



**K. J. Somaiya College of Engineering, Mumbai-77**  
(Autonomous College Affiliated to University of Mumbai)

**Batch: B1** **Roll No.: 1711072**  
**Experiment / assignment / tutorial No. 1**  
**Grade: AA / AB / BB / BC / CC / CD/DD**

**Title:** Problem Definition and Design of Extended-Entity-Relationship diagram

**Objective:** To define a Database Problem and Design an EER diagram for a business domain.

**Expected Outcome of Experiment:**

**CO 1:** Design entity-relationship diagrams to represent different database application scenarios.

**Books/ Journals/ Websites referred:**

1. G. K. Gupta : "Database Management Systems", McGraw –Hill
2. Korth, Silberchatz, Sudarshan : "Database Systems Concept", 6th Edition , McGrawHill
3. Elmasri and Navathe, "Fundamentals of Database Systems", 5th Edition, PEARSON Education.

**Dia Software: A Software to Design ER Model**

Dia is one of the convenient open source tool which runs on multiple platforms including Linux, Windows and MacOS. Dia has a number of "sheets" each of which includes diagram objects for different modeling tools, such as UML, ER diagrams, flowcharts, etc.

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The ER tool has objects for entities, relationships, attributes (using the oval notation), edges, and so on. The properties boxes for each of these elements allow you to specify cardinality constraints, total participation, identifying relationship, etc.

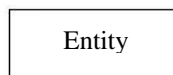
It supports many common formats to store diagrams such as jpeg, png, eps, etc.

**Pre Lab/ Prior Concepts:**

The ER data model was developed to facilitate the database design by allowing specification of an enterprise schema that represents the overall logical structure of the database. The ER model is one of the several data models. The semantic aspect of the model lies in its representation of the meaning of the data. The ER model is very useful many database design tools drawn on concepts from the ER model. The ER model employs 3 basic notations: entity set, relationship set and attributes.

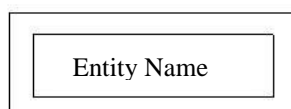
**Symbols Used in ER Notation**

1.



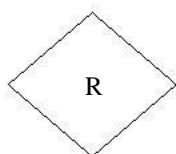
**Entity set:** An entity is a set of entities of the same type that share the properties or attributes.

2.



**Weak entity set:** An entity set may not have sufficient attributes to form a primary key. Such an entity set is termed as weak entity set.

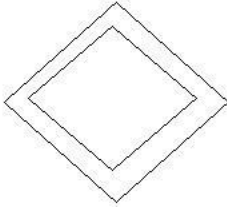
3.



**Relationship Set:** A relationship is an association among several entities. A relationship set is a set of relationships of the same type.

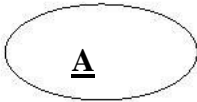
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4.



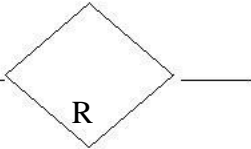
**Identification relationship set for weak entity set:** The relationship associating the weak entity set with the identifying entity set is called the identifying relationship.

5.



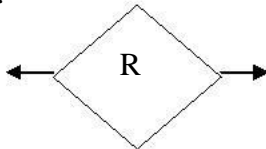
**Primary key:** The primary key is used to denote a candidate key that is chosen by the database designers as the principal means of identifying entities within an entity set.

6.



**Many to Many relationship**

7.



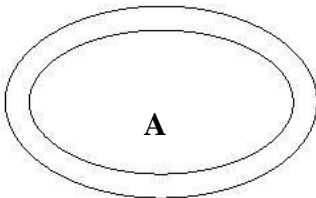
**One to One relationship**

8.



**Attribute**

9.



**Multi valued Attribute**

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**Extended Entity Relationship Diagram:**

The EER model includes all of the concepts introduced by the ER model. Additionally it includes the concepts of a subclass and superclass (Is-a), along with the concepts of specialization and generalization. Furthermore, it introduces the concept of a union type or category, which is used to represent a collection of objects that is the union of objects of different entity types. EER model also includes EER diagrams that are conceptual models that accurately represent the requirements of complex databases.

**Example Case Study:** List the data requirements for the database of the company which keeps track of the company employee, department and projects. The database designers provide the following description

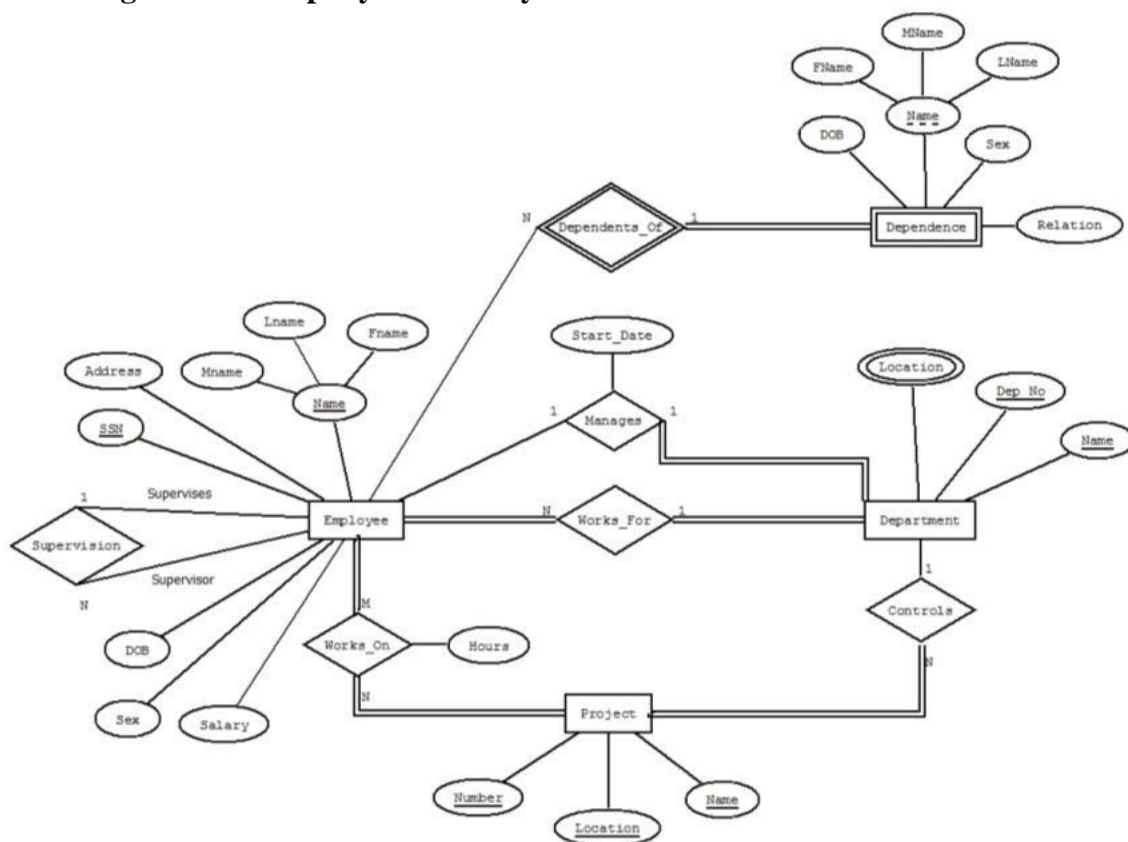
1. The company is organized into departments. Each department has unique name, unique number, and particular employee to manage the department. We keep track of the start date and the employee begins managing the department. The department has several locations.
2. The department controls a number of projects each of which has a unique name, unique number and a single location.
3. We store each employee names social security number, address, salary, sex and dob. An employee is assigned one department but may work on several projects which are not necessarily controlled by the same department. We keep track of the department of each employee works on each project and for insurance purpose. We keep each dependents first name, sex, dob and relation.

**Procedure for doing the ER diagram experiment**

1. Identifying the Entities (Strong and weak entities)
2. Identify attributes of the Entity (keys, partial key, simple, composite, multivalued, derived)
3. Identify relationship(recursive)
4. Identify the structural constraints of the relationship (cardinality ratio, participation constraints)

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**ER- Diagram for company Case Study Database:**



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**Problem Definition:**

People seek information via words, recommendation letters, etc. The search engines retrieve this information using specific keywords mentioned by the user.

Recommendation systems imitate this social process to enable quick filtering of the information on the web.

We aim to develop a database for this movie recommendation system which will contain the details of the following:

1. Movie, like the title, director, movie length;
2. Genre: the basis on which movies will be suggested
3. Customer: customer id, basic details
4. Theatre: name, address, timings
5. Cast: name, age, no. of movies done
6. Reviews: rating by customer, movie analyst

This database will serve as a basis for our movie recommendation system on the basis of user's genre preference and review of the movies.

**Design of EER:**

