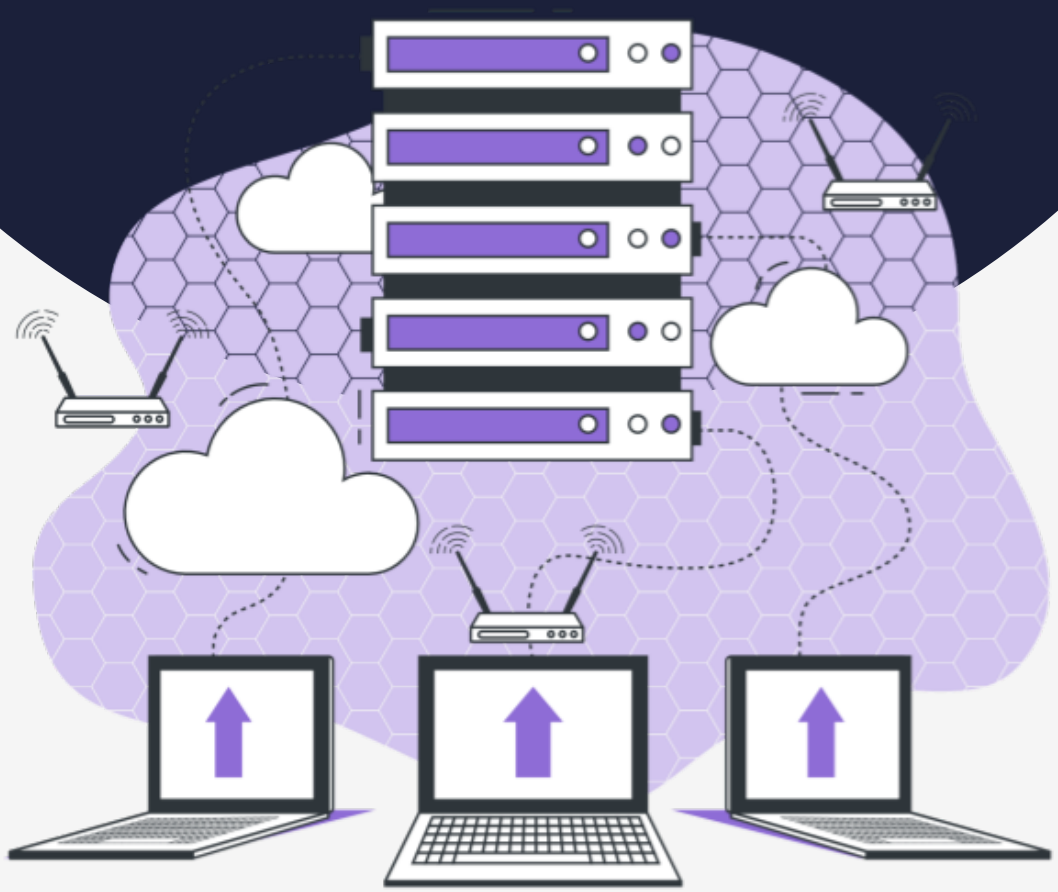
Lesson:

BCNF



PW SKILLS

List of content :

What is BCNF ?

BCNF stands for Boyce-Codd Normal Form.

BCNF was developed in 1974 by Raymond F. Boyce and Edgar F. Codd

For a table to be in BCNF:

- It should be in 3NF
- if every functional dependency X → Y, X is the super key of the table or in simple words,

If Y depends on X then X should be a part of the primary key.

Look at the table below :

Student_Id	Subject	Professor_Id
S101	Maths-100	P101
S101	CS-101	P102
S102	Maths-100	P103
S102	Civil-101	P104
S103	Electrical-100	P101

Here, Student_Id is repeating, hence, Student_Id alone cannot be a primary key.
If we look at the combination of Student_Id and Subject, it can act as a primary key.
Professor_Id is dependent on primary key, hence, the table is in 3NF, and the first condition for BCNF is satisfied.

On taking a closer look at the table, you will notice that Maths(100) is taught by P101 and P103, so if we wish to know which Prof is teaching what subject, this would mean the subject has a dependency on Professor_Id.

If we know the Professor_Id, we can discover the subject but vis-a-versa is not valid.

Since, subject is dependent on Professor_Id, the second condition of BCNF is not satisfied.
This is because Subject is a part of primary key which depends on a non-primary column called Professor_ID.
Now, the question is what to do to bring it in BCNF ?
To bring it to BCNF, we will break it into smaller tables.

Since, we could not address the Subject and Professor_Id relationship in the initial table, we will make another table addressing the relationship between Professor_Id and Subject.

Student_Id	Professor_Id
S101	P101
S101	P102
S102	P103
S102	P104
S103	P101

Professor_Id	Subject
P101	Maths-100
P102	CS-101
P103	Maths-100
P104	Civil-101

In this table, Professor_Id is a primary key and subject depends on Professor_Id.

Now, the tables are in 1NF, 2NF and 3NF and BCNF since Subject depends on Professor_Id which is a part of primary key.