**ST. XAVIER’S COLLEGE**

**(Affiliated to Tribhuvan University)**

Maitighar, Kathmandu



**Database Management System**

**Lab Assignment #5**

**Submitted by:**

Dwarika Shiwakoti

013BSCCSIT020

**Submitted to:**

|  |  |
| --- | --- |
| **Er. Sanjay Kumar Yadav**  Lecturer  St. Xavier’s College |  |

**Date of Submission:** August 27, 2015

**1.What do you mean by Entity- Relationship Diagram? Explain**

Entity-relationship model describes data involves in real world in terms of object and their relationships. It is widely used for initial database design. It describes overall structure of database. E-R model is in fact, semantic data model which describes the meaning of data. It has a capability to map the meanings and interactions of real world objects on to the conceptual schema.

**2.Define entity and give an example.**

An entity is a “thing” or “object” in the real world that is distinguishable from another object.

For example:

Specific customer , Particular course in university

Entities can be described by a set of properties called attributes. For example: customer\_id, customer\_name, customer\_address are attributes for entity customer. Similarly, course\_id, course\_name are attributes for entity course.

**3.Explain the different between an entity class and an entity instance.**

An entity is a person, place, event, or thing about which data is collected. An instance is an occurrence of an entity."

An example of this would be STUDENT as the *entity* while JACK SMITH is an *instance* of that entity.   
If an entity is an individual "person, place, event, or thing about which data is collected", then an entity **is** an instance. Linguistically, entity is just another word for a single thing. Entities that have the same attributes are grouped in what are best called entity classes (it doesn't make sense to refer to a collection of entities as an entity). Entity and entity class are data modeling terms. The corresponding object modeling terms are object and class, albeit that a class typically has operations, which are foreign to an entity class.

**4.Define attribute and its types.**

In simple, attribute is descriptive property of entity set. Set of attributes describes entity set.

For example

customer = (customer-id, customer-name, customer-city)

account=( account\_number, balance)

loan = (loan\_number, amount)

Types of attributes

1. Simple and Composite attribute

Attribute which can not be divide into subparts (i.e. into other attributes) called simple attribute

1. Single-valued and Multivalued attributes

Attribute that can take only one value in every entry called singled-valued attribute.

1. Stored and Derived attribute

Attribute whose values can be derived from the values of other related attributes or entities called derived attribute.

**5.What is derived attributes?**

Attribute whose values can be derived from the values of other related attributes or entities called derived attribute. For example, in customer entity set, attribute age is derived attribute if customer entity set has attribute date\_of\_birth. We can derive age of customer from date\_of\_birth and current\_date. Here the attribute date\_of\_birth is stored attribute and the attribute age is derived attribute. The value of derived attribute is not stored, it is computed when required.

**6.Define relationship and give an example.**

A relationship is an association among two or more entities.

Formally, if E1, E2, . . ,En (n≥2) are entity sets then a relationship set R is a subset of

{(e1,e2, . . ,en)│e1∈E1,e2 ∈E2, . . en ∈En}

where (e1,e2, . . ,en) is relationship.

**7.Explain the difference between a relationship class and a relationship instance.**

Relationship classes manage the associations between objects in one class (feature class or table) and objects in another. Objects at either end of the relationship can be features with geometry or records in a table.

Relationship instance: Each relationship instance ri in R is an association of entities, where the association includes exactly one entity from each participating entity type. Each such relationship instance ri represent the fact that the entities participating in ri are related in some way in the corresponding miniworld situation. For example, in relationship type WORKS\_FOR associates one EMPLOYEE and DEPARTMENT, which associates each employee with the department for which the employee works. Each relationship instance in the relationship set WORKS\_FOR associates one EMPLOYEE and one DEPARTMENT.

**8.Define degree of relationship.**

* The degree of relationship (also known as cardinality) is the number of occurrences in one entity which are associated (or linked) to the number of occurrences in another.

There are three degrees of relationship, known as:

* one-to-one (1:1)
* one-to-many (1:M)
* many-to-many (M:N)

**9. List and give an example of the three types of binary relationships. Draw an E-R diagram**

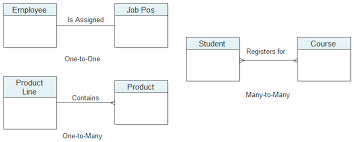
**for each.**

* For binary relationship set between entity set A and B mapping cardinality must one of the following.

**One to one**: An entity in A is associated with at most one entity in B and entity in B is associated with at most one entity in A.

**One to many**: An entity in A is associated with zero or more entities in B but entity in B can be associated with at most one entity in A.

**Many to one**: An entity in A is associated with at most one entity in B but an entity in B can be associated with zero or more entities in A.



**10. Define the terms maximum cardinality and minimum cardinality.**

**Maximum Cardinality**

Maximum cardinality indicates how many instances are participating in a relationship.

**Minimum Cardinality**

The minimum cardinality indicates the smallest number of participants in a relationship, which can be 0 or 1 (optional or mandatory).

**11. Explain the distinctions among the terms primary key, candidate key and super key.**

**12. What are the main building modules of the entity relationship model? Discuss each one.**

**13. What is composite attributes, when it is used?**

**14. Explain the difference between single-value attributes and simple attributes.**

**15. Discuss the difference between a composite key and a composite attribute. How would**

**each indicated in an E-R diagram?**

**16. What two courses of action are available to a designer when a multivalued attribute is**

**encountered ?**

**17. Explain the various terms of an E-R model and how are they represented in an E-R**

**model?**

**18. Explain the concept of dependent entities? Give example.**

**19. What is the difference total and partial participation? Explain.**

**20. What do you mean by mapping cardinalities ? explain various type of cardinalities.**

**21. What is the difference between single-value and multivalued attributes? Explain**

**22. Explain the concept of participation constraints.**

**23. Difference the binary relationship with ternary relationship with example.**

**24. Explain the difference between weak and strong entity set.**

**25. Define the components of extended E-R features.**

**26. Define the concept of aggregation. Give two examples of where this concept is useful.**

**27. Explain the distinction between disjoint and overlapping constraints.**

**28. Explain the distinction between total and partial constraints.**



**29. Write short notes on:**

**· Specialization** Specialization follows top down design approach. Entity sets are subgroups in distinct entity sets. For example entity set person with attributes name, street and city can further subgroup into two entities sets customer and employee. Each of these person types can describes by set of attributes that includes all the attributes of entity set person plus all possible attributes of itself. For example, customer entity set can further described by set of attributes: customer\_id, enroll\_date etc. Similarly entity attributes can further describes by set of attributes: emplouee\_id, salary etc. The process of sub groupings within an entity set is called specialization. We can apply specialization repeatedly to refine a design schema. For instance bank employees may be further classified into officer, teller or secretary.

In E-R diagram, specialization can be represented by a triangle component labeled ISA. The label ISA stands for “is a “. For example customer is a person, officer is an employee etc. The ISA relationship also called super class-subclass relationship.

·**Generalization**

Generalization follows bottom-up approach in which multiple entity sets are synthesized into higher-level entity set on the basis of common features. For example, the database designer may have first identified a customer entity set with the attributes: name,street, city and customer\_id and employee entity set with the attributes name, street, city, employee\_id and salary. In both entities some attributes are common. These similarities between these two entities can be express by generalization.

During the course of database design or E-R schema for enterprise database designer may use both specialization and generalization process. Specialization and generalization in E-R diagram represent by a same way. The terms specialization and generalization are used interchangeably.



Figure: Specialization and generalization.

**Aggregation**

E-R model can not express relationship among relationship. To illustrate this, let us consider quaternary relationship manages among employee, branch, job and manager. Its main job is to record managers who manages particular job/task perform by particular employee at particular branch.



E-R diagram with redundant relationships.

This quaternary relationship is required since binary relationship between manager and employee can not represent required information. This E-R diagram is able to represent the required information but information are redundant since every employee, branch and job exist both relationship set “work-on” and “manages”. Here aggregation is better to represent such information.

Aggregation is in fact an abstraction it treats relationships as higher level entities. In our example, it treats relationship set work-on (including entity set employee, branch and job) as entity set. So now we can create binary relationship set “manages” between work-on and manager. This removes redundant information.



E-R Diagram with aggregation