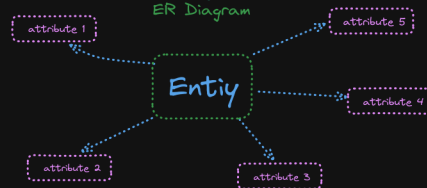Data Model (ER Model)

Data Model

Collection of tools to describe data, data relationship, data semantics and consistency constraints.
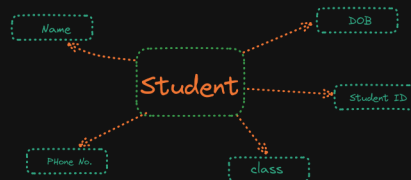
ER Model ->

High level data model based on persepction of real world
it has collection of basic objects called entities and relationship among objects.

ER Diagram

EX.->

attribute 1   attribute 5
Entiy
attribute 4
attribute 2   attribute 3

Ex2 ->

Name   DOB
Student
Student ID
Phone No.   class

// Entity always have unique ID (primary KEY) to differentiate with other entity.

Entity set -> In example 2 student is entity set, entity set is collection of entity shares same attributes.
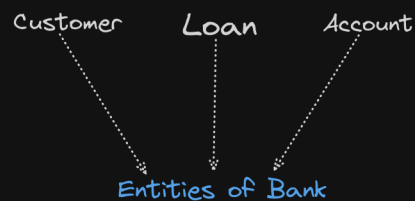
// Entity set == entity

Attributes -> Attributes describe the set of entity

Relationship -> Shows association between two or more entities.

Example -> Bank

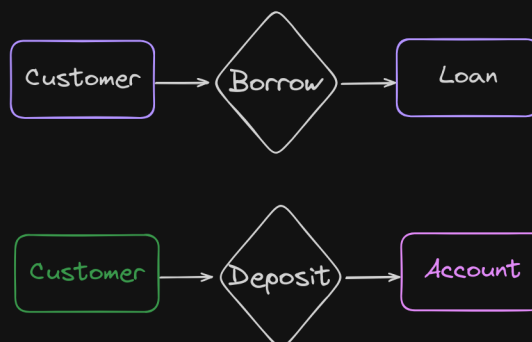**Bank**

Customer   Loan   Account

Entities of Bank

// customer borrows loan (borrow is relatiomship)

// Customer deposit in Accout (deposit is relationship)

Then ER diagram will be

Customer → Borrow → Loan

Customer → Deposit → Account

# ER Model / ER diagram

ER Diagram act as blueprint in DB

* Attributes properties

It has domain(range), values, permitted and non permitted

*Types of Attributes

    i) Simple attributes- > Cannot be further divided
                example -> rollNo. , bank account no

    ii) Composite attributes- > Can be further divided
                example -> address -> house no, street, pincode etc.

    iii) Single Valued attributes- > Having only single value
                example -> student ID, loan ID etc.

    iv) Multiple valued attributes- > Can have multiple values
                example -> phone no. , nominee name etc .
    v) Derived attributes- > Created from above attributes,
                example -> age of student through dob etc.

Types of Attributes ER diagram Example -
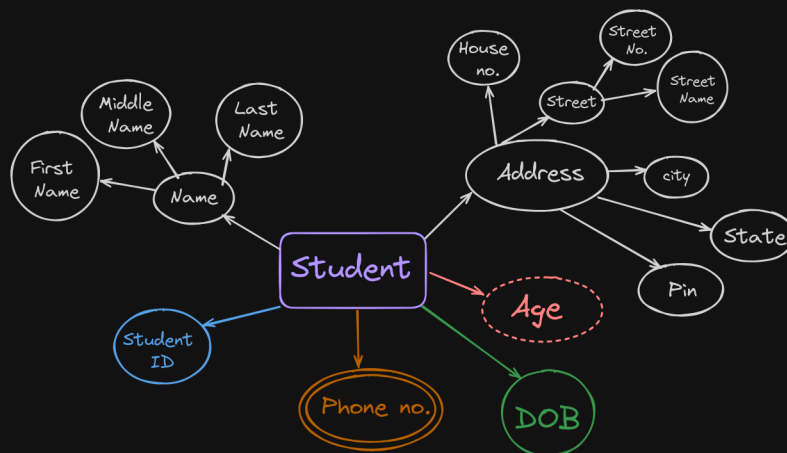
Null Value

Null value can have 3 behaviours

    -> NOT APPLICABLE -> Example, a student not having middle name
      -> MISSING -> Example, a student name is missing
  -> NOT KNOWN -> Example, a student student ID is not defined yet.

*More on relationship (Type)

    Strong entity -> Having primary key and not depend on another entity.
        Weak entity -> Depend on another strong entity.

i) Weak relationship

Example for strong and weak entity ->

Loan Amount   Loan ID   Payment No.

Loan → Loan payment ·········> Payment

ii) Strong relationship -> Relation bw entity and having each entity unique id.

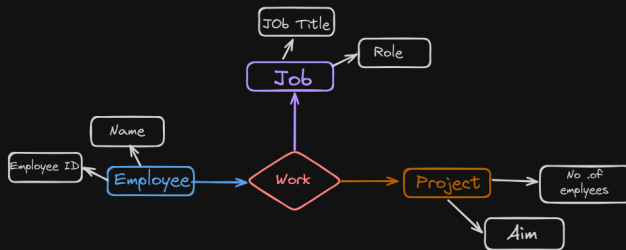***Degree of relation -> No. of entities in a relation is degree of relation**
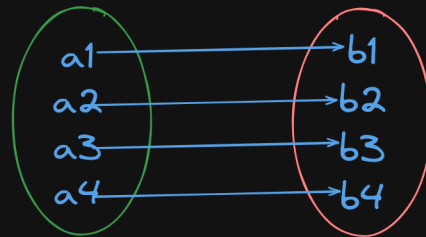
i) Unary relation ->

Employee — Manage

ii) Binary relation ->

Student → enroll → Course

iii) Ternary relation ->

JOb Title ← Job → Role
Job ↑
Name ← Employee
Employee ID → Employee → Work → Project → No. of emplyees
                                Project → Aim

Relationship constraints

-> Mapping cardinality -> (vahi maths ka relation set vala concept but thoda sa alag)
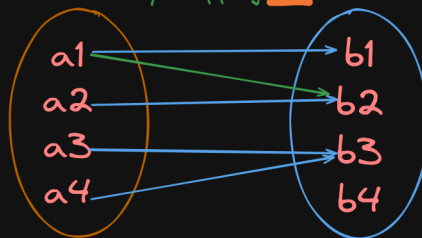
i) One to one mapping 1:1
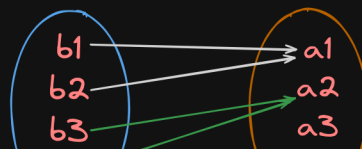

Citizen entity set   Addhaar entity set

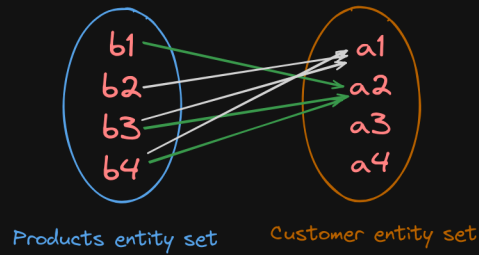**ii) One to many mapping 1:N**

Owner entity set   Car entity set

iii) Many to one mapping N:1

b4   a4

iv) Many to Many mapping N:N

b1   a1
b2   a2
b3   a3
b4   a4

Products entity set   Customer entity set

-> Participant constraints -> also known as minimum cardinality constraint
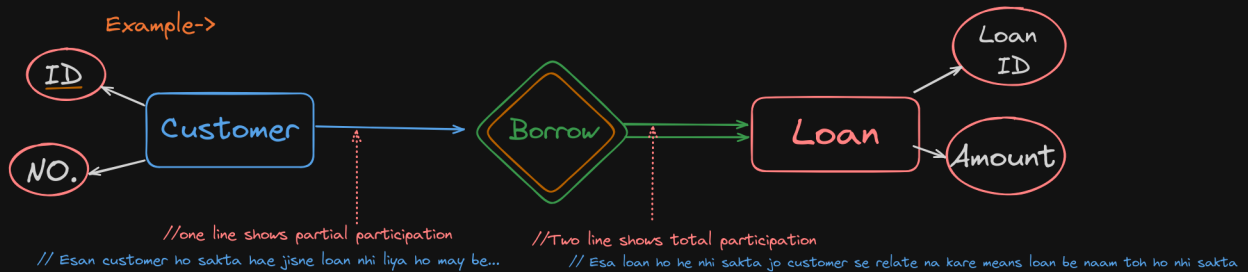
Two types

i) Total Participation   ii) Partial Participation

-> All entities are involved in one relationship   -> Not all entities are involved in one relationship

Example->

ID

Customer   Borrow   Loan   Loan ID

NO.   Amount

//one line shows partial participation   //Two line shows total participation
// Esan customer ho sakta hae jisne loan nhi liya ho may be...   // Esa loan ho he nhi sakta jo customer se relate na kare means loan be naam toh ho nhi sakta

=>Weak entities are always with the total participant constraints but
strong entities may be partial or total paritcipation.

Symbols used in ER Diagram

Entity   Attribute   Relationship

Weak Entity   Multi-valued Attribute

              Primary Key Attribute   Relationship   Total Participation   Entity

              Weak Key Attribute

              Derived Attribute   Weak Relationship