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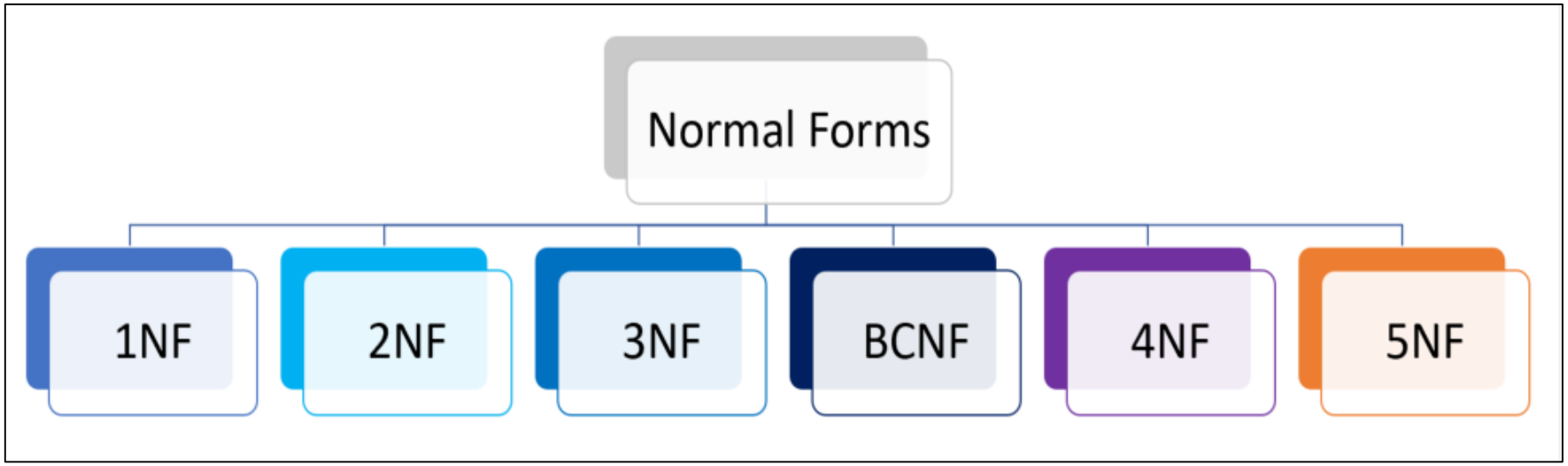
Database Management Systems (BCSC-0003)

Topic: Normalization



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Normalization

- Normalization is a database design technique that reduces data redundancy and eliminates undesirable characteristics like Insertion, Update and Deletion Anomalies.

- Normalization rules divides larger tables into smaller tables and links them using relationships.

- The purpose of Normalization in SQL is to eliminate redundant (repetitive) data and ensure data is stored logically.

Anomalies

Anomalies are problems that can occur in poorly planned, un-normalized databases where all the data is stored in one table.

Types of Anomalies:

1. Insert Anomaly,
2. Update Anomaly, and
3. Delete Anomaly.

Anomalies

- Insertion Anomaly:

An Insert Anomaly occurs when certain attributes cannot be inserted into the database without the presence of other attributes.

- Update or Modification Anomaly:

An update anomaly is a data inconsistency that results from data redundancy and a partial update.

- Deletion Anomaly:

Deletion Anomaly. A deletion anomaly occurs when you delete a record that may contain attributes that shouldn't be deleted.

Anomalies

SRNO	SNAME	CREDIT	DEPT_NAME	BUILDING	ROOM_NO
1	Rahul	5	CSE	B1	101
2	Jitendra	8	CSE	B1	101
3	Jagdish	9	EE	B2	201
4	Payal	7	EE	B2	201
5	Ankur	9	CIVIL	B1	110
6	Akash	8	ECE	B1	115
7	Vansh	7	CIVIL	B1	110
8	Tanuj	6	CSE	B1	101

Insert Anomalies

SRNO	SNAME	CREDIT	DEPT_NAME	BUILDING	ROOM_NO
1	Rahul	5	CSE	B1	101
2	Jitendra	8	CSE	B1	101
3	Jagdish	9	EE	B2	201
4	Payal	7	EE	B2	201
5	Ankur	9	CIVIL	B1	110
6	Akash	8	ECE	B1	115
7	Vansh	7	CIVIL	B1	110
8	Tanuj	6	CSE	B1	101
-	-	-	ME	B1	120

Update Anomalies

SRNO	SNAME	CREDIT	DEPT_NAME	BUILDING	ROOM_NO
1	Rahul	5	CSE	~~B1~~ B4	~~101~~ 301
2	Jitendra	8	CSE	~~B1~~ B4	~~101~~ 301
3	Jagdish	9	EE	B2	201
4	Payal	7	EE	B2	201
5	Ankur	9	CIVIL	B1	110
6	Akash	8	ECE	B3	115
7	Vansh	7	CIVIL	B1	110
8	Tanuj	6	CSE	~~B1~~ B4	~~101~~ 301

Delete Anomalies

SRNO	SNAME	CREDIT	DEPT_NAME	BUILDING	ROOM_NO
1	Rahul	5	CSE	B1	101
2	Jitendra	8	CSE	B1	101
3	Jagdish	9	EE	B2	201
4	Payal	7	EE	B2	201
5	Ankur	9	CIVIL	B1	110
6	Akash	8	ECE	B1	115
7	Vansh	7	CIVIL	B1	110
8	Tanuj	6	CSE	B1	101

Solution

STUDENT

SRNO	SNAME	CREDIT	DEPT_NAME
1	Rahul	5	CSE
2	Jitendra	8	CSE
3	Jagdish	9	EE
4	Payal	7	EE
5	Ankur	9	CIVIL
6	Akash	8	ECE
7	Vansh	7	CIVIL
8	Tanuj	6	CSE

DEPARTMENT

DEPT_NAME	BUILDING	ROOM_NO
CSE	B4	301
EE	B2	201
CIVIL	B1	110
ECE	B1	115

Advantages of Normalization

Following are some of the advantages of normalization:

1.To reduce the redundancy from the table.

2. To save the memory space as data can be stored in compact form.

3. To remove Insert, Update and Delete anomalies.

4. Normalization minimizes the null values.

5. Using normalization, we can simple the queries.

6. It is important for OLTP (Online Transaction Processing). However De-normalization supports OLAP (Online Analytical Processing).

7. It simplifies the database structure.

8. Searching, sorting and creating indexes will be faster after applying the normalization.

References

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Thank
you