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Functional Dependecy

Functional dependency describes the relationship between attributes in a relation.

A FD is a constraint between two sets of attributes in a relation from a database

For a Relation(table) R, if there are two attributes X and Y then

FD : X(determinant) -› Y(dependent)

Attribute Y is functionally dependent on attribute X.

R

X	Y

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Functional Dependecy

If x=1, we can find the value of y.

F.D : X–>Y (X,Y is a subset of R)

EmpID	EmpFirstName	EmpLastNmae
1	Riti	Kumari
2	Rahul	Kumar
3	Suraj	Singh

What is subset?

Let A={1,2,3}
Let B={1,2,3,4,5}
A is a subset of B because every element of A is also an element of B.

FD: **EmpId–> EmpFirstName** (EmpFirstName is functionally dependent on EmpId)
EmpId–>EmpLastNmae

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Functional Dependecy

Properties of Functional Dependencies:
1. Reflexivity: If Y is a subset of X, then X –> Y . (X–>X)
2. Augmentation: If X –> Y, then XZ –> YZ for any Z.
3. Transitivity: If X –> Y and Y –> Z, then X –> Z.
4. Union: If X –> Y and X –> Z, then X –> YZ.
5. Decomposition: If X –> YZ, then X –> Y and X –> Z.

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Functional Dependecy

Types of Functional Dependency
1. Trivial dependency
2. Non-trivial dependency

EmpID	EmpFirstName	EmpLastNmae
1	Riti	Kumari
2	Rahul	Kumar
3	Suraj	Singh

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Functional Dependecy

Trivial dependency

A functional dependency X –› Y is trivial if Y is a subset of X

We can also say it as X–>X .

{EmpID, EmpFirstName} –› {EmpID}

is trivial because {EmpID} is a subset of {EmpID, EmpFirstName}.

X ∩ Y = Y

EmpID	EmpFirstName	EmpLastNmae
1	Riti	Kumari
2	Rahul	Kumar
3	Suraj	Singh

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Functional Dependecy

Non-Trivial dependency

A functional dependency X –> Y is non-trivial if Y is not a subset of X i.e X Y=
{EmpID} –> {EmpFirstName}
is trivial because {EmpFirstName} is not a subset of {EmpID}.

X ∩ Y = empty

EmpID	EmpFirstName	EmpLastNmae
1	Riti	Kumari
2	Rahul	Kumar
3	Suraj	Singh