NAME :- B.Lohith Reddy
Reg.No :- 19BCS014

1)

a)

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

Sol:-

The given table is not in 1nf as the column courses has a list of values for 1nf all the values should be atomic

primary key :- Id
candidate key :- Id,name,Location
Prime atributes :- Id,name,Location
Non-Prime :- Age,Course

The 1 NF would be.

Id	Name	Age	Location
1	Sachin	22	Delhi
2	Ram	22	Jamshedpur
3	Mike	23	Chennai
4	Sameer	21	Bengaluru
5	Vijay	22	Mumbai

Id	Course
1	OS
1	DBMS
2	DAA
2	DBMS
3	ML
3	OS

4	DAA
4	ML
5	ML
5	DBMS

the second table is already in 1NF

for second table

primary key :- Id
candidate key :- Id,name,Phone,State
Prime atributes :- Id,name,Phone,State
Non-Prime :- Country

2)

Emp_ID	Duty_shift_ID	Name	Age	Duty_shift
101	1	Arun	26	Morning
102	2	Bobby	28	Afternoon
103	3	Suresh	32	Night
104	1	Sita	24	Morning

Emp_ID	Project_ID	Name	Proj_Name	No_of_hours
123	Prj_21	Ajay	Speech_system	10
321	Prj_45	Charu	HR System	15
546	Prj_24	Rajesh	Automate Tickets	23
765	Prj_11	Abhishek	NLP	16

~

sol)

a)

not in 2NF because the table is not fully functional independent
 Emp_id -> name,age
emp_id,Duty_shift_id -> Duty_Shift

primary key :- Emp_Id,
candidate key :- Emp_Id,
Prime atributes :- Emp_Id,Duty_shift_id
Non-Prime :-name,age,Duty_shift

Emp_ID	Name	Age
101	Arun	26
102	Bobby	28
103	Suresh	32
104	Sita	24

Emp_ID	Duty_shift_ID	Duty_shift
101	1	Morning
102	2	Afternoon
103	3	Night
104	1	Morning

b)

not in 2NF because the table is not fully functional independent
 Emp_id -> name
emp_id,Project_id -> name,proj_name,no_of_hours

primary key :- Emp_Id
candidate key :- Emp_Id,Project_id
Prime atributes :- Emp_Id,Project_id
Non-Prime :- ,name,Project_name,No_of_hours

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)

Cust_ID	Cust_name	Cust_postcode	Cust_address	Cust_loc
25	Dell	560037	Whitefield	Bangalore
45	Lenovo	560046	Marathahalli	Bangalore
89	Acer	210067	Bandra	Mumbai
90	Samsung	4500078	Delhi Central	Delhi

Building	Contractor	Builder	Fee
B_2156	Taylor	Prestige	2567891
B_8765	Sandeep	Hiranandani	3567356
B_4567	vishaka	Tata	4567990

sol)

a)
there exists transitive dependency between {cust_loc} and {cust_address} on non primary key
which is {cust_post_code}

So, it is not in 3NF {contractor} -> {fee}
there should be no transitive dependency in 3NF

primary key :- Cust_Id
candidate key :- Cust_Id, Cust_postcode,Cust_address,Cust_name
Prime atributes :- Cust_Id, Cust_postcode,Cust_address,Cust_name
Non-Prime :- Cust_loc

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	Bangalore
560046	Marathahalli	Bangalore
210067	Bandra	Mumbai
4500078	Delhi Central	Delhi

b)

primary key :- Building
candidate key :-Building
Prime atributes :- Building ,
Non-Prime :- Contractor,Builder,Fee

there exists transitive dependency. So, it is not in 3NF {contractor} -> {fee}
there should be no transitive dependency in 3NF

Building	Contractor	Builder
B_2156	Taylor	Prestige
B_8765	Sandeep	Hiranandani
B_4567	vishaka	Tata

Contractor	Fee
Taylor	2567891
Sandeep	3567356
vishaka	4567990