

Normalization

(82)

Functional Dependency

- The functional Dependency is a relationship that exists between two attributes.
- It typically exists between the primary key and non-key attributes within a table.

$$X \rightarrow Y$$

The Left Side of FD is known as a determinand,
The right side of the production is known as a dependent.

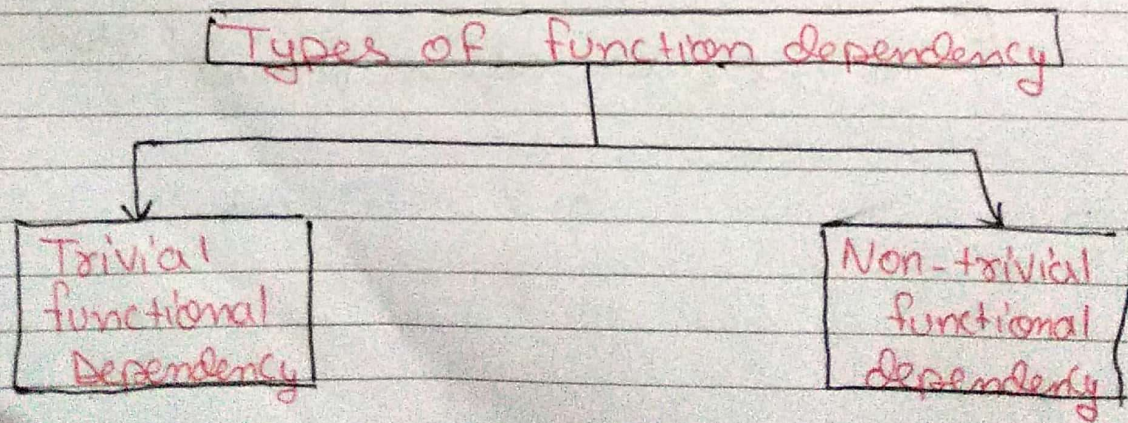
For Example \Rightarrow Assume we have an Employee table with attributes: Emp-Id, Emp-Name, Emp-Address.

Here Emp-Id attribute can uniquely identify the Emp-Name attribute of Employee table because if we know the Emp-Id, we can tell that Employee name associated with it.

functional dependency can be written as:

$$\text{Emp-Id} \rightarrow \text{Emp-Name}$$

We can say that Emp-Name is functionally dependent on Emp-Id.



Trivial functional dependency \Rightarrow

- $A \rightarrow B$ has trivial functional dependency if B is a Subset of A
- The following dependencies are also trivial like: $A \rightarrow A$, $B \rightarrow B$

Ex \Rightarrow Consider a table with two columns Employee-id and Employee-Name.

$\{ \text{Employee-id}, \text{Employee-Name} \} \rightarrow \text{Employee-id}$ is a trivial functional dependency as

Employee-id is a Subset of $\{ \text{Employee-id}, \text{Employee-Name} \}$

Also, $\text{Employee-id} \rightarrow \text{Employee-id}$ and $\text{Employee-Name} \rightarrow \text{Employee-Name}$ are trivial dependencies too.

Non-Trivial functional Dependency \Rightarrow

- $A \rightarrow B$ has a non-trivial functional dependency if B is not a Subset of A .
- When $A \cap B$ is NULL, then $A \rightarrow B$ is called as Complete non-trivial

Ex \Rightarrow Consider a table with three Column Emp-id, Emp-Name and Emp-age

$\text{Emp-id} \rightarrow \text{Emp-Name}$ is a Non trivial functional dependency because Emp-Name is not a Subset of Emp-id. Similarly

$\text{Emp-id}, \text{Emp-Name} \rightarrow \text{Emp-Age}$ is non-trivial because Emp-age is not a Subset of Emp-id, Emp-Name