



Triggers in MySQL (Validating Input Data)

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Outline

- **BEFORE Row_level Triggers**
- **Triggers for Validating Input Data**
- **Triggers for Enforcing Business Rules**



Why We Need Triggers in Database?

- We already mentioned following reasons as some of the main reasons for using triggers:
 - **Validating Input Data**
 - Keeping a Log of Records
 - **Enforce Business Rules**
- In the previous lecture, we explained After Row-Level triggers for keeping a log of records.
- This lecture's focus is on Before Row-Level triggers that are used for validating input data or enforcing business rules.

Types of Triggers

1. **Before Insert** : It is activated **before the insertion** of data into the table.
2. **After Insert** : It is activated **after the insertion** of data into the table.
3. **Before Update** : It is activated **before the update** of data in the table.
4. **After Update** : It is activated **after the update** of the data in the table.
5. **Before Delete** : It is activated **before the deletion** of data from the table.
6. **After Delete** : It is activated **after the deletion** of data from the table.

Syntax of Creating Row_Level Trigger in MySQL

```

DELIMITER //

CREATE TRIGGER trigger_name
(BEFORE | AFTER) (INSERT | UPDATE | DELETE) ON table_name
FOR EACH ROW
BEGIN
    <Trigger Statements>
END//  

DELIMITER ;

```

Validating Input Data Scenario

- We are going to create a trigger that is activated **before** inserting a row into the **product** table.
- The trigger is activated **before** a user inserted data into the **product** table and avoids entering negative value for **price** column.
- If a user wanted to insert data of a new product to the table while the **price** value is negative, the trigger doesn't allow this insertion and shows an error message to the user.

Product Table

PID	Pname	Price

ERROR: Price Can not be Negative!

- In case **price** value of the new product is not negative, the trigger lets the insertion happens.

insert into Product values (1, 'Tablet', - 200);



How to Return Error Message to User?

- By using **SIGNAL** Statement:
 - **SIGNAL** statement is a way to “return” an error.
 - **SIGNAL** provides error information to the client.
- Syntax of **SIGNAL** Statement:
SIGNAL SQLSTATE sqlstate_value **SET** Error_Message;
- To signal a generic **SQLSTATE** value, use '**45000**', which means “unhandled user-defined exception.”

Creating Validate_Price Trigger on Product Table

```
delimiter //
CREATE TRIGGER validate_price
BEFORE INSERT ON product
FOR EACH ROW
BEGIN
    IF NEW.price < 0 THEN
        SIGNAL SQLSTATE '45000' SET MESSAGE_TEXT = 'Price cannot be negative';
    END IF;
END//
delimiter ;
```

Enforcing Business Rules Scenario

- Suppose that a business has a limitation on employees' salaries as follows:

Limitation for Salary: $0 \leq \text{Salary} \leq 5000$

- Define a trigger that is activated before any update is going to happen on the **Employee** table.
- The trigger considers the above limitation for salary. So, if the updated salary becomes more than \$5000, it automatically sets to the maximum amount of salary (\$5000), and if the updated salary becomes less than \$0, it sets to \$0.

Enforcing Business Rules Scenario

Limitation for Salary: $0 \leq \text{Salary} \leq 5000$

- For example, when the following update statement is executed, before it affects the **Employee** table, the trigger is executed to check the rule of salary amount ($0 \leq \text{Salary} \leq 5000$).
- The current salary for "Peter" is \$900, and after updating his salary, it becomes $\$900 * 5 = \4500 , which is in allowed range of salary.
- The current salary for "Sandy" is \$1300, and after updating his salary, it becomes $\$1300 * 5 = \6500 , which is NOT in allowed range of salary. So, the trigger automatically sets his salary to \$5000, instead of \$6500.

Employee Table

ID	name	salary
1	Peter	900
2	Sandy	1300

UPDATE Employee
SET salary = salary * 5 ;

ID	name	salary
1	Peter	4500
2	Sandy	5000

Creating Validate_Salary Trigger

```

delimiter //
CREATE TRIGGER validate_salary
BEFORE UPDATE ON employee
FOR EACH ROW
BEGIN
    IF NEW.salary > 5000 Then SET NEW.salary=5000;
    ELSEIF NEW.salary < 0 Then SET NEW.salary = 0;
    END IF;
END///
delimiter ;

```

Enforcing Business Rules Scenario

- For the previous scenario, define a trigger that is activated before any update is going to happen on the **Employee** table.

Limitation for Salary: 0 <= Salary <= 5000

- This trigger considers the above limitation for salary, but if the updated salary becomes more than \$5000 or less than \$0, the trigger sends an error message to the user and doesn't allow the updating statement to be executed.

Employee Table

ID	name	salary
1	Peter	900
2	Sandy	1300

UPDATE Employee
SET salary = salary * 5 ;

ERROR: Update is against the rules.

ID	name	salary
1	Peter	4500
2	Sandy	1300

Creating Validate_Salary_V2 Trigger

```
delimiter //
CREATE TRIGGER validate_salary_v2
BEFORE UPDATE ON employee
FOR EACH ROW
BEGIN
    IF NEW.salary > 5000 OR New.salary < 0 THEN
        SIGNAL SQLSTATE '45000' SET message_text='Update is against the rules!';
    END IF;
END//
```

delimiter ;