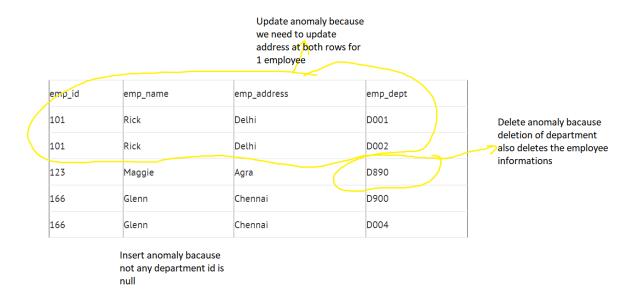
Normalization - Normalization is a process of organizing the data in database to avoid data redundancy, insertion anomaly, update anomaly & deletion anomaly.

Anomalies-



Types of Normalization – 4 types-

- 1. 1NF
- 2. 2NF
- 3. 3NF
- 4. BCNF (Boyce and Codd Normal Form)

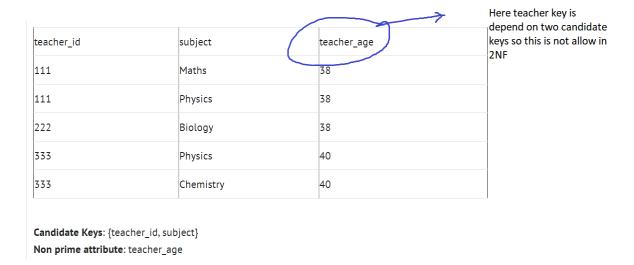
 $\boldsymbol{1NF}-\mathtt{1NF}$ says that any column of the table can't store 2 values.



2NF - It has 2 conditions-

- Table must be in 1NF
- No non-prime attribute is dependent on the proper subset of any candidate key of table

Attribute that is not part of any candidate key is the non-prime attribute.



We can remove this by made 2 different tables.

One table is of teacher_id and teacher_age, and another table is subject and teacher_id.

3NF – it also has 2 conditions-

- Table must be in 2NF
- Transitive functional dependency of non-prime attribute on any super key should be removed.

transitional functional dependency is when X->Y, then X is super key and Y is prime attribute.

						-9
emp_id	emp_name (emp_zip	emp_state	emp_city	emp_district	Here emp_state, city and district dependent on emp_zip and emp_zip is dependent on emp_id. So non-prime attributes transitively depend on super key, so we must need to remove it.
1001	John	282005	UP	Agra	Dayal Bagh	
1002	Ajeet	222008	TN	Chennai	M-City	
1006	Lora	282007	TN	Chennai	Urrapakkam	
1101	Lilly	292008	UK	Pauri	Bhagwan	
1201	Steve	222999	MP	Gwalior	Ratan	

Super keys: {emp_id}, {emp_id, emp_name}, {emp_id, emp_name, emp_zip}...so on

Candidate Keys: {emp_id}

Non-prime attributes: all attributes except emp_id are non-prime as they are not part of any

candidate keys.

So we divide this table in two parts as-

- 1. Emp_id, Emp_name, Emp_zip
- 2. Emp_zip, state, city and district.

BCNF – This is updated version of 3NF. Its conditions are-

- Table must be in 3NF
- For functional dependency X->Y, X should be a super key.

emp_id	emp_nationality	emp_dept	dept_type	dept_no_of_emp
1001	Austrian	Production and planning	D001	200
1001	Austrian	stores	D001	250
1002	American	design and technical support	D134	100
1002	American	Purchasing department	D134	600

Functional dependencies in the table above:

emp_id -> emp_nationality
emp_dept -> {dept_type, dept_no_of_emp}

Candidate key: {emp_id, emp_dept}

We can divide this table in 3 tables as-

- 1. Emp_id and emp_nationality
- 2. Emp_dept, dept_type and dept_no_of_emp
- 3. Emp_id and emp_dept (this is to map both above tables)