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1NF Normalization

1) The table given in the question was not in 1NF as the course attribute was multivalued. Thus, we separated the column and kept it in a different table.

id	Name	location	age
1	Sachin	Delhi	22
2	ram	Jamshed	22
3	mike	Chennai	23
4	Sameer	Bengaluru	21
5	vijay	Mumbai	22

Primary key is **id**

1	os
1	dbms
2	daa
2	dbma
3	ml
3	os
4	daa
4	ml
5	ml
5	dbms

The Primary key {**ID, Course**}

2NF Normalization

The table given in the question is not in 2NF form as Duty_Shift has partial dependency as it solely depends on Duty_Shift_ID rather than Emp_ID.

empid	name	age	Duty shift id
101	arun	26	1
102	bobby	28	2
103	Suresh	32	3
104	sita	24	1

Primary Key {**Emp_ID**}

Duty_shift_id	Duty_shift
1	morning

2	afternoon
3	night

Primary Key {**Duty_Shift_ID**}

2).

The table given in the question is not in 2NF as Project_name and No_of_hours solely depend on Project_ID rather than Emp_ID resulting in partial dependency

Emp_ID	Project_ID	Name
123	Prj_21	Ajay
321	Prj_45	Charu
546	Prj_24	Rajesh
765	Prj_11	Abhishek

Primary Key {**Emp_ID**}

Project_ID	Proj_Name	No_of_hours
Prj_21	Speech System	10
Prj_45	HR System	15
Prj_24	Automatic Tickets	23
Prj_11	NLP	16

Primary Key {**Project_ID**}

3NF Normalization 1)

Cust_ID	Cust_Name	Cust_Postcode
25	Dell	560037
45	Lenovo	560046
89	Acer	210067
90	samsung	4500078

The table given in the question is not in 3NF as Cust_Address and Cust_loc attributes depend transitively i.e., on a non-primary key attribute which is Cust_Postcode.

Primary Key {**Cust_ID**}

Cust_Postcode	Cust_Address	Cust_loc
560037	Whitefield	Bangalore

560046	Marathahalli	Bangalore
210067	Bandra	Mumbai
4500078	Delhi central	Delhi

Primary Key {**Cust_Postcode**}

2) The table given in the question is not in 3NF as the fee depends on a non-prime attribute contractor.

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

The primary key here is {**Building**}

Contractor	Fee
Taylor	2567891
Sandeep	3567356
Vishaka	4567990

The primary key {**Contractor**}