EXPLAIN

This lesson demonstrates the usage of the EXPLAIN statement.

We'll cover the following

- Syntax

EXPLAIN

In this lesson, we'll make a brief introduction to the **EXPLAIN** statement. The **EXPLAIN** statement is sort of a dry-run of your query or the blueprint/plan of how the server plans to execute your query. Generally, when complicated queries exhibit performance degradation, we can use the **EXPLAIN** statement to seek and identify bottlenecks. This lesson is not a comprehensive treatment of query optimization, rather just a light and general introduction to a vast subject.

Note that **EXPLAIN** and **DESCRIBE** are synonyms, however, as a convention **EXPLAIN** is used with queries whereas **DESCRIBE** is with structures.

Syntax

> EXPLAIN <**SQL Statement**>;

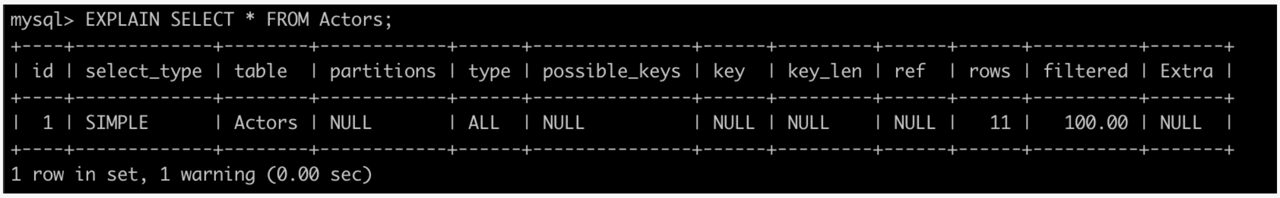
> Connect to the terminal below by clicking in the widget. Once connected, the command line prompt will show up. Enter or copy and paste the command **./DataJek/Lessons/40lesson.sh** and wait for the MySQL prompt to start-up.

```
-- The lesson queries are reproduced below for convenient copy/paste into the terminal.

-- Query 1
EXPLAIN SELECT * FROM Actors;

-- Query 2
DESCRIBE SELECT Id FROM Actors;

-- Query 3
EXPLAIN
SELECT *
FROM Actors INNER JOIN DigitalAssets
ON Id = ActorId;
```

Terminal

1. Let's see what the server output does when EXPLAIN is used with a simple select-all statement as follows:

```
EXPLAIN SELECT * FROM Actors;
```



```
mysql> EXPLAIN SELECT * FROM Actors;
+----+-------------+--------+------------+------+---------------+------+---------+------+------+----------+-------+
| id | select_type | table  | partitions | type | possible_keys | key  | key_len | ref  | rows | filtered | Extra |
+----+-------------+--------+------------+------+---------------+------+---------+------+------+----------+-------+
|  1 | SIMPLE      | Actors | NULL       | ALL  | NULL          | NULL | NULL    | NULL |   11 |   100.00 | NULL  |
+----+-------------+--------+------------+------+---------------+------+---------+------+------+----------+-------+
1 row in set, 1 warning (0.00 sec)
```

The output is a table with different columns. Let's see what each column means:

Column	Description
id	This is the sequential number of the **SELECT** within the query.
select_type	This is the type of select. For instance, it can be listed as SIMPLE if it doesn't involve any queries. It can be PRIMARY if it's the outermost select. There are

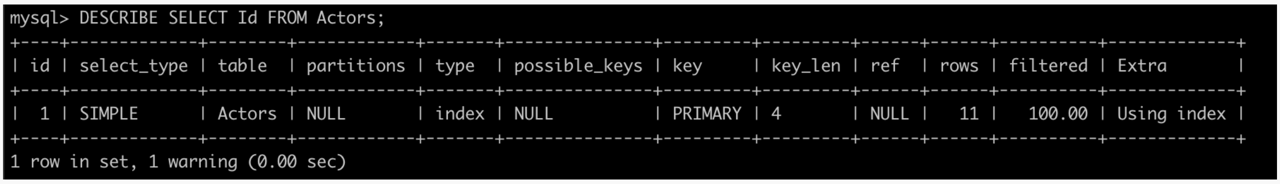
	also other values. For a complete list see this.
table	The name of the table, the rows come from. The value can also be derived if the table comes from a sub-query in the **FROM** clause.
partitions	The partitions from which records would be matched by the query. We don't discuss partitioned tables in this course and this value will always be NULL for our queries.
type	The type of join.
possible_keys	This is one of the most useful pieces of information. It indicates the indexes from which MySQL can choose to find the rows in this table. If it is NULL, it implies there are no relevant indexes. It also presents an opportunity to add an index based on the columns used in the **WHERE** clause on a slow-running query to improve execution time.
key	The key column indicates the key (index) that MySQL actually

	(index) that MySQL actually decided to use. If MySQL decides to use one of the possible_keys indexes to lookup rows, that index is listed as the key-value
key_len	The key_len column indicates the length of the key that MySQL decided to use.
ref	The ref column shows which columns or constants are compared to the index named in the key column to select rows from the table.
rows	Refers to the number of rows MySQL believes it must examine to execute the query.
filtered	The filtered column indicates an estimated percentage of table rows that will be filtered by the table condition. The maximum value is 100, which means no filtering of rows occurred.
Extra	This column contains additional information about how MySQL resolves the query.

Now we can discuss the output of the **EXPLAIN** statement. The select_type is SIMPLE and no index is used in resolving the query. Furthermore, since MySQL estimates it will need to scan all eleven rows and none of the rows will be filtered.

2. Now we'll slightly tweak our query and select the ID column, which is also the primary key of the **Actors** table.

```
DESCRIBE SELECT Id FROM Actors;
```

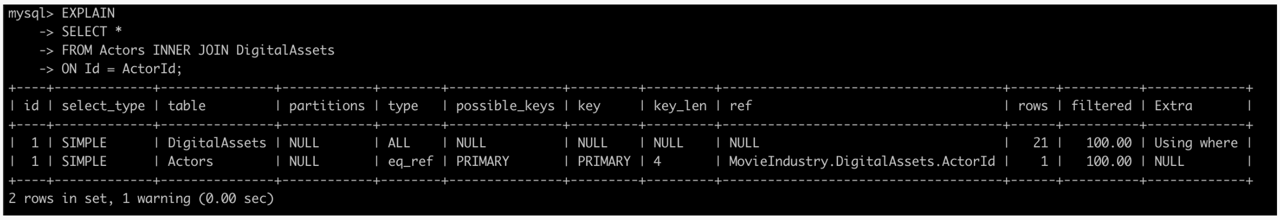


```
mysql> DESCRIBE SELECT Id FROM Actors;
+----+-------------+--------+------------+-------+---------------+---------+---------+------+------+----------+-------------+
| id | select_type | table  | partitions | type  | possible_keys | key     | key_len | ref  | rows | filtered | Extra       |
+----+-------------+--------+------------+-------+---------------+---------+---------+------+------+----------+-------------+
|  1 | SIMPLE      | Actors | NULL       | index | NULL          | PRIMARY | 4       | NULL |   11 |   100.00 | Using index |
+----+-------------+--------+------------+-------+---------------+---------+---------+------+------+----------+-------------+
1 row in set, 1 warning (0.00 sec)
```

Now MySQL says it will use the primary key to resolve the query. Also note we have used DESCRIBE instead of EXPLAIN.

3. Here's another example of an inner join between the **DigitalAssets** and **Actors** tables.

```
EXPLAIN
SELECT *
FROM Actors INNER JOIN DigitalAssets
ON Id = ActorId;
```



```
mysql> EXPLAIN
    -> SELECT *
    -> FROM Actors INNER JOIN DigitalAssets
    -> ON Id = ActorId;
+----+-------------+---------------+------------+--------+---------------+---------+---------+-------------------------------------+------+----------+-------------+
| id | select_type | table         | partitions | type   | possible_keys | key     | key_len | ref                                 | rows | filtered | Extra       |
+----+-------------+---------------+------------+--------+---------------+---------+---------+-------------------------------------+------+----------+-------------+
|  1 | SIMPLE      | DigitalAssets | NULL       | ALL    | NULL          | NULL    | NULL    | NULL                                |   21 |   100.00 | Using where |
|  1 | SIMPLE      | Actors        | NULL       | eq_ref | PRIMARY       | PRIMARY | 4       | MovieIndustry.DigitalAssets.ActorId |    1 |   100.00 | NULL        |
+----+-------------+---------------+------------+--------+---------------+---------+---------+-------------------------------------+------+----------+-------------+
2 rows in set, 1 warning (0.00 sec)
```