

# Karthik Sajjan

## 19bcs049

### 1. Convert the table to 1NF.

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

Primary key: ID

Candidate keys: ID, Name, Location

Prime Attributes: ID, Name, Location

Non-Prime Attributes: Age, Course

The table is not in 1NF because the column “Course” has multiple values.

This violates the rule that for a table to exist as 1NF, it must contain atomic values in each column.

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	DBMS

b)

ID	Name	Phone	State	Country
1	Kailley	9716245698	Karnataka	INDIA
2	Janet	9876543261	Maharashtra	INDIA
3	Robert	9456735678	Andra Pradesh	INDIA
4	Thomas	9966744381	Kerala	INDIA

Primary key: ID

Candidate keys: : ID, Name, Phone, State

Prime Attributes: ID, Name, Phone, State

Non-Prime Attributes: Country

The table is already in 1NF. So, no need to convert.

## 2. Convert the table to 2NF.

a)

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

Primary key: Emp\_ID

Candidate keys: Emp\_ID, Name, Age

Prime Attributes: Emp\_ID, Name, Age

Non-Prime Attributes: Duty\_Shift\_ID and Duty\_Shift.

The table is already in 1NF. The table is in 2NF as there exists partial dependency between columns Duty\_Shift\_ID and Duty\_Shift.

<b>Emp_ID</b>	<b>Duty_Shift_ID</b>	<b>Name</b>	<b>Age</b>
101	1	Arun	26
102	2	Bobby	28
103	3	Suresh	32
104	1	Sita	24

<b>Duty_Shift_ID</b>	<b>Duty_Shift</b>
1	Morning
2	Afternoon
3	Night

b)

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

Primary key: Emp\_ID

Candidate keys: Emp\_ID, Project\_ID, Name, Proj\_Name, No\_of\_hours.

Prime Attributes: Emp\_ID, Project\_ID, Name, Proj\_Name, No\_of\_hours

Non-Prime Attributes: ---

The table is already in 1NF. The table is in 2NF as there exists partial dependency between columns Project\_ID and Proj\_Name and No\_of\_hours.

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

Project_ID	Proj_Name	No_of_hours
Prj_21	Speech_system	10
Prj_45	HR System	15
Prj_24	Automate Tickets	23
Prj_11	NLP	16

### 3. Convert the table to 3NF.

a)

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

Primary key: Cust\_ID

Candidate keys: Cust\_ID, Cust\_Name, Cust\_postcode

Prime Attributes: Cust\_ID, Cust\_Name, Cust\_postcode

Non-Prime Attributes: Cust\_address , Cust\_loc

The table given in the question is not in 3NF as Cust\_Address and Cust\_loc attributes depend transitively i.e., on a primary key attribute which is Cust\_Postcode.

<b>Cust_ID</b>	<b>Cust_Name</b>	<b>Cust_postcode</b>
25	Dell	560037
45	Lenovo	560046
89	Acer	210067
90	Samsung	4500078

<b>Cust_postcode</b>	<b>Cust_address</b>	<b>Cust_loc</b>
560037	Whitefield	Bangalore
560046	Marathahalli	Bangalore
210067	Bandra	Mumbai
4500078	Delhi Central	Delhi

b)

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

Primary key: Building

Candidate keys: Building, Contractor, Builder

Prime Attributes: Building, Contractor, Builder

Non-Prime Attributes: Fee

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

<b>Bulding</b>	<b>Contactor</b>	<b>Builder</b>
B_2156	Taylor	Prestige
B_8765	Sandeep	Hiranandani
B_4567	Vishaka	Tata

<b>Contactor</b>	<b>Fee</b>
Taylor	2567891
Sandeep	3567356

Vishaka	4567990
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