UNIVERSITY OF BARISHAL

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

DATABASE PROJECT REPORT

Hospital Management System

A Report Submitted in Partial Fulfillment of the Requirements for the Course:

CSE-2102: Database Management System Lab

Submitted by:

Israt Jahan Tamanna

Roll: 22CSE036

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Submitted to:

Md Samsuddoha

Assistant Professor, Dept. of CSE

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Overview of the Project

The Hospital Management System is designed to streamline and enhance hospital operations by efficiently managing patient records, physician details, room allocations, procedures, medications, appointments, and staff information. This database-driven system ensures smooth handling of hospital workflows, improving patient care and

administrative efficiency.

The system will support various hospital functions such as patient admissions, doctor assignments, scheduling of procedures and treatments, prescription management, and room allocation. By implementing a relational database structure, the system ensures data integrity, accessibility, and scalability, providing a well-structured approach to managing healthcare services.

Objectives of the Project

The primary objective of this project is to design and develop a Hospital Management System database that facilitates efficient management of patient records, hospital staff, and medical services.

Key goals include:

- Store and manage detailed patient information, including medical history, physician assignments, and prescribed medications.

- Maintain records of hospital staff, including physicians, nurses, and their respective roles.

- Manage hospital room allocations, ensuring efficient tracking of room availability and patient stays.

- Track medical procedures and the physicians trained to perform them.

- Support appointment scheduling between patients and doctors.

- Ensure accurate prescription management for patient treatments.

- Facilitate reporting and analysis for hospital administration.

Motivation

- Hospitals handle vast data daily.
- A well-structured HMS reduces errors, improves record-keeping, and enhances communication, ensuring efficient healthcare management.

Requirements (Hospital Management System-HMS)

- We have to develop a database for a hospital, including information on departments, physicians, nurses, patients, and treatments.
- Each department is managed by one head physician, who is also a physician.
- A department can have multiple physicians and nurses.
- Physicians belong to a department but can be affiliated with multiple departments.
- Patients are assigned a primary care physician and can undergo multiple treatments or procedures.
- The system must also track appointments, room assignments, medications, and nurse schedules.

Software:

- JDK , Xampp , JDBC Driver for database connectivity , IntelliJ.

Scope of the project

Designed for the HMS manages:

- **Patients:** Records details and history.

- **Staff:** Tracks credentials and shifts.

- **Appointments & Procedures:** Automates scheduling and tracking.

- **Infrastructure:** Manages rooms and availability.

- **Medications:** Ensures accurate prescriptions.

Entity Relationship Diagram Steps By Steps

Step 1: Entities

- **procedureDetails**: Stores information about medical procedures.

- **physician**: Holds physician information.

- **department**: Manages department details.

- **medication**: Stores data about medications

- **patient**: Holds patient records.

- **appointment**: Manages patient appointments.

- **nurse**: Records nurse information.

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- **room**: Contains details of hospital rooms.

- **stay**: Tracks patient stays in hospital rooms.

- **block**: Represents hospital blocks.

- **prescribes**: Tracks prescriptions made by physicians.

Step 2: Attributes and Primary Keys

- **procedureDetails**: <u>procedure_code</u>, name, cost.

- **physician**: <u>employee_id</u>, name, position, social_security_number.

- **department**: <u>department_id</u>, name, head.

- **medication**: <u>medication_code</u>, name, brand, description

- **patient**: <u>social_security_number</u>, name, address, phone, insurance_id, primary_care_physician.

- **appointment**: <u>appointment_id</u>, patient_id, prep_nurse_id, physician_id, start_time, end_time, examination_room

- **nurse**: <u>employee_id</u>, name, position, registered, social_security_number

- **room**: <u>room_number</u>, roomtype, blockfloor, blockcode, unavailable

- **block**: <u>blockfloor</u>, <u>blockcode</u>.

- **stay**: <u>stay_id</u>, patient_id, room_id, start_time, end_time.

- **prescribes**: <u>physician_id</u>, <u>patient_id</u>, <u>medication_code</u>, <u>prescription_date</u>, appointment_id, dose.

Step 3: Relationship

1. Physician manage department.

2. Physician affiliated_with department.

3. Physician have appointment.

4. Physician prescribes medication.

5. Physician trained_in procedureDetails.

6. Patient have appointment.

7. Patient takes medication.

8. Patient examined by physician.

9. Patient can have stays.

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10. Nurse assists patients.11. Nurse gives appointment.

12. Nurse on_call blocks.

13. Room host stays.

14. Procedures undergoes patient .

Step 4: Cardinality ratio and participation

1. Physician manage department (One to one):

2. Physician affiliated_with department (Many to many):

3. Physician trained_in procedureDetails (One to many):

4. Physician have appointment (One to many):

5. Physician prescribes medication(One to Many):

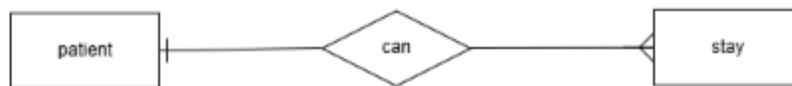6. Patient have appointment(One to Many):

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7. Patient takes medication(Many to Many):

8. Patient examined by physician(Many to Many):

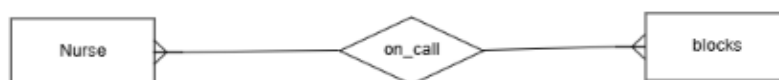9. Patient can have stays(One to Many):

10. Nurse assists patients(Many to Many):

11. Nurse gives appointment(One to Many):

12. Nurse on_call blocks(Many to many):

13. Room host stays(One to Many):

14. Patient undergoes procedures (One to Many):
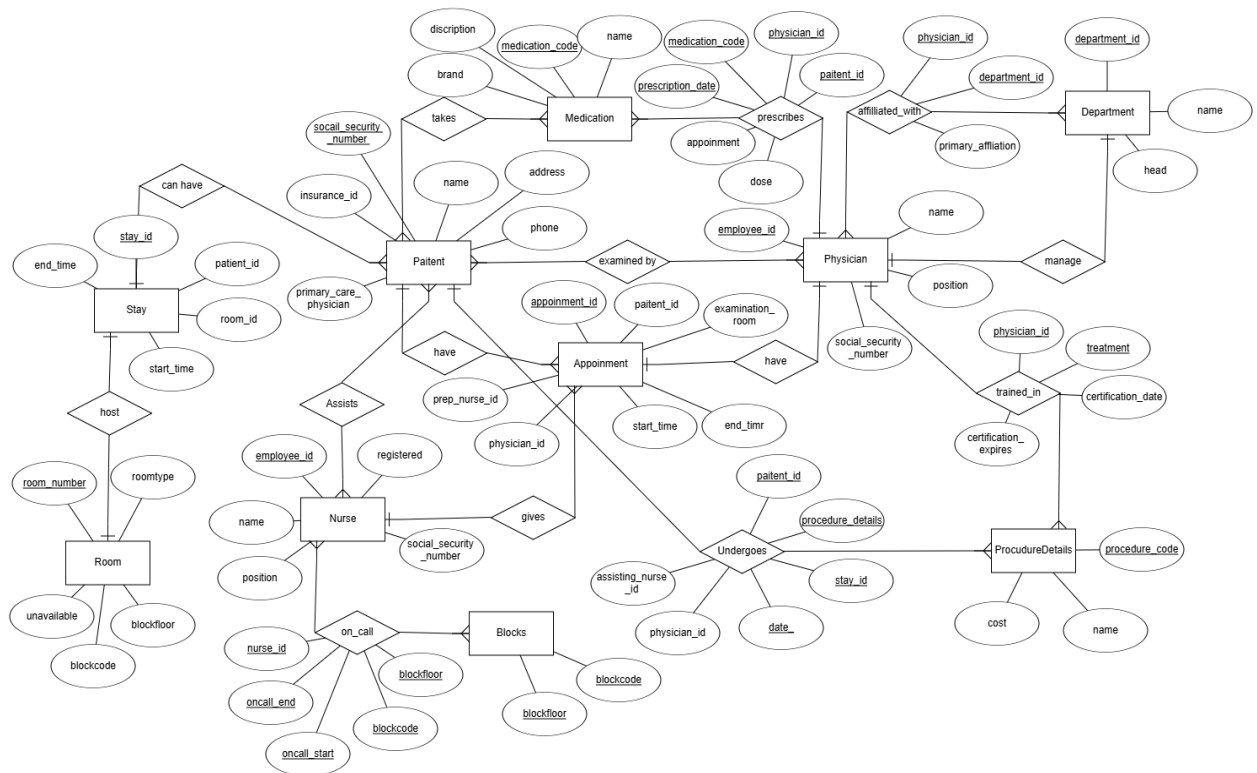
Step 5: Draw ER diagram

Figure : ER diagram of Hospital Management System

Relations (Tables)

1. procedureDetails(procedure_code, name, cost)

2. physician(employee_id, name, position, social_security_number)

3. department(department_id, name, head)

4. medication(medication_code, name, brand, description)

5. patient(social_security_number, name, address, phone, insurance_id, primary_care_physician)

6. stay(stay_id, patient_id, room_id, start_time, end_time)

7. nurse(employee_id, name, position, registered, social_security_number)

8. appointment(appointment_id, patient_id, prep_nurse_id, physician_id, start_time, end_time, examination_room)

9. block(blockfloor, blockcode)

10. prescribes(physician_id, patient_id, medication_code, prescription_date, appointment_id, dose)

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11. room(<u>room_number</u>, roomtype, blockfloor, blockcode, unavailable)

12. affiliated_with(<u>physician_id</u>, <u>department_id</u>, primary_affiliation)

13. trained_in(<u>physician_id</u>, <u>treatment</u>, certification_date, certification_expires)

14. undergoes(patient_id, <u>procedure_details</u>, <u>stay_id</u>, <u>date_</u>, <u>physician_id</u>, assisting_nurse_id)

15. on_call(<u>nurse_id</u>, <u>blockfloor</u>, <u>blockcode</u>, <u>oncall_start</u>, <u>oncall_end</u>)
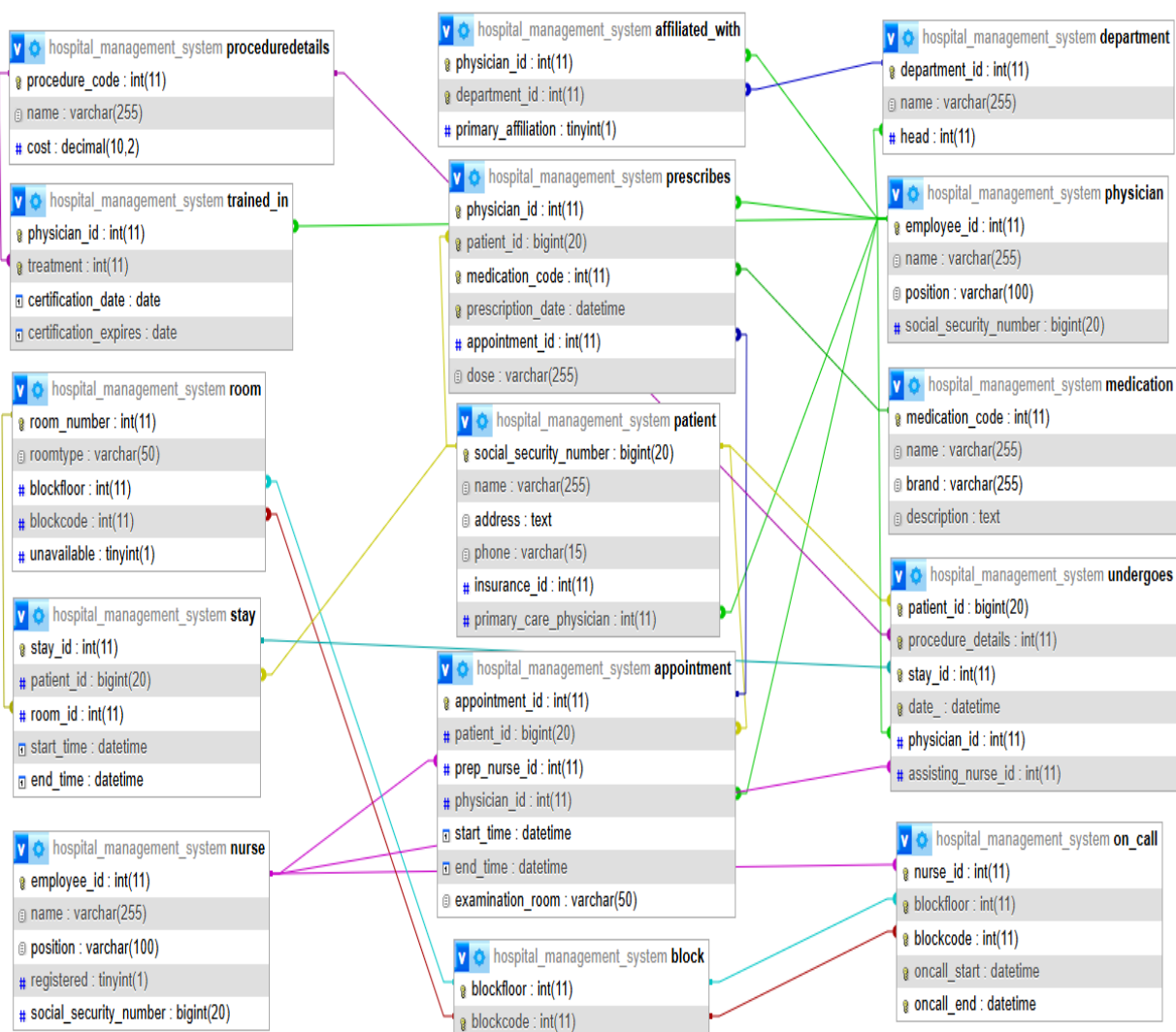
Schema Diagram :

Figure : Schema diagram of Hospital Management System

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Implementing the database in MySQL

Here are a few tables with sample data:

physician(employee_id, name, position, social_security_number)

employee_id	name	position	social_security_number
01	Dr. John Smith	Cardiologist	123456789
02	Dr. Jane Doe	Neurologist	987654321
03	Dr. Albert White	Orthopedic Surgeon	456789123
04	Dr. Emily Green	Pediatrician	789123456
05	Dr. Michael Brown	Oncologist	321654987

patient(social_security_number, name, address, phone, insurance_id, primary_care_physician)

social_security_number	name	address	phone	insurance_id	primary_care_physician
1	Alice Johnson	123 Main St	555-1234	1001	1
2	Bob Williams	456 Elm St	555-5678	1002	2
3	Charlie Brown	789 Oak St	555-9876	1003	3
4	David Clark	321 Pine St	555-6543	1004	4
5	Eve Davis	654 Maple	555-4321	1005	5

Conclusion

The Hospital Management System enhances efficiency in healthcare by ensuring secure data storage and seamless management, paving the way for future advancements.