E-R Model

↳ used to get a logical or conceptual view of database to be designed.

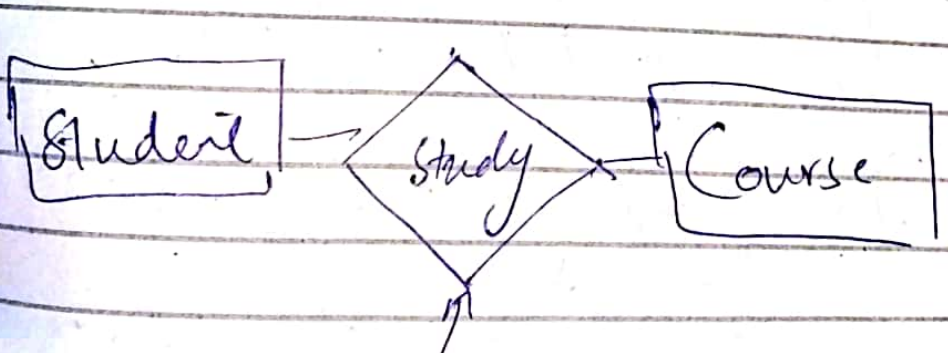
Entity => Anything having physical existance

e.g

Student (Roll no, age, name)

Course (name, credit hours, title)

Relationship



Student (Rollno, Age, Address)

=> Entity Type

=> Schema

Representation

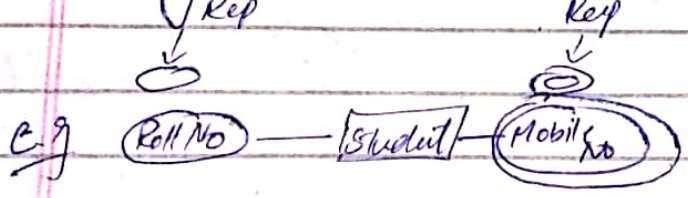
Entity -> ▭

Attribute -> ⬭

Relationship -> ◇

Types of Attributes

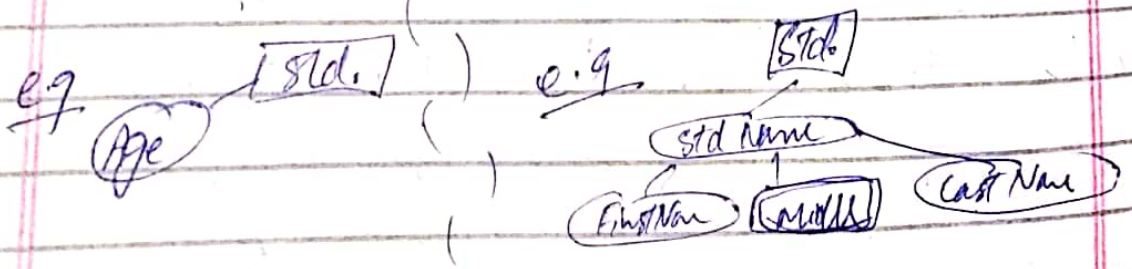
(i) Single vs Multivalue Attribute



ii) Simple vs Composite

Can't be broken

Can be broken



Stored vs Derived

Stored: can be derived from other attributes

e.g. Date of Birth

e.g. Age

age can be derived from date of birth

Key Attribute vs Non Key Attribute

Key Attribute => (Unique)

Rep: AHO

e.g. Student — Reg No

Non Key Attribute => (can be repeate)

e.g. Student — age

(5) Required vs Optional Attribute

=> Mendatory (Key field) => Non-Mendatory

(6) Complex Attribute.

=> Composite + Multivalued

e.g Address of student

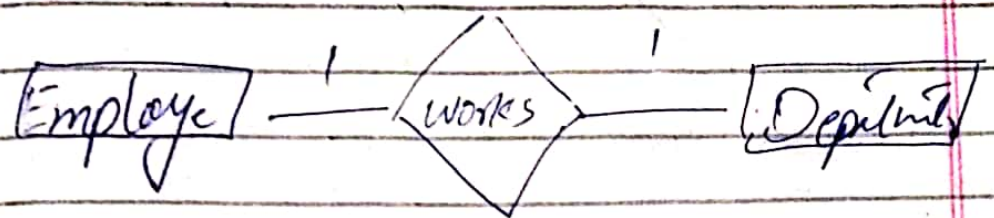
Types of Relationships

Cardinality

=> How 2 entities are related with each other

one to one	1-1
one to many	1-M
many to one	M-1
many to many	M-N

One to One Relationships



Explanation

Employe Table

Eid	Ename	Eage
E_1	A	20
E_2	B	26
E_3	C	28
E_4	A	24

Department

Did	Dname	Loc
D_1	IT	Bang
D_2	Sw	Delh
D_3	HR	Delhi

Works Table
Relationship Table

FK Eid	Did FK
E_4	D_1
E_3	D_3
E_2	D_2

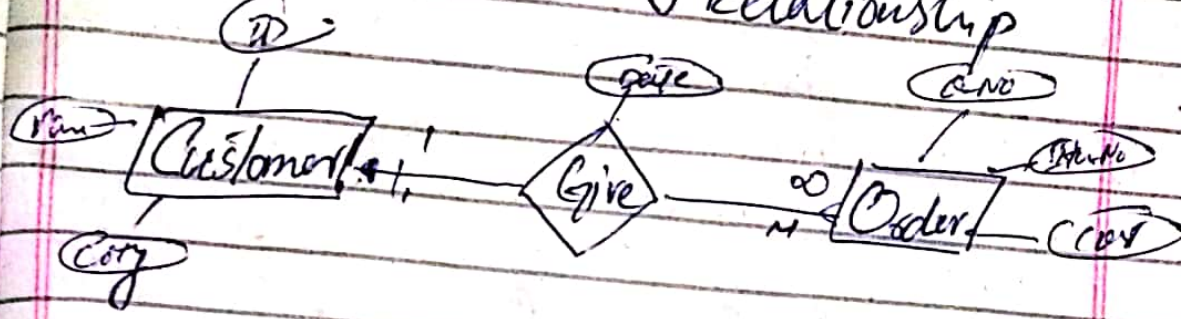
we can't repeat values bcz given relationship is 1-1

As their is no repetation in work table so we can use Eid or Did as primary key

Can reduce these table

Eid	Ename	Score	Did
E_1	D	20	D_1
E_2	B	26	D_3
E_3	C	28	D_2
E_4	D	24	
E_6	B	25	

One to Many Relationship



Q 1: Primary key

Q 2: Reduce no of tables

PK			FK FK		PK	
ID	Name	City	ID	O_No	Date	O_No	Item No
C_1	A	R	C_1	O_1	~	O_1	~ ~
C_2	B	~	C_1	O_2	~	O_2	~ ~
C_3	C	~	C_2	O_3	~	O_3	~ ~
C_4	A	~	C_2	O_4	~	O_4	~ ~
			C_3	O_5			

Primary Key

There is repetition of C_{ID} so it can't be used as a P.K.

P.K = O_No

Reduced Table

ID	O_No	Item No	Cost	Date
C_1	O_1	~	~	~
C_2	O_2	~	~	~
C_2	O_3	~	~	~
C_3	O_4	~	~	~

Customer

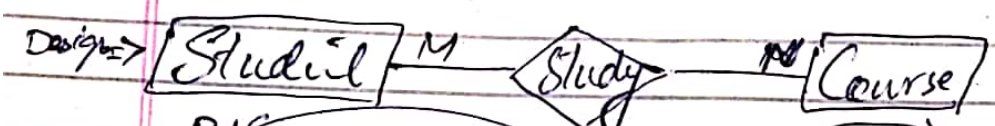
ID	Name	City
C_1	~	~
C_2	~	~
C_3	~	~
C_4	~	~

=> 2 tables total formed

Many to One relationship

=> Same as One to Many rel

Many to Many Relationship



Relational model =>

P.K			F.K	F.K	P.K		
Roll No	Name	Age	Rollno	Cid	Cid	name	Credit
1	A	16	1	C_1	C_1	Ard	4
2	B	17	2	C_2	C_2	Sem	4
3	A	16	1	C_2	C_3	Com	4
4	C	17	2	C_1	C_4	Urd	4
5	D	16	3	C_3			

Primary Key:

Roll No and C.id both are repeating in reference table so individually they cannot act as P.K

We can use as composite primary key Composite Key = Rollno Cid

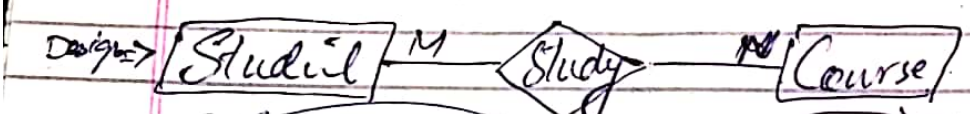
Reduce

These tables can't be reduced, M-N no reduction.

Many to One relationship

=> Same as One to Many rel

Many to Many Relationship



P.K F.K F.K P.K

Relational Model=> Roll No Name Age (Roll No , Cid) Cid name Credit

1	A	16	1	C1	C1	Ant	4
2	B	17	2	C2	C2	Sem	4
3	A	16	1	C2	C3	Clm	4
4	C	17	2	C1	C4	Vrl	4
5	D	16	3	C3			

Primary Key:

Roll No and Cid both are repeating in reference table so individually they can't act as P.K

We can use as composite primary key

Composite Key = Roll no Cid

Reduce

These tables can't be reduced, M-N no reduction.