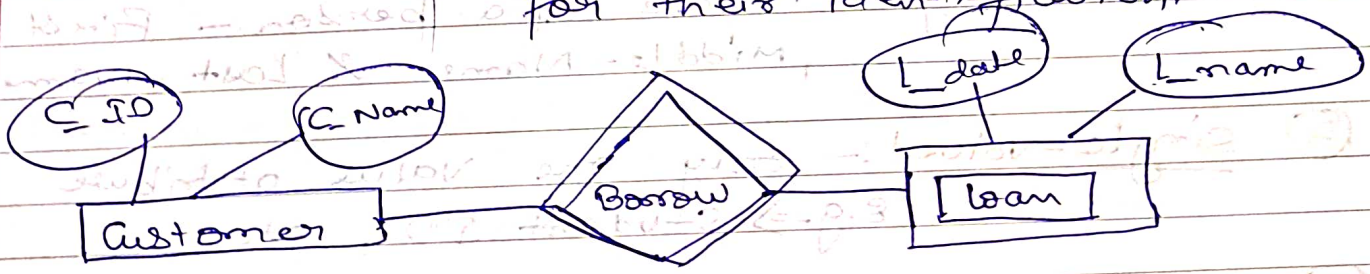
{ Lecture :- 3 }

ER Model

- Entity- Relationship Model is a high level data model based on a real World that consists of a collection of basic objects, called entities and of relationships among these objects.
- Graphical representation of ER model is called an ER Diagram.

→ **Entity :-** A thing or object in the real world that is distinguishable from all other objects.

- Each student in a college is an entity.
- It has physical existence.
- Each can be uniquely identified (by a primary key).
- Strong Entity :- can be uniquely identified.
- Weak Entity :- can't be uniquely identified, depends on strong entity for their identification.



- As Customer has C_ID as primary key but a loan hasn't so. We need customer to uniquely identified the loan.

→ Entity Set

- It is a set of entites of the same type that share the same properties.
  E.g. ⇒ Student is an entity set.

→ Attributes

- Attributes are the features of an entity set.
- E.g. ⇒ Student entity set has following attributes:-
  1. Student_ID
  2. Name
  3. Course .... etc.

→ Types of attributes

1. Single :- Attribute which cannot be further divide.
   E.g. ⇒ Student's Roll number, etc
2. Composite :- Can be divide into subparts.
   E.g. ⇒ Name of a person — First Name, Middle-Name, & Last-Name etc.
3. Single-valued :- Only one value attribute
   E.g. ⇒ Student ID, etc.
4. Multi-valued :- More than one Value.
   E.g. ⇒ phone-number (Can have 2 numbers to a person)
5. Derived :- Valued derived from the value of other related attributes
   E.g. ⇒ Age, membership-period etc.

(6) Null value :- When attribute have no value, it shows value doesn't exist.

→ Relationships

- Association among two or more entities.
  E.g. => Person has vehicle, Parent has child.

(1) Strong relationships :- Between 2 independent entities

(2) Weak relationships :- Between weak and its owner / strong entity set.

→ Degree of relationship :-

(1) Unary :- Only one ~~relationship~~ entity participate.
  E.g. => Employee manages employee.

(2) Binary :- two entities participates.
  E.g. => Student take course.

(3) Ternay :- among three entities.
  E.g. => Employee works-on branch,
  Employee works-on job.

→ Relationship constraints :-

- Number of entites to which another entity can be associated via a relationship.

(1) One to one :- Entity in A is associated with ~~one~~ at most one entity in B ; where A & B are entity set.

② One to many :- Entity A associated with 'N' Entity with B.

③ Many to one :- Entity A associated with at most 1 entity in B, while B can have association of N entities in A.

④ Many to many :- Both A and B entity have N association in between.

E.g.-> ① One to one.
citizen has Aadhar Card
(only one card issued to a person).

② One to many.
citizen has vechile
(a citizen can have many vechiles, but a vechile have only one owner).

③ Many to one.
courses taken by Professor.
(a course can have many professors).
(a professor can take many courses).

④ Many to many.

Student attend Course

(a Student can take many courses.
A course can have many students.)

→ Participation Constraints

Minimum cardinality constraint.

- Types of it :-

① Partial :- not all entities are involved in the relationship instance.

② Total :- each entity involved in atleast one relationship instance.

E.g. ⇒ Customer borrow loan.

(a loan cannot exist without customer entity).

- Weak entity have total participation, but strong may not have total.

→ ER Notation :-