Course Name: **A Level (1st Sem)** Subject : **Introduction to DBMS**

Topic: **Database Normalization – Anomalies (Part 2)** Date: **14-May-2020**

Database Normalization - Anomalies

Database Anomalies

When the data in database are not logically arranged and stored, It may lead to some flaws or anomalies that creates problem while performing basic operations (insert, update, delete) in database. These anomalies are:

- **Insert Anomalies**
- **Update Anomalies**
- **Delete Anomalies**

These anomalies occur due to bad and poor designing of database. To remove these anomalies, database must be normalized.

To understand these anomalies, consider the following two designs:

Design1: (All the information are kept in single table)

eid	ename	edob	salary	dname	dlocation	dbudget
101	Shyam	06-06-1990	30000	IT	FF-10	70000
102	Rakesh	11-10-1980	32000	IT	FF-10	70000
103	Kritika Singh	18-04-1999	28000	Electronics	GF-22	30000
104	Shyam	07-02-1989	45000	Accounts	GF-20	54000
105	Rakesh Kumar	06-06-1990	22000	Accounts	GF-20	54000
106	Kartik	07-08-1990	25000	Admin	GF-20	60000
107	Ayan Kumar	08-05-1992	25000	Accounts	GF-20	54000
108	Shubham Verma	06-03-1981	35000	IT	FF-10	70000
109	Saloni Shrama	07-02-1989	25000	Electronics	GF-22	30000

Design 2: (Same information are kept into two tables: Employee, Department)

Table1: Employee

eid	ename	edob	salary	dname
101	Shyam	06-06-1990	30000	IT
102	Rakesh	11-10-1980	32000	IT
103	Kritika Singh	18-04-1999	28000	Electronics
104	Shyam	07-02-1989	45000	Accounts
105	Rakesh Kumar	06-06-1990	22000	Accounts
106	Kartik	07-08-1990	25000	Admin
107	Ayan Kumar	08-05-1992	25000	Accounts
108	Shubham Verma	06-03-1981	35000	IT
109	Saloni Shrama	07-02-1989	25000	Electronics

Table2: Department

dname	dlocation	dbudget
IT	FF-10	70000
Electronics	GF-22	30000
Admin	GF-20	60000
Accounts	GF-20	54000

- **Insert Anomalies**

Insert anomalies occurs when insertion of some information depends on the presence /insertion of some other information.

In design1, if any new department information is needed to be insert then it needs at least one employee information who is working on that department.

Likewise to add any new employee, it needs department information. Otherwise NULL values needed to be inserted.

In design2, department information, and employee information are kept in two different tables, and they are linked through "dname" attributes.

The employee and department information can be added independently.

Design 1 has insert anomalies while design 2 has not insert anomalies.

- **Delete Anomalies**

Delete anomalies occurs when deletion of some information requires the deletion of some other information.

In design1, if any department information is needed to be delete then its employee information will also be get deleted. Suppose Employee having eid 106 needs to be deleted then, the record of Admin department will also be get deleted.

Likewise to delete any employee, department information will also be get deleted.

In design2, The employee and department information can be deleted independently.

Design 1 has delete anomalies while design 2 has not delete anomalies.

- **Update Anomalies**

Update anomalies occurs when try to update of some information, and it needs to update several place because the copy of data are scattered over several locations. If few instances of data get updated, and few are left unchanged, then the database will be in an inconsistent state.

In design1, if any new department information is needed to be update then it needs to be updated several location because the copy of data exist over multiple location. Suppose, the "dbudget" of "IT" department needs to be updated from 70000 to 80000, then it needs to updated three times i.e. for the employee having "eid" 101, 102, 108

In design2 the employee and department information can be updated independently.

Design 1 has update anomalies while design 2 has not update anomalies.

It concludes that design 2 has better design than design 1because design 1 has insert, update and delete anomalies.

Exercise:

1. What are database anomalies? Explain with example.