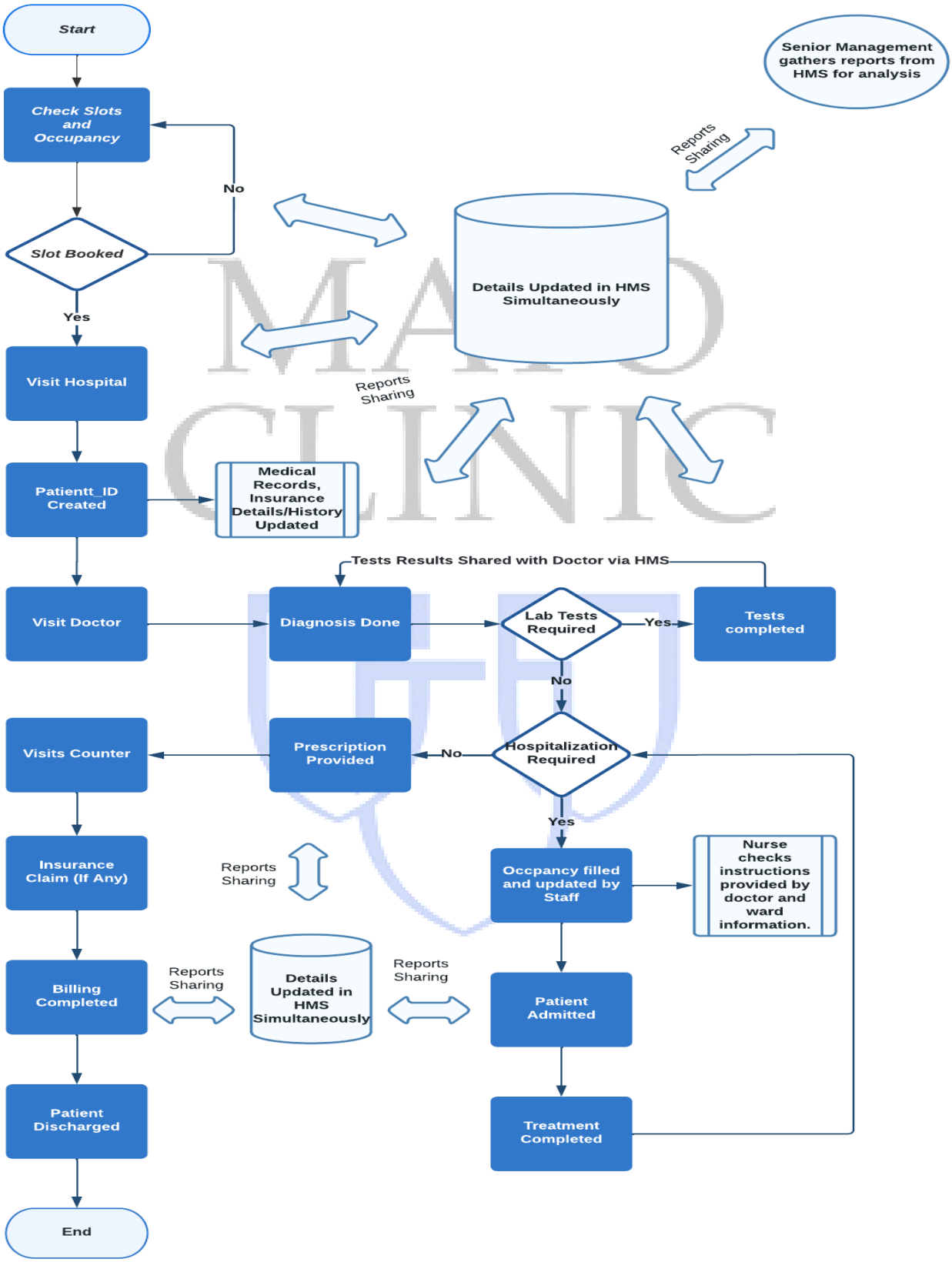
# ER Diagram for HMS



# Data Flow Diagram for HMS



# Flow chart for patient admission



## FUNCTIONAL REQUIREMENTS

- Option to register/login for HMS.
- View occupancy of beds and available slot for next available doctor
- Automation of remainder to be sent one day prior for appointment upon successful registration.
- System should allow submission of new patients' past medical records and history upon admission for each patient using unique Patient ID.
- Creation of unique patient ID for every user upon registration and delete the same once patient's treatment is completed/discharged.
- Accessibility to clinic staff to Create/read/update/delete patients' information.
- Option to prescribe medical tests by doctors and view same using patient ID upon completion.
- Option to check prescribed tests by laboratory team.
- Option to check instructions submitted by doctors for the nurses to treat patients.
- Option to generate reports to be viewed by senior management for analysis.
- Option to view staff timings.
- The system should allow the submission of insurance details for claim settlement.
- The system should be able to do cumulative billing at one time rather than individual billing by each department/individual upon submission.

## NON-FUNCTIONAL REQUIREMENTS

- Response Time: The system shall give responses in 1 second
- Capacity: The System must support 500 people using it at a time
- Errors: The system shall keep a log of all the errors
- Availability: The system shall be available all the time
- Maintainability: The system should be maintainable if found any error or not working efficiently.
- Usability: The screens should be self-explanatory and very user friendly. Management would not want employees not ordering from the system as they cannot understand the screens and data fields on screen. The users should not find the system cumbersome.

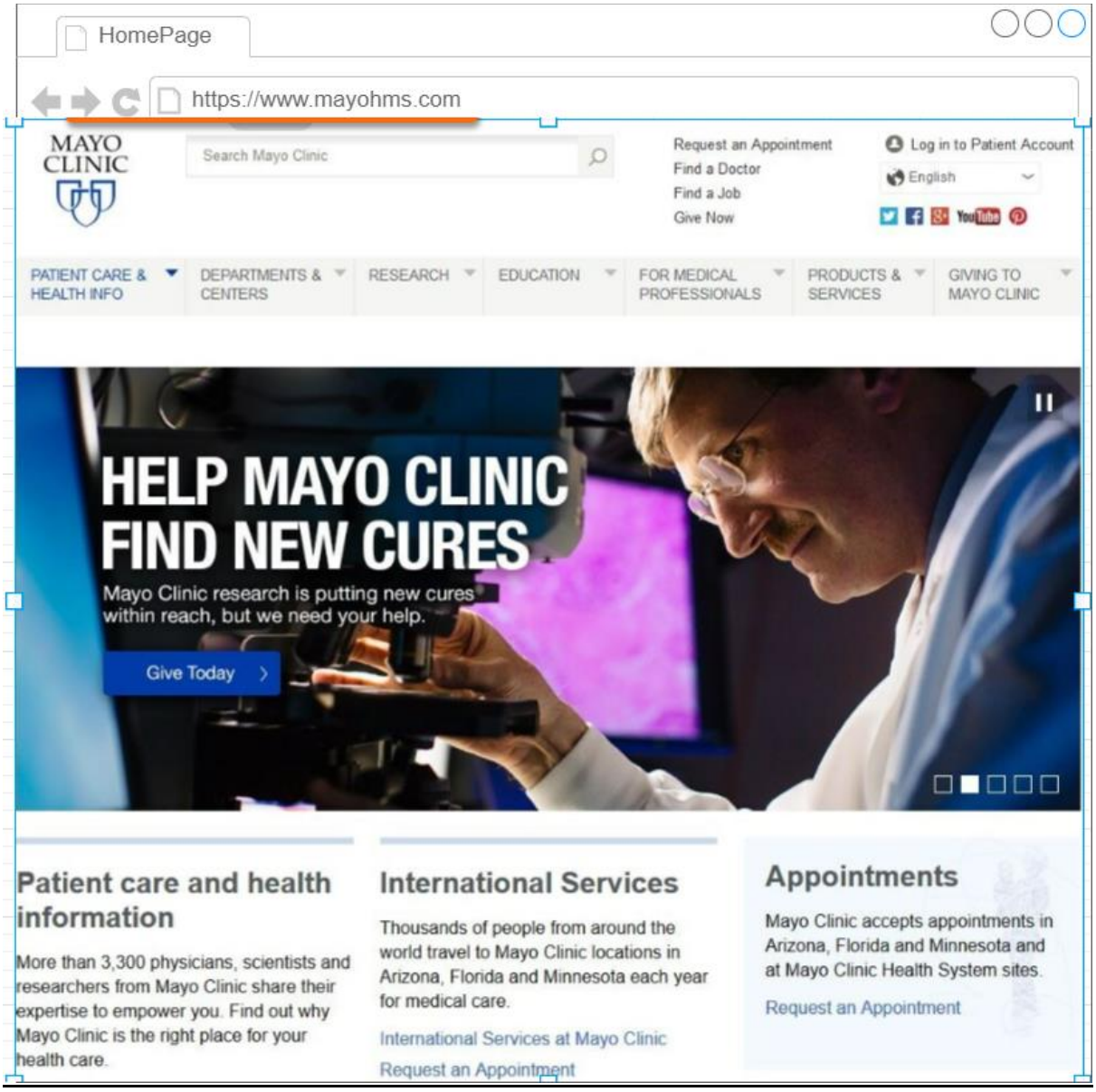
## System Requirement:

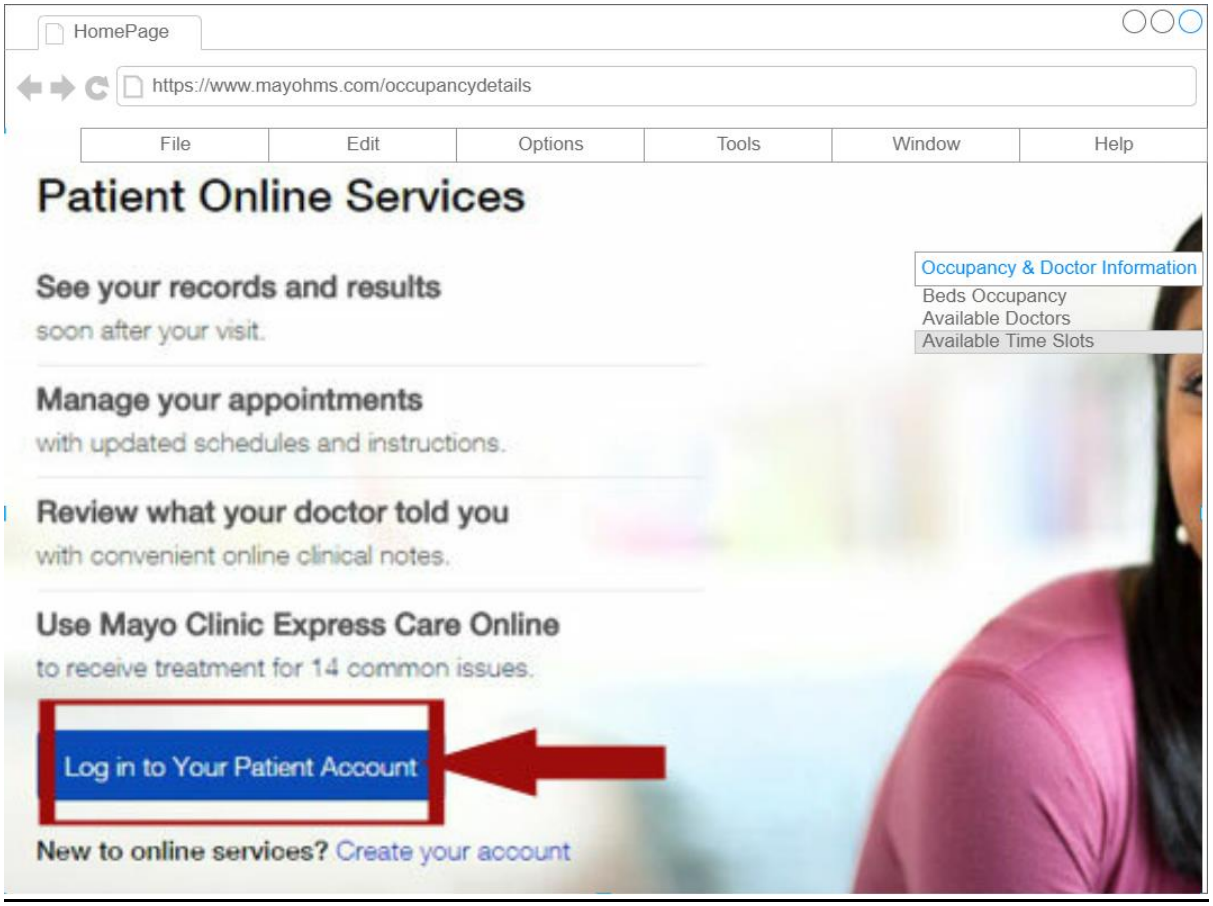
- Database: MySQL Database to be used since it is open source and free.
- Operating System: Shall be Windows 2016
- Web-Based: The system shall be a web-based application

## Usability:

The screens should be self-explanatory and very user friendly. Management would not want employees not ordering from the system as they cannot understand the screens and data fields on screen. The users should not find the system cumbersome.

## Screen Wireframes




HomePage
https://www.mayohms.com/occupancydetails
File
Edit
Options
Tools
Window
Help
Patient Online Services
See your records and results
soon after your visit.
Manage your appointments
with updated schedules and instructions.
Review what your doctor told you
with convenient online clinical notes.
Use Mayo Clinic Express Care Online
to receive treatment for 14 common issues.
Log in to Your Patient Account
New to online services? Create your account
Occupancy & Doctor Information
Beds Occupancy
Available Doctors
Available Time Slots