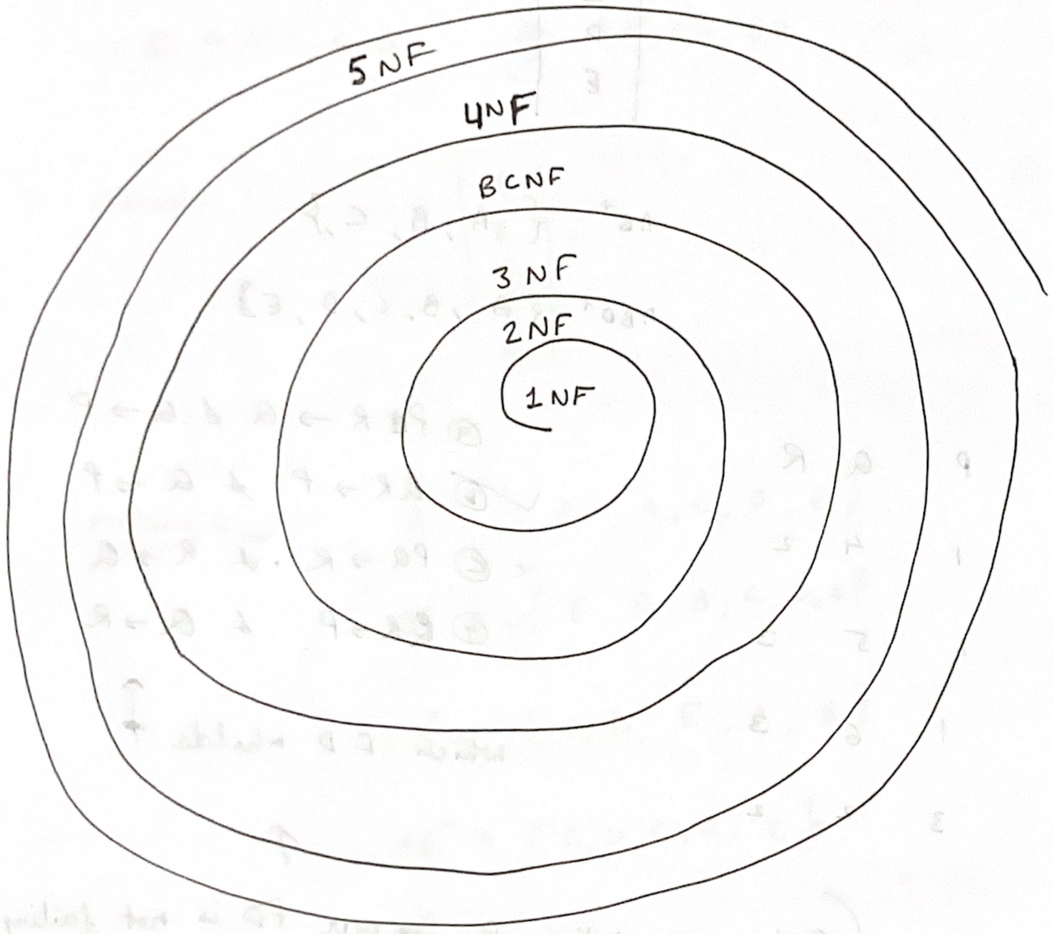
11/3/2024

Normalization

→ Process of refining the database to ~~remove~~ minimise redundancy ~~redundacy~~

and to ~~remove~~ minimise update anomalies.



1NF →

→ No Composite attributes

→ No multivalued attributes

UNF { Un-Normal form }

Emp

eid	ename	mob
1	A	9991, 8999, 8998
2	B	9898, 9888

1NF ⟹

1NF

eid	ename	mob
1	A	9991
1	A	8999
1	A	8998
2	B	9898
2	B	9888

Emp

cid	Ename	mob
1	Subhash Chand Saini	9991, 8999, 8998
2	Rajat Panday	9898, 9888
3	Jitendra Meena	8989.

eid	f_name	m_name	Lname	mob
1	Shubhash	Chand	Saini	9991
1	Shubhash	Chand	Saini	8999
1	Shubhash	Chand	Saini	8998
1	1	1	1	1
1	1	1	1	1

12/3/2024

2NF

Condition 1 → Should be 1NF

Condition 2 → Should not have any partial dependency.
All non-key attribute must be functional dependent on primary key.

eid	ename	jobCode	job	S_Code	State
1	A	101	Dev	101	Raj
1	A	102	Team Lead	101	Raj
2	B	102	Team Lead	102	UP

P.K = { eid, jobCode }

eid → ename ✓
jobcode → job ✓
} Partial dependencies.

eid	jobcode
1	101
1	102
2	102

PK (eid, job_code)

job_code	job
101	Dev
102	Team Lead

PK (job_code)

eid	ename	S_id	State
1	A	101	Raj
2	B	102	UP

PK (eid)

1NF

rollno	name	Course	age
1	A	C	22
1	A	C++	22
2	B	Java	21
2	B	DBMS	21
3	C	C++	23

→ PK { rollno, Course }

rollno → name ✓
rollno → age ✓
Partial dependencies.

roll no	Course
1	C
1	C++
2	Java
2	DBMS
3	C++

PK { rollno, course }

rollno	age	name
1	22	A
2	21	B
3	23	C

PK { Rollno }.

Teacher

Tid	Subject	age
1	Java	48
1	DBMS	48
2	Networking	38
3	Fundamental	25
2	Security	38

tid	age
1	48
2	38
3	25

tid	subject
1	Java
1	DBMS
2	Networking
3	Fundamental
2	Security.

~~Question~~

Question → Convert following table to 2NF

(1)

P Code P_title P_man. Budget e_id e_name dept_no d_name, Hourly_sal

(2)

Lect_no. Lect_name Lect_grade dept_code dept name Subcode Sub name

⇒ Each lecturer can teach many subject about may not belong to more than one department

15/3/24

3NF

⇒ First definition →

- 2NF
- No transitive dependencies for non-key attribute.

⇒ Second definition → For every non-trivial definition at least one of following must ~~add~~ hold for each FD $x \longrightarrow y$.

→ x is a Super key

→ Y is a Prime attribute

(1)

{ Stud_id , Stud_name , ~~Stud~~ Stud_state , Stud_country , age }

CK -> Stud_id

Stud_id → Stud_state

⊄

Stud_State → Stud_country.

{ Stud_id , name, State , age }

{ State, Country }

(2)

R { A , B , C , D , E }

FD ⇒ A → BC , CD → E , B → D , E → A

A
B
C
D
E

A, E, CD, BC

A⁺{ A, B, C, D, E }

BCD⁺{ C, D, E, A, B }

B⁺{ B, D }

E⁺{ E, A, B, C, D }

BC⁺{ A, B, C, D, E }

CD⁺{ A, B, C, D, E }