**DBMS Lab Assignment-2**

**Conversion of EER Model into Relational Model**

**Assignment 2 Lab Questions**

**Theory Questions:-**

**1. Explain the need of EER diagrams.**

Enhanced entity-relationship (EER) diagrams are basically an expanded version of ER diagrams. EER models are helpful tools for designing databases with high-level models. With their enhanced features, you can plan databases more thoroughly by delving into the properties and constraints with more precision.

An EER diagram provides you with all the elements of an ER diagram while adding:

* Attribute or relationship inheritances
* Category or union types
* Specialization and generalization
* Subclasses and superclasses

EER diagrams are perfect for taking a more detailed look at your information. When your database contains a larger amount of data it is best to turn to an enhanced model to more deeply understand your model.

**2. Explain in detail Generalization, Specialization and Aggregation and how do we convert them into relational model.**

Generalization and specialization act as opposites of one another. Generalization combines lower-level entities into one that is a higher level. Meanwhile, specialization divides high-level entities into lower levels. With aggregation, two entities are treated as a single one.

* **Generalization**

Generalization is the process of extracting common properties from a set of entities and create a generalized entity from it. It is a bottom-up approach in which two or more entities can be generalized to a higher level entity if they have some attributes in common.

Generalization to relational Schema:

Method 1:

Make the Schema only for lower-level entity set and include the attributes of higher-level entity into each of the schema of lower level entity.

Method 2:

* Create relational schema for the higher entity with its primary key and other attributes.
* Create relational schema for each of the lower entities and include primary key of higher entities as foreign key in lower entity sets.
* **Specialization**

In specialization, an entity is divided into sub-entities based on their characteristics. It is a top-down approach where higher level entity is specialized into two or more lower level entities. It maximizes the difference between the members of an entity by identifying the unique characteristic or attributes of each member. It defines one or more sub class for the super class and also forms the superclass/subclass relationship.

Specialization to relational Schema:

* Create relational schema for the higher entity with its primary key and other attributes.
* Create relational schema for each lower entities and include primary key of higher entities as foreign key in lower entity sets.
* **Aggregation**

An ER diagram is not capable of representing relationship between an entity and a relationship which may be required in some scenarios. In those cases, a relationship with its corresponding entities is aggregated into a higher level entity. Aggregation is an abstraction through which we can represent relationships as higher level entity sets.

To represent aggregation via schema, create a schema containing:

1. primary key of the aggregated relationship
2. primary key of the associated entity set
3. descriptive attribute, if exists.

**Implementation Question:-**

Q.1 Draw the EER for SIU library management and convert into relational model.

Diagram

Description automatically generated

Relational Schema:

SIU\_Library( **ID**, Name , Location)

Institute\_Library(**Inst\_ID**,Institute\_name,City,Area,ID)

Members(**Mem\_ID**,Mem\_name,Mem\_email,Mem\_phn)

Faculty(**Faculty\_ID**,Department, Position)

Student(**PRN**,Department,Batch,Division)

Non\_teaching\_staff(Position,Sector)

Books(**B\_ID**,B\_name,Price,Genre,Description,has\_graphics ,Institute\_ID, Publisher\_ID, Author\_ID)

Sellers(**S\_ID**,S\_Name,City)

Author(**Author\_ID**,Author\_Name, Author\_phn, Author\_email)

Publisher(**P\_ID**,P\_Name,P\_City,P\_email)

Publishes(**P\_ID**,**B\_ID**, **Author\_ID**)

Purchases(**Institute\_ID,Seller\_ID**)

Sells(**Book\_ID**,**Seller\_ID**, **P\_ID**)

Issues(**Issue\_ID**, Issue\_Date, Return\_Date, Due\_Date, Fine, **Mem\_ID**,**B\_ID**)

Writes(**Author\_ID**, **B\_ID**)

**Q.2 Convert following EER to relational model.**

Diagram

Description automatically generated

Relational Schema:

Person(**SSN**,Name,D.O.B)

Employee(**SSN**,Department, Salary)

Secretary(**SSN**)

Technician(**SSN**, Specialization)

Student(**SSN**,GPA,StartDate)

Freshman(**SSN**)

Sophomore(**SSN**, Major)

Junior(**SSN**,Major)

Senior(**SSN**, Major,Advisor)