08/01/2025

Hospital Management System

Presented To

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Implemented By

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SQL Server Project
Intensive Code Camps - Round 24-25

Business Idea

Our innovative healthcare management system streamlines operations for hospitals and clinics by integrating comprehensive functionality across key domains. The system facilitates seamless management of departments, employees, patients, rooms, and billing, ensuring data integrity and operational efficiency. It categorizes employees into specialized roles such as doctors, nurses, and receptionists, tracks their details, and ranks performance metrics like salaries.

Patient information, including medical history and type (In-Patient/Out-Patient), is maintained with robust validation, while inpatient lifecycles—admissions, discharges, and examinations—are meticulously tracked. Room assignments and occupancy are dynamically managed, ensuring optimal utilization.

The platform also supports appointment scheduling, drug management, detailed reporting on diseases and diagnoses, and generates actionable billing insights. With features like prescription tracking, role-based access, and statistical analysis, the system empowers healthcare providers to enhance patient care, optimize resource allocation, and achieve operational excellence.

Function Requirements

1. Department Management

- Ensure that newly added departments have unique names and provide error messages if duplicates are detected.

2. Employee Management

- Employees are categorized into distinct types: Doctors, Nurses, and Receptionists (disjoint sets).
- Track personal and professional details, phone number (unique), roles, and salary information.
- Ensure the employee is assigned to an existing department.

Manage Employee Roles:

- Ensure doctors are assigned valid specialties.
- Ensure nurses are linked only to rooms they are authorized to manage.
- Generate reports ranking employees based on specific metrics such as salary.

3. Patient Management

- Manage patient information full name, date of birth, address, phone number, type (InPatient / OutPatient).
- Ensure data integrity through validation rules (disjoint type).
- Track patient medical history.

4. Inpatient Management

- Manage the lifecycle of inpatients
- **Assign Room to In-Patient:**
  - Verify that the room assignment does not exceed the room's capacity and ensure a patient is not assigned to multiple rooms simultaneously.
- **Record Doctor Examinations:**
  - Allow tracking of in-patient examinations, including the examination date and doctor details.
- **Track Room Occupancy:**
  - Automatically update and reflect changes to room occupancy when patients are admitted or discharged.

5. Appointment Management

- Schedule, update, and cancel appointments for patients with specific doctors.
- Allow filtering appointments by status, doctor, or date.

6. Prescription Management

- Create prescriptions linked to patients and doctors.
- Allow tracking of prescription updates, including the doctor making changes and the time of updates

7. Report Management

- Ensure reports include accurate details about disease, symptoms, and diagnosis.
- Track all updates to reports, including timestamps and doctors involved in the updates.

8. Billing Management

- **Inpatient and Outpatient Billing:**
  - Generate bills based on services provided, including:
- **Billing Insights:**
  - Provide statistical insights such as: average, max, and mini billing values.
  - Generate detailed billing reports.

9. Room Management

- Ensure the addition of new rooms meets the required specifications, such as maximum capacity.
- Manage room availability and assignments for inpatients.

10. Drug Management

- Ensure newly added drugs have unique codes and accurate details, including recommended dosages.
- Record the administration of drugs to in-patients, including the nurse responsible, dosage, and date.
- Search and retrieve drug details

Non-Function Requirements

1.Performance (Query Optimization)

- Use indexes to optimize search and retrieval operations for tables like Patient, Employee, and Drug.
- Write efficient SQL queries to minimize execution time for complex operations, such as joins and aggregations.

2. Security:

- **Restricted Access:** Direct access to sensitive database tables is strictly prohibited to ensure confidentiality and integrity.
- **Controlled Interaction:** All data operations are handled exclusively through stored procedures, functions, and views.

- **Encryption**: All stored procedures, functions, and views are encrypted to prevent unauthorized access to their internal logic and ensure the confidentiality of critical business rules.

3. Data Integrity:

- Enforce constraints like primary keys, foreign keys, and unique constraints to maintain data consistency.
- Use triggers to validate changes for critical data fields.

4. Maintainability:

- Use a version control system for SQL scripts to track schema changes and rollback if needed.
- Document the schema, including relationships, constraints, and index usage.