Assignment 5: DBMS Lab CS 3095D

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1NF Normalisation

The **user** table is initially as follows. The **User_ID** and **Manager_ID** are columns that serve as a compound key. In 1NF normalisation, the relation must not contain composite, multi-valued attributes or their compositions. Here, **Address** is a composite attribute containing street address, district and state. We can make them single(atomic) and divisible.

User_ID	Manager_ID	Mob_Num	Address	Company_name	Email_ID	User_Name
100000	164521	6383887969	221 St, New Delhi, Delhi	Google	ritika@hotmail.com	ritika1998
120000	724521	9396523419	Silver Hills, Calicut, Kerala	Tata Consultancy	shanaya@hotmail.com	shanaya1997
130000	164521	8606222928	14 Ram Street, Allahabad, Uttar Pradesh	Intel	ravi@gmail.com	rahul2206
140000	453451	9765423145	Nirmala Road, Trivandrum, Kerala	Micromax	rohan@hotmail.com	rohan_23
150000	724521	8907652341	Pankim Nagar, Bhubhaneshwar, Orissa	Blume Global	amritha@hotmail.com	amritha1990

It has been achieved in the following way:

User_ID ▲ 1	Manager_ID	Mob_Num	Address	District	State	Company_name	Email_ID	User_Name
100000	164521	6383887969	221 St	New Delhi	Delhi	Google	ritika@hotmail.com	ritika1998
120000	724521	9396523419	Silver Hills	Calicut	Kerala	Tata Consultancy	shanaya@hotmail.com	shanaya1997
130000	164521	8606222928	14 Ram Street	Allahabad	Uttar Pradesh	Intel	ravi@gmail.com	rahul2206
140000	453451	9765423145	Nirmala Road	Trivandrum	Kerala	Micromax	rohan@hotmail.com	rohan_23
150000	724521	8907652341	Pankim Nagar	Bhubhaneshwar	Orissa	Blume Global	amritha@hotmail.com	amritha1990

In the manager_data table, the degrees column is a multi-valued attribute. Each manager can have 1 or more **Degrees** awarded. In order to achieve 1NF normalisation, I resolve this with redundancy. Man_ID was initially the primary key, but now it will be combined with degrees to become a compound key. Each manager can have one or more degrees and it will be split to be atomic.

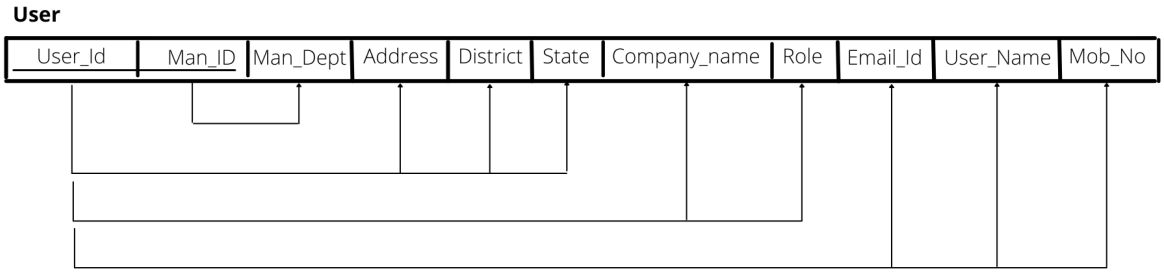
Man_ID	Man_Name	Degrees
759645	Mr. Athul	BSc Computer Science
231654	Mr. Rahul	B.Tech, M.Tech
724521	Mr. Sharma	B.Tech
453451	Mrs. Seema	BBA, MBA
632459	Ms. Athira	B.Tech
164521	Ms. Hema	B.Tech, M.Tech

The following is the table after achieving 1NF normalisation.

Man_ID	Man_Name	Degrees
164521	Ms. Hema	B.Tech
164521	Ms. Hema	M.Tech
231654	Mr. Rahul	B.Tech
231654	Mr. Rahul	M.Tech
453451	Mrs. Seema	BBA
453451	Mrs. Seema	MBA
632459	Ms. Athira	B.Tech
724521	Mr. Sharma	B.Tech
759645	Mr. Athul	BSc Computer Science

2NF Normalisation

In the user table, I have added additional attributes called **role** of the user in the company they are associated with and the 'Man_Dept to indicate the department the manager belongs to. Since **User_ID** and **Manager_ID** are compound keys we can see the functional dependencies as follows:



In 2NF, no partial dependencies are allowed and no partial dependence with any other key. So, in cases of partial dependencies, I will achieve 2NF by splitting those dependencies as shown:

User_ID	Manager_ID	Man_Dept	Mob_Num	Address	District	State	Company_name	Role	Email_ID	User_Name
100000	164521	IT	6383887969	221 St	New Delhi	Delhi	Google	SDE	ritika@hotmail.com	ritika1998
120000	724521	SW	9396523419	Silver Hills	Calicut	Kerala	Tata Consultancy	Data Scientist	shanaya@hotmail.com	shanaya1997
130000	164521	HW	8606222928	14 Ram Street	Allahabad	Uttar Pradesh	Intel	Hardware Engineer	ravi@gmail.com	rahul2206
140000	453451	SW	9765423145	Nirmala Road	Trivandrum	Kerala	Micromax	Tester	rohan@hotmail.com	rohan_23
150000	724521	CE	8907652341	Pankim Nagar	Bhubhaneshwar	Orissa	Blume Global	Consultant	amritha@hotmail.com	amritha1990

FD1:

User_ID	Address	District	State
100000	221 St	New Delhi	Delhi
120000	Silver Hills	Calicut	Kerala
130000	14 Ram Street	Allahabad	Uttar Pradesh
140000	Nirmala Road	Trivandrum	Kerala
150000	Pankim Nagar	Bhubhaneshwar	Orissa

FD2:

User_ID	Company_name	Role
100000	Google	SDE
120000	Tata Consultancy	Data Scientist
130000	Intel	Hardware Engineer
140000	Micromax	Tester
150000	Blume Global	Consultant

FD3:

Manager_ID	Man_Dept
164521	IT
724521	SW
164521	HW
453451	SW
724521	CE

FD4:

User_ID	User_Name	Mob_Num	Email_ID
100000	ritika1998	6383887969	ritika@hotmail.com
120000	shanaya1997	9396523419	shanaya@hotmail.com
130000	rahul2206	8606222928	ravi@gmail.com
140000	rohan_23	9765423145	rohan@hotmail.com
150000	amritha1990	8907652341	amritha@hotmail.com

3NF Normalisation

In the user table, I have added an additional attribute called **Zip_Code** of the user. A relation schema is in 3NF if it satisfies 2NF and no nonprime attribute is transitively dependent on the primary key. Here Address, District and State is transitively dependent upon Zip_Code

User_ID	Manager_ID	Man_Dept	Mob_Num	Address	Zip_Code	District	State	Company_name	Role	Email_ID	User_Name
100000	164521	IT	6383887969	221 St	110020	New Delhi	Delhi	Google	SDE	ritika@hotmail.com	ritika1998
120000	724521	SW	9396523419	Silver Hills	673012	Calicut	Kerala	Tata Consultancy	Data Scientist	shanaya@hotmail.com	shanaya1997
130000	164521	HW	8606222928	14 Ram Street	221102	Allahabad	Uttar Pradesh	Intel	Hardware Engineer	ravi@gmail.com	rahul2206
140000	453451	SW	9765423145	Nirmala Road	685404	Trivandrum	Kerala	Micromax	Tester	rohan@hotmail.com	rohan_23
150000	724521	CE	8907652341	Pankim Nagar	759024	Bhubhaneshwar	Orissa	Blume Global	Consultant	amritha@hotmail.com	amritha1990

User_ID	Zip_Code
100000	110020
120000	673012
130000	221102
140000	685404
150000	759024

Zip_Code	Address	District	State
110020	221 St	New Delhi	Delhi
673012	Silver Hills	Calicut	Kerala
221102	14 Ram Street	Allahabad	Uttar Pradesh
685404	Nirmala Road	Trivandrum	Kerala
759024	Pankim Nagar	Bhubhaneshwar	Orissa