Functions in MySQL

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What is a MySQL Function?

- ➔ A function is a stored program that returns a single value.
- ➔ Can be used in SELECT, WHERE, SET clauses.
- ➔ Similar to procedures but return values.
- ➔ Called inside SQL expressions.
- ➔ Q1: What is the main difference between a function and a procedure in MySQL?

Answer

A function must return a value and can be used in expressions, unlike procedures.

Syntax of a Function

```
DELIMITER $$
CREATE FUNCTION name(params)
RETURNS datatype DETERMINISTIC
BEGIN
  RETURN value;
END $$
DELIMITER ;
```

Q3: Why is DETERMINISTIC used in function definitions?

Answer

A: It tells MySQL the function always returns the same result for the same input.

Simple Function – Add Two Numbers

```
DELIMITER $$
CREATE FUNCTION AddNumbers(a INT, b INT)
RETURNS INT DETERMINISTIC
BEGIN
  RETURN a + b;
END $$
DELIMITER ;
SELECT AddNumbers(10, 20);
```

Q4: What will happen if we call AddNumbers(10, NULL)?

Answer

A: It will return NULL, because any arithmetic with NULL gives NULL.

Why Use Functions?

- ➔ Encapsulate reusable logic that returns a value.
- ➔ Used in queries.
- ➔ Improves code modularity and readability.
- ➔ Q2: Can a function perform multiple SELECT queries like a procedure?

Answer：No, it cannot.

- ➔ Why?
  - MySQL functions are designed to return a single value.
  - They are used within SQL expressions, so:
    - Must not produce multiple result sets.
    - Cannot include statements that modify data (like INSERT, UPDATE, DELETE).
    - Should be deterministic.
- ➔ Allowed in Functions:

```
DECLARE total INT;
SELECT COUNT(*) INTO total FROM employees;
RETURN total;
```

- ➔ Not Allowed in Functions:

```
SELECT * FROM employees;   -- This will cause an error
```

Important Points

Functions -

- ★ Must not produce multiple result sets.
- ★ Cannot include statements that modify data (like INSERT, UPDATE, DELETE).
- ★ Should be deterministic.

Use Cases

- ➔ Calculations (e.g., tax, discounts)
- ➔ String manipulation
- ➔ Date formatting
- ➔ Input validations

Function with String Manipulation

```
DELIMITER $$
CREATE FUNCTION Greet(name VARCHAR(50))
RETURNS VARCHAR(100) DETERMINISTIC
BEGIN
  RETURN CONCAT('Hello, ', name);
END $$
DELIMITER ;
SELECT Greet('Amit');
```

Q5: Can we use this function inside a WHERE clause?

Answer

A: Yes. Functions can be used in WHERE, SELECT, and ORDER BY clauses.

Function to Calculate Square

```
DELIMITER $$
CREATE FUNCTION Square(x INT)
RETURNS INT DETERMINISTIC
BEGIN
  RETURN x * x;
END $$
DELIMITER ;
SELECT Square(7);
```

Q6: Is it allowed to call a function from another function?

Answer

A: Yes, as long as it doesn't cause recursion or infinite loops.

Function for Date Calculation

```
DELIMITER $$
CREATE FUNCTION YearsBetween(startDate DATE, endDate DATE)
RETURNS INT DETERMINISTIC
BEGIN
  RETURN YEAR(endDate) - YEAR(startDate);
END $$
DELIMITER ;
SELECT YearsBetween('2010-01-01', '2024-01-01');
```

Summary

- ➔ Functions return a single value.
- ➔ Cannot modify data (no INSERT/UPDATE).
- ➔ Useful in SELECT, WHERE, and expressions.
- ➔ Must always include RETURN statement.

Practice Challenges

1. Function to return area of circle (input radius).
2. Function to return reverse of a string.
3. Function to check if number is even or odd.
4. Function to return factorial of a number.