



Vidyavardhini's College of Engineering and Technology
Department of Artificial Intelligence & Data Science

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



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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.

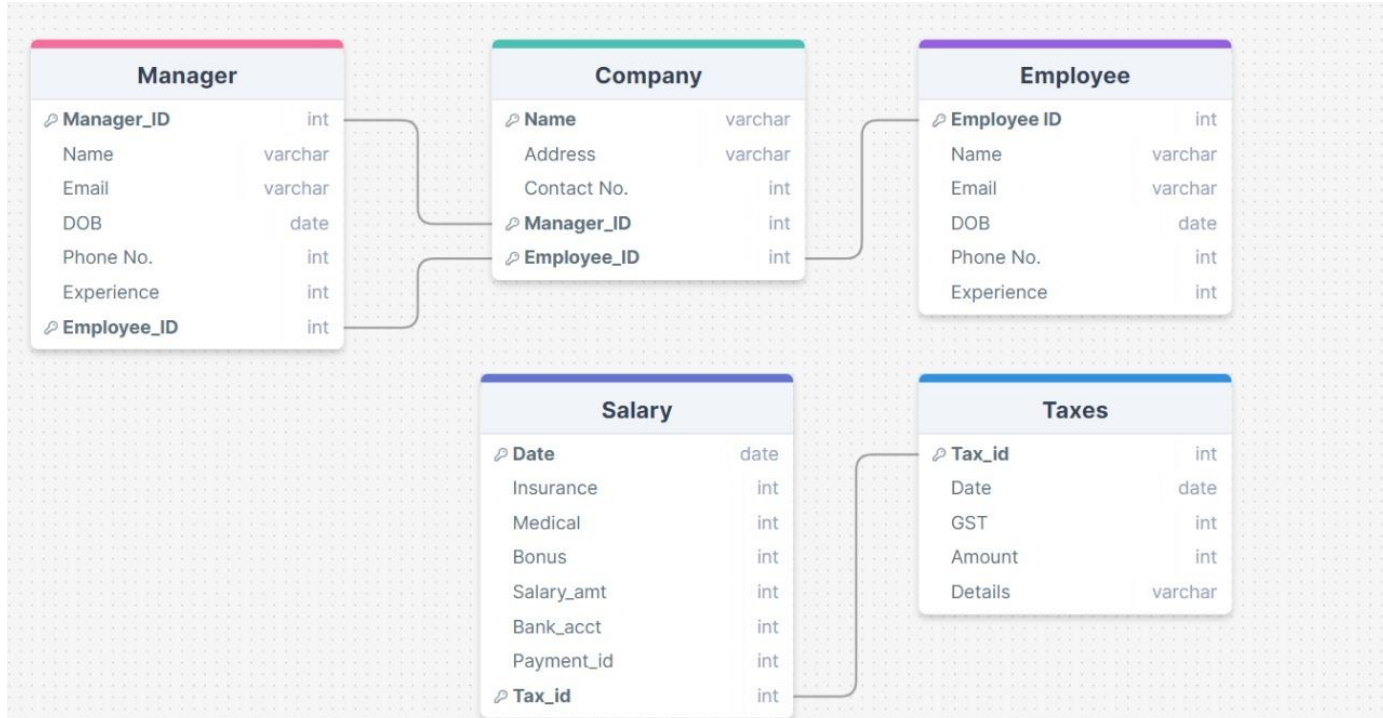


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- d. Ensure that foreign keys have appropriate constraints, such as ON DELETE CASCADE or ON UPDATE CASCADE, to maintain data integrity.
5. Cardinality Constraints:
 - a. Use the cardinality constraints from the ER diagram to determine the multiplicity 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

Ans Schema Definition:

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

Ans

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.



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