(15 Marks)

DBMS

(Database Management System)

MCQ → 5
SAQ → 3
LAQ → 7

1 → 2, 8, 9, 10

Introduction

SQL

Relational Algebra

Relational Model & Normalization

Entity

1. Table / Relation
   1. Record / Tupple / Row
   2. Attribute / column

Cardinality

Degree

Column = 3

Roll	Name	Total
1	Sourik	499
2	Sonali	498

2 = Row

cardinality = 2

Degree = 3

Constraints (বাধা)

↓

Key constraints

PK (Primary Key)

CK

AK

SK

FK

Primary key

Characteristic → unique + Not NULL

Roll	Name	Total	Grade	Reg no	Cert no
1	Ankita	500	E	R001	C001
2	Sanik	499	O	R002	C002
3	Sonia	498	AA	R003	C003
4	Ayushi	497	A+	R004	C004

CK (Roll, Reg no, Cert no)

PK (Roll)

AK (Reg no, Cert no)

Relation :- Student

CK (Candidate Key) :-

CK = PK + all the unique key

= Roll + (Reg no, Cert no)

= 1 + 2

= 3

Alternate Key :- (AK)

AK = CK − PK

= 3 − 1 = 2

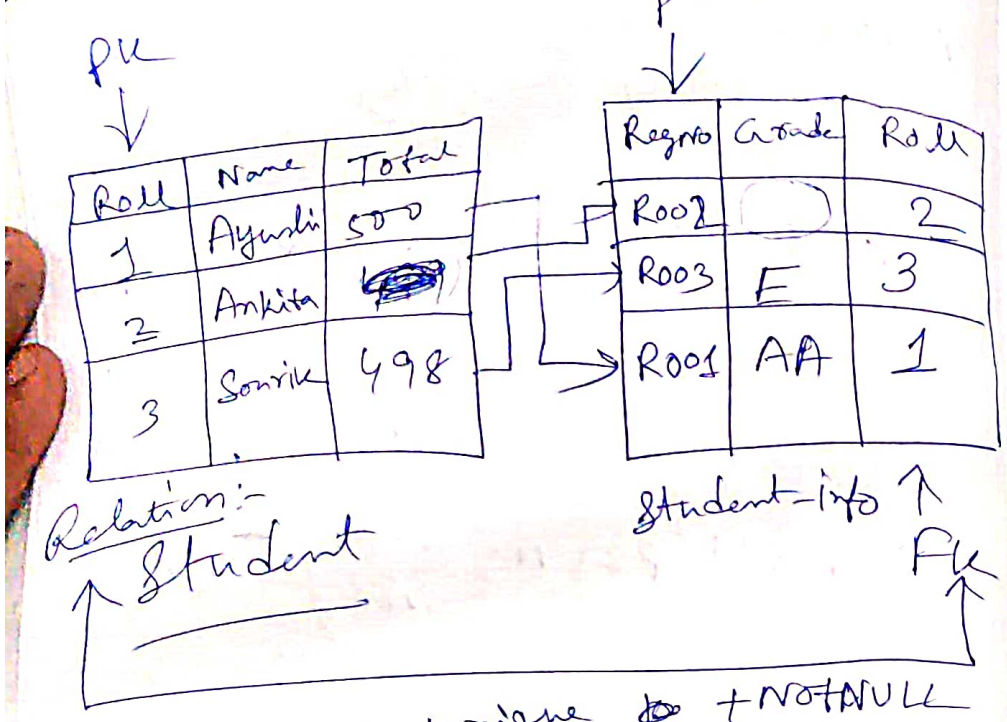
(Roll, Reg no, Cert no) − (Roll)

∴ Reg no, Cert no

= 2

FK (Foreign Key) :-

[may or may not be unique & not null



Super Key :- (SK)

Roll	Name	Total	Grade

{Roll}

{Roll, Name}

{ " , " , Total}

{ " , " , " , Grade}

{Name}

× {Name Roll}

{Name, Total}

× { " , Total, Roll}

× { " , " , Grade}

{ " , " , " , Roll}

× { " , " , " , " }

etc.

Relationship

- 1 : 1
- 1 : M
- M : N [many : many]

1 : 1

PK

Roll	Name	Address
1	Ankita	Ultodanga
2	Ayushi	Kestopur
3	Sonik	Salt lake
4	Sonai	Baguiati

Student

1 : 1

RegNo	Total	Roll
R003	500	3
R002	400	2
R004	300	4
R001	450	1

Student - info

FK

M : N

SID	SName	Address
S1	Ayushi	Kestopur
S2	Ankita	Ultadanga
S3	Sonai	Baguiati
S4	Sonik	Salt lake

PK

Student

SUBID	SUBject	
S001	chem	✓
S002	Phy	✓
S003	Math	✓
S004	CS	

PK

Subject

1 : M

FK

Book ID	BName	Publisher
B1	M.C.S.	APB
B1	M.C.A	BPB
B2	Math	APB
B3	Chemistry I	BPB
B3	chem II	APB

M : 1

1 : 1

M : 1

PK

AID	ANam	BookID
A1	J.B.	B1
A2	S.N. Dey	B2
A3	Maity	B3

Book

author

	SID	SUBID
1 : 1	S1	S002
1 : M	S2	S001
	S2	S003
1 : 1	S3	S003
1 : 1	S4	S004

Data Dependency

Data Independency

Student

Roll	Name	Total	Grade
1	Ayushi	450	A
2	Ankita	480	A+
3	Sonvik	500	AA
4	Sonai	490	AA

PK

XPK

Student

Roll	Name	Total	Grade
1	Ayushi	450	A
2	Ankita	480	A+
3	Sonvik	500	AA
4	Sonai	490	AA

Data Integrity

Data non-duplication

Data consistancy

Data Duplication / Data Redundancy / Data inconsistency

Database Model

E-R Model (Entity Relationship Model

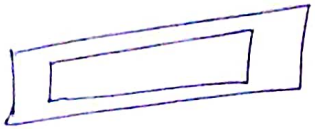
Hierarchical Model

Relational Model

Net

E-R Model

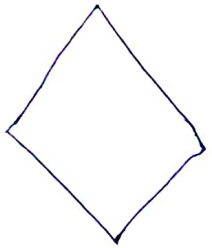
→ Entity (Strong)



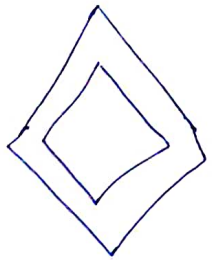
→ Weak Entity

→ attribute (strong)

→ (Weak attribute)



→ Relationship (strong)



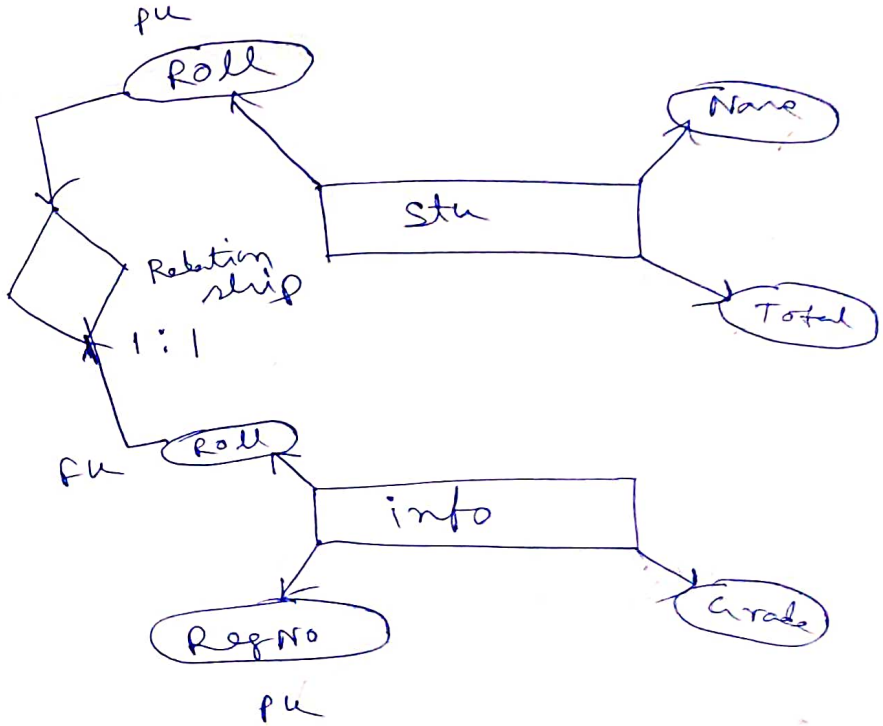
→ Weak Relationship

→ Linker

(E-R) 1:1 Strong Relationship

Stu (Roll, Name, Total)

info (RegNo, Grade, Roll)



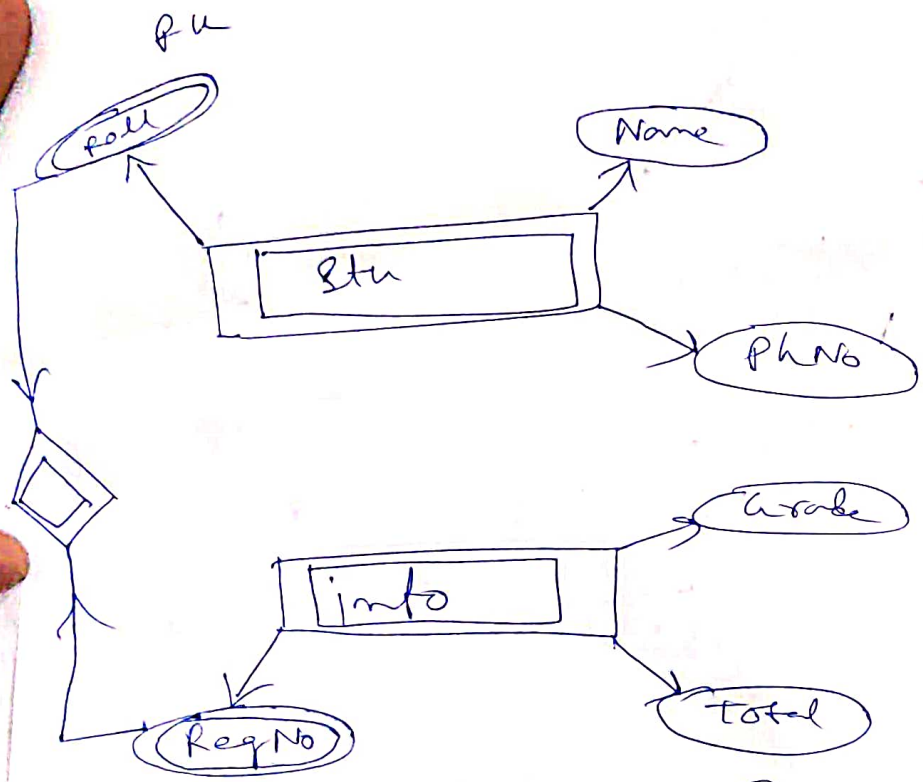
Strong Entity →

Attribute →

Relationship →

E-R Model 1:1
Weak Relationship

Stu (Roll, Name, Phno)
into (RegNo, Total, Grade)



Pu
Weak entity
" attribute
" relationship

E R Model

Adj.

(1) 1:1 ✓

(2) Implementation easy (small brand)

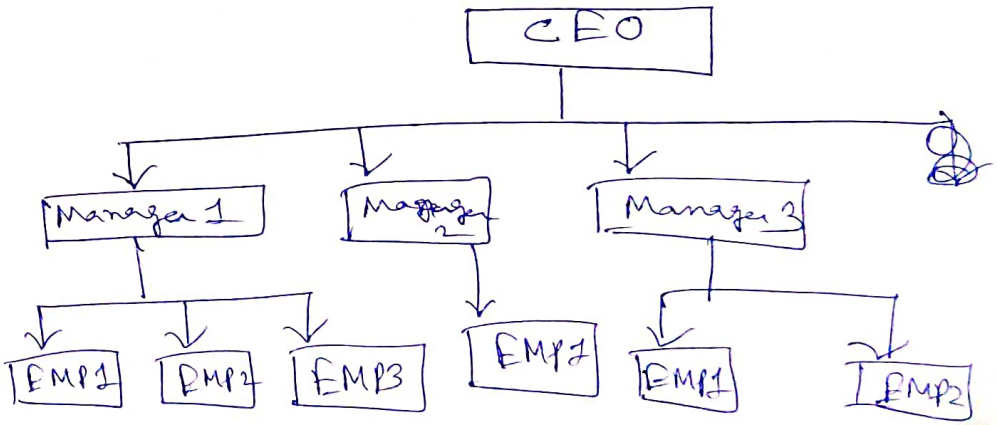
Dis Adj.

(1) 1:M
M:N ✗

(2) large brand Implementation difficult

(3) More then 2 Relation Not Possible

Hierarchical Model



Adj.

1 : M ✓

1 : 1

S.L.I ✓

C single level inheritance

M.L.I ✓

Hierarchical I.

upper layer element search is easier & less time taken

Dis Adj.

X M:N

M.I. ✓

Hybrid. I.

lower layer element search is diff. & more time taken