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**Assignment 5**

**Title** : Trigger

**Problem Statement** : Write and execute suitable database triggers. Consider row level and statement level triggers.

**Requirements** : Mysql

**Prerequisites** : DDL and DML commands

**Theory** : Trigger :-

**Definition** :

Triggers are database object. Basically, these are a special type of stored procedure that is automatically fired/executed when a DDL or DML command statement related to the trigger is executed. Triggers are used to assess/evaluate data before or after data modification using DDL and DML statements.

**Syntax** :

create trigger [trigger\_name] (before | after) {insert | update | delete}

on [table\_name] (for each row) [trigger\_body]

**Explanation of syntax:**

1. create trigger [trigger\_name]: Creates or replaces an existing trigger with the trigger\_name.
2. [before | after]: This specifies when the trigger will be executed. BEFORE triggers run the trigger action before the triggering statement is run.  
   AFTER triggers run the trigger action after the triggering statement is run.
3. {insert | update | delete}: This specifies the DML operation.
4. on [table\_name]: This specifies the name of the table associated with the trigger.
5. [for each row]: This specifies a row-level trigger, i.e., the trigger will be executed for each row being affected.
6. [trigger\_body]: This provides the operation to be performed as trigger is fired

**Types** :

#### [Data Manipulation Language (DML) Triggers](https://sqlhints.com/2016/03/09/data-manipulation-language-dml-triggers-in-sql-server/) : DML triggers are executed when a DML operation like INSERT, UPDATE OR DELETE is fired on a Table or View. DML Triggers are of the following two types - **1) AFTER Triggers** : AFTER Triggers are executed after the DML statement completes but before it is committed to the database. AFTER Triggers if required can rollback it’s actions and source DML statement which invoked it.

#### **2) INSTEAD OF Triggers :** INSTEAD OF Triggers are the triggers which gets executed automatically in place of triggering DML (i.e. INSERT, UPDATE and DELETE) action. It means if we are inserting a record and we have a INSTEAD OF trigger for INSERT then instead of INSERT whatever action is defined in the trigger that gets executed.

#### [Data Definition Language (DDL) Triggers](https://sqlhints.com/2016/03/09/data-definition-language-ddl-triggers-in-sql-server/) : DDL Triggers are executed when a DDL Statements like CREATE, ALTER, DROP, GRANT, DENY, REVOKE, and UPDATE STATISTICS statements are executed. Certain system stored procedures that perform DDL like operations can also fire DDL triggers.

DDL triggers can be DATABASE scoped or SERVER scoped. The DDL triggers with Server level scope gets fired in response to a DDL statement with server scope like CREATE DATABASE, CREATE LOGIN, GRANT\_SERVER, ALTER DATABASE, ALTER LOGIN etc.

* [**LOGON Triggers**](https://sqlhints.com/2016/03/09/logon-triggers-in-sql-server/) : Logon Triggers gets executed automatically in response to a LOGON event. They get executed only after the successful authentication but before the user session is established. If authentication fails the logon triggers will not be fired.

#### CLR Triggers : CLR Triggers are based on the Sql CLR. We can write DML and DDL triggers by using the Supported .NET CLR languages like C#, VB.NET etc. CLR triggers will useful if require heavy computation in the trigger or require reference to object outside SQL.

**Purpose** :

* A trigger is a block of PL/SQL code that is automatically invoked by the DBMS upon the occurrence of a data manipulation event (INSERT, UPDATE or DELETE.)
* The trigger is mostly used for maintaining the integrity of the information on the database.

**Conclusion** :

Thus, we have executed row level and statement level triggers.