

```
USE imdb;
SHOW TABLES;
DESCRIBE movies;
```

\*\*\*\*\*

```
SELECT * FROM movies;
# more data transfer
```

#result-set: a set of rows that form the result of a query along with column-names and meta-data.

```
SELECT name,year FROM movies;
```

```
SELECT rankscore,name FROM movies;
#row order same as the one in the table
```

\*\*\*\*\*

LIMIT:

```
SELECT name,rankscore FROM movies LIMIT 20;
```

```
SELECT name,rankscore FROM movies LIMIT 20 OFFSET 40;
```

\*\*\*\*\*

ORDER BY:

```
# list recent movies first
```

```
SELECT name,rankscore,year FROM movies ORDER BY year DESC LIMIT 10;
```

```
# default:ASC
```

```
SELECT name,rankscore,year FROM movies ORDER BY year LIMIT 10;
```

# the output row order maynot be same as the one in the table due to query optimzier and internal data-structres/indices.

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DISTINCT:

```
# list all genres of
SELECT DISTINCT genre FROM movies_genres;
```

```
# multiple-column DISTINCT
SELECT DISTINCT first_name, last_name FROM directors;
```

\*\*\*\*\*

WHERE:

```
# list all movies with rankscore>9
SELECT name,year,rankscore FROM movies WHERE rankscore>9 ;
```

```
SELECT name,year,rankscore FROM movies WHERE rankscore>9 ORDER BY rankscore
DESC LIMIT 20;
```

# Condition's outputs: TRUE, FALSE, NULL

```
# Comparison Operators: = , <> or != , < , <= , > , >=
SELECT * FROM movies_genres WHERE genre = 'Comedy';
```

```
SELECT * FROM movies_genres WHERE genre <> 'Horror';
```

NULL => doesnot-exist/unknown/missing

```
# "=" doesnot work with NULL, will give you an empty result-set.
SELECT name,year,rankscore FROM movies WHERE rankscore = NULL;
```

```
SELECT name,year,rankscore FROM movies WHERE rankscore IS NULL LIMIT 20;
```

```
SELECT name,year,rankscore FROM movies WHERE rankscore IS NOT NULL LIMIT 20;
```

\*\*\*\*\*

# LOGICAL OPERATORS: AND, OR, NOT, ALL, ANY, BETWEEN, EXISTS, IN, LIKE, SOME

# website search filters

```
SELECT name,year,rankscore FROM movies WHERE rankscore>9 AND year>2000;
```

```
SELECT name,year,rankscore FROM movies WHERE NOT year<=2000 LIMIT 20;
```

```
SELECT name,year,rankscore FROM movies WHERE rankscore>9 OR year>2007;
```

# will discuss about ANY and ALL when we discuss sub-queries

```
SELECT name,year,rankscore FROM movies WHERE year BETWEEN 1999 AND 2000;  
#inclusive: year>=1999 and year<=2000
```

```
SELECT name,year,rankscore FROM movies WHERE year BETWEEN 2000 AND 1999;  
#lowvalue <= highvalue else you will get an empty result set
```

```
SELECT director_id, genre FROM directors_genres WHERE genre IN ('Comedy','Horror');  
# same as genre='Comedy' OR genre='Horror'
```

```
SELECT name,year,rankscore FROM movies WHERE name LIKE 'Tis%';  
# % => wildcard character to imply zero or more characters
```

```
SELECT first_name, last_name FROM actors WHERE first_name LIKE '%es';  
# first name ending in 'es'
```

```
SELECT first_name, last_name FROM actors WHERE first_name LIKE '%es%';  
#first name contains 'es'
```

```
SELECT first_name, last_name FROM actors WHERE first_name LIKE 'Agn_s';  
# '_' implies exactly one character.
```

# If we want to match % or \_, we should use the backslash as the escape character: \% and \\_

```
SELECT first_name, last_name FROM actors WHERE first_name LIKE 'L%' AND first_name NOT LIKE 'Li%';
```

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Aggregate functions: Computes a single value on a set of rows and returns the aggregate

COUNT, MIN, MAX, SUM, AVG

```
SELECT MIN(year) FROM movies;
```

```
SELECT MAX(year) FROM movies;
```

```
SELECT COUNT(*) FROM movies;
```

```
SELECT COUNT(*) FROM movies where year>2000;
```

```
SELECT COUNT(year) FROM movies;
```

\*\*\*\*\*

GROUP-BY

# find number of movies released per year

```
SELECT year, COUNT(year) FROM movies GROUP BY year;
```

```
SELECT year, COUNT(year) FROM movies GROUP BY year ORDER BY year;
```

```
SELECT year, COUNT(year) year_count FROM movies GROUP BY year ORDER BY
year_count;
# year_count is an alias.
```

# often used with COUNT, MIN, MAX or SUM.

# if grouping columns contain NULL values, all null values are grouped together.

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HAVING:

# Print years which have >1000 movies in our DB [Data Scientist for Analysis]

```
SELECT year, COUNT(year) year_count FROM movies GROUP BY year HAVING
year_count>1000;
# specify a condition on groups using HAVING.
```

Order of execution:

1. GROUP BY to create groups
2. apply the AGGREGATE FUNCTION
3. Apply HAVING condition.

# often used along with GROUP BY. Not Mandatory.

```
SELECT name, year FROM movies HAVING year>2000;
# HAVING without GROUP BY is same as WHERE
```

```
SELECT year, COUNT(year) year_count FROM movies WHERE rankscore>9 GROUP BY year
HAVING year_count>20;
```

# HAVING vs WHERE

## WHERE is applied on individual rows while HAVING is applied on groups.

## HAVING is applied after grouping while WHERE is used before grouping.

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JOINS:

#combine data in multiple tables

# For each movie, print name and the genres

```
SELECT m.name, g.genre from movies m JOIN movies_genres g ON m.id=g.movie_id LIMIT 20;
```

# table aliases: m and g

# natural join: a join where we have the same column-names across two tables.

#T1: C1, C2

#T2: C1, C3, C4

```
SELECT * FROM T1 JOIN T2;
```

```
SELECT * FROM T1 JOIN T2 USING (C1);
```

# returns C1,C2,C3,C4

# no need to use the keyword "ON"

# Inner join (default) vs left outer vs right outer vs full-outer join.

T1: C1, C2, C3

```
SELECT m.name, g.genre from movies m LEFT JOIN movies_genres g ON m.id=g.movie_id LIMIT 20;
```

#LEFT JOIN or LEFT OUTER JOIN

#RIGHT JOIN or RIGHT OUTER JOIN

#FULL JOIN or FULL OUTER JOIN

#JOIN or INNER JOIN

# NULL for missing counterpart rows.

# 3-way joins and k-way joins

```
SELECT a.first_name, a.last_name FROM actors a JOIN roles r ON a.id=r.actor_id JOIN movies m on m.id=r.movie_id AND m.name='Officer 444';
```

#Practical note about joins: Joins can be expensive computationally when we have large tables.

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Sub-Queries or Nested Queries or Inner Queries

# List all actors in the movie Schindler's List

#[https://www.imdb.com/title/tt0108052/fullcredits/?ref\\_=tt\\_ov\\_st\\_sm](https://www.imdb.com/title/tt0108052/fullcredits/?ref_=tt_ov_st_sm)

```
SELECT first_name, last_name from actors WHERE id IN
      ( SELECT actor_id from roles WHERE movie_id IN
            (SELECT id FROM movies where name='Schindler's List')
      );
```

# Syntax:

```
SELECT column_name [, column_name ]
FROM   table1 [, table2 ]
WHERE  column_name OPERATOR
      (SELECT column_name [, column_name ]
      FROM table1 [, table2 ]
      [WHERE])
```

# first the inner query is executed and then the outer query is executed using the output values in the inner query

# IN, NOT IN, EXISTS, NOT EXISTS, ANY, ALL, Comparison operators

#EXISTS returns true if the subquery returns one or more records or NULL

# ANY operator returns TRUE if any of the subquery values meet the condition.

# ALL operator returns TRUE if all of the subquery values meet the condition.

```
SELECT * FROM movies where rankscore >= ALL (SELECT MAX(rankscore) from movies);
```

# get all movies whose rankscore is same as the maximum rankscore.

# e.g: rankscore <> ALL(...)

# [https://en.wikipedia.org/wiki/Correlated\\_subquery](https://en.wikipedia.org/wiki/Correlated_subquery)

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Data Manipulation Language: SELECT, INSERT, UPDATE, DELETE

INSERT INTO movies(id, name, year, rankscore) VALUES (412321, 'Thor', 2011, 7);

INSERT INTO movies(id, name, year, rankscore) VALUES (412321, 'Thor', 2011, 7), (412322, 'Iron Man', 2008, 7.9), (412323, 'Iron Man 2', 2010, 7);

# INSERT FROM one table to another using nested sub query:

[https://en.wikipedia.org/wiki/Insert\\_\(SQL\)#Copying\\_rows\\_from\\_other\\_tables](https://en.wikipedia.org/wiki/Insert_(SQL)#Copying_rows_from_other_tables)

\*\*\*\*\*

# UPDATE Command

UPDATE <TableName> SET col1=val1, col2=val2 WHERE condition

UPDATE movies SET rankscore=9 where id=412321;

# Update multiple rows also.

# Can be used along with Sub-queries.

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#DELETE

DELETE FROM movies WHERE id=412321;

# Remove all rows: TRUNCATE TABLE TableName;

# Same as delete without a WHERE Clause.

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Data Definition Language

CREATE TABLE language ( id INT PRIMARY, lang VARCHAR(50) NOT NULL);

# Datatypes: <https://www.journaldev.com/16774/sql-data-types>

# Constraints: [https://www.w3schools.com/sql/sql\\_constraints.asp](https://www.w3schools.com/sql/sql_constraints.asp)



NOT NULL - Ensures that a column cannot have a NULL value  
UNIQUE - Ensures that all values in a column are different  
PRIMARY KEY - A combination of a NOT NULL and UNIQUE. Uniquely identifies each row in a table  
FOREIGN KEY - Uniquely identifies a row/record in another table  
CHECK - Ensures that all values in a column satisfies a specific condition  
DEFAULT - Sets a default value for a column when no value is specified  
INDEX - Used to create and retrieve data from the database very quickly

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ALTER: ADD, MODIFY, DROP

ALTER TABLE language ADD country VARCHAR(50);

ALTER TABLE language MODIFY country VARCHAR(60);

ALTER TABLE language DROP country;

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# Removes both the table and all of the data permanently.  
DROP TABLE TableName;

DROP TABLE TableName IF EXISTS;

#<https://dev.mysql.com/doc/refman/8.0/en/drop-table.html>

TRUNCATE TABLE TableName;

# as discussed earlier same as DELETE FROM TableName;

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Data Control Language for DB Admins.

[https://en.wikipedia.org/wiki/Data\\_control\\_language](https://en.wikipedia.org/wiki/Data_control_language)  
<https://dev.mysql.com/doc/refman/8.0/en/grant.html>

<https://dev.mysql.com/doc/refman/8.0/en/revoke.html>

