

## Foreign Key

⇒ key which is used to link two tables together via the primary key.

Student table

Department key foreign key

Stud-id	Name	Course	Dept name	stud-id
101	John	Computer	CS - Department	105
105	Mexxy	AI	CS - Department	101
107	Jay	Biology	Sci - Department	101
108	Sujata	maths	Maths - Dept	108

↓  
Referenced table

↓  
Referencing table

Foreign keys are also called "Referential Integrity" constraint.

1. Entity Integrity constraints ⇒ means the primary keys can't be null.
2. Referential Integrity constraints ⇒ specified b/w two tables and it is used to maintain the consistency among rows between the two tables.
 

⇒ The rules are ⇒

  - (i) You can't delete a record from a primary table if matching records exist in a related table.
  - (ii) You can't change a primary key value in the primary table if that records has related records.
  - (iii) You can't enter a value in the foreign key field of the related table that doesn't exist in the primary key of the primary table.



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(iv) However, you can enter a null value in the foreign key, specifying that the records are unrelated.

### \* Referential Actions ⇒

⇒ Actions which take place to maintain Referential Integrity of different tables.

(i) Cascade ⇒ When we delete rows in primary table, the same columns in other table also gets deleted.

(ii) Set Null ⇒ When we delete/<sup>update</sup> a referenced row in the parent / referenced table, child table, the value of such referencing row is set as null.

(iii) Set default ⇒ When the value of the referenced row of parent table are updated or row is deleted, the values in the child table are set to default values of the column.

(iv) No <sup>Restrict</sup> Action ⇒ It is the restriction constraint where the value of referenced row in the parent table cannot be modified or deleted unless it is not referred by the foreign key in the child table.

(v) No Action ⇒ It is also a restriction constraint of the foreign key but is implemented only after trying to modify or delete the referenced row of the parent table.

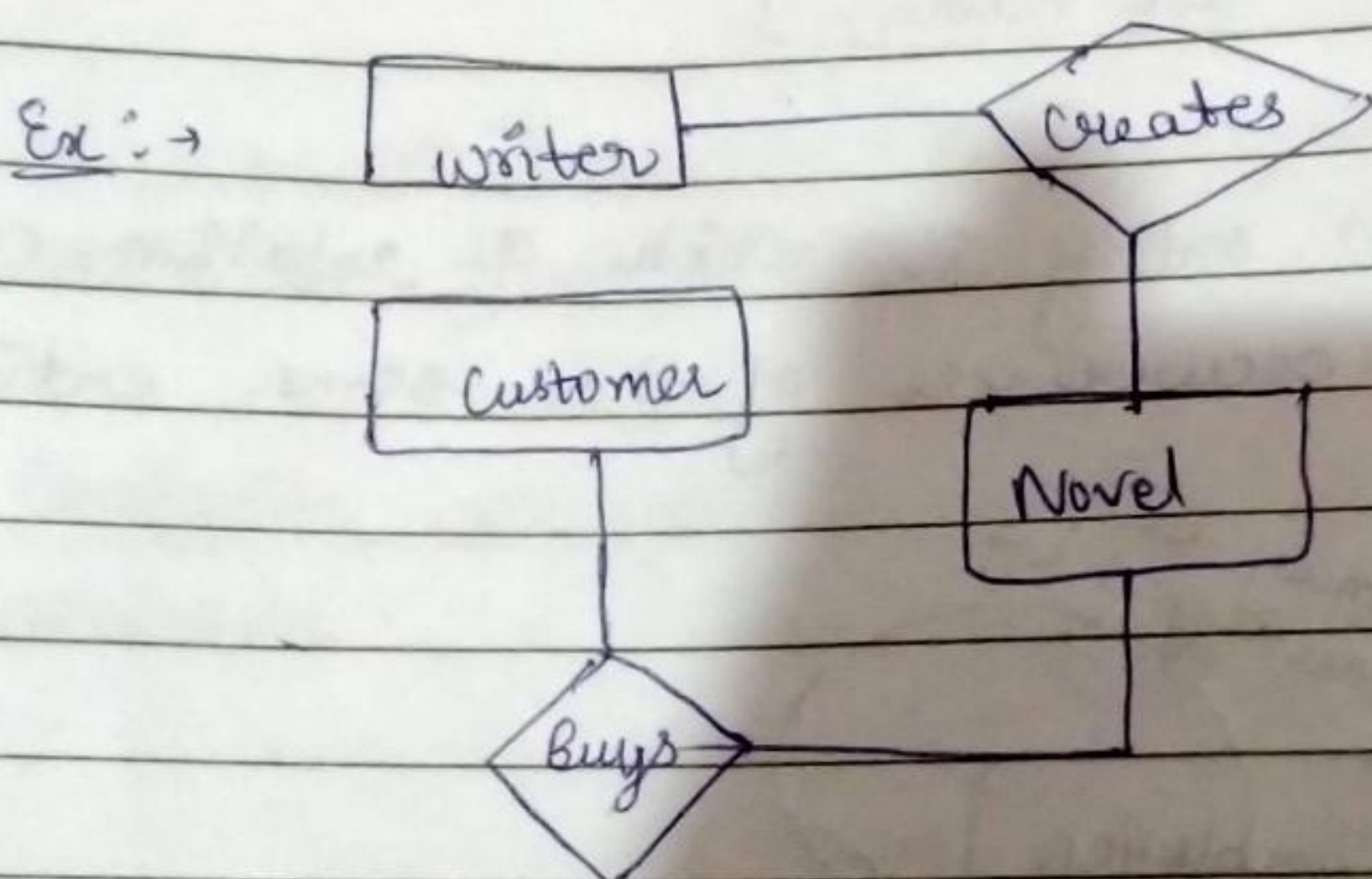


Triggers :->

(vi) User-defined actions or other referential actions are basically implemented as triggers.

\* Relationship Model (Entity RM)

=> An Entity Relationship diagram is visual representation of different data using conventions that describe how these data are related to each other.



=> ER-modelling -> A data modelling technique used in software engineering to produce a conceptual data model of an information system.

=> Entity :- Collection of objects, or single object placed inside rectangles in ER diagram.

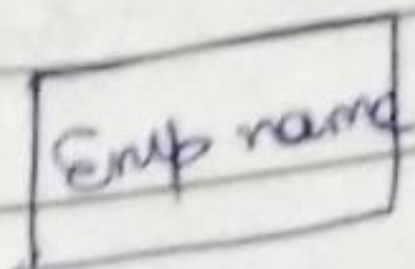
Types of entity :-

1. Strong Entities
2. Weak Entities
3. Recursive Entities
4. Composite Entities



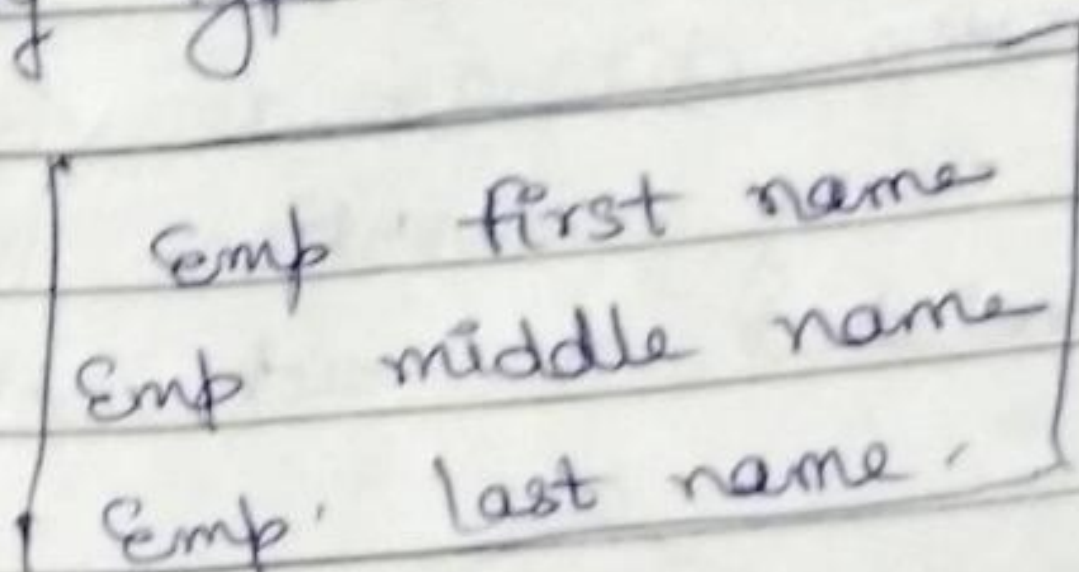
1. Strong Entity  $\rightarrow$  exists independently

Ex  $\rightarrow$



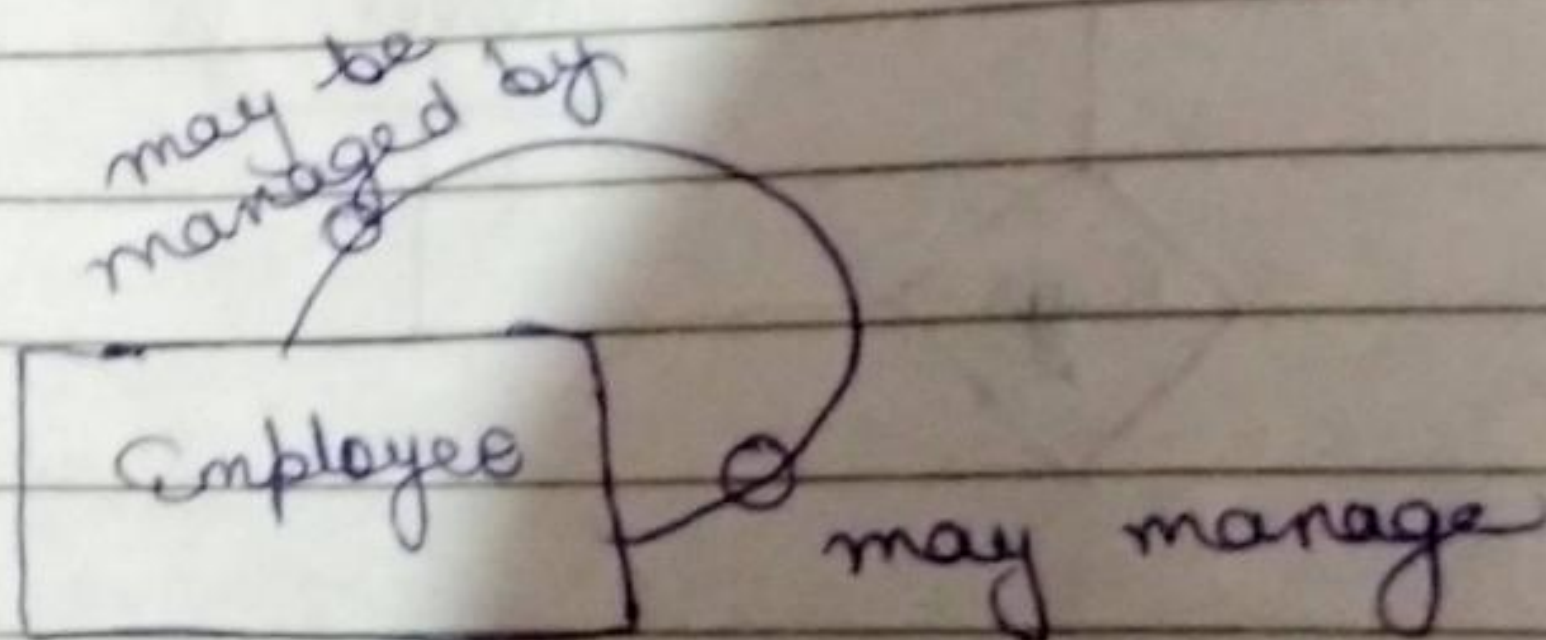
2. Weak Entity  $\rightarrow$  whose existence depends on other entity type

Ex  $\rightarrow$



3. Recursive Entity  $\rightarrow$  entity in which a relation can exist between occurrences of the same entity set

Ex  $\rightarrow$



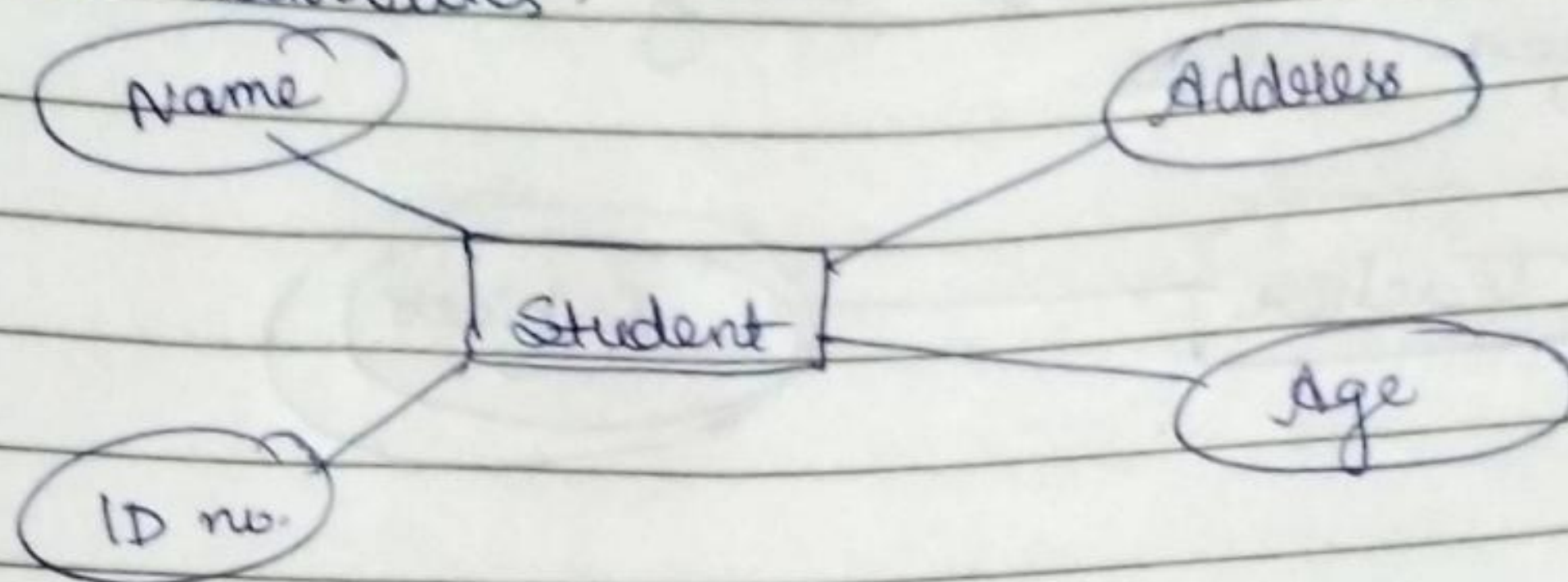
4. Composite entities  $\rightarrow$

\* Entity Set  $\rightarrow$  collection of similar types of entities. An entity set may contain entities with attributes sharing similar values.

For ex  $\rightarrow$  Students set may contain all the students of a school.

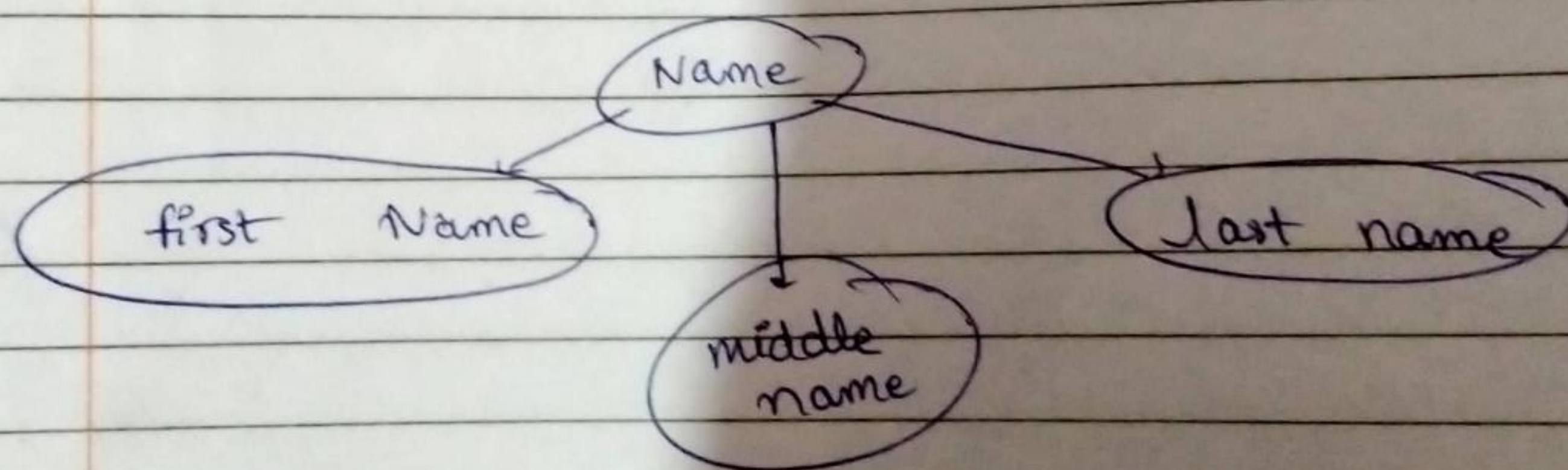


\* Attributes  $\rightarrow$  Entities are represented by means of their properties called attributes.  
For ex  $\rightarrow$  Student entity may have name, class, age as attributes.



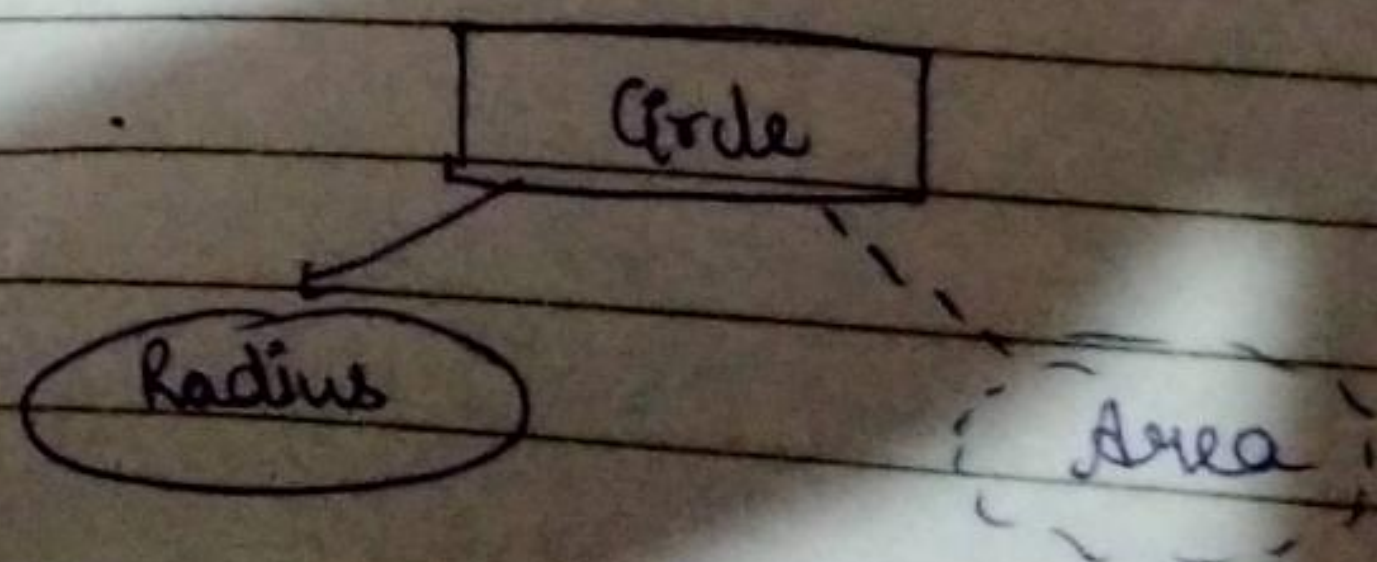
(i) Simple attributes  $\rightarrow$  Atomic values which cannot be divided further. For ex  $\rightarrow$  Student age. student age

(ii) Composite attributes  $\rightarrow$  made of more than <sup>one</sup> simple attribute.



(iii) Derived Attribute  $\rightarrow$  attributes that do not exist in physical database, but their values are derived from other attributes present in the database.

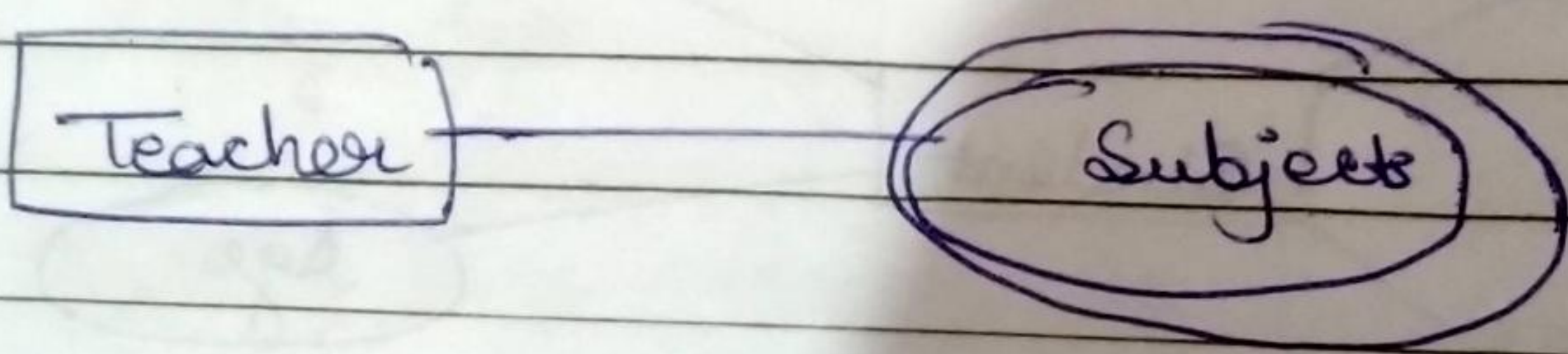
For ex  $\rightarrow$  For a circle the area can be derived from the radius.





(iv) Multivalued Attributes  $\rightarrow$  Attributes which may contain more than one value.

~~for ex~~  $\rightarrow$  A teacher entity can have multiple subject values.





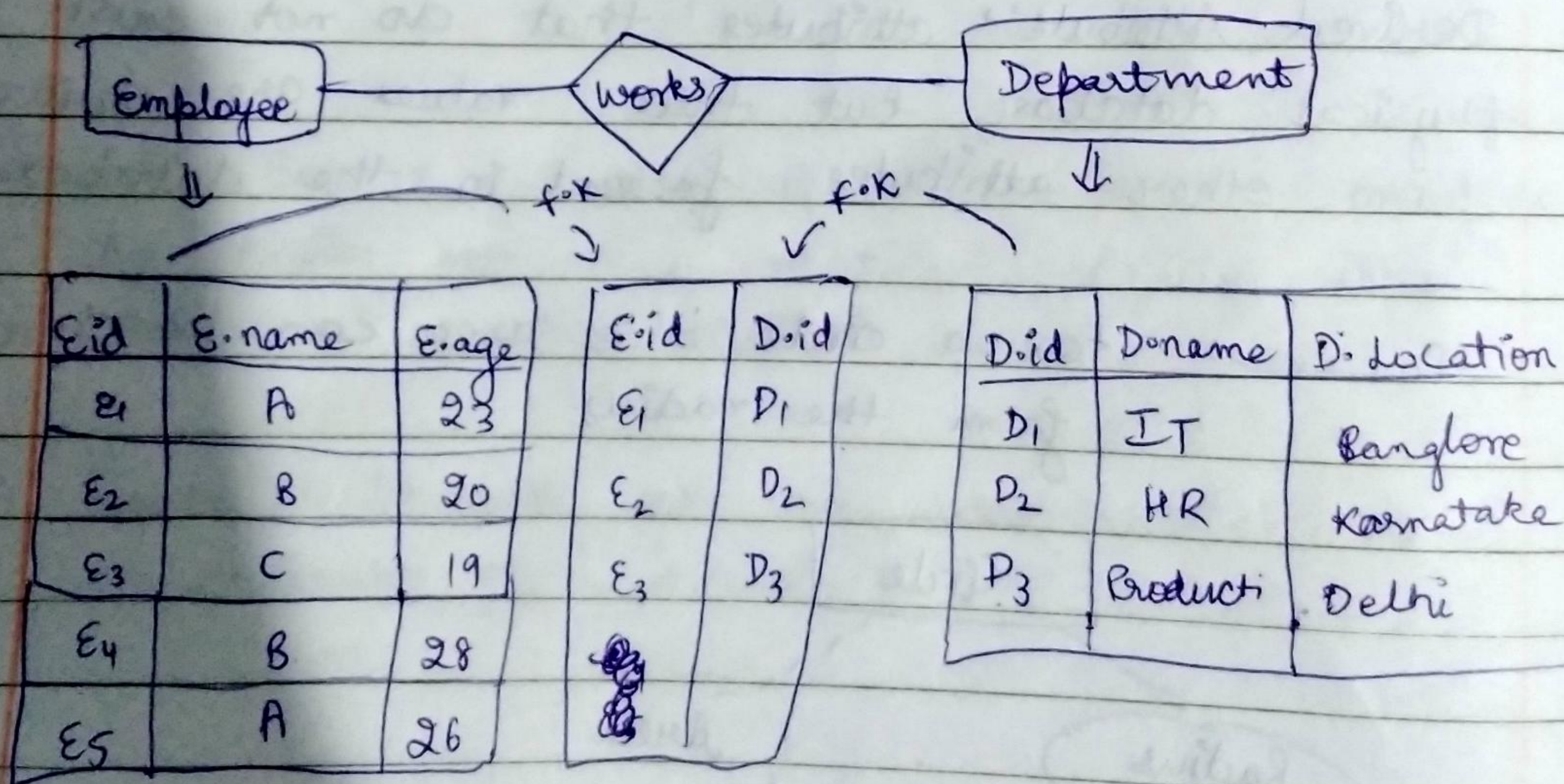
## \* Relationship :-

⇒ A relationship is represented by diamond shape in ER diagram, it shows the relationship among entities.

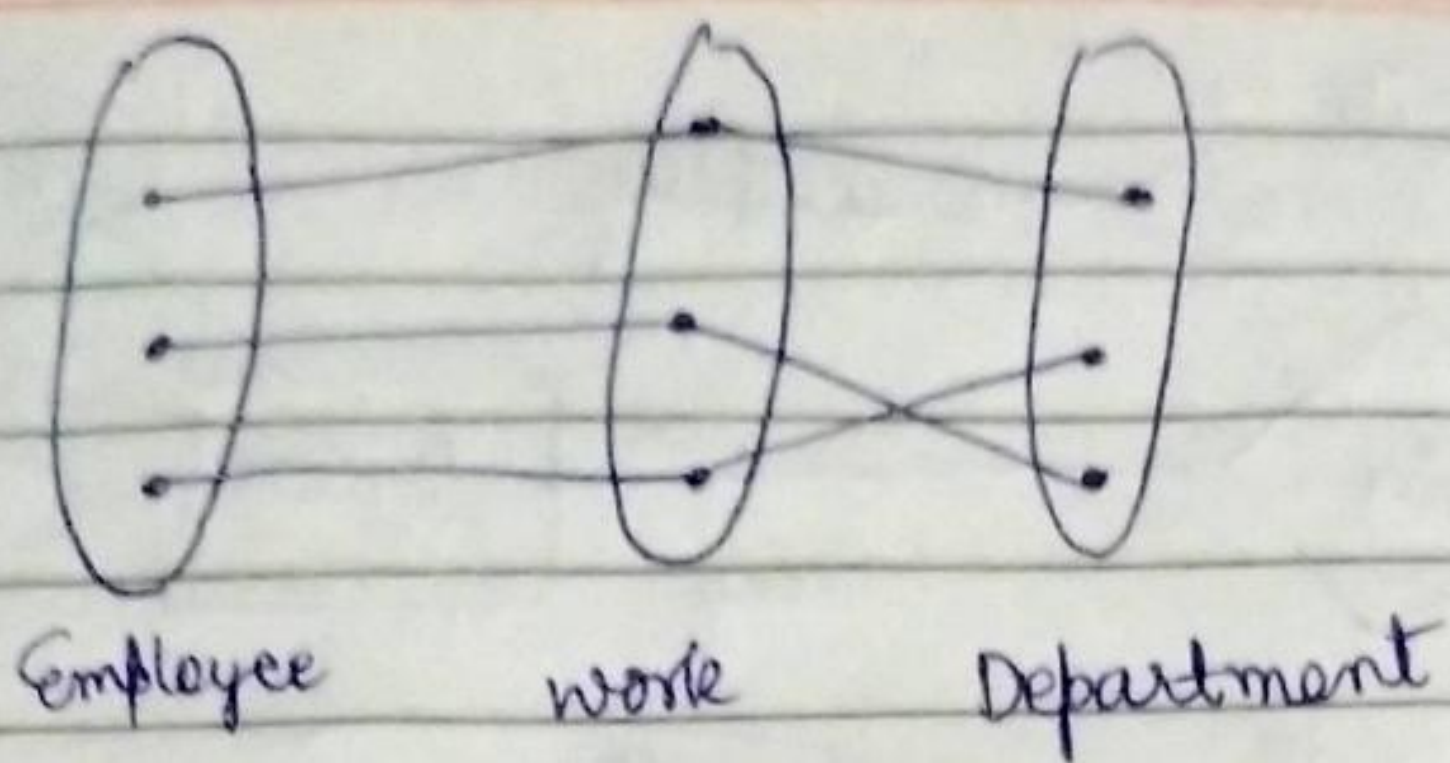
### Four types of Relationships :-

1. One to one
2. One to many
3. Many to one
4. Many to Many

#### I. One to One Relationship :-







Q1. What will be the primary key in work table (relationship) table?

→ Both Employee Id and department Id can be primary key because both are unique.

Q2. Can I reduce these tables?

→ Yes, these can be reduced into 2.

Let's suppose Eid is primary key in work table.

So, Eid is primary key for both employee and work table.

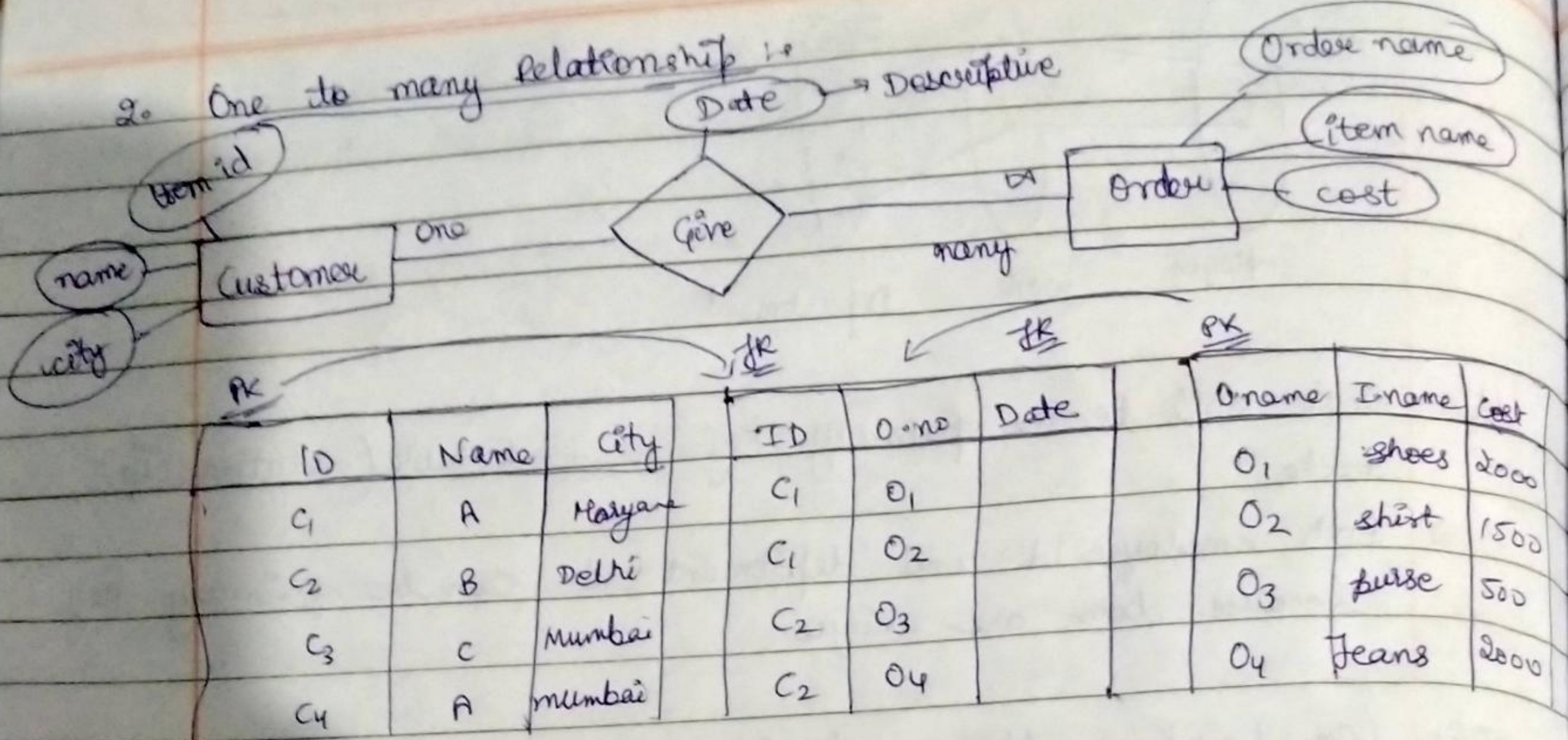
We can reduce employee & work table into one.

Eid	Ename	Eage	Did
E <sub>1</sub>	A	23	D <sub>1</sub>
E <sub>2</sub>	B	20	D <sub>2</sub>
E <sub>3</sub>	C	19	D <sub>3</sub>
E <sub>4</sub>	B	28	<u>null</u>
E <sub>5</sub>	A	26	—

→ Reduced table

Finally, no. of tables will be 2





Q1. Can relationship table also have attributes?  
 + Yes, these additional attributes are called Descriptive attributes.

Q2. What will be the primary key in this table?  
 + Here, primary key will be Order number because a particular order will be of a single customer but a customer can order more than one thing.

Many will primary key will act as primary key in relationship table.

Q3. Can you reduce no of tables?  
 + Yes, ~~same~~ tables having same primary keys can be combined.

for ex :- Here give table and order table will be combined.



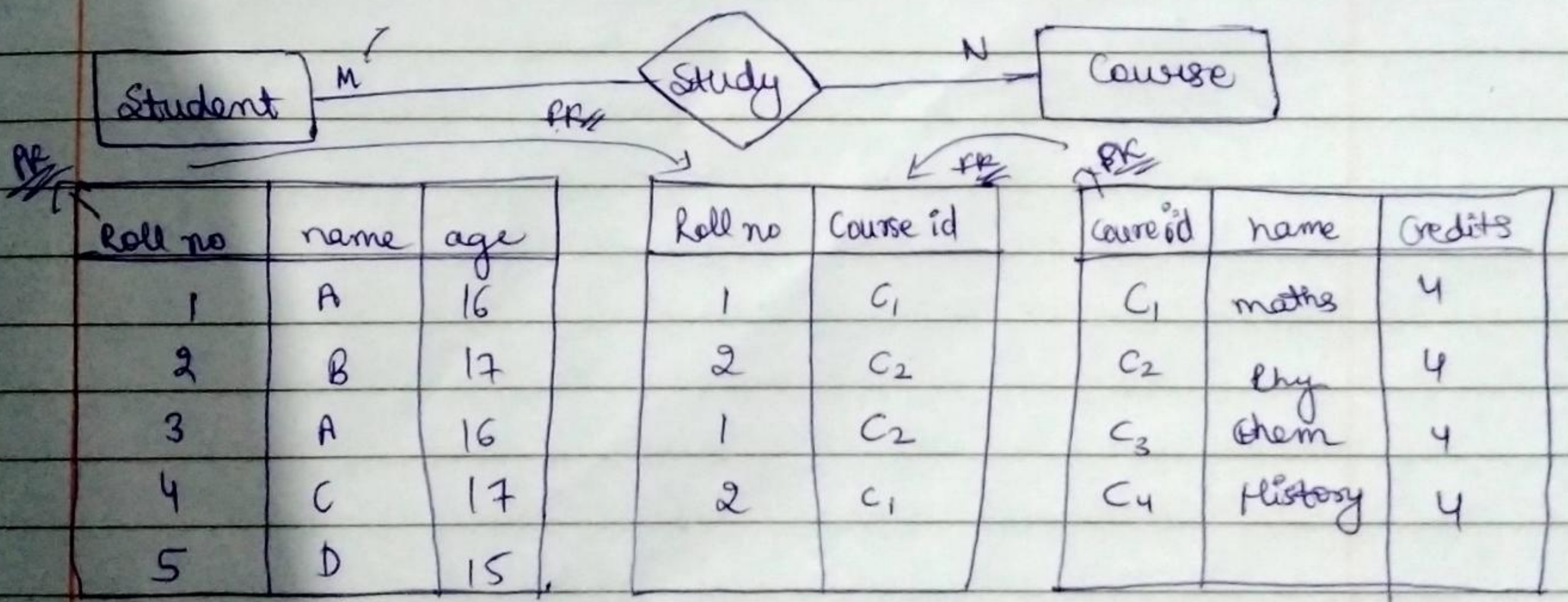
ID	O.no	Date	Item name	cost
C <sub>1</sub>	O <sub>1</sub>		shoes	1000
C <sub>1</sub>	O <sub>2</sub>		shirt	2000
C <sub>2</sub>	O <sub>3</sub>		purse	1500
C <sub>2</sub>	O <sub>4</sub>		jeans	2000

So, no. of tables will be 2 after reducing.

3. Many to one relationship is similar to one to many relationship

Primary key will be of many side primary key.  
many side table will be combined with relationship table.

4. Many to Many Relationship  $\rightarrow$  (M-N)



Q1. What will be the primary key in relationship table?  
 ⇒ Yes, composite key will be here by merging both.

⇒ Rollno + course id



Q2. Can you reduce no. of tables?  
29 No, we cannot reduce no. of tables, because  
primary key is combination of both.