Anomalies in Database

Contents

- What is Anomaly?
- Types of Anomalies
- Disadvantages of Anomalies

Anomalies in Database

- Anomalies are problems that can occur in poorly planned, databases such as all data stored in one table. (Redundant Data)
- The general layman definition of an anomaly is something that you don't expect. For example if your blood pressure is normally 120/80 and you measure it one day and it is 190/140, that is an anomaly.
- Anomaly leads database to the **inconsistent state**.
- **Anomalies** are caused when there is too much redundancy in the **database's** information.
- Anomalies are caused due to inconsistent structure of tables and database.

Types of Anomalies

- Insertion Anomaly
- Deletion Anomaly
- Update Anomaly

Insertion Anomaly

- An **Insert Anomaly** occurs when certain attributes cannot be inserted into the database without the presence of other attributes.
- For example we can't add a new course unless we have at least one student enrolled on the course.

StudentNum	CourseNum	Student Name	Address	Course
S21	9201	Jones	Edinburgh	Accounts
S21	9267	Jones	Edinburgh	Accounts
S24	9267	Smith	Glasgow	physics
S30	9201	Richards	Manchester	Computing
S30	9322	Richards	Manchester	Maths

Deletion Anomaly

- A **Delete Anomaly** exists when certain attributes are lost because of the deletion of other attributes.
- For example, consider what happens if Student S30 is the last student to leave the course - All information about the course is lost.

StudentNum	CourseNum	Student Name	Address	Course
S21	9201	Jones	Edinburgh	Accounts
S21	9267	Jones	Edinburgh	Accounts
S24	9267	Smith	Glasgow	physics
S30	9201	Richards	Manchester	Computing
S30	9322	Richards	Manchester	Maths

Update Anomaly

- An **Update Anomaly** exists when one or more instances of duplicated data is updated, but not all.
- For example, consider Jones moving address - you need to update all instances of Jones's address.

StudentNum	CourseNum	Student Name	Address	Course
S21	9201	Jones	Edinburgh	Accounts
S21	9267	Jones	Edinburgh	Accounts
S24	9267	Smith	Glasgow	physics
S30	9201	Richards	Manchester	Computing
S30	9322	Richards	Manchester	Maths

What We Will See In Next Lecture!

- How to Reduce/Eradicate the Anomalies

- Normalization is a process of Reduction/Eradication of anomalies from the database.
- Normalization is a step by step process which converts inconsistent table to consistent table.

- Normalization has Normal Forms and Each Normal Form normalizes some type of Anomaly