Database Normalization

Database Normalization is a process of arranging the data in a database such a way that it reduces the data redundancy (repetitive) and improve data integrity. In normalization large table are divided into small tables and links them using relationship. It ensures that the data stored logically.

There are seven (7) normal from preent

1. 1NF (First Normal Form)
2. 2NF (Second Normal Form)
3. 3NF (Third Normal form)
4. BCNF (Boyce- Codd Normal From)
5. 4NF (Fourth Normal Form)
6. 5NF (Fifth Normal Form)
7. 6NF (Six Normal Form)

1NF (First Normal Form):--

1NF rules are

1. Value in each column must be atomic and should be same domain name
2. Each table cell must contain atomic single value
3. Each attribute of a table cannot hold multiple values

Course	Content
Programming	Java, c ++
Web developing	PHP, HTML

To Achieve 1NF

Course	Content
Programming	java
Programming	C ++
Web developing	HTML
Web developing	PHP

2NF (Second Normal)

2NF rules are

1. Table should be in first normal form
2. It should not have partial dependency which means non –prime or non- key attribute are fully functional dependent on the primary key

Teacher Table

Teacher ID	Teacher Age	Subject
001	34	PHYS
002	45	MATH
003	42	COMPUTER, CHIEM

Here non-prime attribute Teacher Age is dependent on Teacher ID
To achieve 2NF

1NF

Teacher ID	Teacher Age	Subject
001	34	PHYS
002	45	MATH
003	42	COMPUTER
003	42	CHIEM

2NF (Teacher Age Table)

Teacher ID	Teacher Age
001	34
002	45
003	42
003	42

2NF (Teacher Subject Table)

Teacher ID	subject
001	PHYS
002	MATH
003	COMPUTER
003	CHEM

3NF (Third Normal Form)

3NF rules are

1. It must be in 2NF
2. It doesn't have Transitive dependency.

ID	Name	Zip	State	City
111	Jayanta	201	UP	Noida
222	Deep	301	ASSAM	Guwahati
333	Ratul	404	DELHI	DL
444	Rohit	501	MP	MPC
555	Manash	601	BIHAR	KJL
666	Debases	701	J&K	CJD

Indirect relationship causes Transitive dependency

In this table except ID (Super Key) all other attributes are non- prime. Here State and City are dependent on Zip and Zip dependent on ID. So non- prime attribute State and City transitively dependent on ID.

So we need to move City and State to a another table making Zip code as primary key

Employee table

ID	Name	Zip
111	Jayanta	201
222	Deep	301
333	Ratul	404
444	Rohit	501
555	Manash	601
666	Debases	701

Employee Zip Table

Zip	State	City
201	UP	Noida
301	ASSAM	Guwahati
404	DELHI	DL
501	MP	MPC
601	BIHAR	KJL
701	J&K	CJD