

DATABASE MANAGEMENT SYSTEM

FUNCTIONAL DEPENDENCIES

BY

**A. ZULIGHA SHAFANA,
ASST.PROF., DEPARTMENT OF COMPUTER APPLICATIONS
JAMAL MOHAMED COLLEGE**

Functional Dependencies

Introduction:

Basically a functional dependency (FD) is a many to one relationship from one set of attributes to another within a given relation.

Example:

Relation XY, there is a functional dependency from set of attributes $\{x\#,y\#\}$ to the set of attributes $\{Qty\}$.

- For any given value for the pair of attributes $x\#$ & $y\#$ there is just one corresponding value of attribute QTY, but many distinct values of the pair of attribute $X\#$ & $Y\#$ can have the same corresponding value for attribute QTY.

Definitions:

Let r be a relation, and let X and Y arbitrary subsets of the set of attributes of r . Then we say that Y is functionally dependent on X in symbols

$$X \rightarrow Y$$

(read “ X functionally determines Y ”)

Examples:

$\{\text{emp}\#\} \rightarrow \{\text{ename}\}$

$\{\text{emp}\#, \text{ename}\} \rightarrow \{\text{salary}\}$

$\{\text{emp}\#\} \rightarrow \{\text{ename}, \text{salary}\}$

Left-hand side of an FD called determinant

Right-hand side of an FD called dependent

Singular set :

As the definition indicates, the determinant and dependent are both set of attributes. When such a set contains just one attributes called Singular set.

$\text{Emp}\# \rightarrow \text{ename}$ (drop the set braces)

Trival and Non-trival Dependencies:

Definitions:

An FD is trival if and only if the Right-hand is a subset of the left-hand side.

$$\{ S\# , P\# \} \rightarrow S\#$$

- Trival dependencies are not very interesting in practice, we are usually more interested non-trival.

Clousure of a set of dependies:

Transitive FD:

A relation R with three attributes A, B and C such that the FDs $A \rightarrow B$ and $B \rightarrow C$ both hold for r. Then it is easy to see that the FD $A \rightarrow C$ also hold for R. The FD $A \rightarrow C$ is a transitive FD-C is said to depend on A transitively, via B.

Example:

$$\{\text{emp\#,ename}\} \rightarrow \{\text{Grade, Salary Scale}\}$$