**What is ER Model?**

**ER Model** stands for Entity Relationship Model is a high-level conceptual data model diagram. ER model helps to systematically analyze data requirements to produce a well-designed database. The ER Model represents real-world entities and the relationships between them. Creating an ER Model in DBMS is considered as a best practice before implementing your database

**ER Diagram** stands for Entity Relationship Diagram, also known as ERD is a diagram that displays the relationship of entity sets stored in a database. In other words, ER diagrams help to explain the logical structure of databases. ER diagrams are created based on three basic concepts: entities, attributes and relationships

## Why use ER Diagrams?

Here, are prime reasons for using the ER Diagram

* Helps you to define terms related to entity relationship modeling
* Provide a preview of how all your tables should connect, what fields are going to be on each table
* Helps to describe entities, attributes, relationships
* ER diagrams are translatable into relational tables which allows you to build databases quickly
* ER diagrams can be used by database designers as a blueprint for implementing data in specific software applications
* The database designer gains a better understanding of the information to be contained in the database with the help of ERP diagram
* ERD Diagram allows you to communicate with the logical structure of the database to users

## Facts about ER Diagram Model

**Now in this ERD Diagram Tutorial, let's check out some interesting facts about ER Diagram Model:**

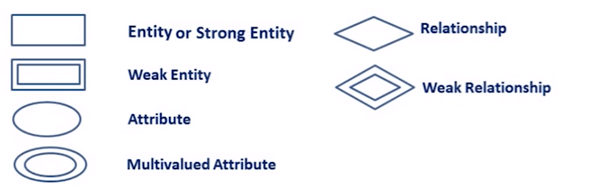
* ER model allows you to draw Database Design
* It is an easy to use graphical tool for modeling data
* Widely used in Database Design
* It is a GUI representation of the logical structure of a Database
* It helps you to identifies the entities which exist in a system and the relationships between those entities

## ER Diagrams Symbols & Notations

**Entity Relationship Diagram Symbols & Notations** mainly contains three basic symbols which are rectangle, oval and diamond to represent relationships between elements, entities and attributes. There are some sub-elements which are based on main elements in ERD Diagram. ER Diagram is a visual representation of data that describes how data is related to each other using different ERD Symbols and Notations.

**Following are the main components and its symbols in ER Diagrams:**

* **Rectangles:**This Entity Relationship Diagram symbol represents entity types
* **Ellipses :**Symbol represent attributes
* **Diamonds:**This symbol represents relationship types
* **Lines:**It links attributes to entity types and entity types with other relationship types
* **Primary key:**attributes are underlined
* **Double Ellipses:**Represent multi-valued attributes

[](https://www.guru99.com/images/1/100518_0621_ERDiagramTu12.png)ER Diagram Symbols

## Components of the ER Diagram

This model is based on three basic concepts:

* Entities
* Attributes
* Relationships

**ER Diagram Examples**

## WHAT IS ENTITY?

A real-world thing either living or non-living that is easily recognizable and nonrecognizable. It is anything in the enterprise that is to be represented in our database. It may be a physical thing or simply a fact about the enterprise or an event that happens in the real world.

An entity can be place, person, object, event or a concept, which stores data in the database. The characteristics of entities are must have an attribute, and a unique key. Every entity is made up of some 'attributes' which represent that entity.

**Examples of entities:**

* **Person:** Employee, Student, Patient
* **Place:** Store, Building
* **Object:** Machine, product, and Car
* **Event:** Sale, Registration, Renewal
* **Concept:** Account, Course

## Relationship

Relationship is nothing but an association among two or more entities.

Entities take part in relationships.

## Weak Entities

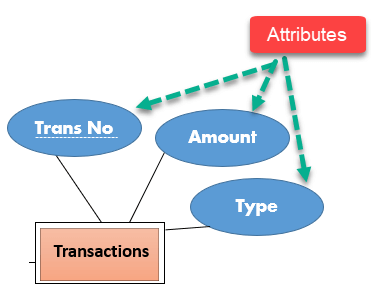
A weak entity is a type of entity which doesn't have its key attribute. It can be identified uniquely by considering the primary key of another entity. For that, weak entity sets need to have participation.

|  |  |
| --- | --- |
| **Strong Entity Set** | **Weak Entity Set** |
| Strong entity set always has a primary key. | It does not have enough attributes to build a primary key. |
| It is represented by a rectangle symbol. | It is represented by a double rectangle symbol. |
| It contains a Primary key represented by the underline symbol. | It contains a Partial Key which is represented by a dashed underline symbol. |

## Attributes

It is a single-valued property of either an entity-type or a relationship-type.

An attribute in ER Diagram examples, is represented by an Ellipse

[](https://www.guru99.com/images/1/100518_0621_ERDiagramTu6.png)

|  |  |
| --- | --- |
| **Types of Attributes** | **Description** |
| **Simple attribute** | Simple attributes can't be divided any further. For example, a student's contact number. It is also called an atomic value. |
| **Composite attribute** | It is possible to break down composite attribute. For example, a student's full name may be further divided into first name, second name, and last name. |
| **Derived attribute** | This type of attribute does not include in the physical database. However, their values are derived from other attributes present in the database. For example, age should not be stored directly. Instead, it should be derived from the DOB of that employee. |
| **Multivalued attribute** | Multivalued attributes can have more than one values. For example, a student can have more than one mobile number, email address, etc. |

## Cardinality

Defines the numerical attributes of the relationship between two entities or entity sets.

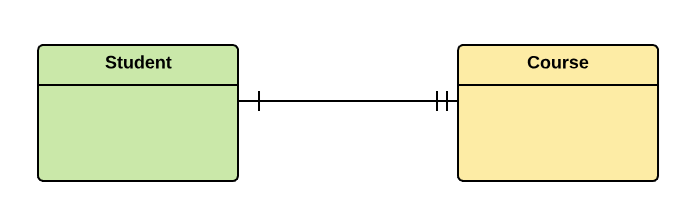
Different types of cardinal relationships are:

* One-to-One Relationships
* One-to-Many Relationships
* May to One Relationships
* Many-to-Many Relationships

**1.One-to-one:**

One entity from entity set X can be associated with at most one entity of entity set Y and vice versa.

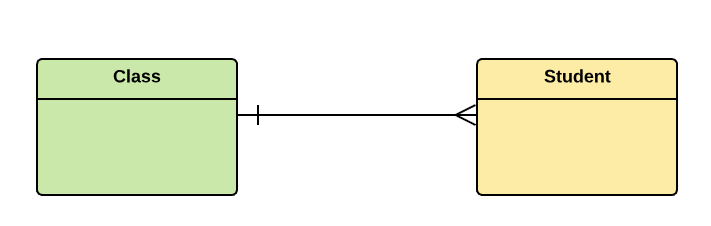
Example: One student can register for numerous courses. However, all those courses have a single line back to that one student.

[](https://www.guru99.com/images/1/100518_0621_ERDiagramTu8.png)

**2.One-to-many:**

One entity from entity set X can be associated with multiple entities of entity set Y, but an entity from entity set Y can be associated with at least one entity.

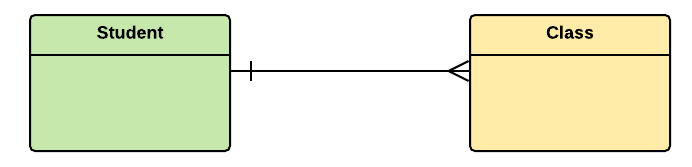
For example, one class is consisting of multiple students.

[](https://www.guru99.com/images/1/100518_0621_ERDiagramTu9.png)

**3. Many to One**

More than one entity from entity set X can be associated with at most one entity of entity set Y. However, an entity from entity set Y may or may not be associated with more than one entity from entity set X.

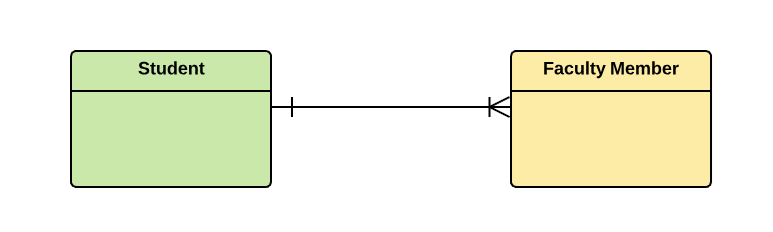
For example, many students belong to the same class.

[](https://www.guru99.com/images/1/100518_0621_ERDiagramTu10.png)

**4. Many to Many:**

One entity from X can be associated with more than one entity from Y and vice versa.

For example, Students as a group are associated with multiple faculty members, and faculty members can be associated with multiple students.

[](https://www.guru99.com/images/1/100518_0621_ERDiagramTu11.png)

### Step 1) Entity Identification

### Step 2) Relationship Identification

### Step 3) Cardinality Identification

### Step 4) Identify Attributes

### Step 5) Create the ERD Diagram

## Best Practices for Developing Effective ER Diagrams

Here are some best practice or example for Developing Effective ER Diagrams.

* Eliminate any redundant entities or relationships
* You need to make sure that all your entities and relationships are properly labeled
* There may be various valid approaches to an ER diagram. You need to make sure that the ER diagram supports all the data you need to store
* You should assure that each entity only appears a single time in the ER diagram
* Name every relationship, entity, and attribute are represented on your diagram
* Never connect relationships to each other

## Summary

* ER Model in DBMS stands for an Entity-Relationship model
* The ER model is a high-level data model diagram
* ER diagrams are a visual tool which is helpful to represent the ER model
* ER diagrams in DBMS are blueprint of a database
* Entity relationship diagram DBMS displays the relationships of entity set stored in a database
* ER diagrams help you to define terms related to entity relationship modeling
* ER Model in DBMS is based on three basic concepts: Entities, Attributes & Relationships
* An entity can be place, person, object, event or a concept, which stores data in the database (DBMS)
* Relationship is nothing but an association among two or more entities
* A weak entity is a type of entity which doesn't have its key attribute
* It is a single-valued property of either an entity-type or a relationship-type
* It helps you to defines the numerical attributes of the relationship between two entities or entity sets
* ER- Diagram DBMS is a visual representation of data that describe how data is related to each other
* While Drawing ER diagrams in DBMS, you need to make sure all your entities and relationships are properly labeled.