CHAPTER : 2

20/01/2023 2. Entity Relationship data model

1. Entity
2. Entity set
3. Entity types
4. Attributes
5. Value
6. Domain (Value set)

1. Entity : It refers to the object, person, place or an event.

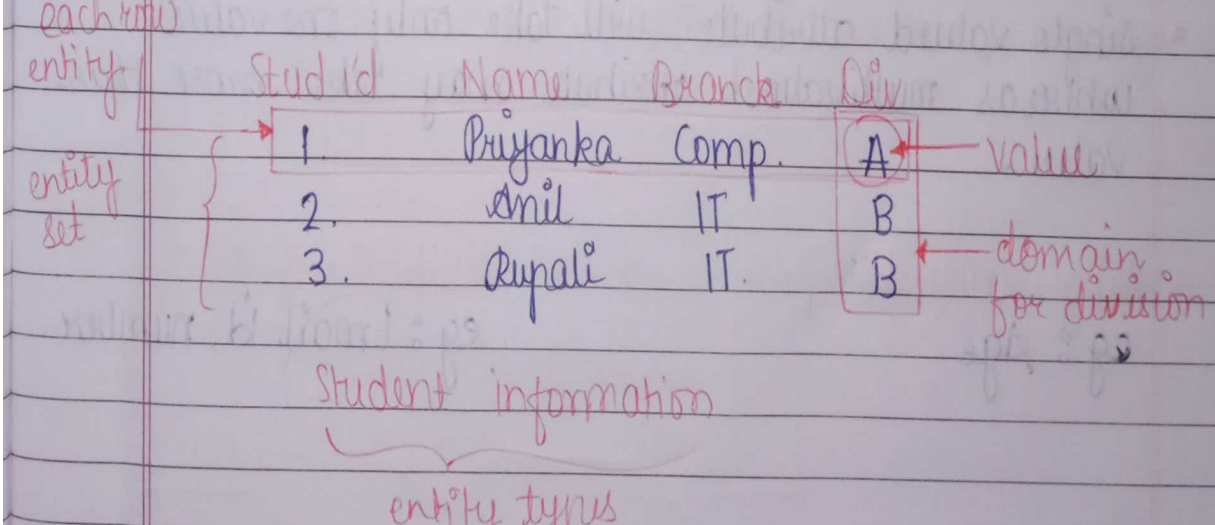
2. Entity set : If we combine, two or more entities together, it is termed as entity set.

3. Entity types : It is refered as, entity sets having common attribute.

4. Attribute : It specifies the features or characteristics of the entity.

5. Value : Any data or information stored for an attribute is termed as value.

6. Domain (Value set) : It defines set of all values of any attribute.

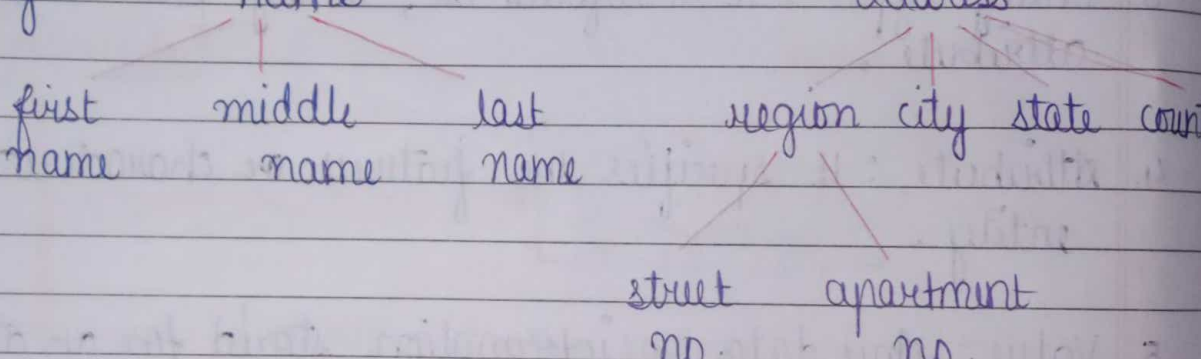


* Types of attributes:

1. Simple vs. Composite Attribute:

- Simple attribute:
Simple attribute is the attribute which is not divided into subparts.
eg: Color of the car.

- Composite attribute:
Composite attribute is the attribute which is divided into subparts.
eg:




2. Single vs. Multivalued:

- Single valued attribute will take only one value whereas multivalued attribute may take more than value.

Single valued:
eg: Age

Multivalued:
eg: Email id, number

3. Stored vs. derived attribute:

Derived attribute:

- It is attribute that gets derived from the attribute that is stored in the table.
  eg: Age attribute can be derived from date of birth column. (Here date of birth is acting as stored attribute).

4. NULL Value attribute:

- Null means nothing. We put null values in the table because of two table.
  1. Value is not known.
  2. Value is not applicable.
  eg: If student is not opting for elective subject we can write value as 'null' (Value is not applicable NA).
  Parents contact no. can also be 'null' (Value is not known).

* RELATIONSHIP:

Relationship acts as an association bet^n two entities. It provides meaningful relation bet^n different entities.

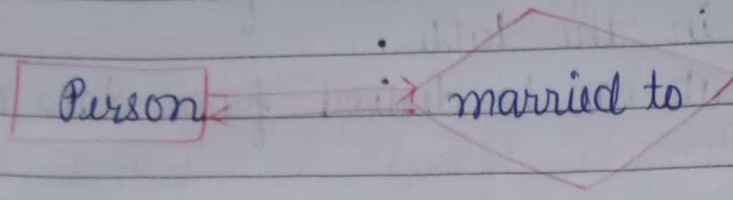
relationship

For example: Student enrolled in courses, employee works on a project.

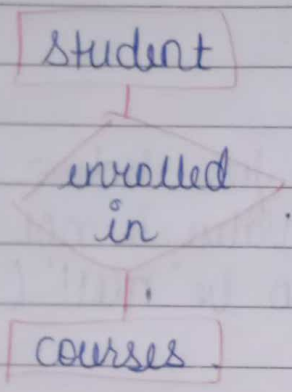
relationship

- Degree of relationship:
  It defines number of entities participating in the given relationship set.

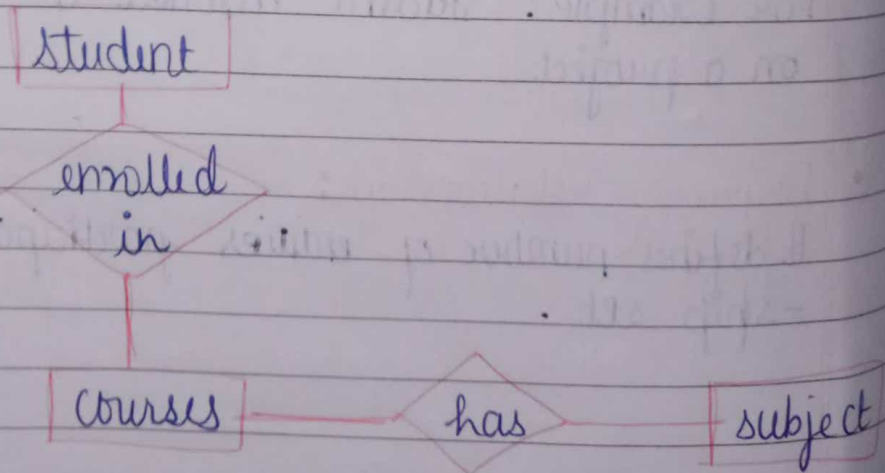
1. Unary relationship :
In this set, only one entity is involved.
eg: Person married to a person.



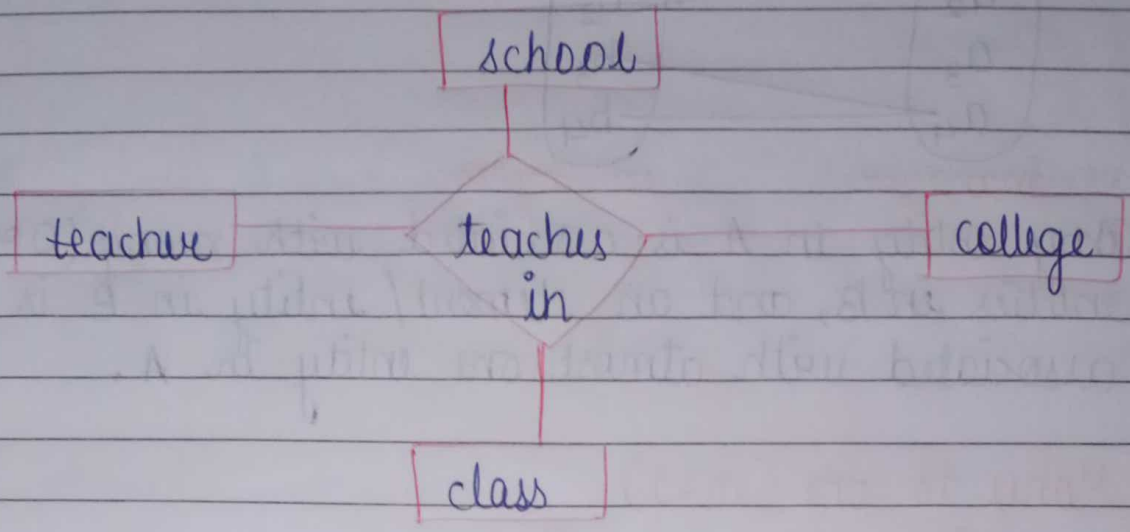

2. Binary relationship:
In this, two entities are involved in relationship.
eg: Student enrolled in courses.




3. Ternary relation:
In this, three entities are involved in entity set.

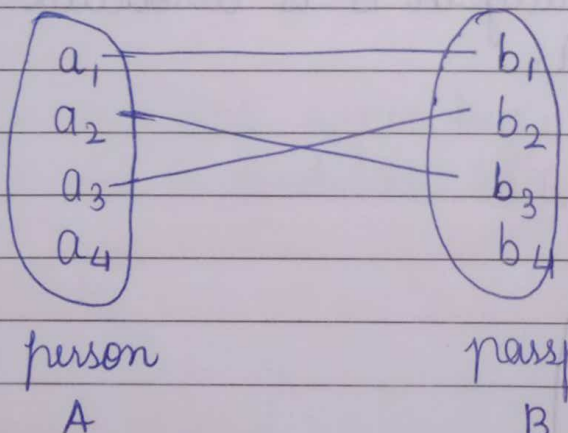


4. N-ary relation:
In this, more than 3 entity sets are involved.

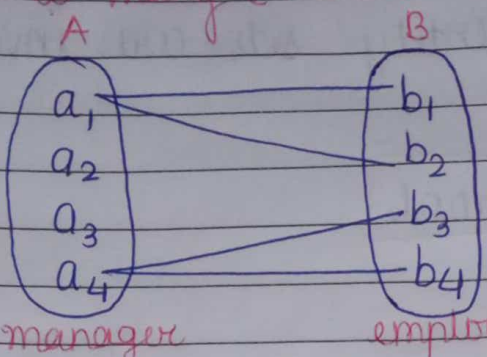



- Mapping constraint / Cardinality:
It describes the number of entities in A associated with number of entities in B.

1. 1:1 (one to one)
In this any entity in A, is associated with atmost (0 or 1) etity in B

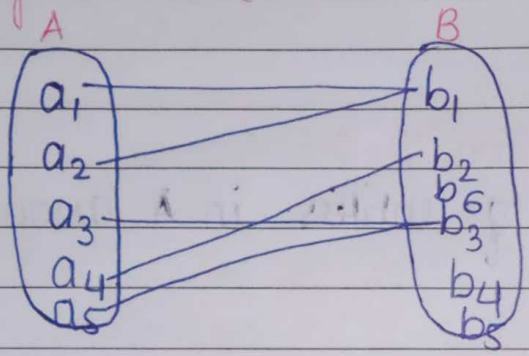


2. One to many (1 : m)



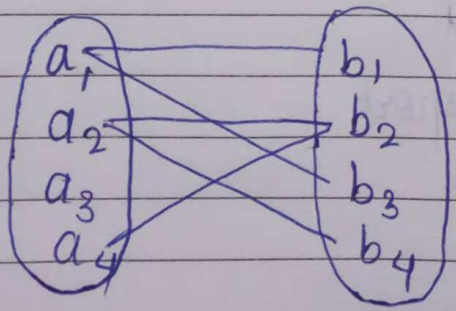

Any entity in A is associated with many (0 or more) entities in B, and an element/entity in B is associated with atmost one entity in A.

3. Many to one (m : 1)




An entity in A is associated with atmost one entity in B, and an entity in B is associated with many entities in A.

4. Many to many (m : m).



An entity in A is associated with many entities in B. and an entity in B is associated with many entities in A.

## * KEYS IN DBMS:

| e-id | f-name | l-name | sal | DOB | DOJ | Passport | Dept. I'd | dept name |
|---|---|---|---|---|---|---|---|---|
| 1. | Priya | Chavan | 50K | 13/2/90 | 18/1/12 | 123 | 10 | COMPS |
| 2. | Ketan | Patil | 80K | 14/8/92 | 1/5/8 | 245 | 13 | IT |
| 3. | Tejas | Kaur | 50K | 20/6/85 | 26/6/3 | 369 | 15 | EXTC |

| dept Id | dept name |
|---|---|
| 10 | COMPS |
| 30 | IT |
| 50 | EXTC |

1. Super key:

→ It is a set of one or more attributes that can uniquely identify each record in a given table.

eg: e-id, DOB, passport no., DOB-DOJ, passport-dept id, etc.

2. Candidate key:

→ It is minimal super key. If two attributes aren't unique, it is also a candidate key.

(as the combination of both gives unique value, if both attributes are unique discard as minimal value is required.)

3. Primary key:

→ Any candidate key can be chosen as primary key.

eg: e-id.

4. Alternate key:

→ Except primary key all other candidate are alternate keys. duplicate keys aren't allowed, i.e same values.

5. Foreign key:

→ Primary key of one table acts as a normal column in another table. (duplicate values are allowed).

eg: here primary key of dept. table (dept id) acts as foreign key to the employee table.

4. Alternate key:

→ Except primary key all other candidate are alternate keys. duplicate keys aren't allowed, i.e same values.

5. Foreign key:

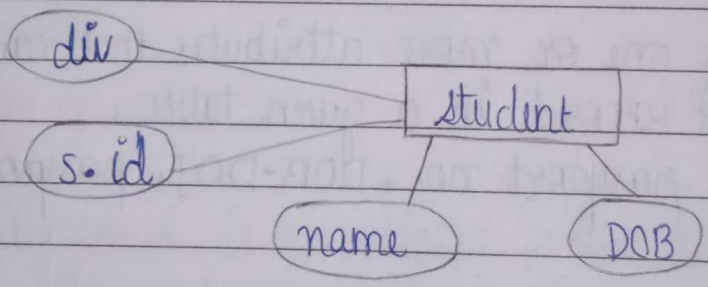
→ Primary key of one table acts as a normal column in another table. (duplicate values are allowed).

eg: here primary key of dept. table (dept id) acts as foreign key to the employee table.

Types of Entity Set:

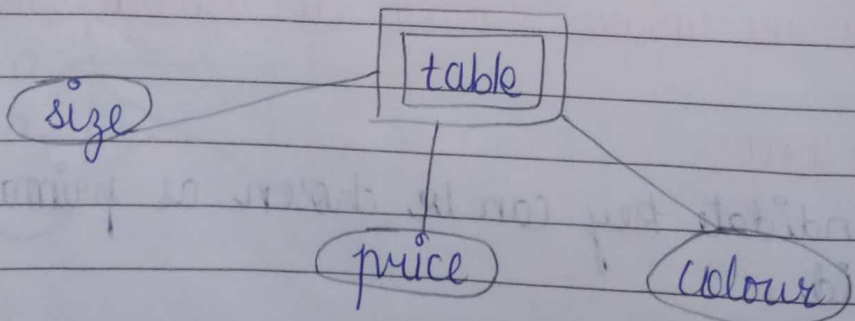
1. Strong Entity set:

- It is the set which has primary key attribute.




2. Weak Entity set:

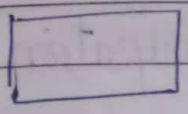
- It is the set which doesn't have primary key attribute.

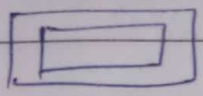


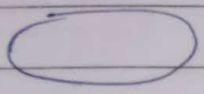
## ER diagram :

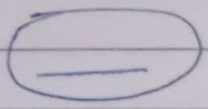
- Stands for entity relationship diagram
- It represents relation betn 2 entities.
- It describes logical or structural view of entire database.

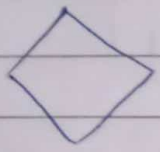
Symbols used in ER diagram :

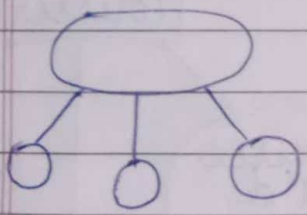
 - strong entity

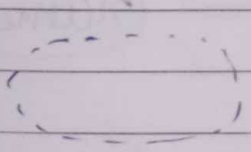
 - weak entity

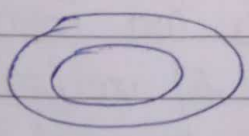
 - attribute

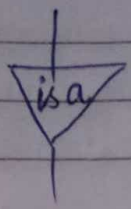
 - primary key attribute

 - relationship

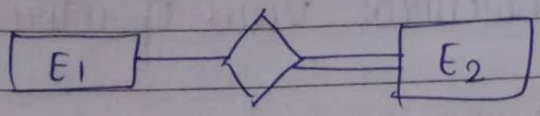
 - composite attribute

 - Derived attribute

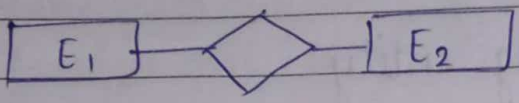
 - multivalued attribute




- Generalisation / specialisation

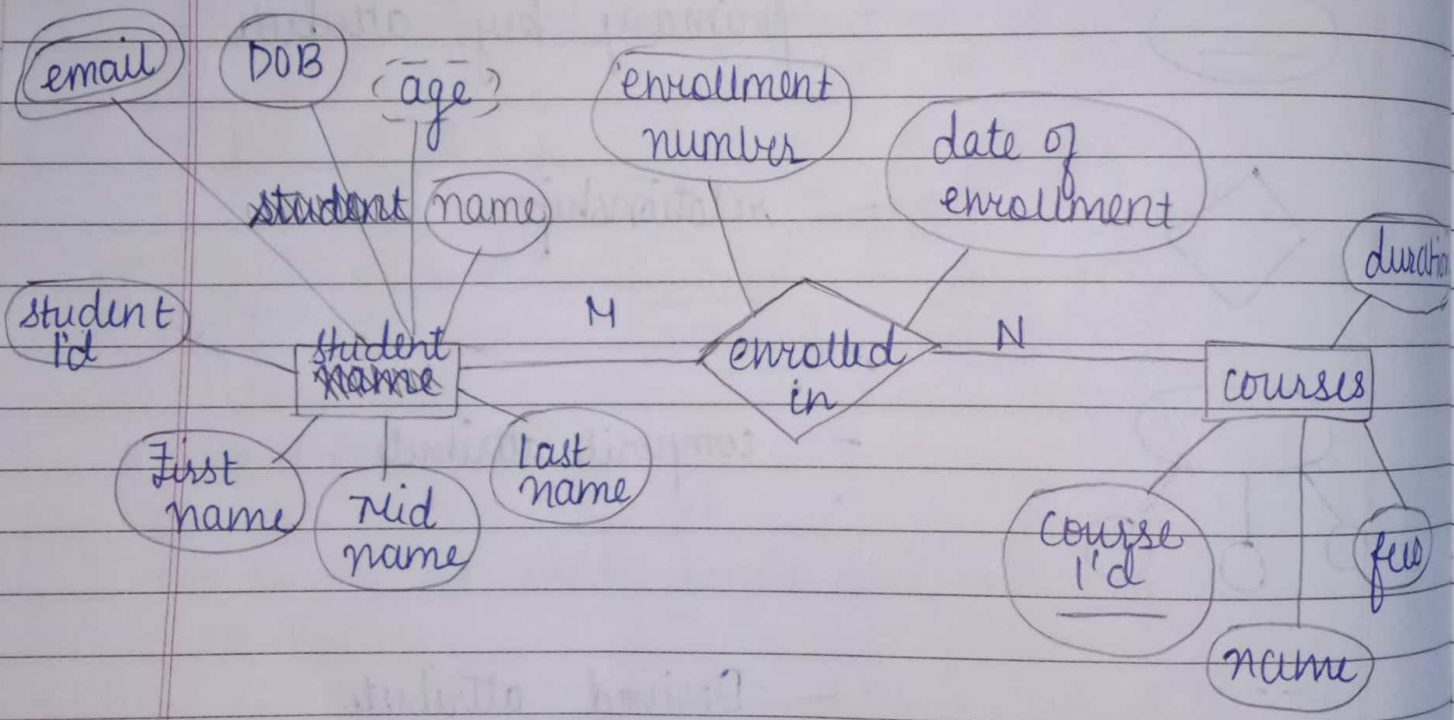



- total participation



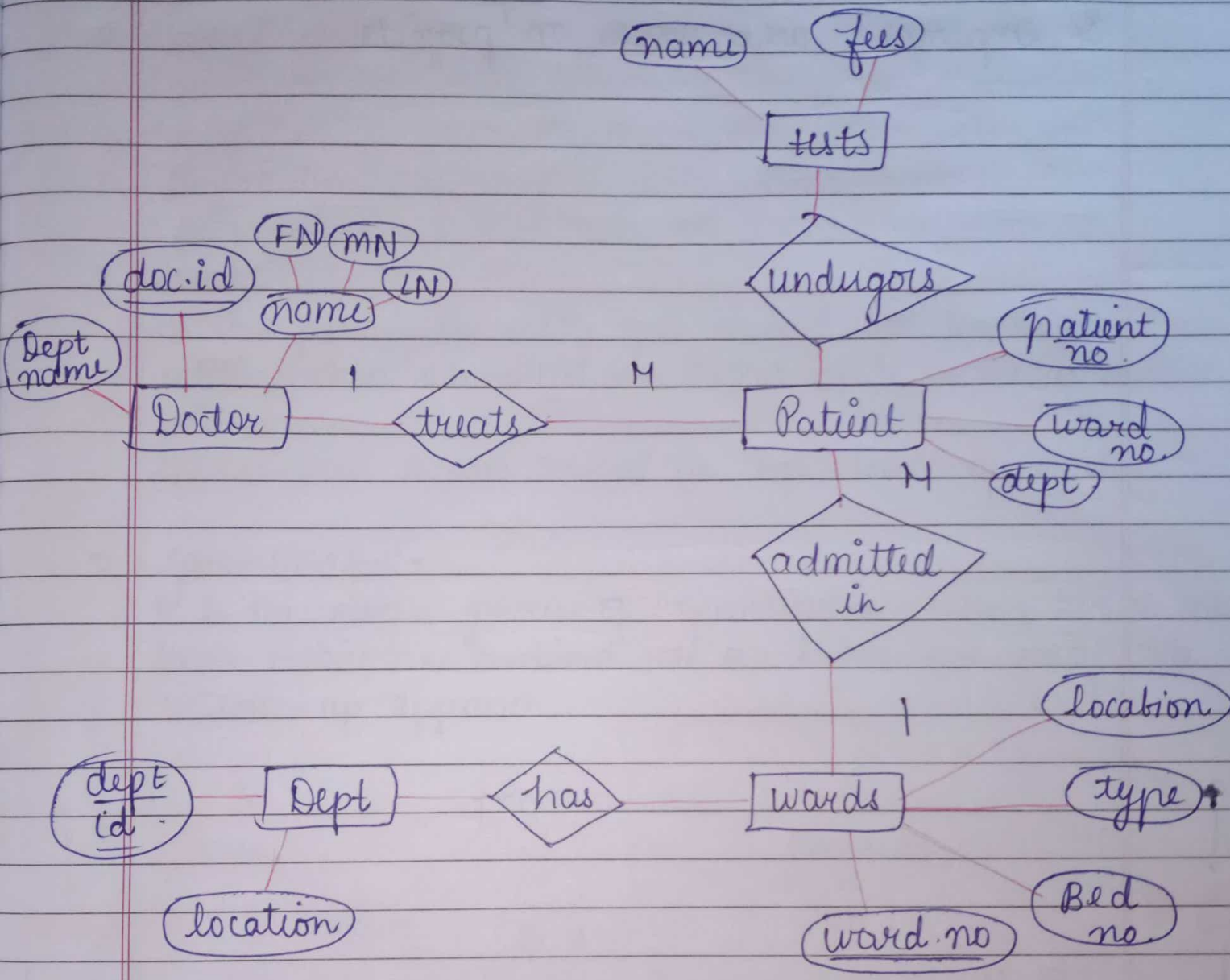

- partial participation

ER diagram 1:
Students enrolled in courses:




Q. Construct an ER diagram for hospital management system where set of documents & set of patients are involved with each record of patient a log of various test examinations are conducted. Patients are admitted in wards. From above scenario, list the entities, attribute

& primary key for the entities. Note: Add suitable entities if needed



27/02/23

## Extended ER diagram :

It includes all the functionality & capabilities of ER diagram having few more features:

1. Specialisation
2. Generalisation
3. Inheritance
4. Aggregation
5. Categorisation

### 1. Specialisation :

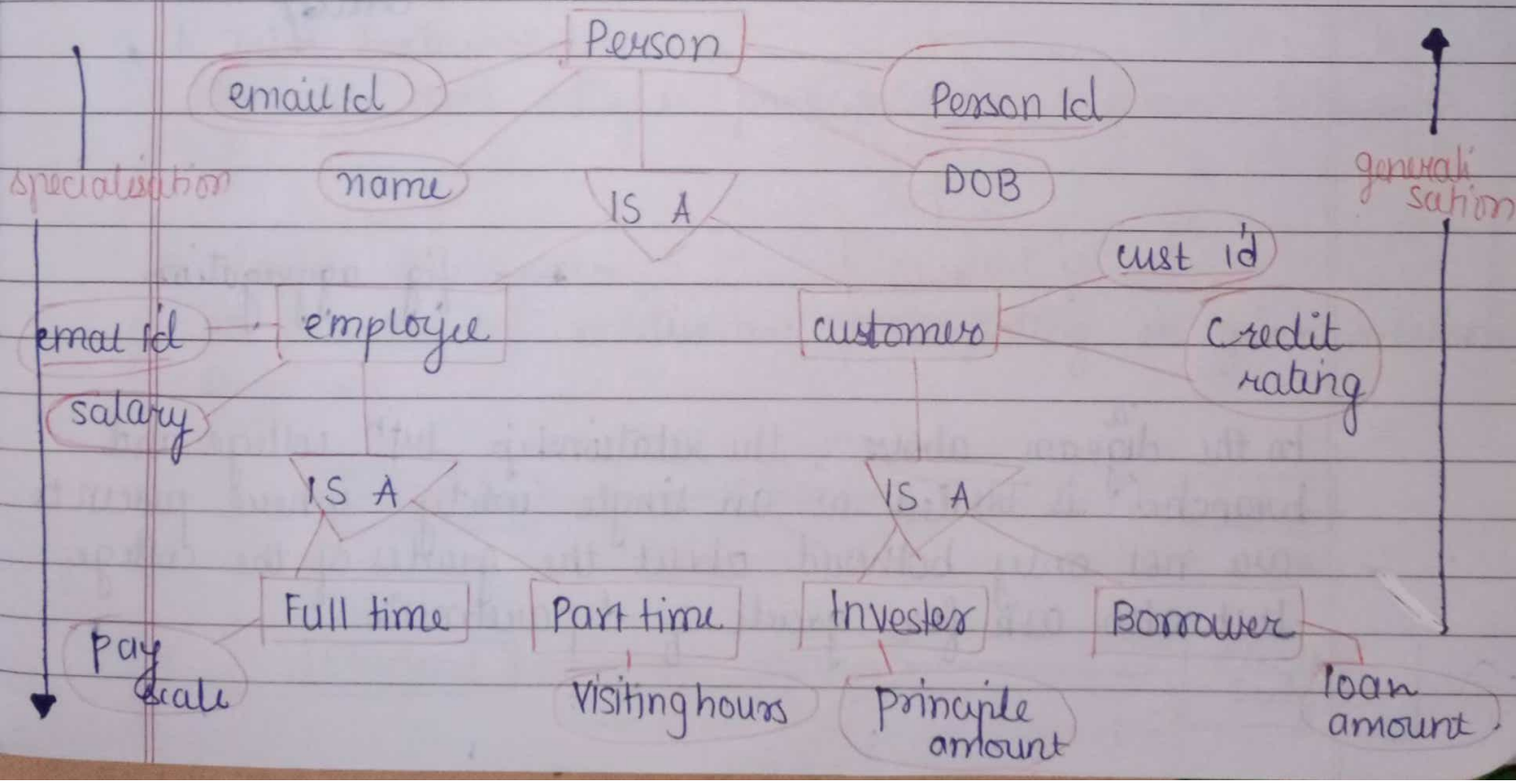
↳ termed as parent or higher level entity.

In this process, one entity gets divided into two or more sub-entities where sub entities are termed as lower entities or child entities.

Specialisation is also termed as top-down approach.

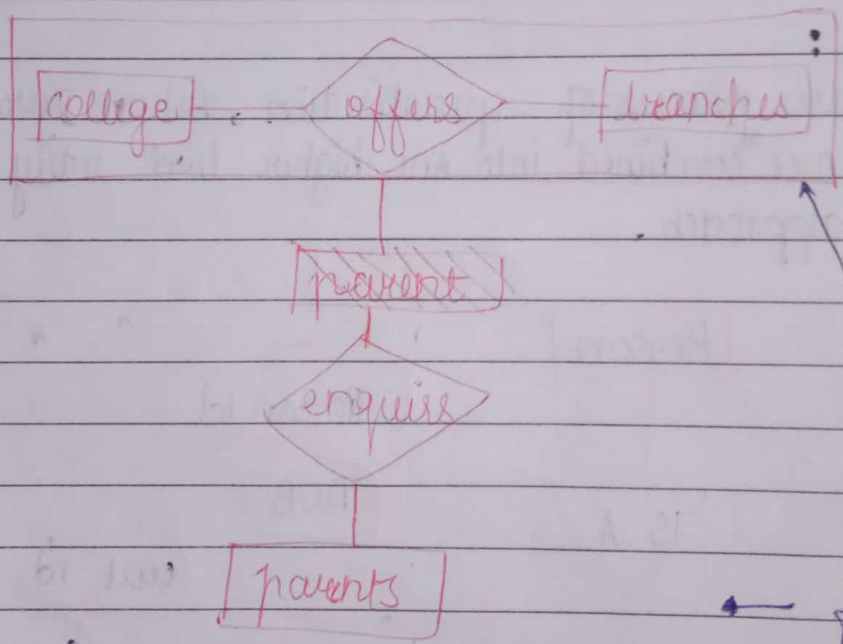
### 2. Generalisation :

It is the reverse process of specialisation, where two or more lower entities are combined into one higher level entity. This bottom-up approach.



3. Inheritance:
Specialisation & generalisation led to inheritance, where child entities inherit properties from its parent entity.
eg:
Employee entity can share / inherit attributes of parent class (person) like email, I'd, name, DOB, person I'd.
Each sub-entity will have its own attributes which is not shared with other sub-entities (salary attribute is only applicable for employees & not for customers)

4. Aggrigation:
Aggrigation is the process where relationship betⁿ two entities ~~shoood with~~ is treated as one entity for some other entity.



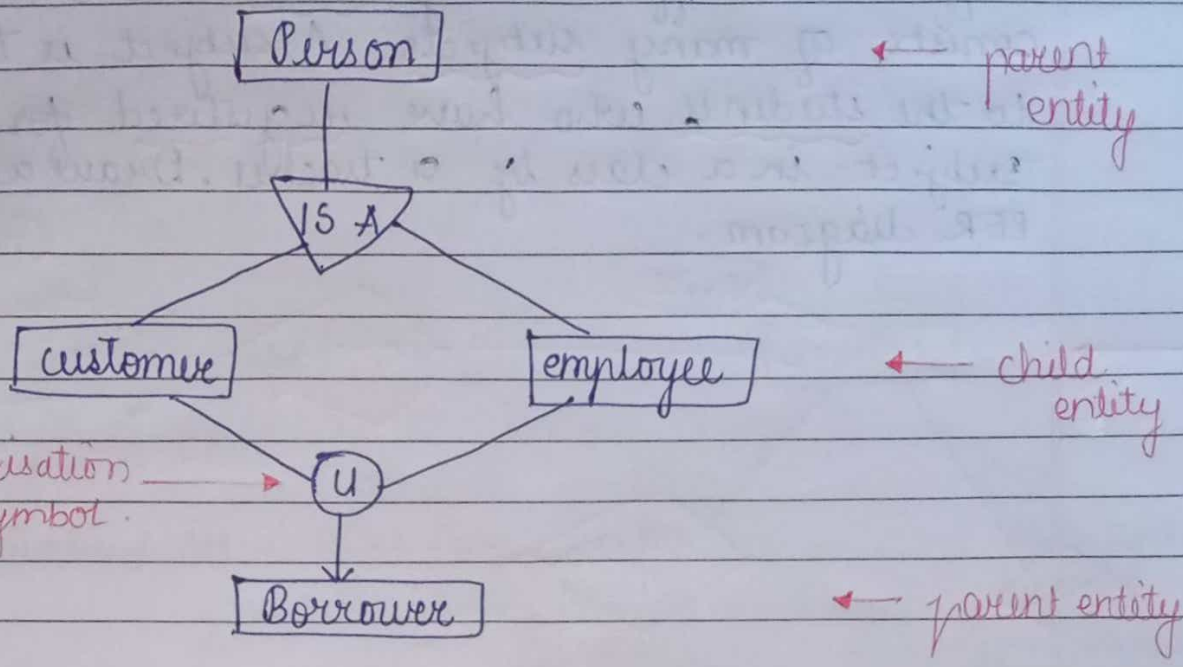

← fig aggregation

In the digram above, the relationship betⁿ college and branches is treated as an single entity where parents are not only bothered about the grades of the college but also ask for grade of department.

Tuesday
31/01/23

5. Categorisation:
It is the process where sub entities will have more than one parent entities. Represented as (U).

eg:

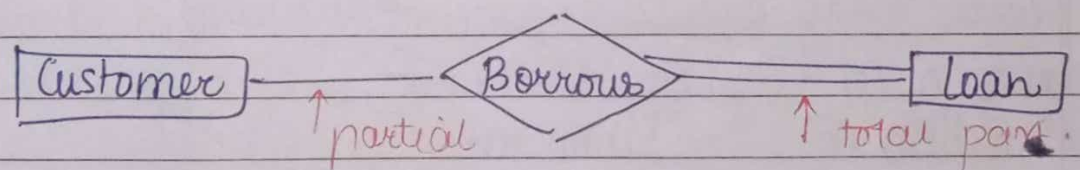


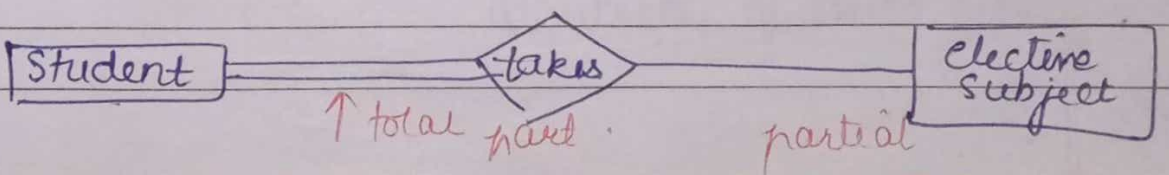

* PARTICIPATION CONSTRAINT: **

It defines how entity sets are participating in a relationship set.

1. Total Participation:
In this, each entity is participating in a given relationship set.

2. Partial Participation:
In this not all entities are participating in given relationship set.

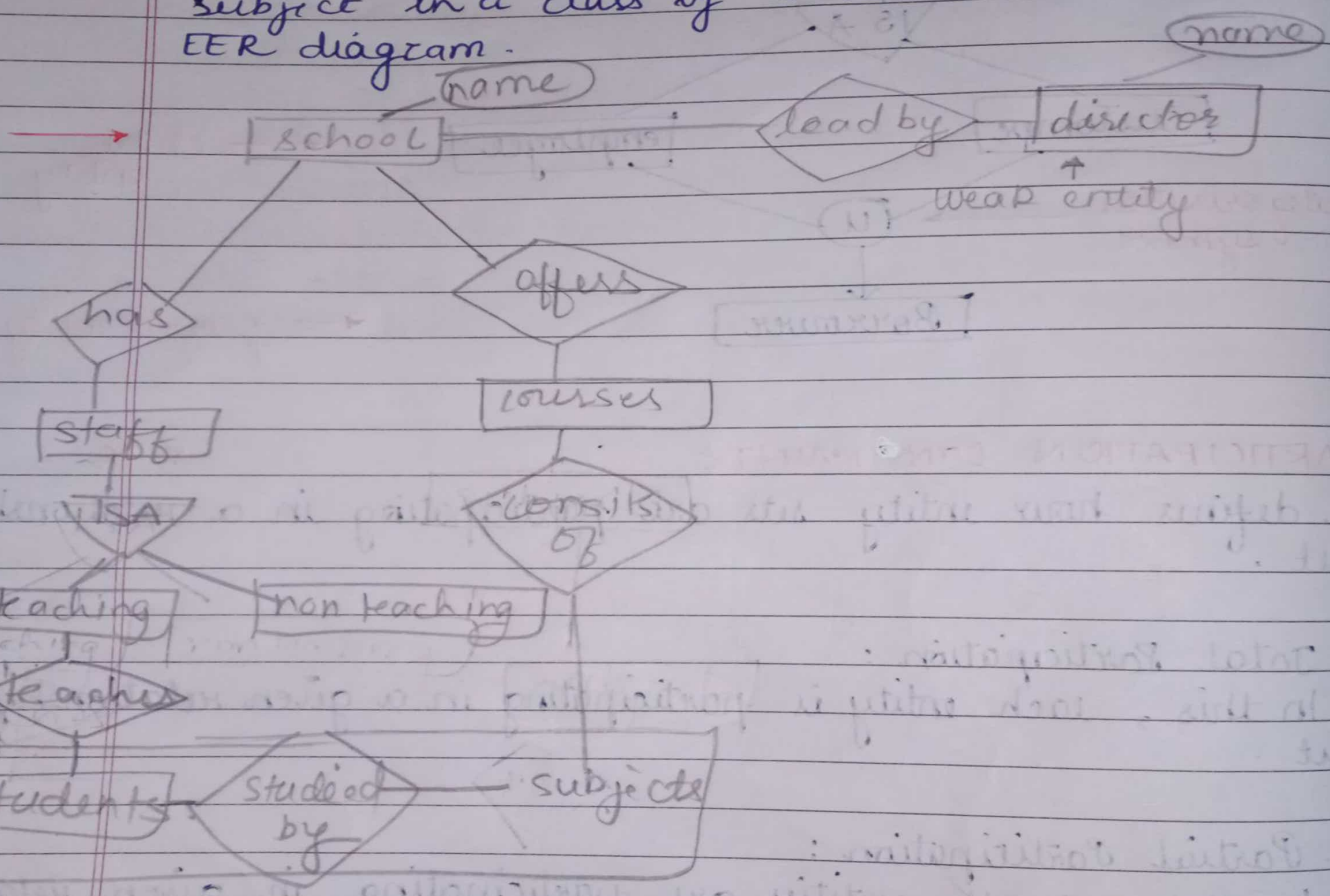


imp →

A university has many academic units name schools. Each school is headed by director of the school. School has teaching and non teaching staff. School offers many courses and a course consists of many subjects. A subject is taught to the students who have registered for that subject in a class by a teacher. Draw an EER diagram.

→




* weak entity doesn't have primary key