



Experiment No.: 01

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



Batch: A2

Roll No.:16010421063

Experiment No.: 01

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 a data model which represent the overall logical structure of database and it is very useful in mapping the meanings and interactions of real world enterprises onto a conceptual 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)

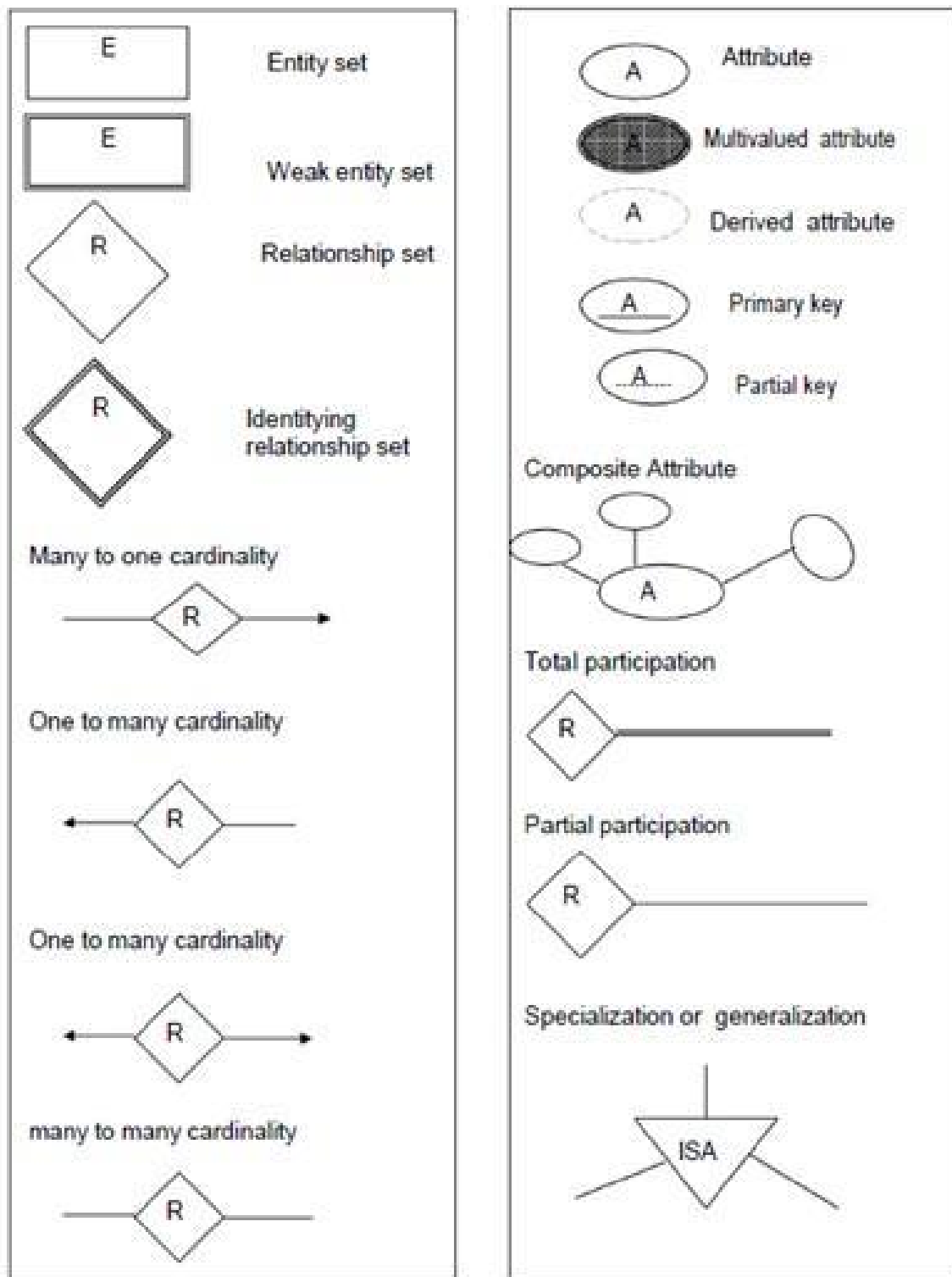
e.g. in entity set person we have two types of entities like customer and employee. Both are person but employee have specialized attribute salary and customer have rating.

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:

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 upon 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/handwritten)

1. Problem definition
2. ER/EER diagram

Example:

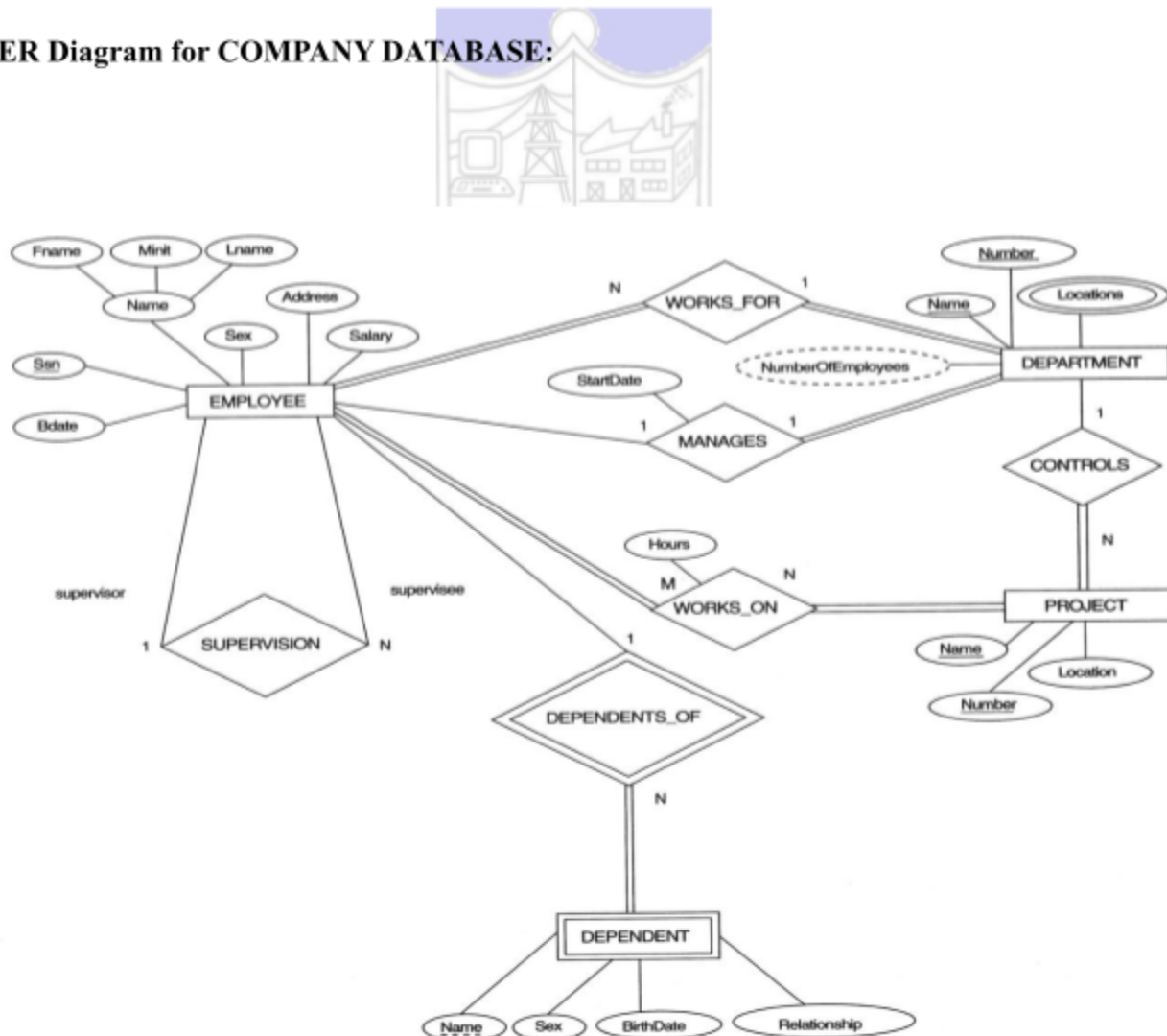
Problem Definition for COMPANY database system

The company is organized into DEPARTMENTS. Each department has a name, number and an employee who *manages* the department. We keep track of the start date of the department manager.

Each department *controls* a number of PROJECTS. Each project has a name, number and is located at a single location.

It stores each EMPLOYEE's social security number, address, salary, gender, and birthdate. Each employee *works for* one department but may *work on* several projects. It keep track of the number of hours per week that an employee currently works on each project. We also keep track of the *direct supervisor* of each employee.

Each employee may *have* a number of DEPENDENTS. For each dependent, we keep track of their name, gender, birthdate, and relationship to employee.

ER Diagram for COMPANY DATABASE:

1.Problem statement

A system built to diminish the complexity of the communication between Builders and customers when it comes to Real estate. So to tackle this problem we build a Web portal for handling the task of fluctuating prices due to market variations and a database system for managing the inventory. It should contain a user-friendly UI.

This web portal should provide builders with the ability to add, delete and update inventory. This should also display the history of the properties already sold.

Customers should log in/ register to access the properties. They should be able to see properties and the related details. The customer details should include the Price bracket they are looking at, the property size

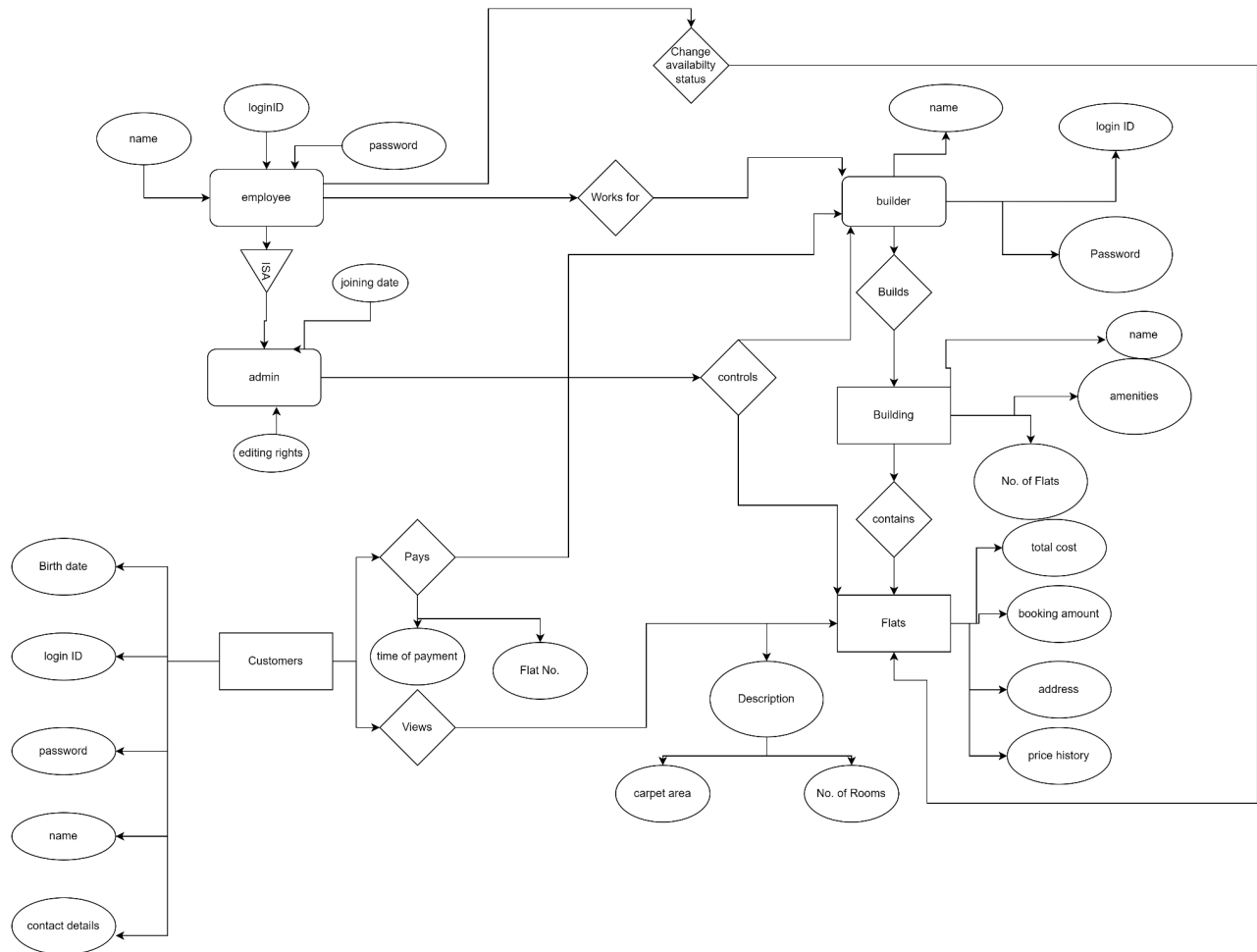
Details of properties should include- Locations, landmarks, and Builder information. The current price, Indoor facilities, The size of the land parcel of the project, images of the property, and the size of the flat. Number of floors

Builder Information should contain- the number of properties sold, Review, address of main office, contact details, highest and lowest price

On the builder side there should be two types of users-1) Admin 2)

Employee Admin should be able to add and delete the properties as well as change the prices and update relevant details. Employees should be able to change the availability status of the property.

2. ER diagram



Outcomes:

Construct ER diagram for a real world problem statement

Questions:**Q1 Explain total and partial participation with example****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 **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

Q2 differentiate between primary key and unique key

PRIMARY KEY	UNIQUE KEY
Used to serve as a unique identifier for each row in a table.	Uniquely determines a row which isn't primary key.
Cannot accept NULL values.	Can accepts NULL values.
Only one primary key	More than one unique key
Creates clustered index	Creates non-clustered index
A Primary key supports auto increment value.	A unique key does not supports auto increment value.
We cannot change or delete values stored in primary keys.	We can change unique key values.

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, Silberchatz, Sudarshan, :”Database System Concepts”, 6th Edition, McGraw Hill
- 3. <http://vlabs.iitkgp.ernet.in/s>