NORMALIZATION

Types Of Normalization

- First Normal Form
- Second Normal form
- Third Normal form
- BCNF
- Fourth Normal form
- Fifth Normal form

First Normal Form (1NF) https://www.geeksforgeeks.org/normal-forms-in-dbms/

- Each table cell of 1NF have single value and all columns must be unique names. (gfg)

  Example: we have 1 table od student data of student_id, student_name, subject. (stn)

  Before 1NF

Student_id	Student_name	subject
101	Std1	Math,English
102	Std2	math

After 1NF

Student_id	Student_name	subject
101	Std1	Math
101	Std1	English
102	Std2	math

Second Normal form (2NF) https://www.geeksforgeeks.org/normal-forms-in-dbms/

- The second normal form is non key attribute depend on entire primary key. That mean the each column directly related to primary key column and not other column.(gfg)

  Example: we have 3 table (stn)

  1. student_id, student_name, branch
  2. subject_id, subject_name
  3. student_id, subject_id, marks, teacher_name

     (student_id and subject_id these 2 are primary key)

student_id	student_name	branch
1	Std1	Cse
2	Std2	Mech

Subject_id	Subject_name
1	C lang
2	DSA
3	OPs

Student_id	Subject_id	marks	Teacher_name
1	1	70	Miss. C
1	2	82	Miss. D
2	1	65	Miss. ops

After applying 2NF:

Updated subject table

Subject_id	Subject_name	Teacher_name
1	C lang	Miss. C
2	DSA	Miss. D
3	OPs	Miss. ops

Updated score table

Student_id	Subject_id	marks
1	1	70
1	2	82
2	1	65

Third Normal form (3NF) https://www.geeksforgeeks.org/normal-forms-in-dbms/

- The 3NF build on 2NF by requiring all non key attributes those are independent with each column. Each column directly related to primary key and not to any other column in that table.

Example : we have 1 table the column name is customerid,customer_name, customer_city, customer_state.

customerid	customer_name	customer_city	customer_state
1	Cs1	nagpur	Maharastra
2	Cs2	pune	Maharastra
3	Cs3	surat	Gujrat

After 3NF: we have to create 2 table

1. customerid,customer_name, customer_city,
2. customer_city, customer_state.

Table1

customerid	customer_name	customer_city
1	Cs1	nagpur
2	Cs2	pune
3	Cs3	surat

Table2

customer_city	customer_state
nagpur	Maharastra
pune	Maharastra
surat	Gujrat

Boyce-Codd Normal Form (BCNF) https://www.geeksforgeeks.org/normal-forms-in-dbms/

- BCNF is the stricter from od 3nf tat will be each determinant in table is candidate key. Thery each non key attribute in bcnf is dependent on candidate key.

Example: we have a table of professorid, department, course

professorid	department	course
1	Comp sci	DS
2	Math	Calculus

After bcnf

Table 1 of professor

professorid	department
1	Comp sci
2	Math

Table 2 course

Coursed	Course	department
101	DS	Comp sci
102	Calculus	Math

Fourth Normal form (4NF) https://www.geeksforgeeks.org/normal-forms-in-dbms/

- The 4NF is the refinment of BCNF that ensure table does not contain any multi- valued dependencies.

Example: we have table that has

Std_id	Course_id	Department
1	C101	D1
1	C102	D2
2	C101	D1

After 4nf

Student-course table1

Std_id	Course_id
1	C101
1	C102
2	C101

student-department table2

Std_id	Department
1	D1
1	D2
2	D1

Fifth Normal form (5NF) https://www.geeksforgeeks.org/normal-forms-in-dbms/

- The 5NF is the highest level of normalization and it involve decomposing table to similar table to remove data and improve data integrity.

Example:

Pro_id	Emp_id	Task_id
P1	E1	T1
P1	E2	T2
P3	E1	T3

After 5NF:

All ids with separate table.

Project-employee table

Pro_id	Emp_id
P1	E1
P1	E2
P3	E1

employee-task table

Emp_id	Task_id
E1	T1
E2	T2
E1	T3

Project-task-table

Pro_id	Task_id
P1	T1
P1	T2
P3	T3

https://www.geeksforgeeks.org/normal-forms-in-dbms/