**SQL Assignment – Hospital Management System**

**Abstract:**

The Hospital Management System database is designed to efficiently manage patient information, doctor schedules, appointments, medications, and medical records within a healthcare facility. This database incorporates various data types, including nominal, ordinal, interval, and ratio data, to represent different aspects of hospital operations. Through the use of multiple tables and foreign key relationships, the database ensures data integrity, reduces redundancy, and facilitates effective data retrieval and analysis.

**Introduction:**

In today's healthcare landscape, efficient management of patient information is essential for delivering quality care and optimising hospital operations. The Hospital Management System database serves as a centralised repository for storing and managing patient records, doctor information, appointments, medications, and medical records. By utilising various data types and establishing relationships between tables, the database enables healthcare providers to streamline administrative tasks, improve communication, and enhance patient care delivery. This report explores the design and implementation of the Hospital Management System database, highlighting its structure, data type representation, ethical considerations, and example queries.

**Database Generation:**

The database is about the hospital management system database. I ensured that all data types, including nominal, ordinal, interval, and ratio data, were represented in the database. The database is generated with 1000 rows of data with appropriate values assigned.

**Patients table:**

* This table stores information about patients who visit the hospital.
* This table allows hospital staff to maintain records of patients and contact them for appointments or follow-up visits.
* Columns include:
  + Patient\_id: A unique identifier for each patient.
  + Patient\_name: The name of the patient.
  + Age: The age of the patient.
  + Gender: The gender of the patient.
  + Address: The address of the patient.
  + Contact\_number: The contact number of the patient.

A table of numbers and names

Description automatically generated

**Doctors table:**

* This table stores information about doctors working at the hospital.
* This table helps in managing doctor schedules, assigning them to specific departments, and tracking their areas of expertise.
* Columns include:
  + Doctor\_id: A unique identifier for each doctor.
  + Doctor\_name: The name of the doctor.
  + Specialty: The specialty or field of expertise of the doctor.
  + Department\_id: A foreign key referencing the department table, indicating the department to which the doctor belongs.

A screenshot of a computer

Description automatically generated

**Departments table:**

* This table stores information about different departments within the hospital.
* This table helps in categorising hospital services into distinct departments, such as cardiology, orthopaedics, etc.
* Columns include:
  + Department\_id: A unique identifier for each department.
  + Department\_name: The name of the department.

A screenshot of a computer

Description automatically generated

**Appointments Table:**

* This table stores information about appointments scheduled between patients and doctors.
* This table facilitates the scheduling and tracking of appointments, allowing hospital staff to manage patient visits efficiently.
* Columns include:
  + Appointment\_id: A unique identifier for each appointment.
  + Patient\_id: A foreign key referencing the doctor’s table, indicating the patient for the appointment.
  + Doctor\_id: A foreign key referencing the doctor’s table, indicating the doctor for the appointment.
  + Appointment\_date: The date of the appointment.
  + Appointment\_time: The time of the appointment.

A table with numbers and numbers

Description automatically generated

**Medications Table:**

* This table stores information about medications prescribed to patients.
* This table helps in maintaining records of prescribed medications and managing patient treatments.
* Columns include:
  + Medication\_id: A unique identifier for each medication.
  + Medication\_name: The name of the medication.
  + Dosage: The dosage of the medication.
  + Frequency: The frequency of the medication dosage.

A screenshot of a medical prescription

Description automatically generated

**Medical Records Table:**

* This table stores information about medical records, including diagnoses and prescribed medications.
* This table helps in maintaining a comprehensive history of patient diagnoses, treatments, and medications prescribed by doctors.
* Columns include:
  + Record\_id: A unique identifier for each medical record.
  + patient\_id: A foreign key referencing the patient’s table, indicating the patient associated with the record.
  + doctor\_id: A foreign key referencing the doctor’s table, indicating the doctor who made the diagnosis.
  + diagnosis: The diagnosis made by the doctor.
  + prescription\_id: A foreign key referencing the Medications table, indicating the prescribed medication.
  + date: The date of the medical record entry.

A screenshot of a computer

Description automatically generated

**Data Types Representation:**

Nominal data:

* In the patients table, the gender column represents nominal data. The gender categories have no inherent order or ranking, and they simply represent distinct labels for different genders.

Ordinal data:

* In the doctors table, the specialty column represents ordinal data. Examples of ordinal values for specialty include cardiology, orthopaedics, and paediatrics. While these specialties have a specific order or ranking, the differences between them are not uniform or measurable.

Interval Data:

* In the appointments table, the appointment\_date column represents the interval date. The intervals between appointment dates are consistent and measurable, but there is no true zero point.

Ratio Data:

* In the patients table, the age column represents’ ratio data. Age represents numeric values with a true zero point, where zero indicates the absence of age. Arithmetic operations such as addition, subtraction, multiplication, and division are meaningful for age values.

**Code:**

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A screenshot of a computer program

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A computer screen shot of a program

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A computer screen shot of a program

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**Database Schema:**

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A close-up of a medical form

Description automatically generated

**Justification of Separate Tables:**

Separating the data into multiple tables allows for better organisation and reduces redundancy. For example, having a separate Patients table allows for storing patient information only once and referencing it in other tables like Appointments and Medical Records. Similarly, separating doctors and departments helps in managing doctor information and their respective specialties and departments efficiently.

**Ethical Discussion:**

* In the hospital database, patient information such as names, contact numbers, and medical records is sensitive and confidential. Unauthorised access to this data could lead to privacy breaches, identity theft, or discrimination. It is ethically imperative to implement robust security measures, access controls, and encryption techniques to safeguard patient data from unauthorised access or misuse.

**Queries:**

1. Retrieve all appointments scheduled for a specific date:

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1. Retrieve patient information along with their assigned doctor and department:

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1. Retrieve the most prescribed medication and its dosage:

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**Conclusion:**

The Hospital Management System database represents a comprehensive solution for managing hospital operations and patient care effectively. By incorporating nominal, ordinal, interval, and ratio data types, the database caters to diverse information needs within a healthcare facility. Ethical considerations, such as patient privacy and data security, are paramount in safeguarding sensitive information and maintaining trust between healthcare providers and patients.

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