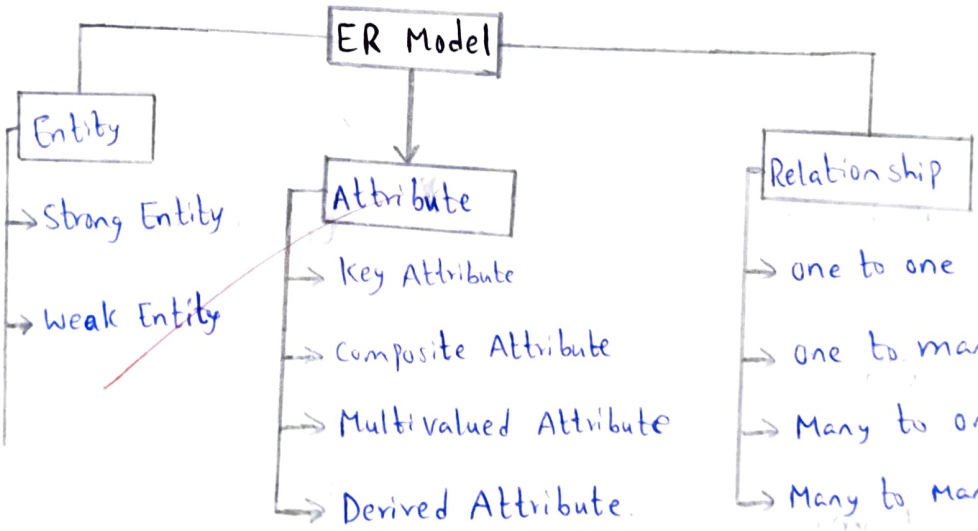
25/7/25

Task-1(a): Introduction of 'ER' Model

Introduction to ER Model

The Entity-Relationship Model (ER Model) is a concepted model for designing a database. This model represents the logical structures of a database, including the entities, their attributes and relationship between them.

- **Entity:** An object that is stored as data such as Student, Course (or) Company.
- **Attribute:** Properties that describes an entity such as Student ID, Course Name (or) Employee Email.
- **Relationship:** A Connection b/w entities such as "a student enrolls in a course".



- The graphical Representation of this model is called an Entity-Relation Diagram (ERD)

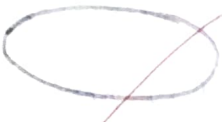
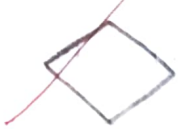
ER Model in Database Design Process

We typically follow the below steps for designing a database for an application.

- Gather the requirements (functional and data) by asking questions to the database users.
- Create a logical (or) conceptual design of the database. This is where ER model plays a role.
- After this, focus on physical Database design (like indexing) and external design (like views).

Symbols used in ER Model

- **Rectangles**: It represents entities in ER model.
- **Ellipses**: It represents attributes in ER model.
- **Diamond**: It represents relationship among entities.
- **Lines**: Represents Attributes to entities & entity sets.
- **Double ellipse**: Represents multi-valued attributes.
- **Double rectangle**: Represents weak entities & which depend on other entities for identification.

Rectangle		Entities in ER model.
Ellipse		Attributes in ER model.
Diamond		Relationship among Entities.
Line		Attribute in entities.
Double ellipse		Multivalued attributes
Double Rectangle		weak entity

What is an entity?

An entity represent a real-world objects concept (or) thing about which data is stored in a database. It act as building block of a data base.

Examples of Entity:-

- Real-world objects: Person, Car, Employee, etc
- Concept: Course, Event, Reservation, etc
- Things: Product, Document, Device, etc

1 Strong Entity:

A strong entity is a type of Entity that hass a key attribute that can uniquely identify each instance of the entity. A strong entity does not depend on any other entity in the schema for its identification. It has a primary key that ensures its uniqueness and is represented by a rectangle in an ER diagram.

2 Weak Entity:

A weak entity cannot be uniquely identified by its own attributes alone. It depends on a strong entity to be identified. A weak entity are represented by a double rectangle. The participation of weak entity types is always total.

Ex: A company may store the information of the dependents of an employee. But the dependents can't exist without the employee will be identifying

entity type for dependent which means it is the strong entity type.

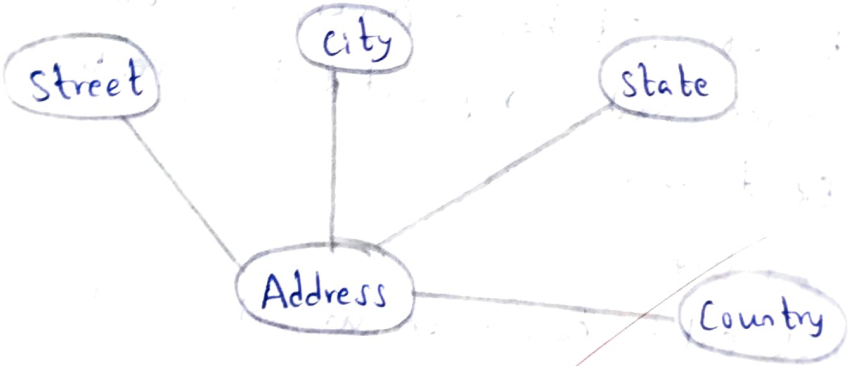
Types of attributes:

1. Key Attribute:

The attribute which uniquely identifies each entity in the entity set is called key attribute. For example, Roll_No will be unique for each student.

2. Composite Attribute:

An attribute composed of many other attributes is called a composite attribute. For example, the address attribute of the student entity type consists of street, city, state and country.



3. Multi-valued Attribute

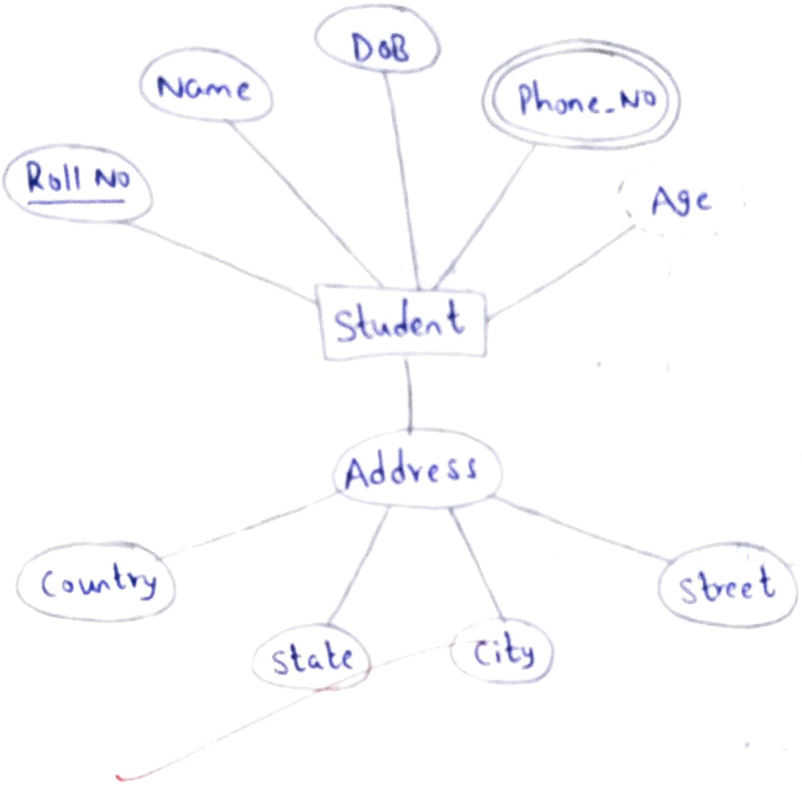
An attribute consisting of more than one value for a given entity. For example, Phone_no (can be more than one for a given student)

4. Derived Attribute:

An attribute that can be derived from other attribute of the entity type is known as a derived attribute. eg: Age.

Age

Task 1(B) using Creatly Tool



Result

Thus, the ER Diagram executes by using the Creatly tool successfully.