

TOPS TECHNOLOGY

# Module 4 – Introduction to DBMS

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# SQL Triggers

## 1. What is a trigger in SQL? Describe its types and when they are used.

- A **trigger** in SQL is a set of instructions automatically executed in response to specific events (e.g., INSERT, UPDATE, or DELETE) on a table or view. Triggers help maintain data integrity, enforce business rules, and automate tasks.
- **Types of Triggers in SQL:**
- **Based on Timing:**
  - **BEFORE Trigger:** Executes before the triggering event.
    - *Used to validate or modify data before it is written to the database.*
  - **AFTER Trigger:** Executes after the triggering event.
    - *Used to log changes, enforce constraints, or trigger related actions.*

## ➤ Based on Event:

- **INSERT Trigger:** Executes when a new record is added to a table.
- *Example Use:* Automatically record the creation timestamp for new rows.
- **UPDATE Trigger:** Executes when an existing record is modified.
- *Example Use:* Maintain an audit trail of updates.
- **DELETE Trigger:** Executes when a record is deleted.
- *Example Use:* Archive deleted records into another table.

## ➤ Triggers Are Used:

- Enforcing business rules (e.g., preventing invalid data entries).
- Maintaining data consistency across related tables.
- Creating audit trails or logging changes for compliance purposes.
- Automatically generating derived values (e.g., updating summary tables).
- Sending notifications or initiating workflows after database changes.

## 2. Explain the difference between INSERT, UPDATE, and DELETE triggers.

Aspect	INSERT Trigger	UPDATE Trigger	DELETE Trigger
Purpose	Executes when a new row is added to a table.	Executes when an existing row is modified.	Executes when a row is removed from a table.
Timing	Can run <b>BEFORE</b> or <b>AFTER</b> an INSERT event.	Can run <b>BEFORE</b> or <b>AFTER</b> an UPDATE event.	Can run <b>BEFORE</b> or <b>AFTER</b> a DELETE event.
Trigger Context	Access new values using the NEW keyword.	Access both old (OLD) and new (NEW) values.	Access old values using the OLD keyword.
Use Cases	Automatically populate derived columns.	Enforce data integrity for updated records.	Archive deleted data into another table.