

Database

Structured Collection of data that is organized and stored for efficient retrieval and manipulation.

Can store various type of data, such as text, numbers, images and more.

Provide a way to store and manage large volumes of data in a consistent and structured manner.

Database Management System (DBMS)

Software system that facilitates the creation, manipulation, and management of database.

Act as an interface between users or application and the physical database.

Types of DBMS

1. Relational DBMS: Data stored in tabular forms linked with some relationships

Example: - MYSQL, SQL Server, Oracle

2. Non-relational DBMS: Doesn't have any table or relationship.

Example: - NoSQL

MYSQL

Open-source RDBMS

Widely used for storing, manipulating and retrieving data

SQL DATATYPES

Provides a variety of datatypes that allows you to specify the type of data that can be stored in each column of a database table.

Eg:- Numeric Type

- int or integer (-2,0,55)
- SMALLINT
- BIGINT
- FLOAT
- DOUBLE or REAL
- DECIMAL or NUMERIC

Character String Types

- CHAR
- VARCHAR

Binary String Types

- BINARY
- VARBINARY
- BLOB

Boolean Types

- Returns True or False

Date and Time

- DATE: Date values (Example:- '2002'-05-11')
- TIME: Time values (Example: - '16:20:00')
- DATETIME or TIMESTAMP: Date and time Values (Example: - '2002'-05-11 16:20:00)

SQL COMMANDS

1. Create and Use Databases

- `CREATE DATABASE database_name`: creates a new database with the specified name.
- `USE database_name`: selects the database you just created, so you can start working with it.



Error Code: 1064

Error 1064 in SQL is a syntax error, which means MySQL (or whatever SQL engine you're using) didn't understand your query because something is written incorrectly.

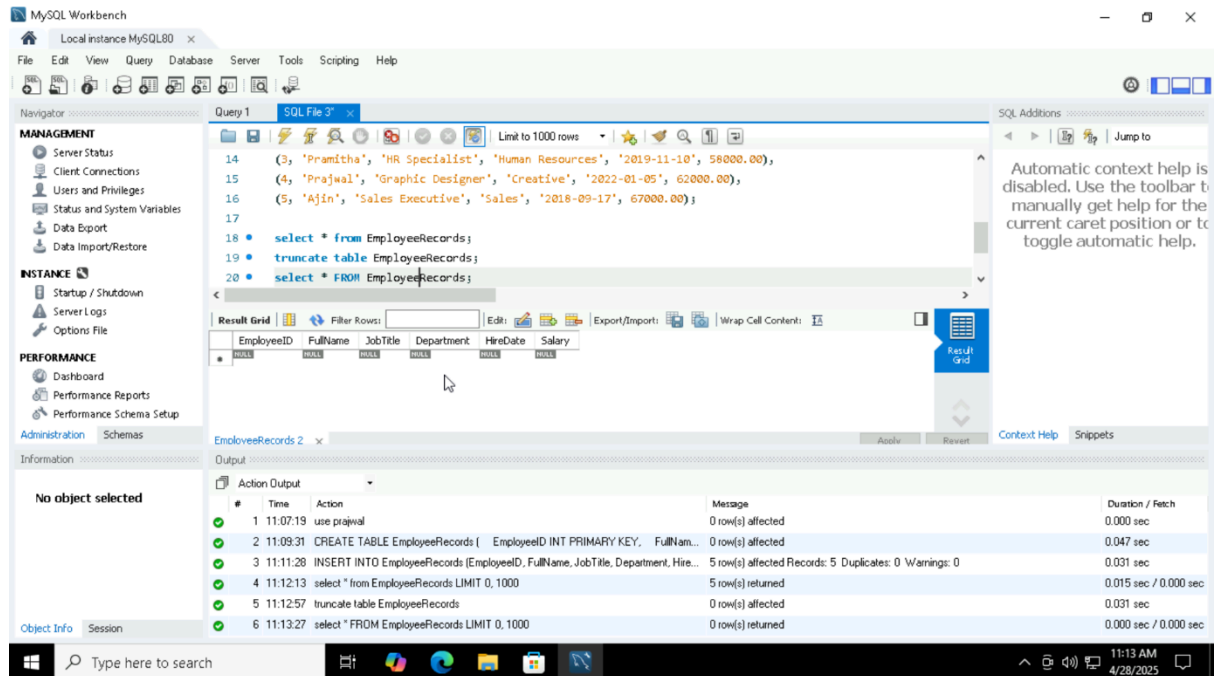
Here word sql is identifier and cannot be used.

Troubleshoot-Create database with non-identifier.

2. Truncate

Truncate deletes table data without deleting the schema.

Here the truncate is performed with the following data in the Table Records.

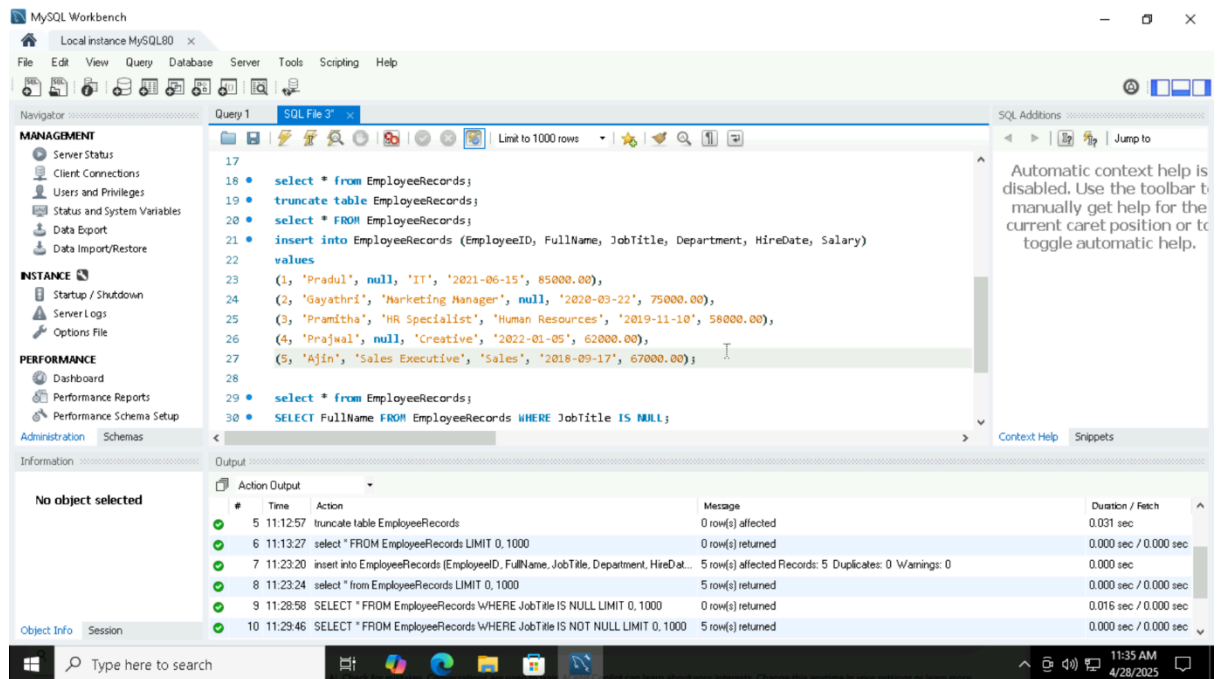


3. Null

Null means no value or unknown values , it is not same as 0 or empty string .

Null means the field has nothing in it.

Here we inserted the null values in table and the table is executed with the null value in the table.



4. Auto Increment

auto increment: The `AUTO_INCREMENT` attribute in SQL is used to automatically generate a unique value for a column in a table.

It's commonly applied to primary key columns so that each new row gets a unique identifier without manually specifying it.

```
46
47 • create table EMPLOYEE (E_Id int AUTO_INCREMENT primary key , E_name varchar(20) not null,
48   E_Designation varchar(30) not null);
49
50 • drop table employee ;
51
52
53
54
55
56
57
58
59
60
```

Output

Action Output

#	Time	Action	Message
✓ 19	11:30:28	drop table employee	0 row(s) affected
✓ 20	11:30:52	create table EMPLOYEE (E_Id int AUTO_INCREMENT primary key , E_name varc...	0 row(s) affected
✓ 21	11:31:32	drop table employee	0 row(s) affected

5. Min and Max

Min() is used to get smallest value.

Max() is to get the largest record or the highest value.

MySQL Workbench

Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator

MANAGEMENT

- Server Status
- Client Connections
- Users and Privileges
- Status and System Variables
- Data Export
- Data Import/Restore

INSTANCE

- Startup / Shutdown
- Server Logs
- Options File

PERFORMANCE

- Dashboard
- Performance Reports
- Performance Schema Setup

Administration Schemas

Information

No object selected

Query 1 SQL File 3

```

26 (4, 'Prajwal', null, 'Creative', '2022-01-05', 62000.00);
27 (5, 'Ajin', 'Sales Executive', 'Sales', '2018-09-17', 67000.00);
28
29 select * from EmployeeRecords;
30 SELECT FullName FROM EmployeeRecords WHERE JobTitle IS NULL;
31 SELECT MIN(Salary) AS LowestSalary
32 FROM EmployeeRecords;

```

Result Grid

LowestSalary
58000.00

Output

Action Output

#	Time	Action	Message	Duration / Fetch
9	11:28:58	SELECT * FROM EmployeeRecords WHERE JobTitle IS NULL LIMIT 0, 1000	0 row(s) returned	0.016 sec / 0.000 sec
10	11:29:46	SELECT * FROM EmployeeRecords WHERE JobTitle IS NOT NULL LIMIT 0, 1000	5 row(s) returned	0.000 sec / 0.000 sec
11	11:30:21	SELECT FullName FROM EmployeeRecords WHERE JobTitle IS NOT NULL LIMIT 0, 1000	5 row(s) returned	0.000 sec / 0.000 sec
12	11:31:33	SELECT FullName FROM EmployeeRecords WHERE JobTitle IS NULL LIMIT 0, 1000	0 row(s) returned	0.000 sec / 0.000 sec
13	11:33:55	insert into EmployeeRecords (EmployeeID, FullName, JobTitle, Department, HireDate)	Error Code: 1062. Duplicate entry '1' for key 'employeerecords.PRIMARY'	0.000 sec
14	11:41:40	SELECT MIN(Salary) AS LowestSalary FROM EmployeeRecords LIMIT 0, 1000	1 row(s) returned	0.015 sec / 0.000 sec

Object Info Session

Type here to search

11:41 AM 4/28/2025

MySQL Workbench

Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator

MANAGEMENT

- Server Status
- Client Connections
- Users and Privileges
- Status and System Variables
- Data Export
- Data Import/Restore

INSTANCE

- Startup / Shutdown
- Server Logs
- Options File

PERFORMANCE

- Dashboard
- Performance Reports
- Performance Schema Setup

Administration Schemas

Information

No object selected

Query 1 SQL File 3

```

29 select * from EmployeeRecords;
30 SELECT FullName FROM EmployeeRecords WHERE JobTitle IS NULL;
31 SELECT MIN(Salary) AS LowestSalary
32 FROM EmployeeRecords;
33 SELECT MIN(Salary) AS LowestSalary
34 FROM EmployeeRecords;
35 SELECT MAX(Salary) AS HighestSalary

```

Result Grid

HighestSalary
85000.00

Output

Action Output

#	Time	Action	Message	Duration / Fetch
11	11:30:21	SELECT FullName FROM EmployeeRecords WHERE JobTitle IS NOT NULL LIMIT 0, 1000	5 row(s) returned	0.000 sec / 0.000 sec
12	11:31:33	SELECT FullName FROM EmployeeRecords WHERE JobTitle IS NULL LIMIT 0, 1000	0 row(s) returned	0.000 sec / 0.000 sec
13	11:33:55	insert into EmployeeRecords (EmployeeID, FullName, JobTitle, Department, HireDate)	Error Code: 1062. Duplicate entry '1' for key 'employeerecords.PRIMARY'	0.000 sec
14	11:41:40	SELECT MIN(Salary) AS LowestSalary FROM EmployeeRecords LIMIT 0, 1000	1 row(s) returned	0.015 sec / 0.000 sec
15	11:42:22	SELECT MIN(Salary) AS LowestSalary FROM EmployeeRecords LIMIT 0, 1000	1 row(s) returned	0.000 sec / 0.000 sec
16	11:42:48	SELECT MAX(Salary) AS HighestSalary FROM EmployeeRecords LIMIT 0, 1000	1 row(s) returned	0.000 sec / 0.000 sec

Object Info Session

Type here to search

11:42 AM 4/28/2025

6. Where, Or, And

WHERE: Used to specify a condition in a query.

OR: Used to specify multiple conditions where at least one must be true.

AND: Used to specify multiple conditions where all must be true.

The screenshot displays a database management interface with two main sections. The top section shows a SQL query in the editor: `SELECT E_Id , E_name ,E_Designation From Employee WHERE E_Designation = 'Developer' or E_Designation = 'HR'`. Below the query, the 'Result Grid' shows the following data:

E_Id	E_name	E_Designation
112	ERIN	Developer
114	GEORGE	Developer
115	WILLIAM	HR
NULL	NULL	NULL

The bottom section shows a SQL query in the editor: `insert into EMPLOYEE (E_Id , E_name ,E_Designation) values (113 , 'INNA', 'Tester');`, `insert into EMPLOYEE (E_Id , E_name ,E_Designation) values (114 , 'GEORGE', 'Developer');`, `insert into EMPLOYEE (E_Id , E_name ,E_Designation) values (115 , 'WILLIAM', 'HR');`, `SELECT E_Id , E_name ,E_Designation From Employee WHERE E_Designation = 'Developer' or 'Tester';`, and `SELECT E_Id , E_name ,E_Designation From Employee WHERE E_Designation = 'Developer' and E_name = 'GEORGE';`. Below the query, the 'Result Grid' shows the following data:

E_Id	E_name	E_Designation
114	GEORGE	Developer
NULL	NULL	NULL

The 'Action Output' section shows the execution results of the queries. The top part shows the results of the 'OR' query, and the bottom part shows the results of the 'AND' query. The 'Action Output' section includes columns for #, Time, Action, and Message. The messages indicate the number of rows returned for each query.

7. Count, Avg, Sum

Count() is used to get the count of the rows in a table.

Avg() is used to get the avg of the rows in a table.

Sum() is used to get the sum of the rows in a table.

MySQL Workbench

Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator

MANAGEMENT

- Server Status
- Client Connections
- Users and Privileges
- Status and System Variables
- Data Export
- Data Import/Restore

INSTANCE

- Startup / Shutdown
- Server Logs
- Options File

PERFORMANCE

- Dashboard
- Performance Reports
- Performance Schema Setup

Administration Schemas

Information

No object selected

Query 1 SQL File 3

```
32 FROM EmployeeRecords;
33 • SELECT MIN(Salary) AS LowestSalary
34 FROM EmployeeRecords;
35 • SELECT MAX(Salary) AS HighestSalary
36 FROM EmployeeRecords;
37 • SELECT COUNT(*) AS TotalEmployees
38 FROM EmployeeRecords;
```

Result Grid

	TotalEmployees
▶	5

SQL Additions

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

Context Help Snippets

Result 11

Output

Action Output

#	Time	Action	Message	Duration / Fetch
12	11:31:33	SELECT FullName FROM EmployeeRecords WHERE JobTitle IS NULL LIMIT 0, 1...	0 row(s) returned	0.000 sec / 0.000 sec
13	11:33:55	insert into EmployeeRecords [EmployeeID, FullName, JobTitle, Department, HireDat...	Error Code: 1062. Duplicate entry '1' for key 'employeerecords.PRIMARY'	0.000 sec
14	11:41:40	SELECT MIN(Salary) AS LowestSalary FROM EmployeeRecords LIMIT 0, 1000	1 row(s) returned	0.015 sec / 0.000 sec
15	11:42:22	SELECT MIN(Salary) AS LowestSalary FROM EmployeeRecords LIMIT 0, 1000	1 row(s) returned	0.000 sec / 0.000 sec
16	11:42:48	SELECT MAX(Salary) AS HighestSalary FROM EmployeeRecords LIMIT 0, 1000	1 row(s) returned	0.000 sec / 0.000 sec
17	11:46:44	SELECT COUNT(*) AS TotalEmployees FROM EmployeeRecords LIMIT 0, 1000	1 row(s) returned	0.015 sec / 0.000 sec

Object Info Session

Type here to search

11:46 AM 4/28/2025

MySQL Workbench

Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator

MANAGEMENT

- Server Status
- Client Connections
- Users and Privileges
- Status and System Variables
- Data Export
- Data Import/Restore

INSTANCE

- Startup / Shutdown
- Server Logs
- Options File

PERFORMANCE

- Dashboard
- Performance Reports
- Performance Schema Setup

Administration Schemas

Information

No object selected

Query 1 SQL File 3

```
36 FROM EmployeeRecords;
37 • SELECT COUNT(*) AS TotalEmployees
38 FROM EmployeeRecords;
39 • SELECT AVG(Salary) AS AVERAGESALARY
40 FROM EmployeeRecords;
41 • SELECT SUM(Salary) AS TOTALSALARY
42 FROM EmployeeRecords;
```

Result Grid

	TOTALSALARY
▶	347000.00

SQL Additions

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

Context Help Snippets

Result 13

Output

Action Output

#	Time	Action	Message	Duration / Fetch
14	11:41:40	SELECT MIN(Salary) AS LowestSalary FROM EmployeeRecords LIMIT 0, 1000	1 row(s) returned	0.015 sec / 0.000 sec
15	11:42:22	SELECT MIN(Salary) AS LowestSalary FROM EmployeeRecords LIMIT 0, 1000	1 row(s) returned	0.000 sec / 0.000 sec
16	11:42:48	SELECT MAX(Salary) AS HighestSalary FROM EmployeeRecords LIMIT 0, 1000	1 row(s) returned	0.000 sec / 0.000 sec
17	11:46:44	SELECT COUNT(*) AS TotalEmployees FROM EmployeeRecords LIMIT 0, 1000	1 row(s) returned	0.015 sec / 0.000 sec
18	11:48:42	SELECT AVG(Salary) AS AVERAGESALARY FROM EmployeeRecords LIMIT 0, 1...	1 row(s) returned	0.000 sec / 0.000 sec
19	11:49:55	SELECT SUM(Salary) AS TOTALSALARY FROM EmployeeRecords LIMIT 0, 1000	1 row(s) returned	0.015 sec / 0.000 sec

Object Info Session

Type here to search

11:49 AM 4/28/2025

MySQL Workbench

Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator

MANAGEMENT

- Server Status
- Client Connections
- Users and Privileges
- Status and System Variables
- Data Export
- Data Import/Restore

INSTANCE

- Startup / Shutdown
- Server Logs
- Options File

PERFORMANCE

- Dashboard
- Performance Reports
- Performance Schema Setup

Administration Schemas

Information

No object selected

Object Info Session

Query 1 SQL File 3

Limit to 1000 rows

```
35 SELECT MAX(Salary) AS HighestSalary
36 FROM EmployeeRecords;
37 SELECT COUNT(*) AS TotalEmployees
38 FROM EmployeeRecords;
39 SELECT AVG(Salary) AS AVERAGESALARY
40 FROM EmployeeRecords;
41 SELECT SUM(Salary) AS TOTALSALARY
```

Result Grid

AVERAGESALARY
69400.000000

SQL Additions

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

Context Help Snippets

Result 14

Output

Action Output

#	Time	Action	Message	Duration / Fetch
15	11:42:22	SELECT MIN(Salary) AS LowestSalary FROM EmployeeRecords LIMIT 0, 1000	1 row(s) returned	0.000 sec / 0.000 sec
16	11:42:48	SELECT MAX(Salary) AS HighestSalary FROM EmployeeRecords LIMIT 0, 1000	1 row(s) returned	0.000 sec / 0.000 sec
17	11:46:44	SELECT COUNT(*) AS TotalEmployees FROM EmployeeRecords LIMIT 0, 1000	1 row(s) returned	0.016 sec / 0.000 sec
18	11:48:42	SELECT AVG(Salary) AS AVERAGESALARY FROM EmployeeRecords LIMIT 0, 1...	1 row(s) returned	0.000 sec / 0.000 sec
19	11:49:55	SELECT SUM(Salary) AS TOTALSALARY FROM EmployeeRecords LIMIT 0, 1000	1 row(s) returned	0.015 sec / 0.000 sec
20	11:51:14	SELECT AVG(Salary) AS AVERAGESALARY FROM EmployeeRecords LIMIT 0, 1...	1 row(s) returned	0.000 sec / 0.000 sec

Type here to search

11:51 AM 4/28/2025

8. Like

Starts with a pattern: LIKE 'A%' finds all values starting with "A".

Ends with a pattern: LIKE '%Z' finds all values ending with "Z".

Contains a pattern: LIKE '%XYZ%' finds all values containing "XY"

59 • `Select E_Id , E_name ,E_Designation from Employee where e_name like 'g%';`
60

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content: |

	E_Id	E_name	E_Designation
▶	114	GEORGE	Developer
*	NULL	NULL	NULL

Employee 6 x

Output

Action Output

#	Time	Action	Message
✗	47	11:43:19	SELECT E_name ,E_Designation WHERE E_Designation = 'Developer' and 'Tester' Error Code: 1054. Unknown column 'E_name' in
✓	48	11:44:09	SELECT E_Id , E_name ,E_Designation From Employee WHERE E_Designation = '...' 0 row(s) returned
✓	49	11:44:24	SELECT E_Id , E_name ,E_Designation From Employee WHERE E_Designation = '...' 2 row(s) returned
✓	50	11:46:11	SELECT E_Id , E_name ,E_Designation From Employee WHERE E_Designation = '...' 1 row(s) returned
✓	51	11:52:13	select distinct E_Designation From Employee LIMIT 0, 300 3 row(s) returned
✓	52	13:48:43	Select E_Id , E_name ,E_Designation from Employee where e_name like 'g%' LIM... 1 row(s) returned

59 • `Select E_Id , E_name ,E_Designation from Employee where e_name like 'g%';`
60 • `Select E_Id , E_name ,E_Designation from Employee where e_name like '%n';`

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content: |

	E_Id	E_name	E_Designation
▶	112	ERIN	Developer
*	NULL	NULL	NULL

Employee 7 x

Output

Action Output

#	Time	Action	Message
✓	48	11:44:09	SELECT E_Id , E_name ,E_Designation From Employee WHERE E_Designation = '...' 0 row(s) returned
✓	49	11:44:24	SELECT E_Id , E_name ,E_Designation From Employee WHERE E_Designation = '...' 2 row(s) returned
✓	50	11:46:11	SELECT E_Id , E_name ,E_Designation From Employee WHERE E_Designation = '...' 1 row(s) returned
✓	51	11:52:13	select distinct E_Designation From Employee LIMIT 0, 300 3 row(s) returned
✓	52	13:48:43	Select E_Id , E_name ,E_Designation from Employee where e_name like 'g%' LIM... 1 row(s) returned
✓	53	13:50:21	Select E_Id , E_name ,E_Designation from Employee where e_name like '%n' LIM... 1 row(s) returned

```

59 • Select E_Id , E_name ,E_Designation from Employee where e_name like 'g%';
60 • Select E_Id , E_name ,E_Designation from Employee where e_name like '%n';
61 • Select E_Id , E_name ,E_Designation from Employee where e_id like '%1%';
62

```

Result Grid			
Filter Rows: <input type="text"/>			
Edit:			
Export/Import:			
Wrap Cell Content: <input type="checkbox"/>			
E_Id	E_name	E_Designation	
112	ERIN	Developer	
113	IMMA	Tester	
114	GEORGE	Developer	
115	WILLIAM	HR	
* NULL	NULL	NULL	

Employee x Apply

Output

Action Output			
#	Time	Action	Message
✓ 50	11:46:11	SELECT E_Id , E_name ,E_Designation From Employee WHERE E_Designation = '...	1 row(s) returned
✓ 51	11:52:13	select distinct E_Designation From Employee LIMIT 0, 300	3 row(s) returned
✓ 52	13:48:43	Select E_Id , E_name ,E_Designation from Employee where e_name like 'g%' LIM...	1 row(s) returned
✓ 53	13:50:21	Select E_Id , E_name ,E_Designation from Employee where e_name like '%n' LIM...	1 row(s) returned
✓ 54	13:51:31	Select E_Id , E_name ,E_Designation from Employee where e_id like '%0%' LIMIT ...	0 row(s) returned
✓ 55	13:51:44	Select E_Id , E_name ,E_Designation from Employee where e_id like '%1%' LIMIT ...	4 row(s) returned

9. Underscore(_)

x → Matches any **single** character followed by "a".

x_ → Matches "a" followed by **any single** character.

x__ → Matches "a" followed by **two** characters.

63 • `Select E_Id , E_name ,E_Designation from Employee where e_name like '%_A%';`

Result Grid

	E_Id	E_name	E_Designation
▶	113	IMMA	Tester
	115	WILLIAM	HR
*	NULL	NULL	NULL

Employee 12

Output

Action Output

#	Time	Action	Message
✓ 53	13:50:21	Select E_Id , E_name ,E_Designation from Employee where e_name like '%n' LIM...	1 row(s) returned
✓ 54	13:51:31	Select E_Id , E_name ,E_Designation from Employee where e_id like '%0%' LIMIT ...	0 row(s) returned
✓ 55	13:51:44	Select E_Id , E_name ,E_Designation from Employee where e_id like '%1%' LIMIT ...	4 row(s) returned
✓ 56	13:52:36	Select E_Id , E_name ,E_Designation from Employee where e_name like '%m%' LI...	2 row(s) returned
✓ 57	13:53:36	Select E_Id , E_name ,E_Designation from Employee where e_id like '%_A%' LIMIT...	0 row(s) returned
✓ 58	13:53:47	Select E_Id , E_name ,E_Designation from Employee where e_name like '%_A%' LI...	2 row(s) returned

59 • `Select E_Id , E_name ,E_Designation from Employee where e_name like 'e%';`
60 • `Select E_Id , E_name ,E_Designation from Employee where e_name like '%n';`
61 • `Select E_Id , E_name ,E_Designation from Employee where e_id like '%1%';`
62 • `Select E_Id , E_name ,E_Designation from Employee where e_name like '%m%';`
63 • `Select E_Id , E_name ,E_Designation from Employee where e_name like '%_A%';`

Result Grid

	E_Id	E_name	E_Designation
▶	115	WILLIAM	HR
*	NULL	NULL	NULL

Employee 13

Output

Action Output

#	Time	Action	Message
✓ 54	13:51:31	Select E_Id , E_name ,E_Designation from Employee where e_id like '%0%' LIMIT ...	0 row(s) returned
✓ 55	13:51:44	Select E_Id , E_name ,E_Designation from Employee where e_id like '%1%' LIMIT ...	4 row(s) returned
✓ 56	13:52:36	Select E_Id , E_name ,E_Designation from Employee where e_name like '%m%' LI...	2 row(s) returned
✓ 57	13:53:36	Select E_Id , E_name ,E_Designation from Employee where e_id like '%_A%' LIMIT...	0 row(s) returned
✓ 58	13:53:47	Select E_Id , E_name ,E_Designation from Employee where e_name like '%_A%' LI...	2 row(s) returned
✓ 59	13:54:14	Select E_Id , E_name ,E_Designation from Employee where e_name like '%A_%' LI...	1 row(s) returned

61 •
62 •
63 •
64
65
66

```
Select E_Id , E_name ,E_Designation from Employee where e_id like '%1%';
Select E_Id , E_name ,E_Designation from Employee where e_name like '%m%';
Select E_Id , E_name ,E_Designation from Employee where e_name like '%E__%';
```

Result Grid

Filter Rows:

Edit:

Export/Import:

Wrap Cell Content:

Apply

	E_Id	E_name	E_Designation
▶	112	ERIN	Developer
	114	GEORGE	Developer
*	NULL	NULL	NULL

Employee 14

×

Apply

Output

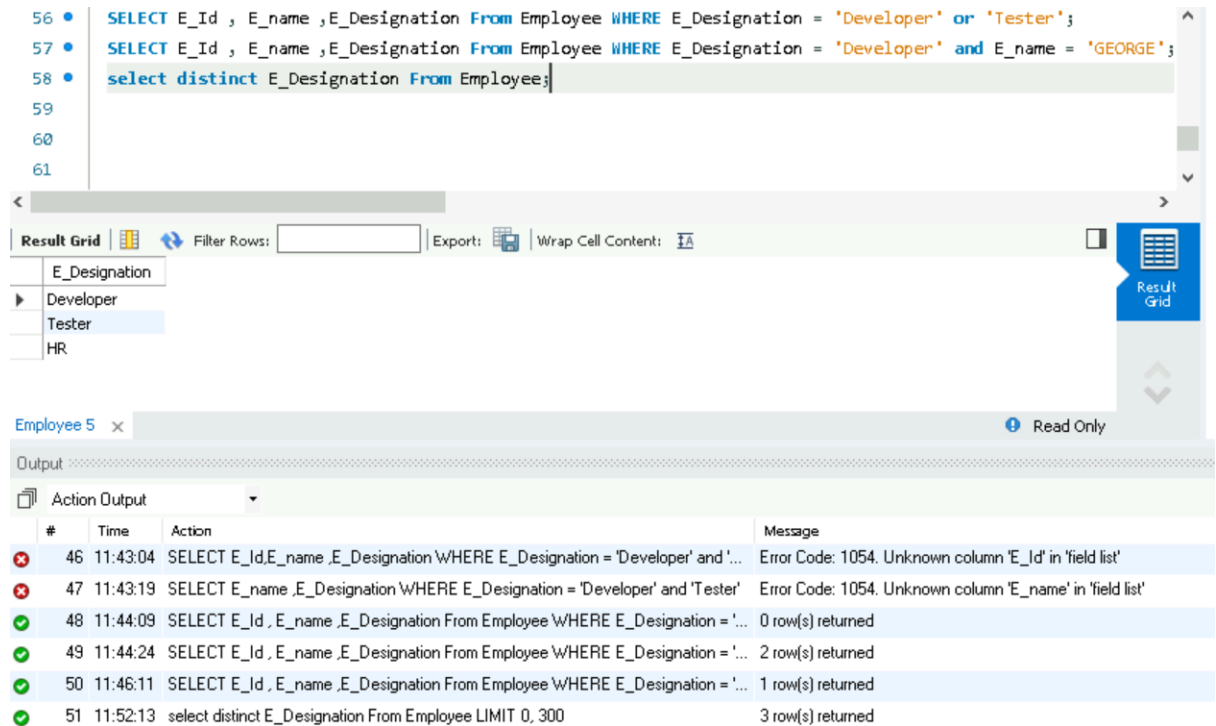
▼

Action Output

#	Time	Action	Message
✓ 55	13:51:44	Select E_Id , E_name ,E_Designation from Employee where e_id like '%1%' LIMIT ...	4 row(s) returned
✓ 56	13:52:36	Select E_Id , E_name ,E_Designation from Employee where e_name like '%m%' LI...	2 row(s) returned
✓ 57	13:53:36	Select E_Id , E_name ,E_Designation from Employee where e_id like '%_A%' LIMIT...	0 row(s) returned
✓ 58	13:53:47	Select E_Id , E_name ,E_Designation from Employee where e_name like '%_A%' LI...	2 row(s) returned
✓ 59	13:54:14	Select E_Id , E_name ,E_Designation from Employee where e_name like '%A_%' LI...	1 row(s) returned
✓ 60	13:54:43	Select E_Id , E_name ,E_Designation from Employee where e_name like '%E__%' ...	2 row(s) returned

10. Distinct

The DISTINCT keyword in SQL is used to retrieve unique values from a column, eliminating duplicates from the result set.



The screenshot shows a SQL IDE interface. The top pane contains three SQL queries:

```
56 • SELECT E_Id , E_name ,E_Designation From Employee WHERE E_Designation = 'Developer' or 'Tester';
57 • SELECT E_Id , E_name ,E_Designation From Employee WHERE E_Designation = 'Developer' and E_name = 'GEORGE';
58 • select distinct E_Designation From Employee;
```

The bottom pane shows the results of these queries. The first two queries (lines 56 and 57) resulted in errors (Error Code: 1054). The third query (line 58) returned 3 rows.

#	Time	Action	Message
46	11:43:04	SELECT E_Id,E_name ,E_Designation WHERE E_Designation = 'Developer' and '...	Error Code: 1054. Unknown column 'E_Id' in 'field list'
47	11:43:19	SELECT E_name ,E_Designation WHERE E_Designation = 'Developer' and 'Tester'	Error Code: 1054. Unknown column 'E_name' in 'field list'
48	11:44:09	SELECT E_Id , E_name ,E_Designation From Employee WHERE E_Designation = '...	0 row(s) returned
49	11:44:24	SELECT E_Id , E_name ,E_Designation From Employee WHERE E_Designation = '...	2 row(s) returned
50	11:46:11	SELECT E_Id , E_name ,E_Designation From Employee WHERE E_Designation = '...	1 row(s) returned
51	11:52:13	select distinct E_Designation From Employee LIMIT 0, 300	3 row(s) returned

11. Limit , order by , order by desc

1.LIMIT – Restricts the number of rows returned.

```
59 • Select E_Id , E_name ,E_Designation from Employee where e_name like 'g%';
60 • Select E_Id , E_name ,E_Designation from Employee where e_name like '%n';
61 • Select E_Id , E_name ,E_Designation from Employee where e_id like '%1%';
62 • Select E_Id , E_name ,E_Designation from Employee where e_name like '%tr%';
63 • Select E_Id , E_name ,E_Designation from Employee limit 2;
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content: | Fetch rows:

E_Id	E_name	E_Designation
112	ERIN	Developer
113	IMMA	Tester
NULL	NULL	NULL

Employee 16 x

Output

Action Output

#	Time	Action	Message
✓ 57	13:53:36	Select E_Id , E_name ,E_Designation from Employee where e_id like '%_A%' LIMIT...	0 row(s) returned
✓ 58	13:53:47	Select E_Id , E_name ,E_Designation from Employee where e_name like '%_A%' LI...	2 row(s) returned
✓ 59	13:54:14	Select E_Id , E_name ,E_Designation from Employee where e_name like '%A_%' LI...	1 row(s) returned
✓ 60	13:54:43	Select E_Id , E_name ,E_Designation from Employee where e_name like '%E_%' ...	2 row(s) returned
✓ 61	13:57:20	Select E_Id , E_name ,E_Designation from Employee where e_id like '%1%' limit 2	2 row(s) returned
✓ 62	13:57:48	Select E_Id , E_name ,E_Designation from Employee limit 2	2 row(s) returned

2.ORDER BY – Sorts the result set based on one or more columns.

63 • `Select E_Id , E_name ,E_Designation from Employee order by e_name ;`

Result Grid

	E_Id	E_name	E_Designation
▶	112	ERIN	Developer
	114	GEORGE	Developer
	113	IMMA	Tester
	115	WILLIAM	HR
•	NULL	NULL	NULL

Employee 18

Output

Action Output

#	Time	Action	Message
✓ 59	13:54:14	Select E_Id , E_name ,E_Designation from Employee where e_name like '%A_%' LI...	1 row(s) returned
✓ 60	13:54:43	Select E_Id , E_name ,E_Designation from Employee where e_name like '%E_%' ...	2 row(s) returned
✓ 61	13:57:20	Select E_Id , E_name ,E_Designation from Employee where e_id like '%1%' limit 2	2 row(s) returned
✓ 62	13:57:48	Select E_Id , E_name ,E_Designation from Employee limit 2	2 row(s) returned
✓ 63	13:58:31	Select E_Id , E_name ,E_Designation from Employee order by e_name desc LIMIT...	4 row(s) returned
✓ 64	13:58:47	Select E_Id , E_name ,E_Designation from Employee order by e_name LIMIT 0, 300	4 row(s) returned

3.ORDER BY DESC – Sorts the result set in **descending** order.

59 • `Select E_Id , E_name ,E_Designation from Employee where e_name like 'e%';`

60 • `Select E_Id , E_name ,E_Designation from Employee where e_name like '%n';`

61 • `Select E_Id , E_name ,E_Designation from Employee where e_id like '%1%';`

62 • `Select E_Id , E_name ,E_Designation from Employee where e_name like '%m%';`

63 • `Select E_Id , E_name ,E_Designation from Employee limit 2;`

Result Grid

	E_Id	E_name	E_Designation
▶	112	ERIN	Developer
	113	IMMA	Tester
•	NULL	NULL	NULL

Employee 16

Output

Action Output

#	Time	Action	Message
✓ 57	13:53:36	Select E_Id , E_name ,E_Designation from Employee where e_id like '%A%' LIMIT...	0 row(s) returned
✓ 58	13:53:47	Select E_Id , E_name ,E_Designation from Employee where e_name like '%A%' LI...	2 row(s) returned
✓ 59	13:54:14	Select E_Id , E_name ,E_Designation from Employee where e_name like '%A_%' LI...	1 row(s) returned
✓ 60	13:54:43	Select E_Id , E_name ,E_Designation from Employee where e_name like '%E_%' ...	2 row(s) returned
✓ 61	13:57:20	Select E_Id , E_name ,E_Designation from Employee where e_id like '%1%' limit 2	2 row(s) returned
✓ 62	13:57:48	Select E_Id , E_name ,E_Designation from Employee limit 2	2 row(s) returned

12. desc table, in , between, alias

In SQL, the DESC (short for **DESCRIBE**) command is used to display the structure of a table, including column names, data types, and constraints.

IN – Used to filter results based on a list of values.

BETWEEN – Selects values within a range (inclusive).

ALIAS – Assigns temporary names to columns or tables.

```
66 • Select E_Id , E_name ,E_Designation from Employee where e_id in(113, 115);
67
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

	E_Id	E_name	E_Designation
▶	113	IMMA	Tester
	115	WILLIAM	HR
*	NULL	NULL	NULL

Employee 22 x

Output

Action Output

#	Time	Action	Message
✓ 63	13:58:31	Select E_Id , E_name ,E_Designation from Employee order by e_name desc LIMIT ...	4 row(s) returned
✓ 64	13:58:47	Select E_Id , E_name ,E_Designation from Employee order by e_name LIMIT 0, 300	4 row(s) returned
✓ 65	13:58:59	Select E_Id , E_name ,E_Designation from Employee order by e_name desc LIMIT ...	4 row(s) returned
✓ 66	13:59:28	desc employee	3 row(s) returned
✓ 67	14:17:07	Select E_Id , E_name ,E_Designation from Employee where e_id between 113 and...	3 row(s) returned
✓ 68	14:17:47	Select E_Id , E_name ,E_Designation from Employee where e_id in(113, 115) LIM...	2 row(s) returned

```
66 • Select E_Id , E_name ,E_Designation from Employee where e_id between 113 and 115;
67
```

Result Grid

	E_Id	E_name	E_Designation
▶	113	IMMA	Tester
	114	GEORGE	Developer
	115	WILLIAM	HR
•	NULL	NULL	NULL

Employee 21 x

Output

Action Output

#	Time	Action	Message
✓ 62	13:57:48	Select E_Id , E_name ,E_Designation from Employee limit 2	2 row(s) returned
✓ 63	13:58:31	Select E_Id , E_name ,E_Designation from Employee order by e_name desc LIMIT...	4 row(s) returned
✓ 64	13:58:47	Select E_Id , E_name ,E_Designation from Employee order by e_name LIMIT 0, 300	4 row(s) returned
✓ 65	13:58:59	Select E_Id , E_name ,E_Designation from Employee order by e_name desc LIMIT...	4 row(s) returned
✓ 66	13:59:28	desc employee	3 row(s) returned
✓ 67	14:17:07	Select E_Id , E_name ,E_Designation from Employee where e_id between 113 and...	3 row(s) returned

```
59 • Select E_Id , E_name ,E_Designation from Employee where e_name like 'e%';
60 • Select E_Id , E_name ,E_Designation from Employee where e_name like '%n';
61 • Select E_Id , E_name ,E_Designation from Employee where e_id like '%1%';
62 • Select E_Id , E_name ,E_Designation from Employee where e_name like '%nt%';
63 • Select E_Id , E_name ,E_Designation from Employee order by e_name desc;
64 • desc employee;
```

Result Grid

	Field	Type	Null	Key	Default	Extra
▶	E_Id	int	NO	PRI	NULL	auto_increment
	E_name	varchar(20)	NO		NULL	
	E_Designation	varchar(30)	NO		NULL	

Result 20 x

Output

Action Output

#	Time	Action	Message
✓ 61	13:57:20	Select E_Id , E_name ,E_Designation from Employee where e_id like '%1%' limit 2	2 row(s) returned
✓ 62	13:57:48	Select E_Id , E_name ,E_Designation from Employee limit 2	2 row(s) returned
✓ 63	13:58:31	Select E_Id , E_name ,E_Designation from Employee order by e_name desc LIMIT...	4 row(s) returned
✓ 64	13:58:47	Select E_Id , E_name ,E_Designation from Employee order by e_name LIMIT 0, 300	4 row(s) returned
✓ 65	13:58:59	Select E_Id , E_name ,E_Designation from Employee order by e_name desc LIMIT...	4 row(s) returned
✓ 66	13:59:28	desc employee	3 row(s) returned

67 • `select E_Id as EMP_ID from Employee;`

Result Grid | Filter Rows: | Export: | Wrap Cell Content: |

	EMP_ID
▶	112
	113
	114
	115

Employee 23 x

Output :-----

Action Output

#	Time	Action	Message
✓ 64	13:58:47	Select E_Id , E_name ,E_Designation from Employee order by e_name LIMIT 0, 300	4 row(s) returned
✓ 65	13:58:59	Select E_Id , E_name ,E_Designation from Employee order by e_name desc LIMIT...	4 row(s) returned
✓ 66	13:59:28	desc employee	3 row(s) returned
✓ 67	14:17:07	Select E_Id , E_name ,E_Designation from Employee where e_id between 113 and...	3 row(s) returned
✓ 68	14:17:47	Select E_Id , E_name ,E_Designation from Employee where e_id in(113, 115) LIMIT...	2 row(s) returned
✓ 69	14:18:31	select E_Id as EMP_ID from Employee LIMIT 0, 300	4 row(s) returned

JOIN

1. **INNER JOIN:** Returns only the rows where there is a match in both tables.

SQL Query:

```

75 • select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary
76 | from Employee INNER join Emp_Details ON Employee.E_id = EMP_DETAILS.ED_ID;
77
78

```

Result Grid:

E_id	E_name	Salary
112	ERIN	50000
113	IMMA	40000
115	WILLIAM	58000

Result 30 x Read Only

Output:

Action Output

#	Time	Action	Message
87	15:35:45	Insert into EMP_DETAILS (department , salary , ED_ID) values ('IT' , 50000,112)	1 row(s) affected
88	15:35:49	Insert into EMP_DETAILS (department , salary , ED_ID) values ('IT' , 40000,113)	1 row(s) affected
89	15:35:52	Insert into EMP_DETAILS (department , salary , ED_ID) values ('HR' , 58000,115)	1 row(s) affected
90	15:35:56	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee j...	Error Code: 1054. Unknown column 'Employee.Emp_id' in 'on clau
91	15:36:07	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee l...	Error Code: 1054. Unknown column 'Employee.Emp_id' in 'on clau
92	15:37:17	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee l...	3 row(s) returned

2. LEFT JOIN (LEFT OUTER JOIN): Returns all rows from the left table, and the matched rows from the right table. If there's no match, NULL values are returned for columns from the right table.

SQL Query:

```

75 • select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary
76 | from Employee LEFT join Emp_Details ON Employee.E_id = EMP_DETAILS.ED_ID;
77
78

```

Result Grid:

E_id	E_name	Salary
112	ERIN	50000
113	IMMA	40000
114	GEORGE	NULL
115	WILLIAM	58000

Result 31 x Read Only

Output:

Action Output

#	Time	Action	Message
88	15:35:49	Insert into EMP_DETAILS (department , salary , ED_ID) values ('IT' , 40000,113)	1 row(s) affected
89	15:35:52	Insert into EMP_DETAILS (department , salary , ED_ID) values ('HR' , 58000,115)	1 row(s) affected
90	15:35:56	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee j...	Error Code: 1054. Unknown column 'Employee.Emp_id' in 'on clause
91	15:36:07	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee l...	Error Code: 1054. Unknown column 'Employee.Emp_id' in 'on clause
92	15:37:17	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee l...	3 row(s) returned
93	15:37:56	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee ...	4 row(s) returned

3. RIGHT JOIN (RIGHT OUTER JOIN): Returns all rows from the right table, and the matched rows from the left table. If there's no match, NULL values are returned for columns from the left table.

The screenshot displays the SQL Server Enterprise Manager interface. At the top, a query window shows the following SQL statement:

```
75 • select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary
76 from Employee RIGHT join Emp_Details ON Employee.E_id = EMP_DETAILS.ED_ID;
77
78
```

Below the query window, the 'Result Grid' is visible, showing the results of the query:

E_id	E_name	Salary
112	ERIN	50000
113	IMMA	40000
115	WILLIAM	58000

At the bottom, the 'Output' pane shows the execution log:

#	Time	Action	Message	Duration / Fe
89	15:35:52	Insert into EMP_DETAILS (department , salary , ED_ID) values ('HR' , 58000,115)	1 row(s) affected	0.000 sec
90	15:35:56	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee i...	Error Code: 1054. Unknown column 'Employee.Emp_id' in 'on clause'	0.000 sec
91	15:36:07	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee l...	Error Code: 1054. Unknown column 'Employee.Emp_id' in 'on clause'	0.000 sec
92	15:37:17	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee l...	3 row(s) returned	0.000 sec / C
93	15:37:56	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee ...	4 row(s) returned	0.000 sec / C
94	15:38:16	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee ...	3 row(s) returned	0.000 sec / C

There is a watermark in the bottom right corner that reads: "Activate Windows Go to Settings to activate Windows".

4. FULL JOIN (FULL OUTER JOIN): Returns all rows when there is a match in one of the tables. If there's no match, NULL values are returned for columns from the table without a match.

74

75 •

76

77

78

79

80

81

82

83

84

85

86

```

select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary
from Employee FULL join Emp_Details ON Employee.E_id = EMP_DETAILS.ED_ID;

```

disabled. Use th
manually get h
current caret pc
toggle autom

Context Help

Snippets

Output

Action Output

#	Time	Action	Message	Duration
✖ 90	15:35:56	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee i...	Error Code: 1054. Unknown column 'Employee.Emp_id' in 'on clause'	0.000 se
✖ 91	15:36:07	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee I...	Error Code: 1054. Unknown column 'Employee.Emp_id' in 'on clause'	0.000 se
✔ 92	15:37:17	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee I...	3 row(s) returned	0.000 se
✔ 93	15:37:56	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee ...	4 row(s) returned	0.000 se
✔ 94	15:38:16	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee ...	3 row(s) returned	0.000 se
✖ 95	15:38:32	select Employee.E_id , Employee.E_name , EMP_DETAILS.Salary from Employee ...	Error Code: 1054. Unknown column 'Employee.E_id' in 'field list'	0.000 se

UNION

The UNION operator in SQL is used to combine the results of two or more SELECT statements into a single result set. It removes duplicate rows by default.

53 • `select emp_name from employee union select manager_name from manager`

Result Grid

emp_name
Anna
Emma
Sam
Ann
John

Result 39 x Read Only Context Help Snippets

Output

Action Output

#	Time	Action	Message	Duration / Fetch
110	15:22:31	<code>select emp_name from employee union select manager_name from manager</code>	5 row(s) returned	0.000 sec / 0.000 sec
111	15:23:56	<code>select emp_name,max(s) from employee group by s LIMIT 0, 1000</code>	Error Code: 1054. Unknown column 's' in 'field list'	0.016 sec
112	15:24:13	<code>select emp_name,max(salary) from employee group by salary LIMIT 0, 1000</code>	Error Code: 1055. Expression #1 of SELECT list is not in GROUP BY clause and contains non-aggregate value	0.000 sec / 0.000 sec
113	15:24:19	<code>select emp_name,max(salary) from employee group by salary LIMIT 0, 1000</code>	Error Code: 1055. Expression #1 of SELECT list is not in GROUP BY clause and contains non-aggregate value	0.000 sec / 0.000 sec
114	15:55:02	<code>select emp_name from employee union select manager_name from manager</code>	5 row(s) returned	0.000 sec / 0.000 sec
115	16:00:04	<code>select emp_name from employee union select manager_name from manager</code>	5 row(s) returned	0.000 sec / 0.000 sec

GROUP BY – Groups rows that have the same values in specified columns.

54 • `select emp_name from employee union select manager_name from manager;`
 54 • `select dpt,count(*) as dpt_count`
 55 `from manager`
 56 `group by dpt;`

Result Grid

dpt	dpt_count
IT	1
Hr	1
Finance	1

Result 43 x Read Only Context Help Snippets

Output

Action Output

#	Time	Action	Message	Duration / Fetch
115	16:00:04	<code>select emp_name from employee union select manager_name from manager</code>	5 row(s) returned	0.000 sec / 0.000 sec
116	16:01:35	<code>select emp_name,max(salary) from employee group by salary LIMIT 0, 1000</code>	Error Code: 1055. Expression #1 of SELECT list is not in GROUP BY clause and contains non-aggregate value	0.016 sec
117	16:01:54	<code>select emp_name,max(salary) from employee group by emp_id LIMIT 0, 1000</code>	3 row(s) returned	0.000 sec / 0.000 sec
118	16:03:18	<code>select emp_name,count(3) from employee group by emp_id LIMIT 0, 1000</code>	3 row(s) returned	0.000 sec / 0.000 sec
119	16:03:57	<code>select emp_name,max(salary) from employee group by emp_id LIMIT 0, 1000</code>	3 row(s) returned	0.000 sec / 0.000 sec
120	16:08:30	<code>select dpt,count(*) as dpt_count from manager group by dpt LIMIT 0, 1000</code>	3 row(s) returned	0.000 sec / 0.000 sec

HAVING – Filters grouped results based on aggregate functions.

49 • `select * from Marks;`
 50 • `SELECT StudentID, Subject, Score`
 51 • `FROM Marks WHERE Score BETWEEN 80 AND 90;`
 52 • `SELECT Class, COUNT(StudentID) AS StudentCount`
 53 • `FROM Students GROUP BY Class having count(StudentID) > 1;`

Result Grid

Class	StudentCount
10A	2

Result 11 x

Output

Action Output

#	Time	Action	Message
20	15:07:51	SELECT StudentID, Subject, Score FROM Marks WHERE Subject IN (Ma...	4 row(s) returned
21	15:11:16	select * from Students LIMIT 0, 1000	3 row(s) returned
22	15:11:26	select * from Marks LIMIT 0, 1000	4 row(s) returned
23	15:17:22	SELECT StudentID, Subject, Score FROM Marks WHERE Score BETWEEN 80 A...	3 row(s) returned
24	16:09:03	SELECT Class, COUNT(StudentID) AS StudentCount FROM Students GROUP BY ...	2 row(s) returned
25	16:14:02	SELECT Class, COUNT(StudentID) AS StudentCount FROM Students GROUP BY ...	1 row(s) returned

EXISTS – Checks if a subquery returns any rows.

58
 59 • `select emp_name, emp_id from employee where exists(select dpt from MANAGER`
 60 • `where dpt="HR");`

Result Grid

emp_name	emp_id
Anna	101
Emma	102
Sam	103
NULL	NULL

employee 48 x

Output

Action Output

#	Time	Action	Message
122	16:10:05	select dpt, count(*) as dpt_count from manager group by dpt having count(*) > 0 LIMI...	3 row(s) returned
123	16:12:43	select emp_name, emp_id from employee where exists(select dpt from employee where...	Error Code: 1054. Unknown column 'dpt' in 'field list'
124	16:13:16	select emp_name, emp_id from employee where exists(select dpt from employee where...	Error Code: 1054. Unknown column 'dpt' in 'field list'
125	16:14:01	select emp_name, emp_id from employee where exists(select dpt from MANAGER wh...	3 row(s) returned
126	16:14:45	select emp_name, emp_id from employee where exists(select dpt from MANAGER wh...	0 row(s) returned
127	16:14:58	select emp_name, emp_id from employee where exists(select dpt from MANAGER wh...	3 row(s) returned