Experiment No.2
Mapping ER/EER to Relational schema model.
Date of Performance:
Date of Submission:

Aim :- Prepare the schema for Relational Model with the ER/ERR diagram, drawn for the identified case study in experiment no.1.

Objective :- To map the Entity Relationship (ER) / Extended Entity-Relationship (EER) Diagram to Relational Model schema and learn to incorporate various schema-based constraints.

Theory:

Mapping an Entity-Relationship (ER) model to a relational database schema involves translating the conceptual model represented in the ER diagram into tables and relationships in a relational database management system (DBMS). Here are the general rules for mapping ER to a schema in a DBMS:

1. Entities to Tables:
    a. Each entity in the ER diagram corresponds to a table in the relational schema.
    b. The attributes of the entity become the columns of the table.
    c. The primary key of the entity becomes the primary key of the table.

2. Relationships to Tables:
    a. Many-to-Many Relationships:
        i. Convert each many-to-many relationship into a new table.
        ii. Include foreign key columns in this table to reference the participating entities.
        iii. The primary key of this table may consist of a combination of the foreign keys from the participating entities.
    b. One-to-Many and One-to-One Relationships:
        i. Represented by foreign key columns in one of the participating tables.
        ii. The table on the "many" side of the relationship includes the foreign key column referencing the table on the "one" side.
        iii. The foreign key column typically references the primary key of the related table.

3. Attributes to Columns:
    a. Each attribute of an entity becomes a column in the corresponding table.
    b. Choose appropriate data types for each attribute based on its domain and constraints.
    c. Ensure that attributes participating in relationships are represented as foreign keys when needed.

4. Primary and Foreign Keys:
    a. Identify the primary key(s) of each table based on the primary key(s) of the corresponding entity.
    b. Ensure referential integrity by defining foreign keys in tables to establish relationships between them.
    c. Foreign keys should reference the primary key(s) of related tables.

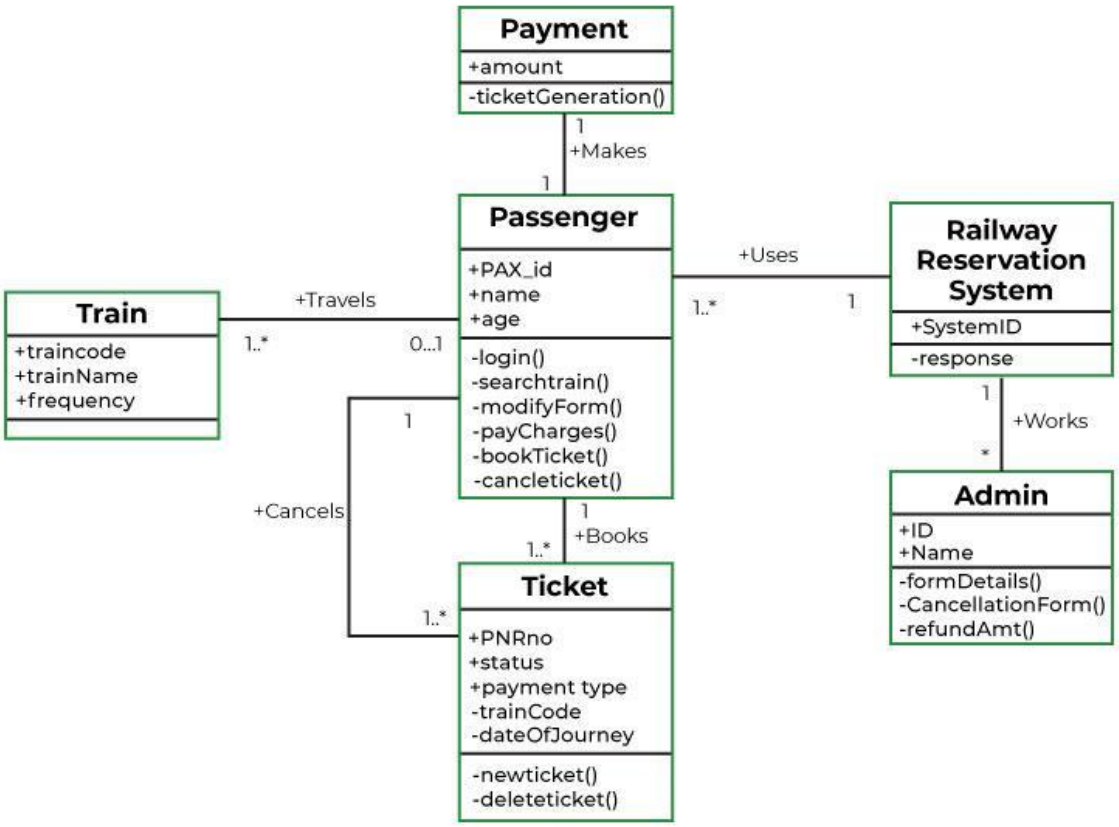
d. Ensure that foreign keys have appropriate constraints, such as ON DELETE CASCADE or ON UPDATE CASCADE, to maintain data integrity.

5. Cardinality Constraints:
   a. Use the cardinality constraints from the ER diagram to determine the multiplicity of relationships in the relational schema.
   b. Ensure that the constraints are enforced through the appropriate use of primary and foreign keys.

6. Normalization:
   a. Normalize the schema to minimize redundancy and dependency.
   b. Follow normalization rules such as First Normal Form (1NF), Second Normal Form (2NF), Third Normal Form (3NF), etc., to ensure data integrity and minimize anomalies.

7. Indexing and Optimization:
   a. Consider indexing frequently queried columns to improve query performance.
   b. Evaluate the schema design for optimization opportunities based on query patterns and performance requirements.

Implementation:



Conclusion:

1. write definition of relational schema and notations.
   Schema :
   A relational schema is a blueprint or structure that represents the logical arrangement of data elements (tables) and the relationships between them in a relational database. It outlines the tables, their attributes, and the constraints that govern their relationships. The schema provides a formal description of how the database is organized, facilitating data management, querying, and manipulation.
   Relational Schema Notations:
   1. Tables: Represented by rectangles, each table corresponds to an entity or relation in the database.
   2. Attributes: Shown inside the table rectangles, attributes describe the properties or characteristics of the entities. Each attribute has a name and a data type.
   3. Primary Key: Identified by underlining or highlighting, the primary key uniquely identifies each record within a table. It ensures data integrity and serves as a unique identifier.
   4. Foreign Key: Denoted by an attribute in one table that references the primary key of another table. It establishes relationships between tables, enforcing referential integrity.
   5. Relationships: Illustrated by lines connecting tables, relationships indicate how tables are related to each other. These lines typically represent one-to-one, one-to-many, or many-to-many relationships.
2. write various schema-based constraints
   1. Primary Key Constraint: Enforces unique identification for rows in a table.
   2. Foreign Key Constraint: Maintains relationships between tables to ensure referential integrity.
   3. Unique Constraint: Ensures uniqueness of values in specified columns.
   4. Check Constraint: Imposes conditions on allowable values in a column.
   5. Not Null Constraint: Requires a column to have a value, prohibiting null entries.
   6. Default Constraint: Provides a default value when none is specified.
   7. Referential Integrity Constraint: Ensures validity of relationships between tables.