Name : B. Ieeshasree

Roll No : 19BCS021

Branch : CSE

1. Convert table to first normal form.

a) This table is not in INF because course column has multiple attributes. For a table to be in INF it should contain only atomic values. Here id is the primary key.

Prime Attribute - Id

Non-Prime Attributes - Name, Age, Location.

Functional dependency :

Id → course, name, age, location.

Converted Table :

Id	Name	Age	Location	Course
1	Sachin	22	Delhi	OS
1	Sachin	22	Delhi	DBMS
2	Ram	22	Jamshedpur	DAA
2	Ram	22	Jamshedpur	DBMS
3	Mike	23	chennai	ML
3	Mike	23	chennai	OS
4	Sameer	21	Bengaluru	DAA
4	Sameer	21	Bengaluru	ML
5	Vijay	22	Mumbai	ML
5	Vijay	22	Mumbai	DSMS

b) This is already in 1st Normal form (INF) No need to convert as it doesn't have any multiple attributes & unique column names.

2. Convert table to 2NF

a) It is not in 2NF because it is not functionally independent [Here it is Partial Dependency]

Duty-shift-id → Duty-shift

Primary key - Emp-ID

Prime Attributes - Emp-ID, Duty-shift-ID

Non-Prime Attributes - Name, Age, duty-shift

Candidate keys - Emp ID, Duty-Shift-ID.

Converted Table :

Table 1 -

Emp-ID	Name	Age
101	Arun	26
102	Bobby	28
103	Suresh	32
104	Sita	24

Table 2 -

Emp-ID	Duty-Shift-ID	Duty-Shift
101	1	Morning
102	2	Afternoon
103	3	Night
104	1	Morning

b) This is also not in 2NF as it is not fully functionally independent. [Partial Dependency here]

Project-ID → Project-Name, No-of-hours

Emp-ID → Name

Primary key - Emp-ID

Candidate Keys → Emp-ID, Project_ID

Prime Attributes - Emp-ID, Project_ID

Non-Prime Attributes - Name, Proj-Name, No-of-hours

Converted Table :

Emp_ID	Name
123	Ajay
321	Charu
546	Rajesh
765	Abhishek

Emp-ID	Project_ID	Proj-Name	No-of-hours
123	Prj-21	Speech-System	10
321	Prj-45	HR System	15
546	Prj-24	Automate Tickets	23
765	Prj-11	NLP	16

3. a) Here there exist transitive dependency. So it is not in 3NF.

Transitive dependency :

Cust-postcode → Cust_loc, Cust_address.

Primary key - Cust_ID

Cust-ID	cust_name	cust-postcode
25	Dell	560037
45	Lenovo	560046
89	Acer	210067
90	Samsung	4500078

cust-postcode	Cust-address	Cust-loc
560037	Whitefield	Banglore
560046	Marathahall	Banglore
210067	Bandra	Mumbai
4500078	Delhicentral	Delhi

b) Here transitive dependency exists. There should be no transitive dependency for table to be in third Normal form.

    building → contractor, builder
    contractor → fee.

Primary key - building
Prime Attributes - building
Non-Prime Attributes - contractor, builder, fee.

building is transitively dependent on fee.

Converted :

Building	Contractor	Builder
B-2156	Taylor	Prestige
B-8765	Sandeep	Hiranandani
B-4567	Vishaka	Tata

contractor	fee
Taylor	2567891
Sandeep	3567356
Vishaka	4567990