

## Pre-Joining Topics

### Week 2: MYSQL ADVANCED

#### Explain Keyword

The `EXPLAIN` keyword in MySQL is used to obtain information about how a `SELECT`, `INSERT`, `UPDATE`, or `DELETE` statement is executed. It provides insights into the query execution plan, helping developers optimize database queries.

##### Usage

The `EXPLAIN` keyword is primarily used to diagnose and optimize SQL queries by showing details like table scans and index usage. It is placed before a query to reveal the execution strategy MySQL will use.

```
EXPLAIN SELECT column1, column2, ...
```

```
FROM table_name
```

```
[WHERE condition];
```

##### Examples

###### 1. Basic EXPLAIN on a SELECT Query

```
EXPLAIN SELECT * FROM orders;
```

This example provides execution details, such as the type of join or index usage, for retrieving all columns from the `orders` table.

###### 2. EXPLAIN with WHERE Clause

```
EXPLAIN SELECT first_name FROM employees WHERE department_id = 5;
```

Here, `EXPLAIN` helps identify how the query performance is influenced by the `WHERE` clause, such as index utilization for filtering.

###### 3. EXPLAIN with JOIN

```
EXPLAIN SELECT o.order_id, c.customer_name
```

```
FROM orders o
```

```
JOIN customers c ON o.customer_id = c.customer_id
```

```
WHERE c.city = 'New York';
```

This example analyzes a `JOIN` operation, providing insights into how tables are linked and filtered by the `WHERE` condition.

#### 4. EXPLAIN with INSERT, UPDATE, or DELETE

For non-`SELECT` statements, use `EXPLAIN FORMAT=JSON` for detailed insights:

```
EXPLAIN FORMAT=JSON INSERT INTO archive SELECT * FROM orders WHERE order_date < '2025-01-01';
```

```
EXPLAIN FORMAT=JSON UPDATE employees SET salary = salary * 1.1 WHERE department_id = 5;
```

```
EXPLAIN FORMAT=JSON DELETE FROM orders WHERE status = 'canceled';
```

#### Common EXPLAIN Output Columns

- **id**: The identifier of the SELECT within a query.
- **select\_type**: The type of SELECT, such as SIMPLE or PRIMARY.
- **table**: The name of the table to which the row of output refers.
- **type**: The join type.
- **possible\_keys**: The possible indexes MySQL can choose from.
- **key**: The actual index MySQL decided to use.
- **key\_len**: The length of the key used.
- **ref**: The columns or constants compared to the index.
- **rows**: The estimate of rows examined.
- **Extra**: Additional information.