Project Title: Mayo Clinic_Healthcare Management System

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1. Introduction

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. 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.

1.1 Healthcare MAnagement Software (HMS):

HMS is designed to store patients records, show availability of beds, manage patients' billing, scheduling a doctor's appointment, and will bring about coordination among the different departments.

Advantages of HMS:

- Reduce operating costs of the hospital
- Provide reports to senior management for better decision-making
- Saves patients' time
- Keeps patients' medical records secure and stored in cloud
- Keeps track of empty and filled beds in the hospital
- Easy access to patient data
- Reduces documentation in the hospital

1.2 Project Task:

1. Identifying stakeholders – Create a list of stakeholders (as taught in Business Analysis Planning and Monitoring Knowledge Area)

2. Describe the proposed system's workflow

3. Write the in-scope and out-of-scope items for this software

4. As a Business Analyst working on this project, find out the scope of the hospital management system. To find the scope you can use Use Case diagram (UML) or Context diagram

5. Write down the main features that need to be developed

6. Draw an ER diagram of the system

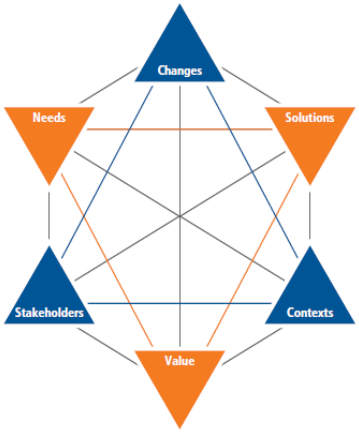
7. Draw a data flow diagram for HMS

8. Write out the Functional and Nonfunctional Requirements for this software

9. Draw a flowchart for the patients' admission process (using flowcharts). You can use any of the popular tools in the market like Microsoft Visio, Lucid Chart, Creately, Pidoco, or Balsamiq

10. Draw wireframes or mock screens for any 2 of the features namely home page and patient registration screen. Students can draw wireframes for any other feature as deemed fit by them. (Use the technique prototyping or wire framing that is taught in the training)

2. BACCM Model



Need	As the clinic size and facilities were increasing, managing such volume of paperwork was a difficult task. The need is to have a hospital management system that will help them manage all the operations effectively.
Change	The change is to move all the paperwork and manual work to a system that can record and manage all the data digitally and reduce the staff load. The new system will help in reducing the hospital operating cost and saving atients' time with online record management and patient communication.
Solutions	The solution is to develop a hospital management system that can facilitate patient registration, patient appointments and reminders, bed occupancy details, billing information, lab tests and reports, staff management and insurance. The data will be stored on cloud and thus eliminating the need for paperwork and manual efforts.
Contexts	The context leading to change that is due to increase in hospital size and facilities. The current system is not efficient enough to safely save all of the patient and internal hospital records.
Value	The Value add to the new system: ● Reduced operational costs in the hospital ● Reports generated by the hospital to make the current functionality better. ● Saves patient time by carrying paper medical history. ● Hospital has access to cloud to safely secure their internal and patient records ● Keeps track of all the beds that are occupied in the hospital for better allocation.
Stakeholders	**Internal stakeholders:** Hospital staff, lab attendants, doctors and nurses, patients, Pharmacy **External Stakeholder:** Supplier, Project Manager, Domain SME, Implementation SME, Operations team, testers

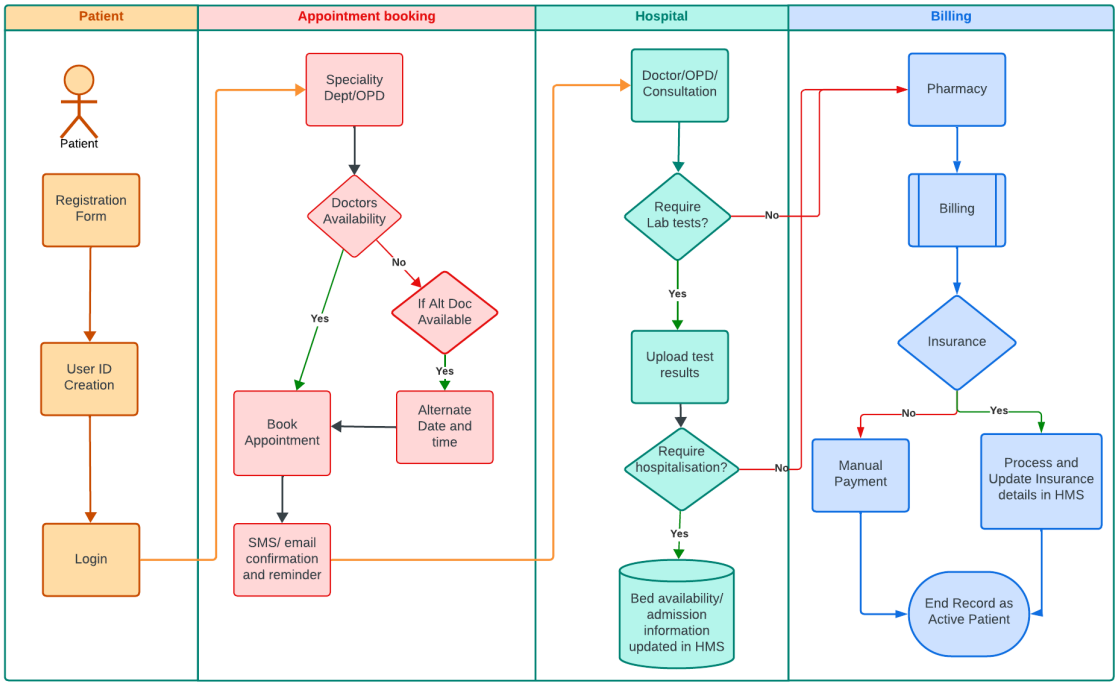
3. Identify Stakeholders

We have already identifies stakeholders in BACCM model. Here, we will crate RACI matrix for the identified stakeholders.

- Responsible (R): The persons who will be performing the work on the task
- Accountable(A): The person who is ultimately held accountable for successful completion of the task and is the decision maker
- Consulted (C): The stakeholder or stakeholder group who will be asked to provide an opinion or information about the task.
- Informed (I): A stakeholder or stakeholder group that is kept up to date on the task and notified of its outcome.

Stakeholders	Responsible	Accountable	Consulted	Informed
Doctors and nurses	R			
Lab attendants	R			I
Pharmacy	R			I
Hospital Staff	R			I
Supplier	R			
Project Manager		A		
Domain SME			C	
Implentation SME			C	
Operations Team			C	
Testers	R			
Business Analyst	R			
Patients				I

4. WorkFlow


Patient
Appointment booking
Hospital
Billing
Patient
Registration Form
User ID Creation
Login
Speciality Dept/OPD
Doctors Availability
No
Yes
If Alt Doc Available
Yes
Alternate Date and time
Book Appointment
SMS/ email confirmation and reminder
Doctor/OPD/ Consultation
Require Lab tests?
No
Yes
Upload test results
Require hospitalisation?
No
Yes
Bed availability/ admission information updated in HMS
Pharmacy
Billing
Insurance
No
Yes
Manual Payment
Process and Update Insurance details in HMS
End Record as Active Patient

5. In Scope and Out of Scope requirements

5.1 In scope requirements:

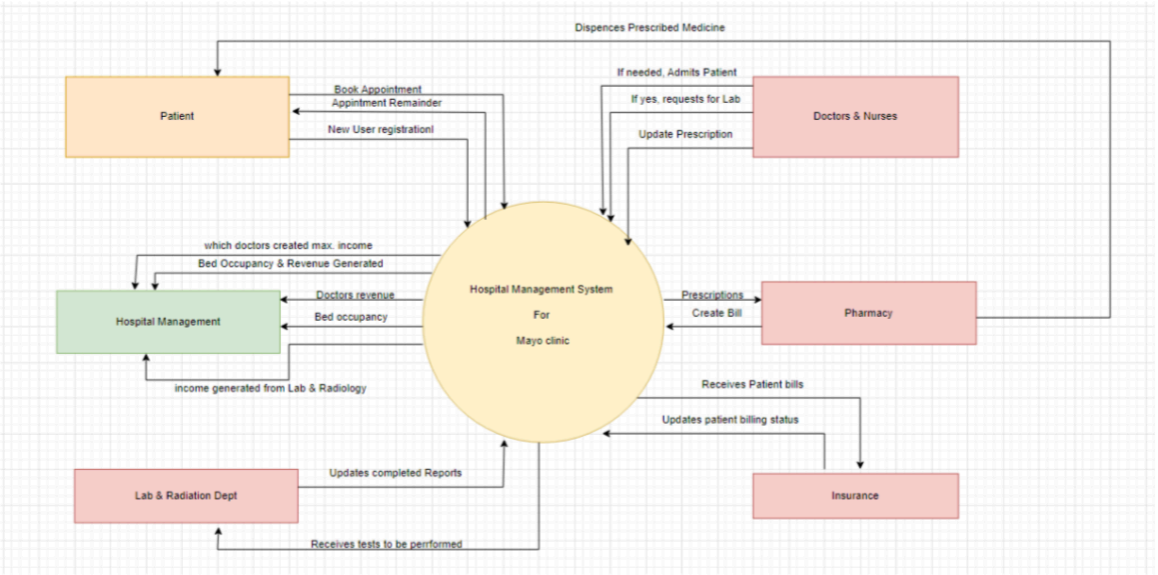
a. Login and Newuser registration : Gives access to the user who fills the necessary registration form and authenticates themselves.
b. Employee Access: Allows appropriate permission to user based role. Authenticates that they are active employees.
c. Patient Appointment: Login and Registration for booking appointments, will display doctors and their availability, Patient can book an appointment with the selected doctor on selected day and time, Patients will in turn receive a reminder by email and SMS one day prior to the date of appointment.
d. Data Repository: The system will store all the patient records and necessary data, Each patient will be given a unique ID that would be used for every visit and stay at the hospital, All the patient aftercare is also stored in the patient history.
e. Lab & Radiology: Dept will receive a prescription from a doctor to do the ordered tests. Results will also be updated for the unique patient ID which will be accessible by Patient and Doctor only.
f. Billing & Insurance: After patient discharge or doctors visit the bill is sent for the payment processing where if active insurance is available the bill is processed accordingly. Patients will be given a bill for payment post not having any active insurance in the record for the payment.
g. Bed Occupancy: During the patient hospital admission process active checks can be done by nursing staff for efficient admission.
h. Staff Management: The system will have a live record of all the active staff workingin the hospital for effective staffing and scheduling.
i. Reports: The system can be used to request following reports for the management:
    - Bed occupancy for each day
    - Doctors' appointments and revenue generated through OPDs.
    - Total number of OPD patients and admitted patients
    - Billings through OPD and admitted patients
    - Billings generated through laboratory and radiology

5.2 Out of Scope requirements:

Below are the features and descriptions:

a. Ordering supplies: The system will not able to integrate with vendor system to order supplies or other items
b. Schedule or Cancellations: Patients cannot cancel or edit appointments once confirmed from their end.
c. Employee details: Staff's personal or other details will not be maintained in this system other than schedules.
d. Employee Payroll: Any type of payroll related to hospital employees will not be maintained here.

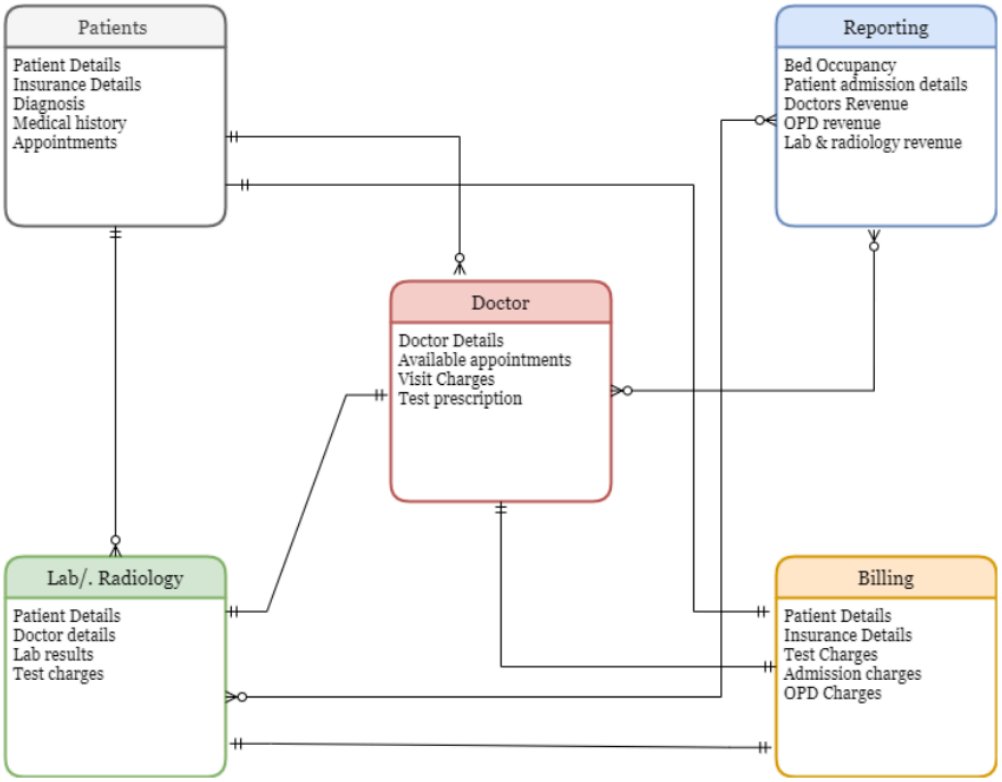
6. Scope of the Project



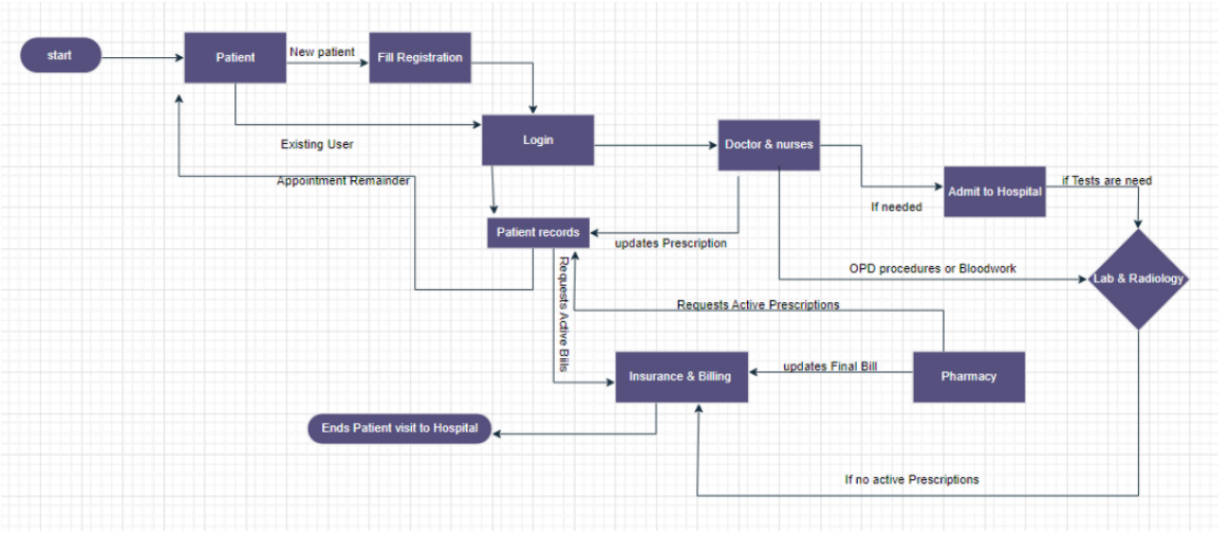
7. Main features of HMS:

1. Web-based Management System
    - Must have MYSQL database and operate with windows 2016
    - Must support volume of at least 500 users at a time
    - Must response within 1 second
    - Must be interactive and user friendly
    - Must be working all the times
2. Patient registration and Login
3. Appointment reminders via Email or SMS
4. Schedule/ Reschedule/ cancel appointment
5. Store patients medical records for anytime access
6. Staff allocation
7. Vacant and allocated bed details
8. Bill generation
9. Patient's insurance details
10. Reports for Senior management
    - Bed occupancy for each day
    - Doctor's appointment and revenue generation through OPDs
    - Total number of OPD and admitted patients
    - Which doctor generate maximum revenue
    - Total amount of earnings through OPDs and admitted patients
    - Total amount of earnings through lab and radiology

8. Entity relationship (ER) diagram:



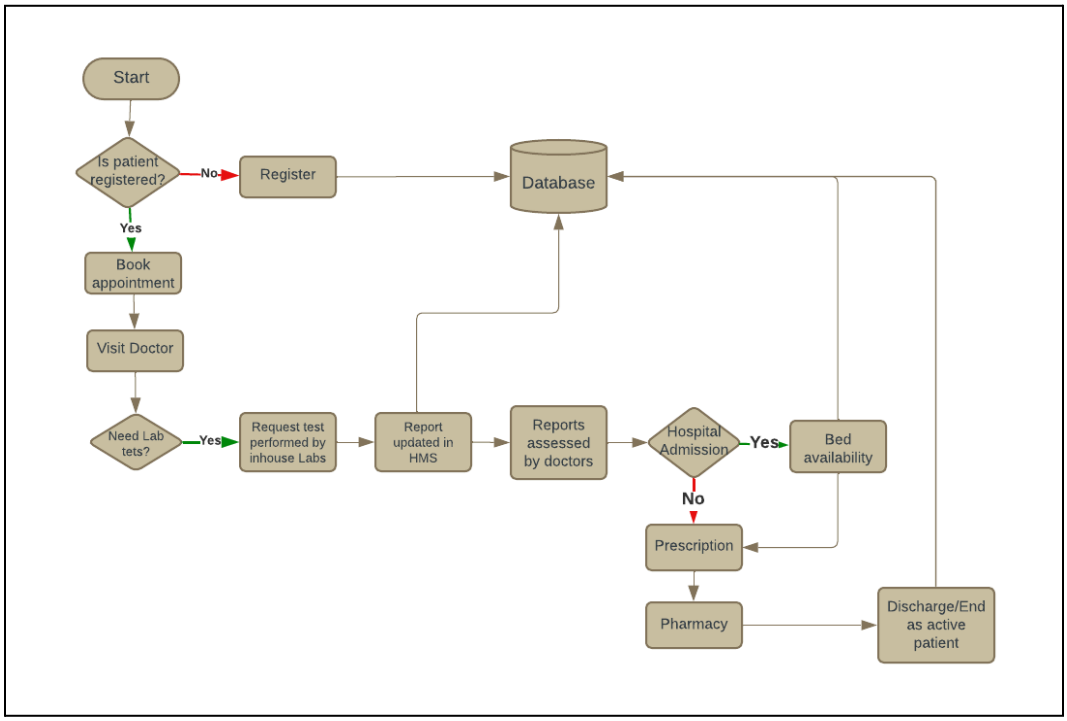
9. Data Flow diagram



10. Functional and Non-functional requirements:

Functional Requirements	Non-functional requirements
• Patient registration screen • Appointment booking and reminder • Patient's medical records • Doctor's prescription page • Lab and radiology reports page • Bed occupancy details portal • Staff allocation and management • Medical expenses and billing calculation • Reports for senior management • Insurance information	• **MySQL Database** to be used since it is open source and free. • **Operating system** shall be windows 2016 • The system shall be a web-based application. • The system shall response within 1 second • The system must support 500 people using at a time • The system shall keep logs of all the errors • The system shall be available all the time • The system should be self explanatory and very user friendly. • Cloud storage system

11. Patient Admission Process



12. Wireframing