Normalization

1. Decompose a large & complex table into smaller and easy table.
2. Remove anomalies and simple design technique.
3. The normal form is used to reduce redundancy from the database table.
4. Easy maintenance , Durability and long life.
5. Normalization is the process of organizing the data in the database.
6. Step by step process.

Youtube :- https://www.youtube.com/@TheCrazyProgrammer123/search?query=normalization

There are 6 types of Normalization Form :-
1. 1NF (First Normal Form)
2. 2NF (Second Normal Form)
3. 3NF (Third Normal Form)
4. BCNF (Boyce-Codd Normal Form)
5. 4NF (Fourth Normal Form)
6. 5NF (Fifth Normal Form)

1NF - (NORAML FORM)

1. A table should hold atomic values.
2. Remove multi valued attributes, composite attributes.

Normal Table Example -

STD	NAME	COURSE
1	RAJ	DBMS,OS,CN
2	JYOTI	DBMS
3	HARSH	CN,CAD

1NF

STD	NAME	COURSE
1	RAJ	DBMS
1	RAJ	OS
1	RAJ	CN
2	JYOTI	DBMS
3	HARSH	CN
3	HARSH	CAD

2NF - (NORMAL FORM)

1. A table should be 1NF.
2. All non – key attributes must fully functionally dependent on key – attributes (primary key).

1NF Example -

STD	NAME	COURSE ID	C. NAME
1	RAJ	24	DBMS
2	JYOTI	47	CN
3	HARSH	38	CAD

2NF

SID	NAME	COURSE ID
24	1	RAJ
47	2	JYOTI
38	3	HARSH

| COURSE ID	C. NAME
RAJ	DBMS
JYOTI	CN
HARSH	CAD

3NF - (NORMAL FORM)

1. A table should be in 2NF.
2. **A table should not hold transitive dependency.**

SID	NAME	CITY	STATE	ZIP
1	RAJ	JAIPUR	RAJ	42619
2	JYOTI	JAIPUR	RAJ	42619
3	HARSH	JODHPUR	RAJ	76891
4	AJAY	MUMBAI	MAHARASHTRA	21987
5	VIKAS	PATNA	BIHAR	56327

SID	NAME	ZIP
1	RAJ	42619
2	JYOTI	42619
3	HARSH	76891
4	AJAY	21987
5	VIKAS	56327

ZIP	CITY	STATE
42619	JAIPUR	RAJ
76891	JODHPUR	RAJ
21987	MUMBAI	MAHARASHTRA
56327	PATNA	BIHAR
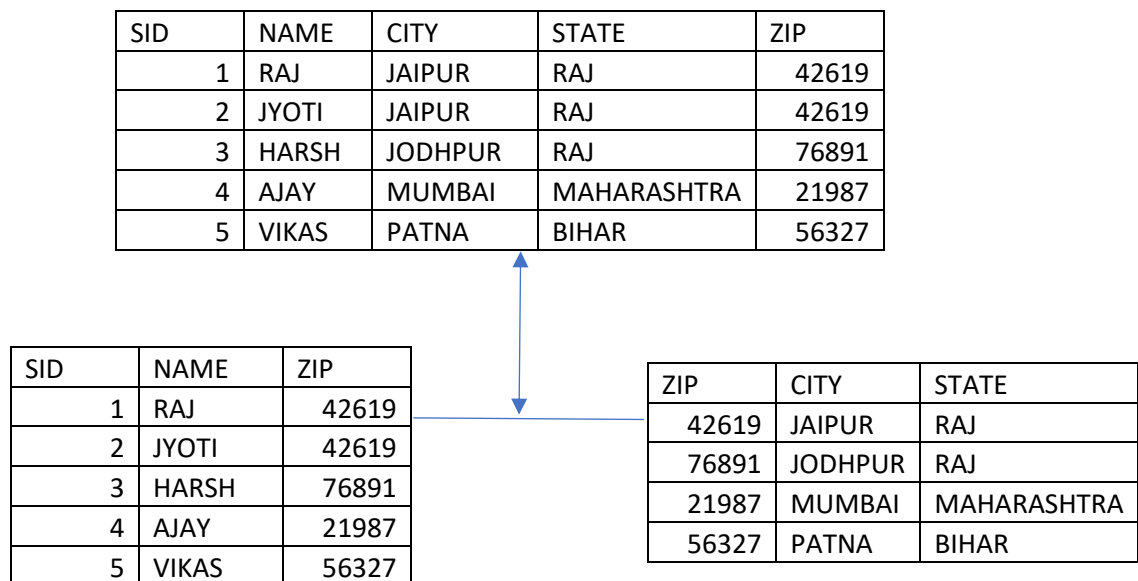
BCNF - (NORMAL FORM)

1. A table should be in 3rd NF.
2. For any non trival functional dependency.

SID	NAME	BID	BNAME
1	RAJ	87	HINDI
2	JYOTI	115	ENGLISH
3	HARSH	397	COMPUTER

SID	NAME	BID
1	RAJ	87
2	JYOTI	115
3	HARSH	397

BID	BNAME
87	HINDI
115	ENGLISH
397	COMPUTER
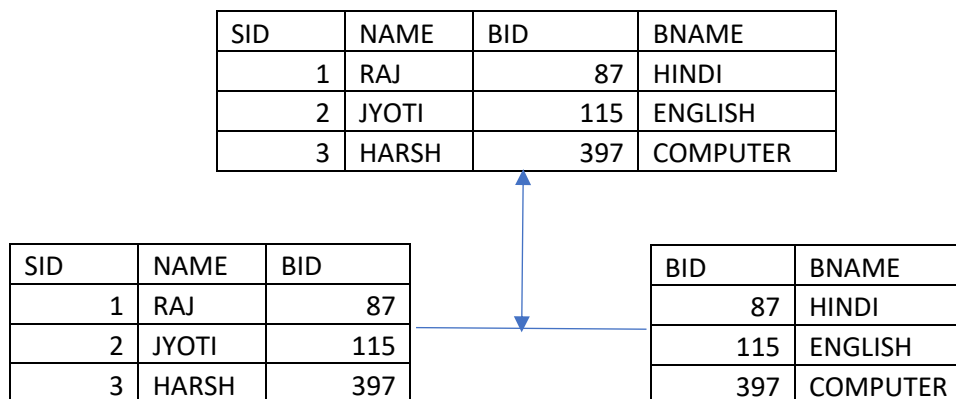
4NF - (NORAML FORM)

1. A table should be in BCNF.
2. No multi value dependency allowed.

SID	COURSE	SPORTS
1	DBMS	CRICKET
1	CN	TENNIS
3	DSA	FOOTBALL
4	DE	CRICKET

SID	COURSE
1	DBMS
1	CN
3	DSA
4	DE

SID	SPORTS
1	CRICKET
1	TENNIS
3	FOOTBALL
4	CRICKET

5NF - (NORAML FORM)

1. A table should be in 4NF.
2. No join dependency allowed.
3. Decomposition should be loss-less.

COURSE	FACULTY	CLASS
MATH	JOHN	11
HINDI	JOHN	11
HINDI	VIJAY	12
MATH	RASHMI	11

COURSE	FACULTY
MATH	JOHN
HINDI	JOHN
HINDI	VIJAY
MATH	RASHMI

FACULTY	CLASS
JOHN	11
JOHN	11
VIJAY	12
RASHMI	11

CLASS	COURSE
11	MATH
11	HINDI
12	HINDI
11	MATH