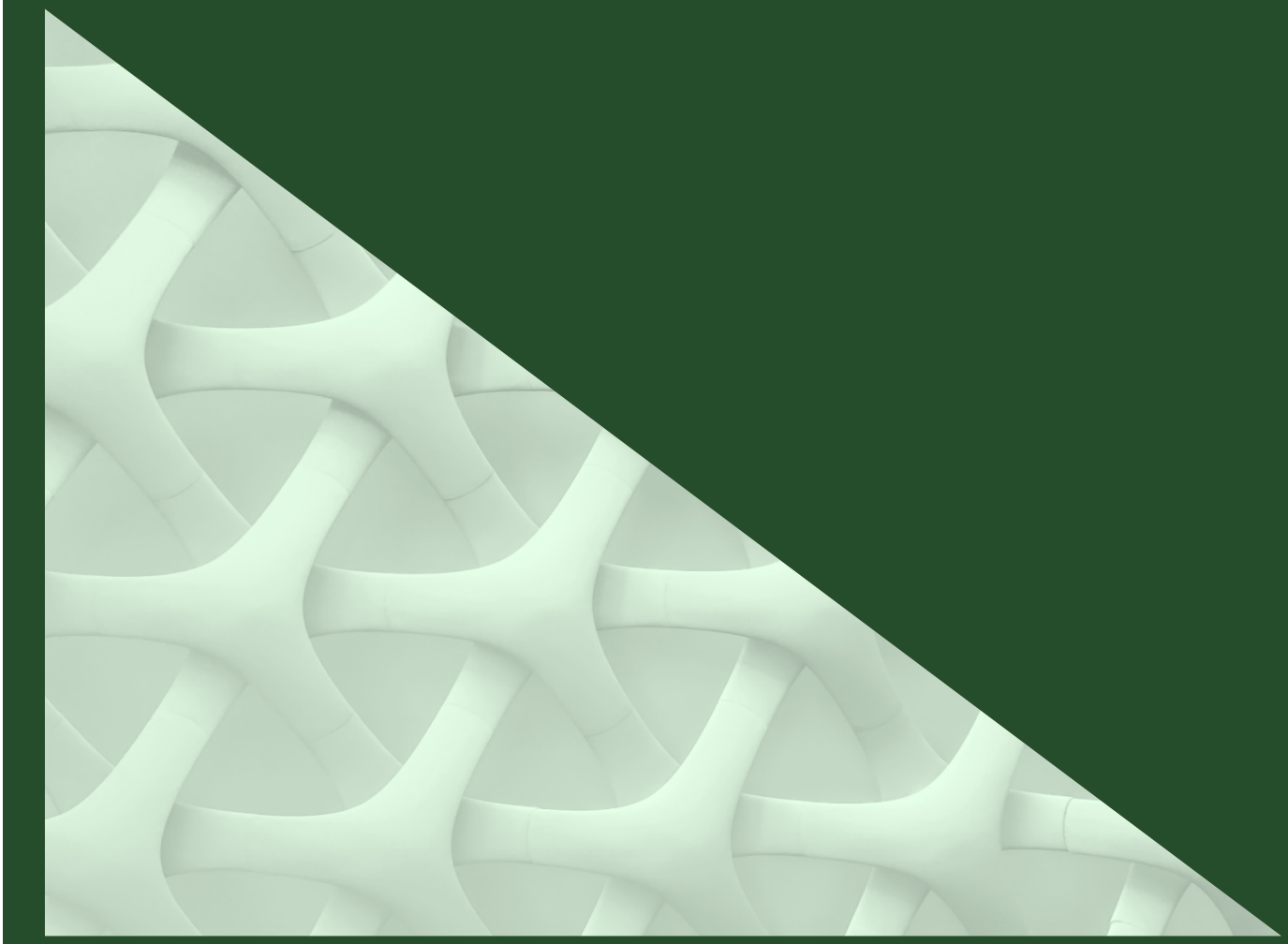

The Mayo Clinic

Overview and summary

The Mayo Clinic is a renowned nonprofit academic medical centre with a significant presence in Rochester, Minnesota; Jacksonville, Florida; and Scottsdale, Arizona. Renowned for its integrated approach to patient care, education, and research, Mayo Clinic has earned the top ranking among U.S. hospitals

Since its establishment on September 30, 1889, Mayo Clinic has undergone substantial growth in both size and capabilities. As the institution expanded, managing its operations became increasingly complex, particularly in terms of patient record management and administrative tasks. To address these challenges, the hospital's leadership made the strategic decision to invest in a comprehensive Hospital Management System.

Hospital Management System Implementation

The HMS is designed to streamline various hospital operations, including:

- Patient record storage
- Bed availability tracking
- Billing management
- Appointment scheduling
- Inter-departmental coordination

Key Advantages of HMS:

1. **Operational Efficiency:** Reduces hospital operating costs
2. **Data-Driven Decision Making:** Provides comprehensive reports to senior management
3. **Patient Experience:** Saves time for patients and improves service delivery
4. **Data Security:** Ensures secure storage of medical records in the cloud
5. **Resource Management:** Efficiently tracks bed occupancy
6. **Information Accessibility:** Facilitates easy access to patient data
7. **Paperless Operations:** Significantly reduces physical documentation

Digital Transformation Journey

Mayo Clinic's digital transformation journey began in the 1980s, setting the foundation for its current technological prowess. The institution's early adoption of internet technologies has positioned it as a leader in online patient communications

This forward-thinking approach to technology adoption aligns with Mayo Clinic's commitment to innovation and excellence in healthcare delivery. The implementation of the HMS represents a significant step in this ongoing digital transformation, enabling the institution to maintain its position at the forefront of healthcare while managing its growing operations efficiently.

Stakeholders

Actors	What they can do on the system
Administrative staffs	• Store medical records of the patients and their medical history • Get updates of bed occupancy and vacant beds • Get complete bill at the end of consultation or discharge
Doctors	• Prescribe tests for patients to the laboratory or radiation department directly • View patients records and test results
Nurses and ward staff	• Get details of prescribed medicine for patients • Get treatment details of the patients
Patients	• Select the available visit slot for the doctor of their choice • Get SMS reminders one day prior to appointment date
Senior management	• Generate reports on hospitals revenue, expenses, bed occupancy and other details

Scope

The HMS will be a comprehensive, web-based solution designed to streamline and automate various hospital operations. The system will include the following benefits to the respective stakeholders:

- Patients
  - Online appointment booking with preferred doctors
  - Appointment reminders via email and SMS
  - Centralized medical records for easy access
  - Streamlined billing process
  - Improved care coordination
- Doctors
  - Efficient appointment scheduling
  - Easy access to patient medical history and test results
  - Digital prescription management
  - Improved communication with other departments
- Nurses and Ward Staff
  - Clear view of patient care instructions
  - Efficient bed management
  - Streamlined communication with doctors and other departments
- Laboratory and Radiology Staff
  - Direct receipt of test orders from doctors
  - Digital report uploading and sharing

- Administrative Staff
  - Simplified patient registration process
  - Automated billing and insurance claim processing
  - Efficient bed occupancy tracking
- Management
  - Comprehensive reports on hospital performance
  - Insights into revenue generation and resource utilization
  - Data-driven decision-making capabilities

Workflow of the proposed system

The future system workflow is described by Swimlane diagram:

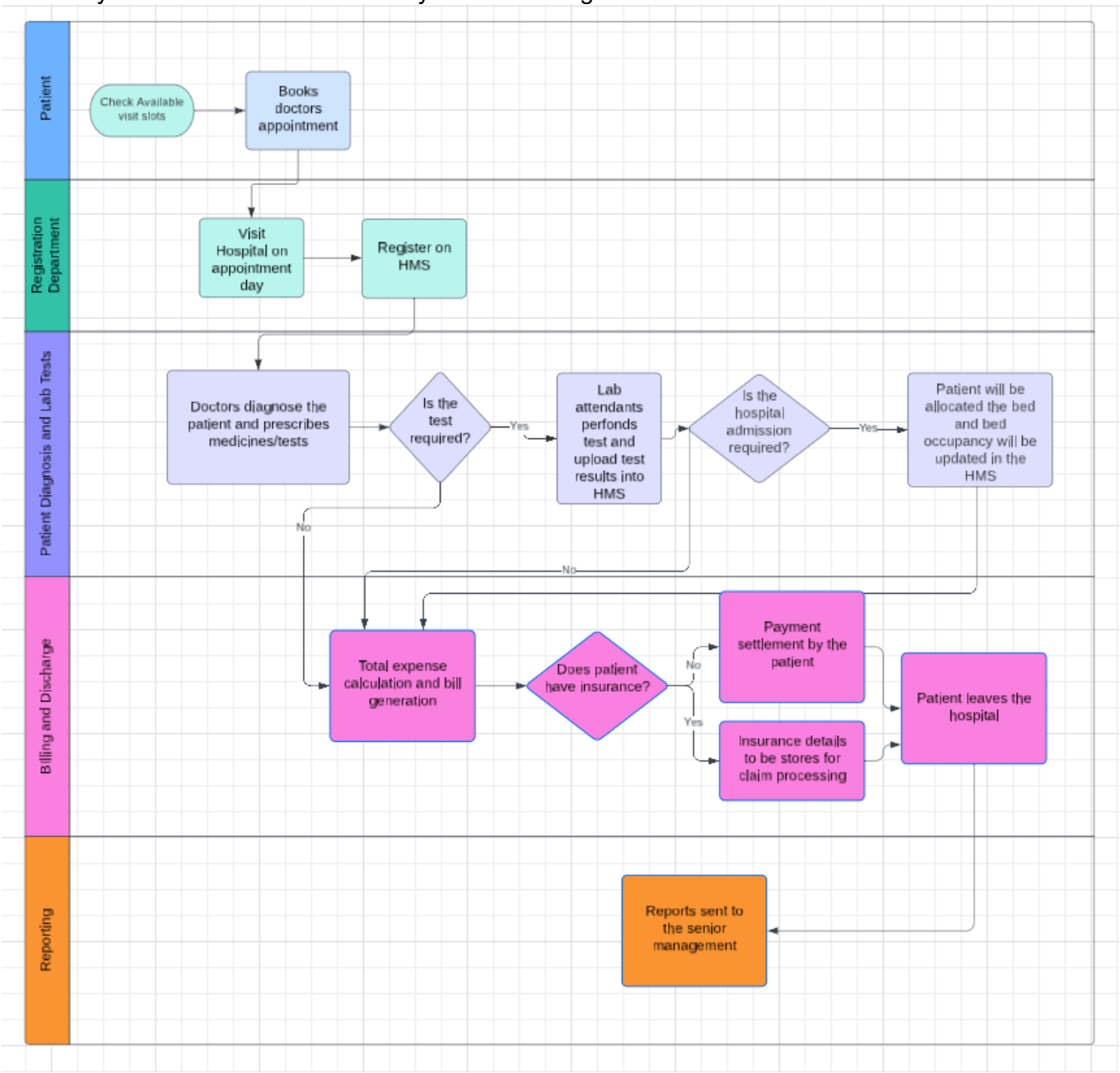

Figure 1: Future system workflow

In-scope and our-of-scope items for this software

In-scope Requirements	Our-of-scope Requirements
1. Appointment Scheduling 2. Appointment reminders 3. Patient registration 4. Create and modify patients' records 5. Order medical prescription 6. Order lab tests and its results 7. Personnel allocation 8. Bed occupancy management 9. Report generation 10. Billing and insurance	1. Management of Emergency department 2. Ordering medicine stocks and lab kits 3. Hospital payroll management 4. Visitor log 5. Human resource management

Scope of the Hospital Management System (Context Diagram)

The scope of the HMS has 6 components: Patients, Registration staff, Doctors and nurses, Lab and radiation department, hospital management and Billing and Management.

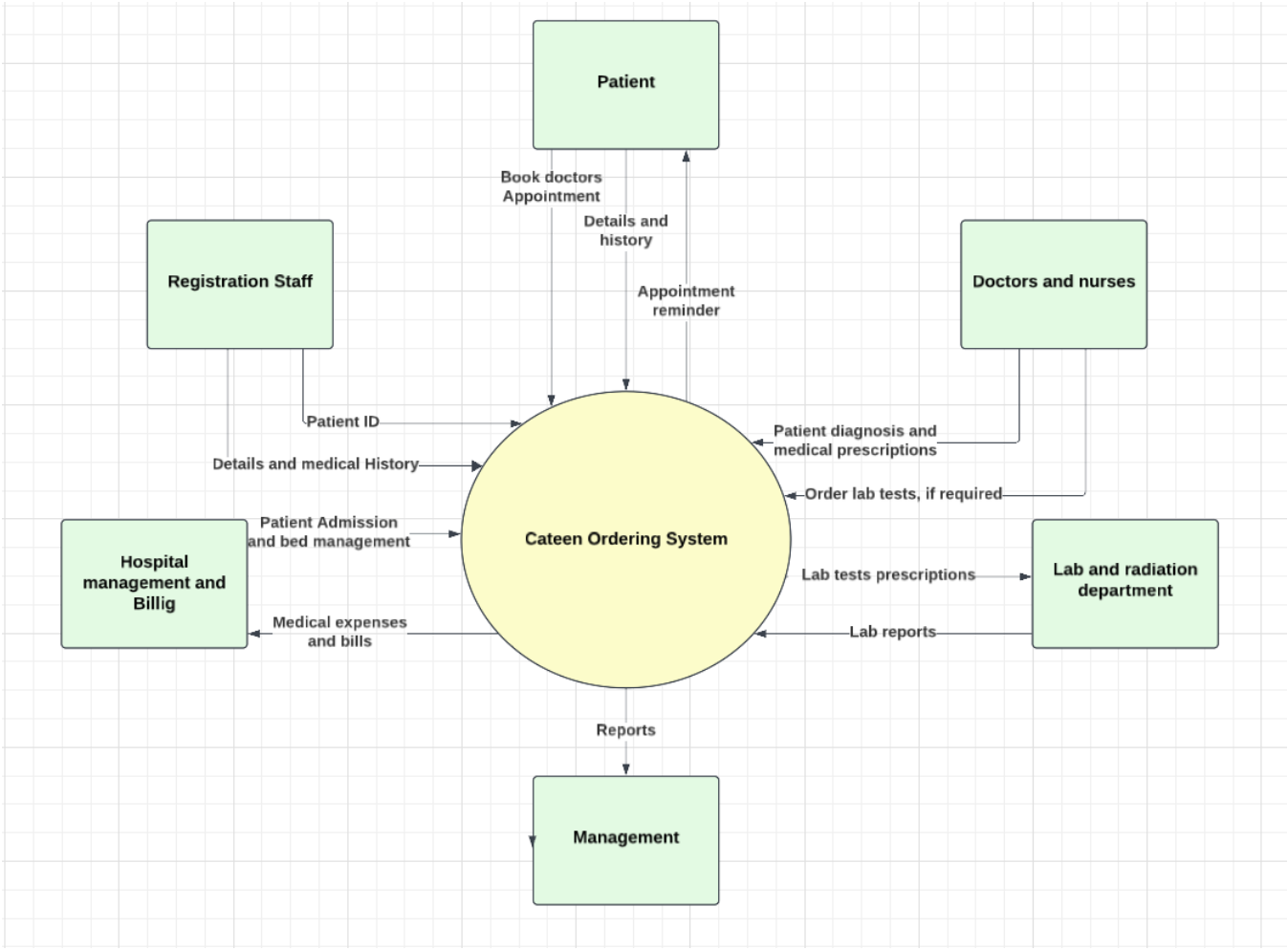

Figure 2: Context Diagram

Main features that need to be developed

- Setting up a patient account/login schedule/rescheduling/cancelling appointment
- Patient ID generation
- Patients can be added, updated or removed
- Keep insurance records
- Doctors profile should be managed and maintained
- Keep records (details and medical history) of patient
- Doctors medical and lab prescription
- Free and allocated bed details
- Lab tests ordering
- Staff allocation
- Reports for senior management
- Reports for billing personnel
- Instructions for the involved employees

ER diagram of the HMS

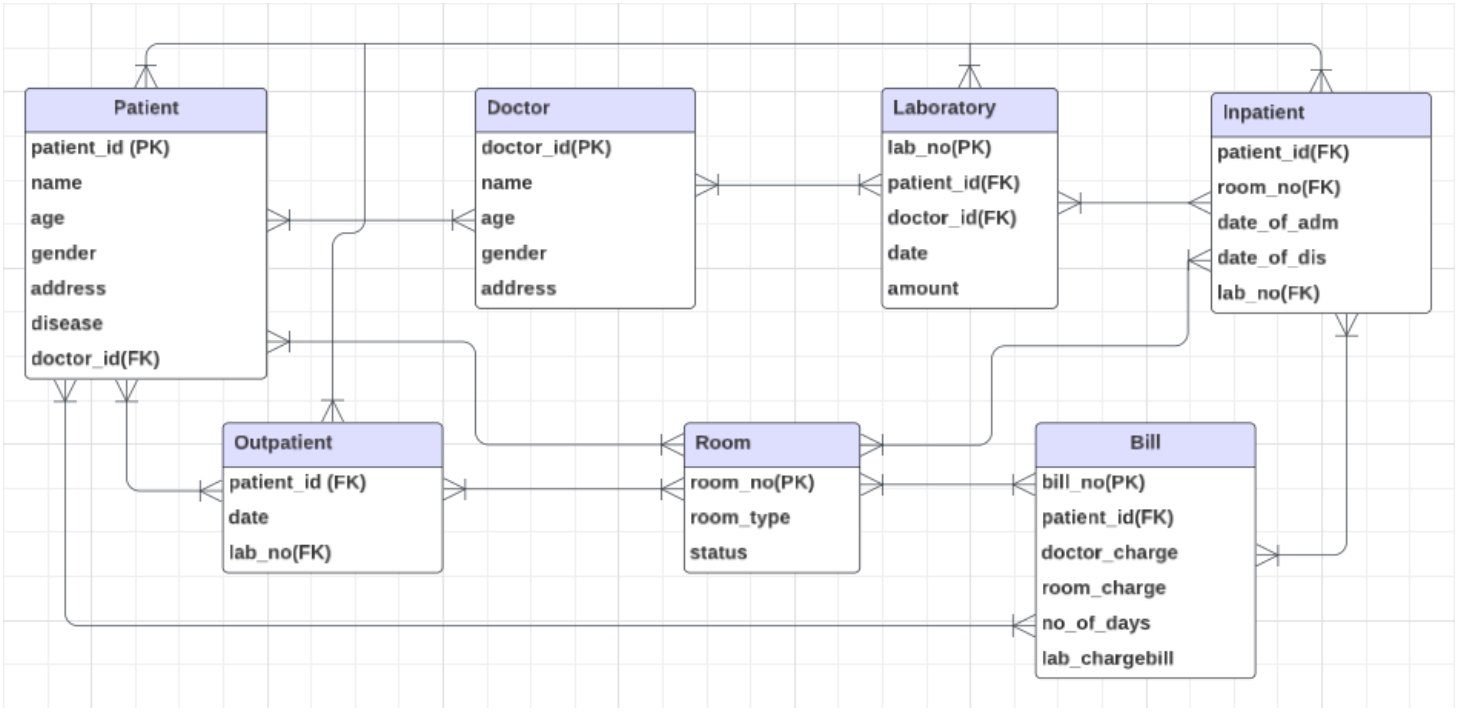

Figure 3: Entity Relationship Diagram

Data Flow Diagram for HMS

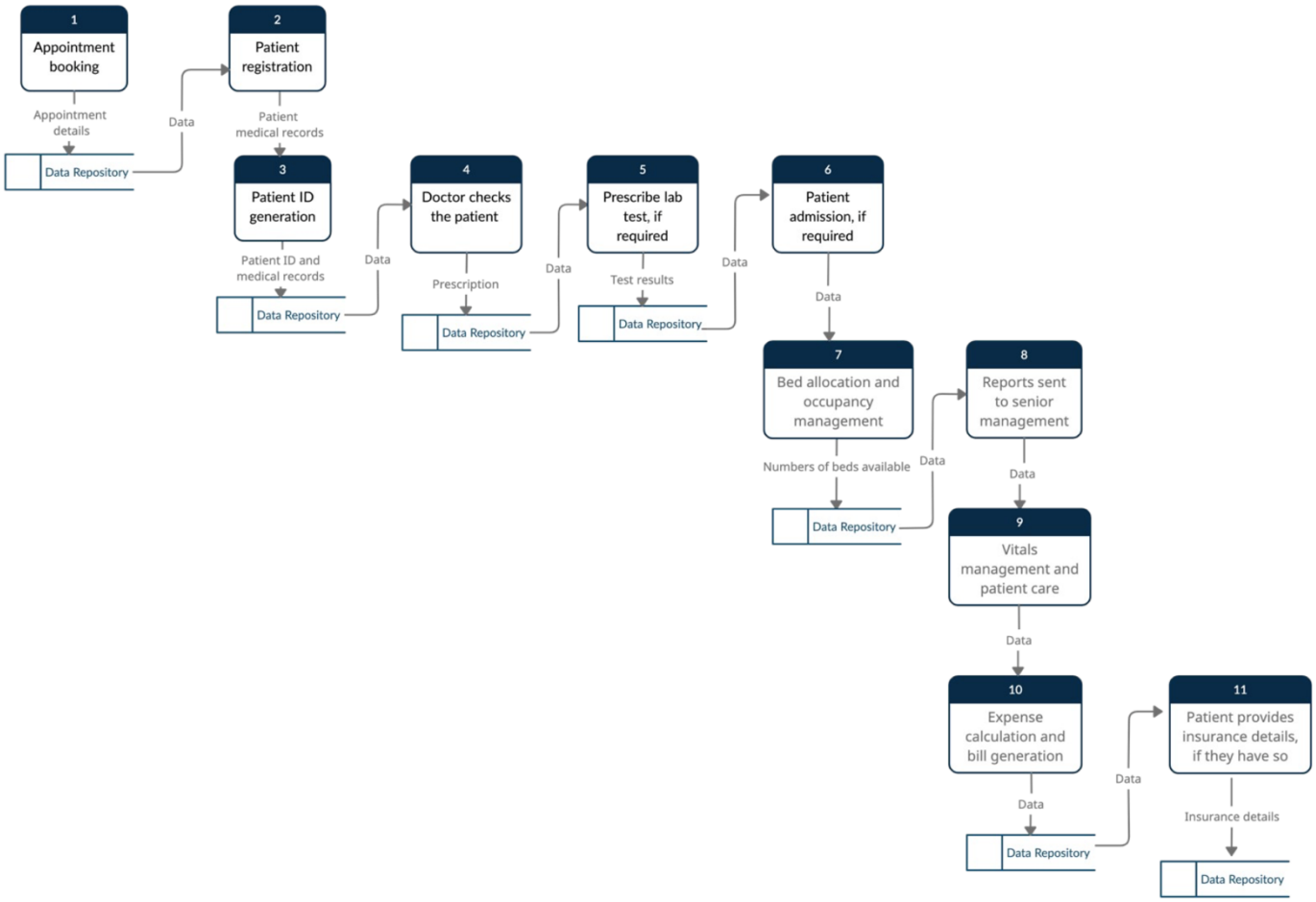

Figure 4: Data Flow Diagram

Flowchart for the patient's admission process

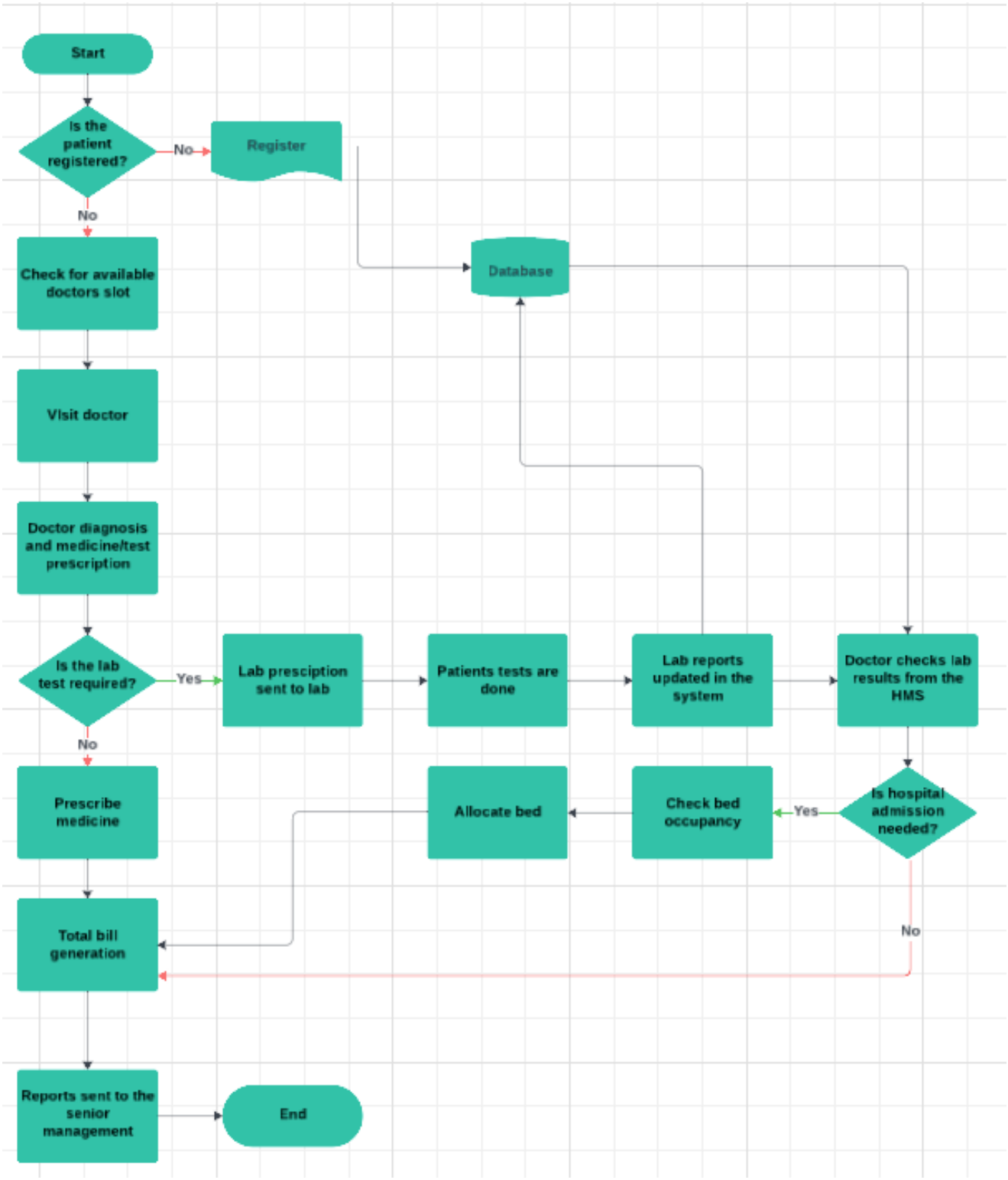

Figure 5: Flowchart for Patients Admission Process

Functional Requirements

- User authentication and login functionality
- Patients record storage and retrieval
- Medical expenses and billing calculation
- Appointment booking and reminder
- Generating reports for senior management
- Doctors' medical prescription page
- Insurance information
- Bed occupancy and patients' status details

Non-functional requirements

- MySQL database to be used since it is open source and free
- Operating system shall be Windows 2016
- The system shall be web-based application
- The system must support 500 people simultaneously
- The system shall give responses in 1 second
- The system should always be available
- The system shall keep log of all the errors
- The system should be self-explanatory ad very user friendly
- Database should be encrypted for privacy and safety reason

Wireframes for HMS

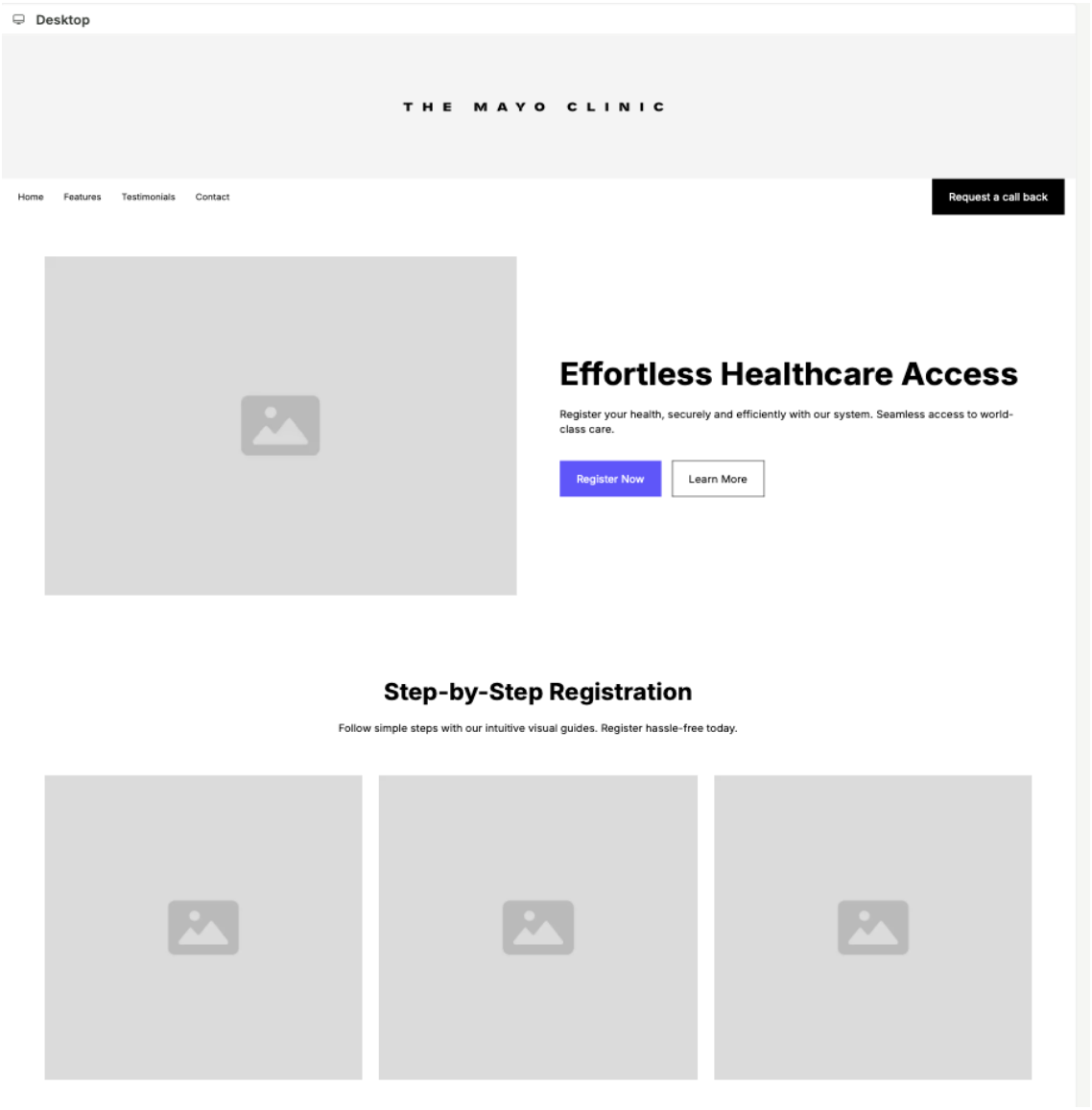

Figure 6:Homepage