Experiment No.: 01

Title: Formulation of a problem definition and Drawing ER /EER diagram.

Aim: Formulation of a problem definition for specific real world DMS system and Drawing ER/EER diagram for the same.
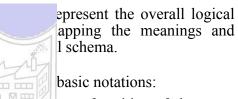
Resources needed: MS-office

Theory:

Entity relationship model is   epresent the overall logical structure of database and it   apping the meanings and interactions of real world enterp   l schema.

The E-R model employs three   basic notations:

Entity sets: An entity set is a   set of entities of the same type that share the same   properties .(an entity is a real world object)

Relationship   sets: Relationship set is a set of relationships of the same   type.(relationship is an association among several   entities)

Attributes: Attributes are   properties of entity set used to describe it. Different types   of attributes are composite, multivalued, derived and simple.

In **extended E R model** we have three additional concepts:

Specialization: The process of designating the subgroupings within an entity set is called specialization(finding specialized attributes)

e.g. in entity set person we have two types of entities like customer and employee. Both are person but employee have specialized attribute salary and customer have rating.

Generalization: It is a top down design process in which multiple entity sets are synthesized into a higher level entity set on the basis of common features.
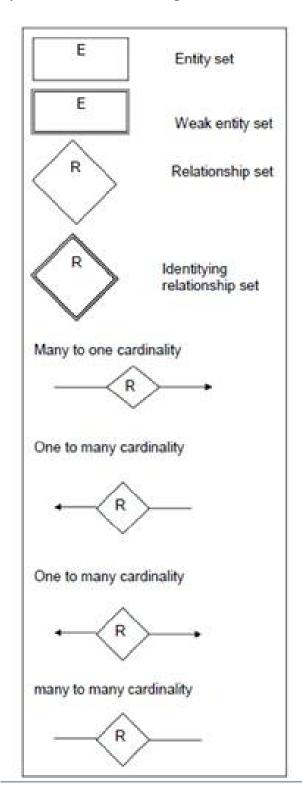
e.g. customer entity set and employee entity set both have common attributes like name, address, age which can be used as attributes of higher level entity set person. **Aggregation:** it is an abstraction through which relationships are treated as higher level entities.
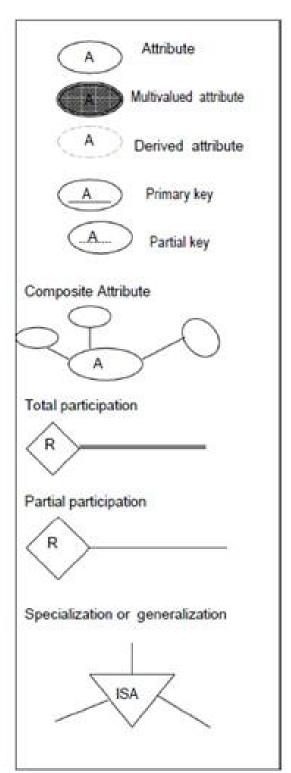
The most important use of the E-R diagram is it represents some constraints like total and partial participation, one to one, many to many, many to one, one to many mapping etc.

Symbols used in EER diagram:

Symbol	Meaning		Symbol	Meaning
E (rectangle)	Entity set		A (ellipse)	Attribute
E (double rectangle)	Weak entity set		A (shaded ellipse)	Multivalued attribute
R (diamond)	Relationship set		A (dashed ellipse)	Derived attribute
R (double diamond)	Identifying relationship set		A (underlined)	Primary key
			A (dashed underline)	Partial key

Many to one cardinality

One to many cardinality

One to many cardinality

many to many cardinality

Composite Attribute

Total participation

Partial participation

Specialization or generalization

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Procedure:
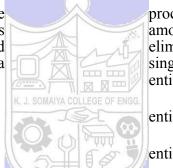
Identify the real world objects to start drawing the diagram
1. Entity – An real world object which can be converted into table name.
2. Entity type – It defines the collection of similar type of entities.
3. Attributes – Properties of entity which describes the entity. Attributes are of different types
   a. Atomic Attributes
   b. Composite Attributes
   c. Single valued attributes
   d. Multivalued Attributes
   e. Derived Attributes
4. Relationship – When one entity refers to another entity type a relationship exists between the two entities.
5. Relationship types – A relationship type R among n entity types defines a set of associations among entities of other types.
6. Weak entity – the entity depends on another entity is called as weak entity.
7. Specialization – this is process of defining a set of subclasses of an entity type .It is derived from a super class depending on different attributes.
8. Generalization – It is the process of abstraction in which we suppress the differences among several entity types grouping some entities and eliminating common features. We generalize them into a single super class.
   a. Disjoint – In this, entity can be a member of any one of the subclass
   b. Overlap – In this, entity can be a member of more than one subclass.
   c. Total – All the entities are member of any one of the subclasses.
   d. Partial – Entity is not a member of any one the subclass.
9. Union – the subclass represent collection of objects.

This detailed problem statement gives the clarification about the database design.

This is tool to find out missing functional dependencies to convert the schema to the appropriate normal form.

Formulate the problem definition to get the detailed description of the problme domain so that entities can be easily identified from the problem definition.

There are many components used into EER.
1. First find out the real world objects as entities.
2. Find out the attributes which will describe the object.
3. Find the relationships and the participation constraints.

4. Apply object oriented fundamentals and get the specialization and generalization objects.
5. Draw the diagram.

Results: (Document printout

ER Diagram for COMPANY DATABASE:

1. Problem definition

2. ER/EER diagram

 Example:

P

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b

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WORKS_FOR

EMPLOYEE

Fname Minit Lname

Name

Ssn

Bdate

Address

Sex Salary

StartDate

NumberOfEmployees

MANAGES

Hours

supervisor supervisee

M N

WORKS_ON

SUPERVISION

1 N

DEPENDENTS_OF

N

Number

Name Locations

DEPARTMENT

CONTROLS

N

PROJECT

Name

Location

Number

DEPENDENT

Name Sex BirthDate Relationship

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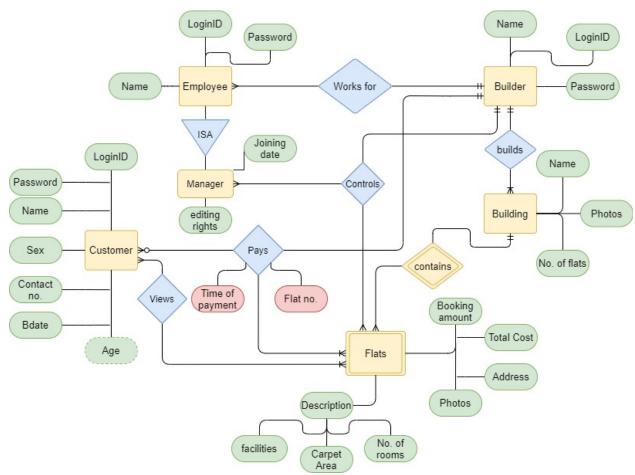
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Problem Definition:

DMS Mini- project Problem statement (Property Management System): Ever wondered how hard it is to track all the properties created by builders from their marketing to selling, with increase and decrease of the prices according to the market rate and investments? Here is a

system that would help the builders not only track the availability of their sales but also present customers with all the information they require to preview their searched houses from the place of their comfort. A database management system for builders to have a database to store all the details of it's newly constructed buildings so that he could use that data for sale of his flats. It will include information about each floor, each room along with cost for buying and renting. This would help the builders to track their property sale and would eventually be converted into a website to display all the property available for sale. Administrators will be given full access to the entire database to change the prices either for a discount or increase in rate of building materials. Facilities for our customers would include them to view the images of the newly created houses along with details of every specific selected house such as number of rooms, location, floor, roadside/ garden side, cost of buying or renting and the facilities that would come along with the house. As an employee, they would have the option to set if the property is available for sale or not. If it is available, it would be updated on the website so that our customers can access the information. Customers will also have the option to book flats by paying booking money online for booking their house.

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EER diagram for Property Management System:

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Outcomes:

Apply data models to real world scenario

Questions:

Q1 Explain total and partial participation with example

Ans: Total participation:

It specifies that each entity in the entity set must compulsorily participate in at least one relationship instance in that relationship set. That is why, it is also called as **mandatory participation.** Total participation is represented using a double line between the entity set and relationship set.

Example:-

Double line between the entity set "Student" and relationship set "Enrolled in" signifies total participation. It specifies that each student must be enrolled in at least one course.

Partial participation:

It specifies that each entity in the entity set may or may not participate in the relationship instance in that relationship set. That is why, it is also called as **optional participation.** Partial participation is represented using a single line between the entity set and relationship set.

Example:-

Single line between the entity set "Course" and relationship set "Enrolled in" signifies partial participation. It specifies that there might exist some courses for which no enrollments are made.

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Q2 differentiate between primary key and unique

key

Ans: Primary Key is a column that is used to uniquely identify each tuple of the table. It is used to add integrity constraints to the table. Only one primary key is allowed to be used in a table. Duplicate and NULL (empty) values are not valid in the case of the primary key. Primary keys can be used as foreign keys for other tables too.

Unique key is a constraint that is used to uniquely identify a tuple in a table. Multiple unique keys can present in a table. NULL values are allowed in case of a unique key. These can also be used as foreign keys for another table.

Conclusion: A problem definition was formulated for a real world problem of property management and the ER diagram was also made for the same.

Reference books:

Elmasri and Navathe, "Fundamentals of Database Systems", 6ᵗʰ Edition, Pearson Education

Korth, Slberchatz,Sudarshan, :"Database System Concepts", 6th Edition, McGraw Hill

3. http://vlabs.iitkgp.ernet.in/se/4/

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