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Date : 22 Jan 2024
Topics : SQL hands on Practice
Batch : Data Engineering Batch-1

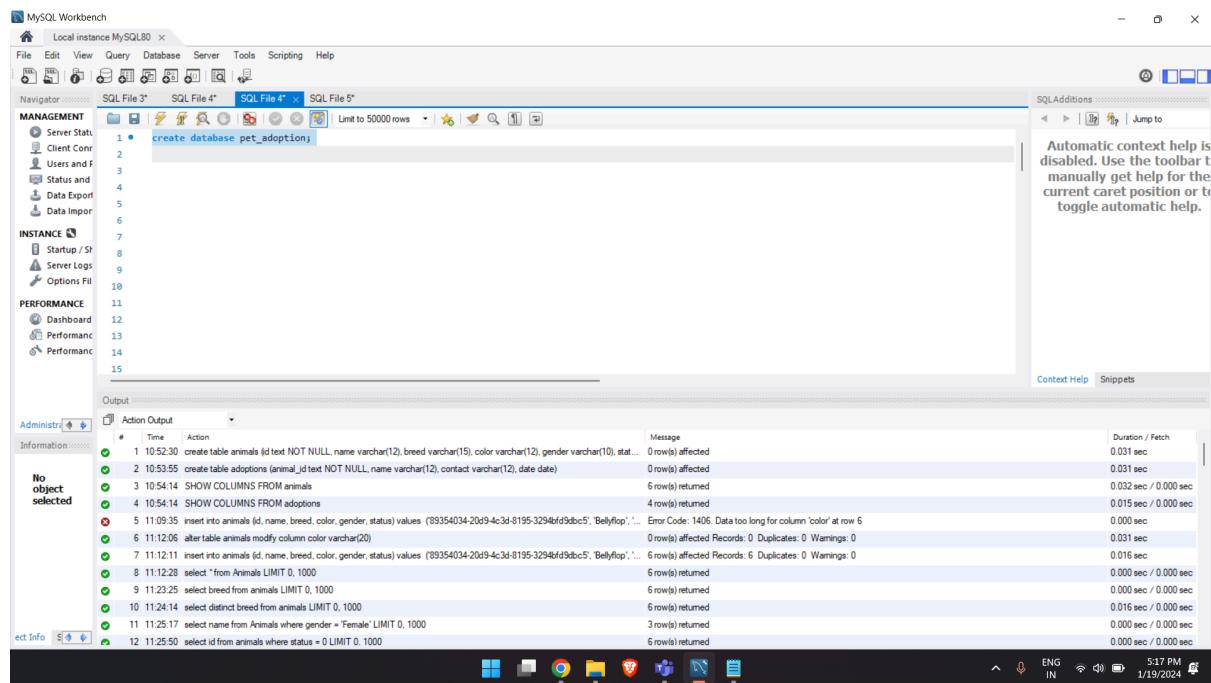
SQL hands on Practice

SQL (Structured Query Language) is a domain-specific programming language designed for managing and manipulating relational database systems. It serves as the standard language for communicating with and managing the data stored in a relational database management system (RDBMS).

As MySQL is free to use and widely used to manage databases, we used MySQL Workbench to perform operations on databases and learn through it.

Creating a database :

Syntax : create database database_name;

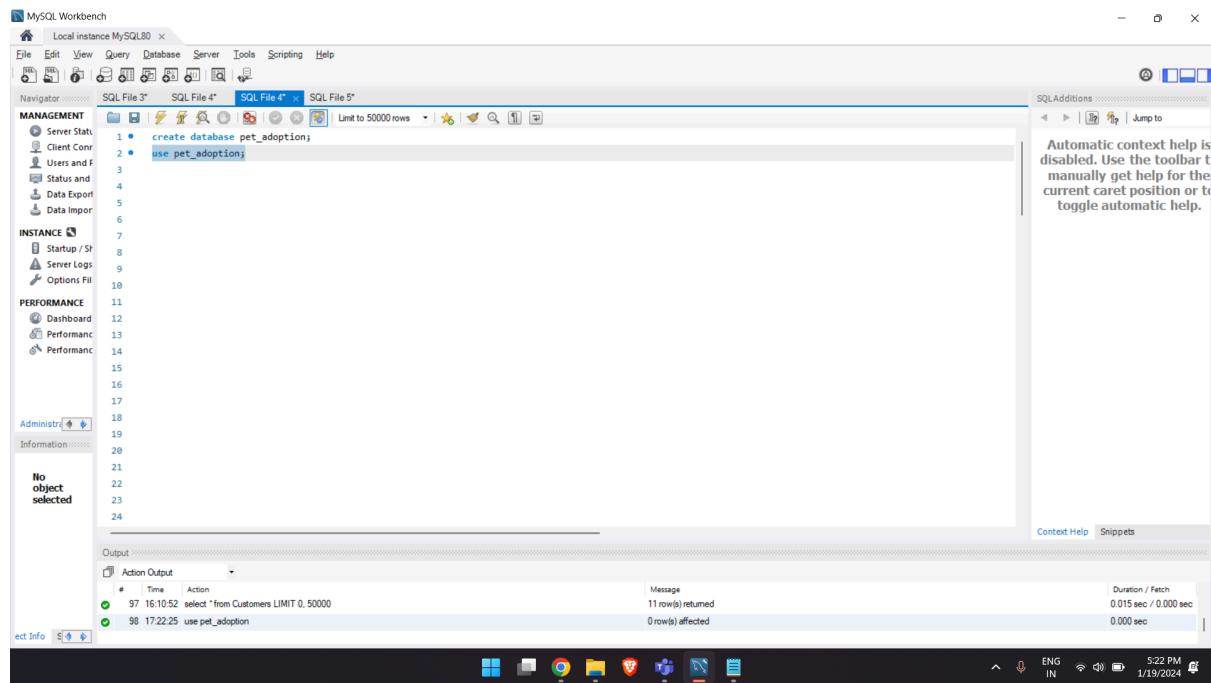


The screenshot shows the MySQL Workbench interface. In the central SQL editor window, the command `create database pet_adoption;` is entered. Below the editor, the 'Action Output' pane displays the results of the query execution, showing the creation of the 'pet_adoption' database and its associated tables. The 'Output' pane also lists other recent database operations.

#	Time	Action	Message	Duration / Fetch
1	10:52:30	create table animals (id text NOT NULL, name varchar(12), breed varchar(15), color varchar(12), gender varchar(10), stat...	0 row(s) affected	0.031 sec
2	10:53:55	create table adoptions (animal_id text NOT NULL, name varchar(12), contact varchar(12), date date)	0 row(s) affected	0.031 sec
3	10:54:14	SHOW COLUMNS FROM animals	6 row(s) returned	0.032 sec / 0.000 sec
4	10:54:14	SHOW COLUMNS FROM adoptions	4 row(s) returned	0.015 sec / 0.000 sec
5	11:09:35	insert into animals (id, name, breed, color, gender, status) values ('89354034-20d9-4c3d-8195-3294bfd9dbc5', 'Bellyflop', '...	Error Code: 1406. Data too long for column 'color' at row 6	0.000 sec
6	11:12:06	alter table animals modify column color varchar(20)	0 row(s) affected Records: 0 Duplicates: 0 Warnings: 0	0.031 sec
7	11:12:11	insert into animals (id, name, breed, color, gender, status) values ('89354034-20d9-4c3d-8195-3294bfd9dbc5', 'Bellyflop', '...	6 row(s) affected Records: 6 Duplicates: 0 Warnings: 0	0.016 sec
8	11:12:28	select * from Animals LIMIT 0, 1000	6 row(s) returned	0.000 sec / 0.000 sec
9	11:12:28	select breed from animals LIMIT 0, 1000	6 row(s) returned	0.000 sec / 0.000 sec
10	11:24:14	select distinct breed from animals LIMIT 0, 1000	6 row(s) returned	0.016 sec / 0.000 sec
11	11:25:17	select name from Animals where gender = 'Female' LIMIT 0, 1000	3 row(s) returned	0.000 sec / 0.000 sec
12	11:25:50	select id from animals where status = 0 LIMIT 0, 1000	6 row(s) returned	0.000 sec / 0.000 sec

Creating a database doesn't automatically set it as the active database, so now let's select the `pet_adoption` database with the **USE command**:

Syntax : use database_name;



Creating Tables :

Syntax :

```
CREATE TABLE table_name (
    column1 datatype,
    column2 datatype,
    column3 datatype,
    ...
);
```

MySQL Workbench

Local instance MySQL80 X

File Edit View Query Database Server Tools Scripting Help

Navigator SQL File 3* SQL File 4* SQL File 4* SQL File 5*

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- Dashboard
- Performance
- Performance

Administrat

No object selected

Information

Action Output

```

1 • create database pet_adoption;
2 • use pet_adoption;
3
4 • show tables;
5
6 • create table animals (id text NOT NULL, name varchar(12), breed varchar(15), color varchar(12), gender varchar(10), status int);
7 • create table adoptions (animal_id text NOT NULL, name varchar(12), contact varchar(12), date date);
8
9 • show columns from animals;

```

SQLAdditions

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

Output

Action	Time	Message	Duration / Fetch
1 10:52:30 create table animals (id text NOT NULL, name varchar(12), breed varchar(15), color varchar(12), gender varchar(10), stat...	0 row(s) affected	0.031 sec	
2 10:53:55 create table adoptions (animal_id text NOT NULL, name varchar(12), contact varchar(12), date date)	0 row(s) affected	0.031 sec	
3 10:54:14 SHOW COLUMNS FROM animals	6 row(s) returned	0.032 sec / 0.000 sec	
4 10:54:14 SHOW COLUMNS FROM adoptions	4 row(s) returned	0.015 sec / 0.000 sec	
5 11:09:35 insert into animals (id, name, breed, color, gender, status) values ('89354034-20d9-4c3d-8195-3294bf9d9dbc5', 'Bellylop', '...	Error Code: 1406. Data too long for column 'color' at row 6	0.000 sec	
6 11:12:06 alter table animals modify column color varchar(20)	0 row(s) affected Records: 0 Duplicates: 0 Warnings: 0	0.031 sec	
7 11:12:11 insert into animals (id, name, breed, color, gender, status) values ('89354034-20d9-4c3d-8195-3294bf9d9dbc5', 'Bellylop', '...	6 row(s) affected Records: 6 Duplicates: 0 Warnings: 0	0.016 sec	
8 11:12:28 select * from Animals LIMIT 0, 1000	6 row(s) returned	0.000 sec / 0.000 sec	
9 11:23:25 select breed from animals LIMIT 0, 1000	6 row(s) returned	0.000 sec / 0.000 sec	
10 11:24:14 select distinct breed from animals LIMIT 0, 1000	6 row(s) returned	0.016 sec / 0.000 sec	
11 11:25:17 select name from Animals where gender = 'Female' LIMIT 0, 1000	3 row(s) returned	0.000 sec / 0.000 sec	
12 11:25:50 select id from animals where status = 0 LIMIT 0, 1000	6 row(s) returned	0.000 sec / 0.000 sec	
13 11:27:14 update animals set color = 'Brown' where id = 'a1e7a7c-b429-41ec-9924-8bb39dd397c8'	0 row(s) affected Rows matched: 0 Changed: 0 Warnings: 0	0.000 sec	
14 11:28:09 update animals set status = 1 where id = '94545432-d27a-4ac8-ab7c-38270d75393'	0 row(s) affected Rows matched: 0 Changed: 0 Warnings: 0	0.000 sec	
15 11:28:17 update animals set status = 0 where id = '94545432-d27a-4ac8-ab7c-38270d75393'	0 row(s) affected Rows matched: 0 Changed: 0 Warnings: 0	0.000 sec	
16 11:28:18 update animals set status = 0 where id = '94545432-d27a-4ac8-ab7c-38270d75393'	0 row(s) affected Rows matched: 0 Changed: 0 Warnings: 0	0.000 sec	
17 11:29:43 alter table adoptions modify column contact varchar(20)	0 row(s) affected Records: 0 Duplicates: 0 Warnings: 0	0.015 sec	
18 11:42:18 update animals set status = 1 where id = 'a1e7a7c-b429-41ec-9924-8bb39dd397c8'	0 row(s) affected Rows matched: 0 Changed: 0 Warnings: 0	0.000 sec	

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Showing Tables :

Syntax : show tables;

MySQL Workbench

Local instance MySQL80 X

File Edit View Query Database Server Tools Scripting Help

Navigator SQL File 3* SQL File 4* SQL File 4* SQL File 5*

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INSTANCE

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PERFORMANCE

- Dashboard
- Performance
- Performance

Administrat

No object selected

Information

Result Grid | Filter Rows: Tables_in_pet_adoption

Tables_in_pet_adoption
adoptions
animals
shelters

Result 20 x

Action Output

Action	Time	Message	Duration / Fetch
82 15:04:01 rollback		0 row(s) affected	0.000 sec
83 15:04:01 rollback		0 row(s) affected	0.000 sec
84 15:04:13 select * from products LIMIT 0, 50000		10 row(s) returned	0.000 sec / 0.000 sec
85 15:04:19 select * from inventory LIMIT 0, 50000		10 row(s) returned	0.000 sec / 0.000 sec
86 15:04:29 select * from Customers LIMIT 0, 50000		11 row(s) returned	0.000 sec / 0.000 sec
87 15:05:44 update customers set phone = 6886585800 where customerid = 11		1 row(s) affected Rows matched: 1 Changed: 1 Warnings: 0	0.016 sec
88 15:05:54 select * from Customers LIMIT 0, 50000		11 row(s) returned	0.000 sec / 0.000 sec
89 15:06:07 rollback		0 row(s) affected	0.000 sec
90 15:06:15 select * from Customers LIMIT 0, 50000		11 row(s) returned	0.000 sec / 0.000 sec
91 15:14:41 SELECT COUNT(productid) AS COUNT FROM products GROUP BY price LIMIT 0, 50000		10 row(s) returned	0.016 sec / 0.000 sec
92 15:14:57 SELECT * FROM products GROUP BY price LIMIT 0, 50000		Error Code: 1055. Expression #1 of SELECT list is not in GROUP BY clause and contains nonaggregated column techsh...	0.000 sec
93 15:15:28 SELECT COUNT(productid) AS COUNT FROM products GROUP BY price LIMIT 0, 50000		10 row(s) returned	0.000 sec / 0.000 sec

SQLAdditions

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

Output

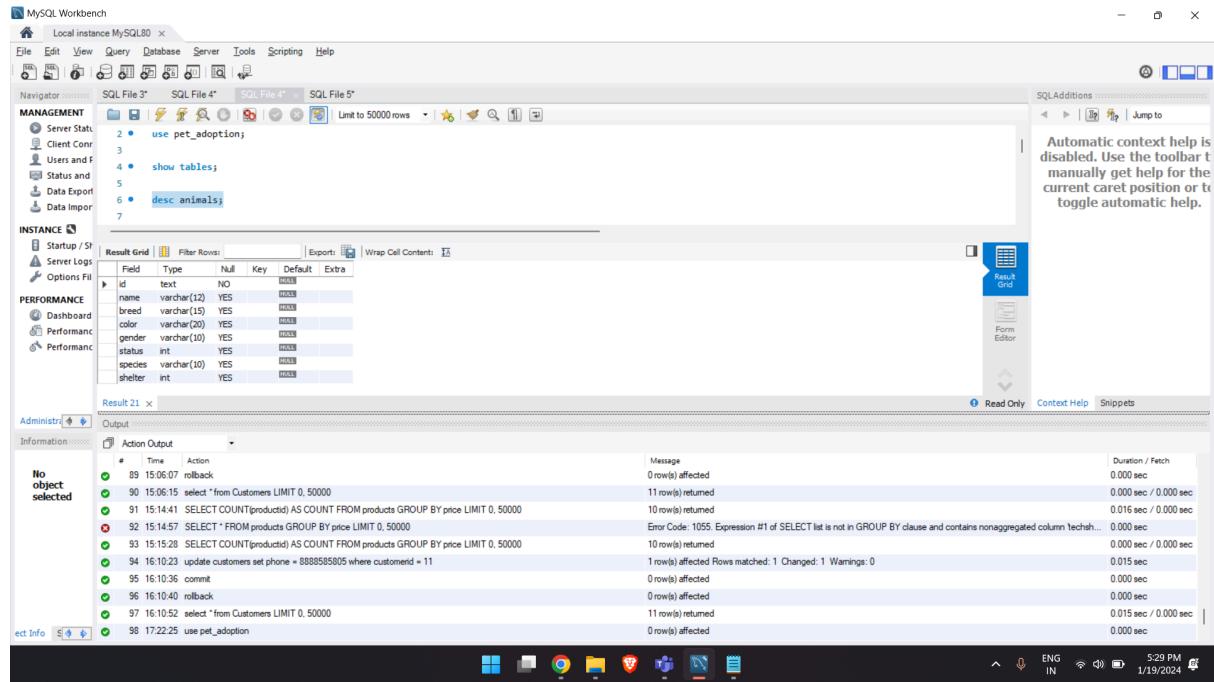
Result Grid | Form Editor

Read Only Context Help Snippets

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Getting Description of Table :

Syntax : DESC table_name;



Inserting values into table :

Syntax :

```
INSERT INTO table_name (column1, column2, column3, ...)
VALUES (value1, value2, value3, ...);
```

MySQL Workbench - Local instance MySQL80

SQL File 4*

```

22
23 • insert into animals (id, name, breed, color, gender, status) values
24 ('89354034-20d9-4c3d-8195-3294fd9dbc5', 'Bellyflop', 'Beagle', 'Brown', 'Male', 0),
25 ('ae91cf1c-f972-42f3-8160-6c944d935699c', 'Snowy', 'Husky', 'White', 'Female', 0),
26 ('37df3388-b0f4-4fd-b6ef-0d840923a48', 'Princess', 'Pomeranian', 'Black', 'Female', 0),
27 ('94545432-d27a-4ec8-ab7c-38270d7535f3', 'Cricket', 'Chihuahua', 'Brown', 'Male', 0),
28 ('ale7a7fc-0429-41ec-9924-8b39d397c8', 'Princess', 'Poodle', 'Purple', 'Female', 0),
29 ('5138ed53-2ab2-400b-973c-91186f6c673d', 'Spot', 'Dalmatian', 'Black And White', 'Male', 0);
--
```

Result Grid

ID	Name	Breed	Color	Gender	Status	Species	Shelter
89354034-20d9-4c3d-8195-3294fd9dbc5	Bellyflop	Beagle	Brown	Male	0	Dog	1
ae91cf1c-f972-42f3-8160-6c944d935699c	Snowy	Husky	White	Female	0	Dog	1
37df3388-b0f4-4fd-b6ef-0d840923a48	Princess	Pomeranian	Black	Female	0	Dog	1
94545432-d27a-4ec8-ab7c-38270d7535f3	Cricket	Chihuahua	Brown	Male	0	Dog	1
ale7a7fc-0429-41ec-9924-8b39d397c8	Princess	Poodle	Purple	Female	1	Dog	1
5138ed53-2ab2-400b-973c-91186f6c673d	Spot	Dalmatian	Black And White	Male	1	Dog	1

Output

#	Time	Action	Message	Duration / Fetch
1	09:48:43	selected * from Animals LIMIT 0, 50000	12 row(s) returned	0.062 sec / 0.000 sec

Alter table :

Syntax :

**ALTER TABLE table_name
ADD column_name datatype;**

MySQL Workbench - Local instance MySQL80

SQL File 4*

```

78 • create table Shelters (id int, name varchar(15), location varchar(25));
79 • alter table Shelters
80   modify column name varchar(30);
81
82 • insert into shelters (id, name, location)
83   values
84   (1, 'Animals 4 Homes', 'Red City');
85
86 • ALTER TABLE animals ADD COLUMN shelter INTEGER;
87 • UPDATE animals SET shelter = 1;
88
89 • INSERT INTO shelters (id, name, location) VALUES (2, 'Adopt A Buddy', 'Green Town');
90 • INSERT INTO shelters (id, name, location) VALUES (3, 'Fluffy Animals', 'Blue Hills');
91
92 • INSERT INTO animals (id, name, shelter, species, breed, color, gender, status) VALUES
--
```

Output

#	Time	Action	Message	Duration / Fetch
1	09:48:43	selected * from Animals LIMIT 0, 50000	12 row(s) returned	0.062 sec / 0.000 sec
2	09:53:12	alter table Shelters modify column name varchar(30)	0 row(s) affected Records: 0 Duplicates: 0 Warnings: 0	0.016 sec

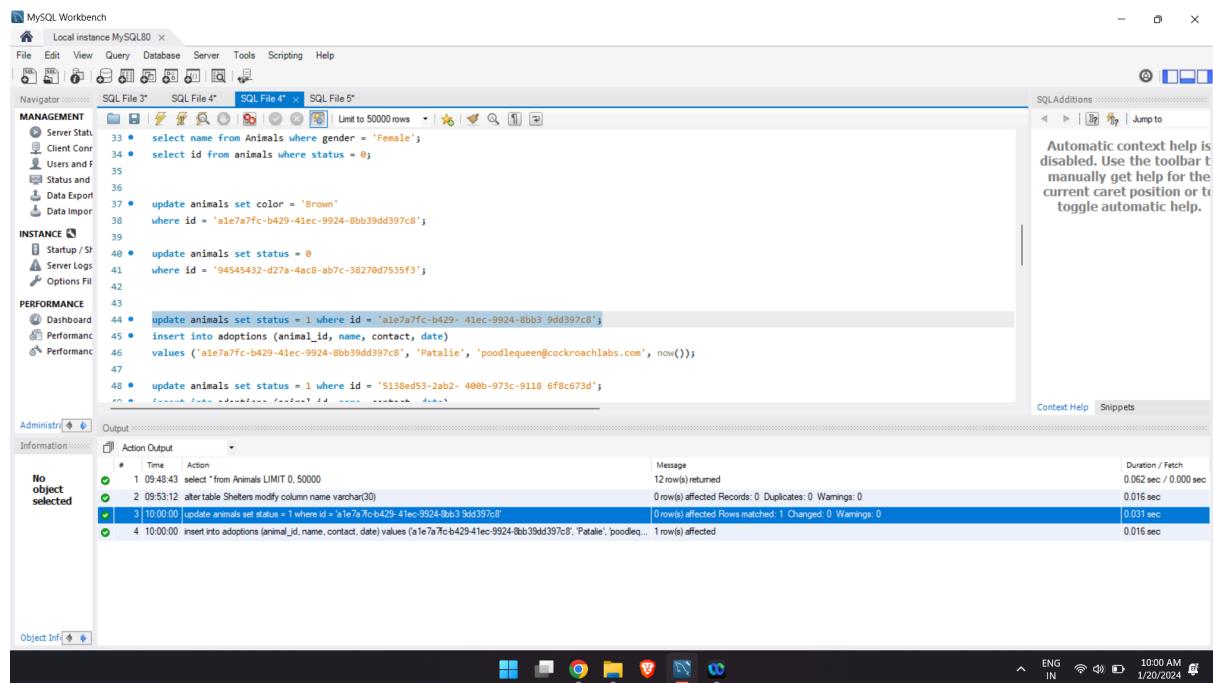
Update table :

Syntax :

UPDATE table_name

SET column1 = value1, column2 = value2, ...

WHERE condition;



The screenshot shows the MySQL Workbench interface with a SQL editor window containing the following code:

```
33 • select name from Animals where gender = 'Female';
34 • select id from animals where status = 0;
35
36
37 • update animals set color = 'Brown'
38   where id = 'a1e7a7fc-b429-41ec-9924-8bb39dd397c8';
39
40 • update animals set status = 0
41   where id = '94545432-d27a-4ac8-ab7c-38270d7535f3';
42
43
44 • update animals set status = 1 where id = 'a1e7a7fc-b429-41ec-9924-8bb3 9dd397c8';
45 • insert into adoptions (animal_id, name, contact, date)
46   values ('a1e7a7fc-b429-41ec-9924-8bb39dd397c8', 'Patalie', 'poodlequeen@cockroachlabs.com', now());
47
48 • update animals set status = 1 where id = '5138ed53-2ab2-400b-973c-9118 6f8c673d';
49
50 • update animals set status = 1 where id = 'a1e7a7fc-b429-41ec-9924-8bb39dd397c8';
```

The output pane shows the results of the executed statements:

#	Time	Action	Message	Duration / Fetch
1	09:49:43	select * from Animals LIMIT 0, 50000	12 row(s) returned	0.062 sec / 0.000 sec
2	09:51:12	alter table Shelters modify column name varchar(30)	0 row(s) affected Records: 0 Duplicates: 0 Warnings: 0	0.016 sec
3	10:00:00	update animals set status = 1 where id = 'a1e7a7fc-b429-41ec-9924-8bb3 9dd397c8'	0 row(s) affected Rows matched: 1 Changed: 0 Warnings: 0	0.031 sec
4	10:00:00	insert into adoptions (animal_id, name, contact, date) values ('a1e7a7fc-b429-41ec-9924-8bb39dd397c8', 'Patalie', 'poodleque...	1 row(s) affected	0.016 sec

Delete from table :

Syntax :

DELETE FROM table_name WHERE condition;

```

MySQL Workbench
Local instance MySQL80 X
File Edit View Query Database Server Tools Scripting Help
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ADMINISTRATOR
  Information
    No object selected
  Object Inf
Output
Action Output
# Time Action Message Duration / Fetch
1 09:48:43 select * from Animals LIMIT 0, 50000 12 row(s) returned 0.062 sec / 0.000 sec
2 09:53:12 alter table Shelters modify column name varchar(30) 0 row(s) affected Records: 0 Duplicates: 0 Warnings: 0 0.016 sec
3 10:00:00 update animals set status = 1 where id = 'a1e7a7c-b429-41ec-9924-8bb39dd397c8' 0 row(s) affected Rows matched: 1 Changed: 0 Warnings: 0 0.031 sec
4 10:00:00 insert into adoptions (animal_id, name, contact, date) values ('a1e7a7c-b429-41ec-9924-8bb39dd397c8', 'Poodle', 'poodle@...', '2024-01-20 10:00:00') 1 row(s) affected 0.016 sec
5 10:03:49 select * from adoptions LIMIT 0, 50000 Error Code: 1146. Table 'pet_adoption.adoptions' doesn't exist. 0.000 sec
6 10:04:05 select * from adoptions LIMIT 0, 50000 3 row(s) returned 0.000 sec / 0.000 sec
7 10:04:45 delete from animals where date = '2024-01-20 10:00:00' Error Code: 1054. Unknown column 'date' in 'where clause' 0.000 sec
8 10:05:12 delete from adoptions where date = '2024-01-20 10:00:00' 1 row(s) affected 0.031 sec

```

The screenshot shows the MySQL Workbench interface. In the top navigation bar, 'File', 'Edit', 'View', 'Query', 'Database', 'Server', 'Tools', 'Scripting', and 'Help' are visible. The 'Query' tab is active. The 'Navigator' pane on the left lists 'MANAGEMENT', 'INSTANCE', 'PERFORMANCE', and 'ADMINISTRATOR' sections. The 'Information' section under 'ADMINISTRATOR' is expanded, showing a table of recent actions. The main query editor window contains several SQL statements, including a 'DELETE' statement at line 97. The 'Output' pane at the bottom shows the execution log for these statements, detailing the time, action, message, and duration for each row.

Aggregate Functions :

- 1) Count() - to count instances
- 2) Sum() - getting sum
- 3) Avg() - to calculate average
- 4) Min() - Finding Minimum value
- 5) Max() - Finding Maximum

```

MySQL Workbench
Local instance MySQL80 X
File Edit View Query Database Server Tools Scripting Help
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  Performanc
  Performanc
ADMINISTRATOR
  Information
    No object selected
  Object Inf
Output
Result Grid | Filter Rows: | Export: | Wrap Cell Content: | Result Grid | Read Only | Context Help Snippets
# Time Action Message Duration / Fetch
1 10:11:28 select max(TotalAmount) from Orders 7 row(s) returned 0.000 sec / 0.000 sec

```

This screenshot shows the MySQL Workbench interface with a focus on aggregate functions. The 'Query' tab is active in the top navigation bar. The 'Navigator' pane on the left includes sections for 'MANAGEMENT', 'INSTANCE', 'PERFORMANCE', and 'ADMINISTRATOR'. The 'Information' section under 'ADMINISTRATOR' is expanded, showing a 'Result Grid' table with the results of a query to find the maximum total amount from the 'Orders' table. The 'Output' pane at the bottom displays the execution log for this query, indicating 7 rows returned and a duration of 0.000 seconds.

MySQL Workbench

Local instance MySQL80 x

File Edit View Query Database Server Tools Scripting Help

Navigator SQL File 3* SQL File 4* SQL File 4* SQL File 5* x

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PERFORMANCE

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- Performanc
- Performanc

SQL File 5* x

117 Address = '457 Oak Avenue'

118 WHERE

119 CustomerID = 2;

120

121 • select sum(TotalAmount) from Orders;

122

123 • select avg(TotalAmount) from Orders;

124

125 • select * from inventory;

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

sun(TotalAmount)

7164

Result 1 x

Administrat

Information

No object selected

Action Output

#	Time	Action	Message	Duration / Fetch
1	10:08:43	select * from Animals LIMIT 0, 50000	12 row(s) returned	0.062 sec / 0.000 sec
2	09:53:12	alter table Shelters modify column name varchar(30)	0 row(s) affected Records: 0 Duplicates: 0 Warnings: 0	0.016 sec
3	10:00:00	update animals set status = 1 where id = 'a1e7a7c-b429-41ec-9924-8bb39dd397c8'	0 row(s) affected Rows matched: 1 Changed: 0 Warnings: 0	0.031 sec
4	10:00:00	insert into adoption(animal_id, name, contact, date)	Error Code: 1146. Table 'pet_adoption.adoptions' doesn't exist.	0.016 sec
5	10:03:49	values ('a1e7a7c-b429-41ec-9924-8bb39dd397c8', 'Patalie', 'poodleq...')	3 row(s) returned	0.000 sec / 0.000 sec
6	10:04:05	select * from adoptions LIMIT 0, 50000	Error Code: 1054. Unknown column 'date' in 'where clause'	0.000 sec
7	10:04:45	delete from animals where date = '2024-01-20 10:00:00'	1 row(s) affected	0.031 sec
8	10:05:12	delete from adoptions where date = '2024-01-20 10:00:00'	0 row(s) affected	0.000 sec
9	10:08:19	use TechShop	1 row(s) returned	0.000 sec / 0.000 sec
10	10:08:34	select sum(TotalAmount)from Orders LIMIT 0, 50000	12 row(s) returned	0.000 sec / 0.000 sec

Object Inf

Result 2 x

ENG US 10:08 AM 1/20/2024

MySQL Workbench

Local instance MySQL80 x

File Edit View Query Database Server Tools Scripting Help

Navigator SQL File 3* SQL File 4* SQL File 4* SQL File 5* x

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PERFORMANCE

- Dashboard
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- Performanc

SQL File 5* x

123 • select avg(TotalAmount) from Orders;

124

125 • select max(TotalAmount) from Orders group by TotalAmount;

126

127

128 • select * from inventory;

129

130 • show tables;

131

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

max(TotalAmount)

2602

1815

1331

484

303

Result 3 x

Administrat

Information

No object selected

Action Output

#	Time	Action	Message	Duration / Fetch
1	10:11:28	select max(TotalAmount) from Orders group by TotalAmount LIMIT 0, 50000	7 row(s) returned	0.000 sec / 0.000 sec

Object Inf

Result 4 x

ENG US 10:11 AM 1/20/2024

INNER JOIN :

Syntax :

SELECT column_name(s)

FROM table1

INNER JOIN table2

ON table1.column_name = table2.column_name;

The screenshot shows the MySQL Workbench interface with a query editor window. The SQL tab contains the following code:

```
35 •      (5,10);
36 •      (4,11);
37
38 •      select * from Student;
39 •      select * from StudentCourse;
40
41 •      SELECT StudentCourse.courseid, Student.NAME, Student.AGE FROM Student
42 INNER JOIN StudentCourse
43 ON Student.rollno = StudentCourse.rollno;
44
45
46
```

The results grid shows the following data:

courseid	NAME	AGE
1	Hars	18
2	Pritik	19
2	Riyanka	20
3	Deep	18
1	Saptarshi	19

The output pane shows the following log entries:

Action	Time	Message	Duration / Fetch
Action Output	10 09:05:20	select * from StudentCourse LIMIT 0, 50000 8 row(s) returned	0.000 sec / 0.000 sec
11 09:07:35	SELECT Student.COURSE_ID, Student.NAME, Student.AGE FROM Student INNER JOIN StudentCourse ON Student.r...	Error Code: 1054. Unknown column 'Student.COURSE_ID' in field list'	0.000 sec
12 09:07:59	SELECT Student.courseid, Student.NAME, Student.AGE FROM Student INNER JOIN StudentCourse ON Student.rolln...	Error Code: 1054. Unknown column 'Student.courseid' in field list'	0.000 sec
13 09:08:08	SELECT StudentCourse.courseid, Student.NAME, Student.AGE FROM Student INNER JOIN StudentCourse ON Student...	5 row(s) returned	0.000 sec / 0.000 sec

LEFT JOIN :

Syntax :

SELECT column_name(s)

FROM table1

LEFT JOIN table2

ON table1.column_name = table2.column_name;

MySQL Workbench - Local instance MySQL80

```

File Edit View Query Database Server Tools Scripting Help
Navigator ..... SQL File 3* SQL File 4* SQL File 4* SQL File 5* SQL File 6* x
MANAGEMENT
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  Server Logi
  Options Fil
PERFORMANCE
  Dashboard
  Performanc
  Performanc
ADMINISTRATOR
  Information
  No object selected
  Object Info
Result Grid | Filter Rows: | Export: | Wrap Cell Content: |
NAME courseid
Harsh 1
Pratik 2
Riyanka 2
Deep 3
Saptarshi 1
Dhanya 1
Rohit 1
Nraj 1
Result 6 x
Output
Action Output
# Time Action Message Duration / Fetch
11 09:07:35 SELECT Student.COURSE_ID, Student.NAME, Student.AGE FROM Student INNER JOIN StudentCourse ON Student.r... Error Code: 1054. Unknown column 'Student.COURSE_ID' in field list' 0.000 sec
12 09:07:59 SELECT Student.courseid, Student.NAME, Student.AGE FROM Student INNER JOIN StudentCourse ON Student.r... Error Code: 1054. Unknown column 'Student.courseid' in field list' 0.000 sec
13 09:08:08 SELECT StudentCourse.courseid, Student.NAME, Student.AGE FROM Student INNER JOIN StudentCourse ON Stud... 5 row(s) returned 0.000 sec / 0.000 sec
14 09:09:29 SELECT Student.NAME, StudentCourse.courseid FROM Student LEFT JOIN StudentCourse ON Student.rollno = Stud... 8 row(s) returned 0.000 sec / 0.000 sec
Object Info
Read Only Context Help Snippets
ENG IN 9:09 AM 1/22/2024

```

The screenshot shows the MySQL Workbench interface with a query editor containing the following SQL code:

```

SELECT Student.NAME, StudentCourse.courseid
FROM Student
LEFT JOIN StudentCourse
ON Student.rollno = StudentCourse.rollno;

```

The code has a syntax error in the WHERE clause, specifically in the line `ON Student.rollno = StudentCourse.rollno;`. The application highlights this line in red.

RIGHT JOIN :

Syntax :

```

SELECT column_name(s)
FROM table1
RIGHT JOIN table2
ON table1.column_name = table2.column_name;

```

MySQL Workbench - Local instance MySQL80

```

File Edit View Query Database Server Tools Scripting Help
Navigator ..... SQL File 3* SQL File 4* SQL File 4* SQL File 5* SQL File 6* x
MANAGEMENT
  Server Stats
  Client Conn
  Users and F
  Status and
  Data Export
  Data Import
INSTANCE
  Startup / St
  Server Logi
  Options Fil
PERFORMANCE
  Dashboard
  Performanc
  Performanc
ADMINISTRATOR
  Information
  No object selected
  Object Info
Result Grid | Filter Rows: | Export: | Wrap Cell Content: |
NAME courseid
Harsh 1
Pratik 2
Riyanka 2
Deep 3
Saptarshi 1
Dhanya 1
Rohit 1
Nraj 1
Result 7 x
Output
Action Output
# Time Action Message Duration / Fetch
12 09:07:59 SELECT Student.courseid, Student.NAME, Student.AGE FROM Student INNER JOIN StudentCourse ON Student.r... Error Code: 1054. Unknown column 'Student.courseid' in field list' 0.000 sec
13 09:08:08 SELECT StudentCourse.courseid, Student.NAME, Student.AGE FROM Student INNER JOIN StudentCourse ON Stud... 5 row(s) returned 0.000 sec / 0.000 sec
14 09:09:29 SELECT Student.NAME, StudentCourse.courseid FROM Student LEFT JOIN StudentCourse ON Student.rollno = Stud... 8 row(s) returned 0.000 sec / 0.000 sec
15 09:11:04 SELECT Student.NAME, StudentCourse.courseid FROM Student RIGHT JOIN StudentCourse ON StudentCourse.rollno ... 8 row(s) returned 0.000 sec / 0.000 sec
Object Info
Read Only Context Help Snippets
ENG IN 9:11 AM 1/22/2024

```

The screenshot shows the MySQL Workbench interface with a query editor containing the following SQL code:

```

SELECT Student.NAME, StudentCourse.courseid
FROM Student
RIGHT JOIN StudentCourse
ON Student.rollno = StudentCourse.rollno;

```

The code has a syntax error in the WHERE clause, specifically in the line `ON Student.rollno = StudentCourse.rollno;`. The application highlights this line in red.

SELF JOIN :

Syntax :

```
SELECT column_name(s)
FROM table1 T1, table1 T2
WHERE condition;
```

The screenshot shows the MySQL Workbench interface with a query editor window open. The query is:

```
55     FULL JOIN StudentCourse sc
56     ON Student.rollno = sc.rollno;
57
58 •   SELECT Student.name, StudentCourse.courseid
59     FROM Student,StudentCourse
60     WHERE Student.rollno = StudentCourse.rollno;
61
62
63
64
65
66
```

The results grid displays the following data:

name	coursed
Harsh	1
Pratik	2
Riyanka	2
Deep	3
Saptarhi	1

The output pane shows the execution log:

#	Time	Action	Message	Duration / Fetch
1	09:26:36	SELECT Student.name, StudentCourse.coursed FROM Student FULL JOIN StudentCourse ON Student.rollno = StudentCourse.rollno;	Error Code: 1054. Unknown column 'Student.name' in field list'	0.000 sec
2	09:26:35	SELECT Student.name, sc.coursed FROM Student FULL JOIN StudentCourse sc ON Student.rollno = StudentCourse.rollno;	Error Code: 1054. Unknown column 'Student.name' in field list'	0.000 sec
3	09:33:02	SELECT Student.name, StudentCourse.coursed FROM Student,StudentCourse WHERE Student.rollno = StudentCourse.rollno;	5 row(s) returned	0.000 sec / 0.000 sec

UNION :

Syntax :

```
SELECT column_name(s) FROM table1
UNION
SELECT column_name(s) FROM table2;
```

```

MySQL Workbench
Local instance MySQL80 X
File Edit View Query Database Server Tools Scripting Help
SQL File 3* SQL File 4* SQL File 4* SQL File 5* SQL File 6* SQL File 7*
Limit to 50000 rows
MANAGEMENT
    Server Status
    Client Connections
    Users and Privileges
    Status and System Variable
    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
Result Grid | Filter Rows: | Export: | Wrap Cell Content: |
rollno
1
2
3
4
5
6
7
Result 12 x
Output
Action Output
# Time Action
23 21:20:03 insert into Orders values (10308,2,7,1996-09-18',3),(10309,37,3,'1996-09-19',1),(10310,77,8,'1996-09-20',2)
24 21:20:48 SELECT Customers.CustomerName, Orders.OrderID FROM Customers FULL JOIN Orders ON Customers.CustomerID = Orders.CustomerID
25 21:40:26 SELECT rollno,name FROM Student UNION SELECT coursed FROM StudentCourse
26 21:41:02 SELECT rollno FROM Student UNION SELECT rollno FROM StudentCourse
Message
3 row(s) affected Records: 3 Duplicates: 0 Warnings: 0
Error Code: 1054 Unknown column 'Customers.CustomerName' in field list
Error Code: 1222 The used SELECT statements have a different number of columns
11 row(s) returned
Duration / Fetch
0.031 sec
0.000 sec
0.000 sec
0.047 sec / 0.000 sec
Object Info Session
ENG US 9:41 PM 1/22/2024

```

GROUP BY:

Syntax :

```

SELECT column_name(s)
FROM table_name
WHERE condition
GROUP BY column_name(s)
ORDER BY column_name(s);

```

```

MySQL Workbench
Local instance MySQL80 X
File Edit View Query Database Server Tools Scripting Help
SQL File 3* SQL File 4* SQL File 4* SQL File 5* SQL File 6* SQL File 7*
Limit to 50000 rows
MANAGEMENT
    Server Status
    Client Connections
    Users and Privileges
    Status and System Variable
    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
Result Grid | Filter Rows: | Export: | Wrap Cell Content: |
COUNT
1
1
1
1
1
1
1
1
1
1
Result 1 x
Output
Action Output
# Time Action
25 21:40:26 SELECT rollno,name FROM Student UNION SELECT coursed FROM StudentCourse
26 21:41:02 SELECT rollno FROM Student UNION SELECT rollno FROM StudentCourse
27 21:42:03 use TechShop
28 21:42:13 SELECT COUNT(productid) AS COUNT FROM products GROUP BY price LIMIT 0, 50000
Message
Error Code: 1222 The used SELECT statements have a different number of columns
11 row(s) returned
0 row(s) affected
10 row(s) returned
Duration / Fetch
0.000 sec
0.047 sec / 0.000 sec
0.000 sec
0.016 sec / 0.000 sec
Object Info Session
ENG US 9:42 PM 1/22/2024

```

HAVING :

Syntax :

```
SELECT column_name(s)
FROM table_name
WHERE condition
GROUP BY column_name(s)
HAVING condition
ORDER BY column_name(s)
```

The screenshot shows the MySQL Workbench interface with a query editor window. The code entered is:

```
64  SELECT rollno FROM StudentCourse;
65
66
67 • show databases;
68 • use sisdb;
69
70 • SELECT s.student_id, s.first_name, s.last_name
   FROM Students s
   JOIN Payments p ON s.student_id = p.student_id
   GROUP BY s.student_id, s.first_name, s.last_name HAVING COUNT(p.payment_id) > 0;
71
72
73
74
75
76
```

The result grid displays the following data:

student_id	first_name	last_name
1	John	Doe
2	Alice	Smith
3	Bob	Johnson
4	Emily	Williams
5	Michael	Brown
6	Sophia	Miller
7	Daniel	Davis
8	Olivia	Turner

The output pane shows the following log entries:

#	Time	Action	Message	Duration / Fetch
28	21:42:13	SELECT COUNT(productId) AS COUNT FROM products GROUP BY price LIMIT 0,50000	10 row(s) returned	0.016 sec / 0.000 sec
29	21:45:34	show databases	24 row(s) returned	0.000 sec / 0.000 sec
30	21:45:52	use sisdb	0 row(s) affected	0.000 sec
31	21:46:31	SELECT s.student_id, s.first_name, s.last_name FROM Students s JOIN Payments p ON s.student_id = p.student_id WHERE COUNT(p.payment_id) > 0;	10 row(s) returned	0.062 sec / 0.000 sec

EXISTS :

Syntax :

```
SELECT column_name(s)
FROM table_name
WHERE EXISTS
(SELECT column_name FROM table_name WHERE condition);
```

MySQL Workbench - Local instance MySQL80 X

MANAGEMENT

- Server Status
- Client Connections
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- Status and System Variable
- Data Export
- Data Import/Restore

INSTANCE

- Startup / Shutdown
- Server Logs
- Options File

PERFORMANCE

- Dashboard
- Performance Reports
- Performance Schema Setup

No object selected

Suppliers 14 x

Output

#	Time	Action	Message	Duration / Fetch
30	21:45:52	use sisd	0 row(s) affected	0.000 sec
31	21:46:31	SELECT s.student_id, s.first_name, s.last_name FROM Students s JOIN Payments p ON s.student_id = p.student_id WHERE p.amount > ANY (SELECT sum(amount) FROM Payments WHERE student_id < s.student_id)	10 row(s) returned	0.062 sec / 0.000 sec
32	21:47:16	use joinspract	0 row(s) affected	0.000 sec
33	21:47:26	SELECT SupplierName FROM Suppliers WHERE EXISTS (SELECT ProductName FROM Products WHERE Products.SupplierID = Suppliers.supplierID AND Price < 20)	1 row(s) returned	0.015 sec / 0.000 sec

Object Info Session

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

SupplierName
Exotic Liquid

SQL Additions | Jump to |

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

Result Grid | Form Editor | Read Only | Context Help | Snippets

ENG US 9:47 PM 1/22/2024

ANY :

Syntax :

```
SELECT column_name(s)
FROM table_name
WHERE column_name operator ANY
    (SELECT column_name
     FROM table_name
     WHERE condition);
```

MySQL Workbench - Local instance MySQL80 X

MANAGEMENT

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

INSTANCE

- Startup / Shutdown
- Server Logs
- Options File

PERFORMANCE

- Dashboard
- Performance Reports
- Performance Schema Setup

No object selected

Products 15 x

Output

#	Time	Action	Message	Duration / Fetch
31	21:46:31	SELECT s.student_id, s.first_name, s.last_name FROM Students s JOIN Payments p ON s.student_id = p.student_id WHERE p.amount > ANY (SELECT sum(amount) FROM Payments WHERE student_id < s.student_id)	10 row(s) returned	0.062 sec / 0.000 sec
32	21:47:16	use joinspract	0 row(s) affected	0.000 sec
33	21:47:26	SELECT SupplierName FROM Suppliers WHERE EXISTS (SELECT ProductName FROM Products WHERE Products.SupplierID = Suppliers.supplierID AND Price < 20)	1 row(s) returned	0.015 sec / 0.000 sec
34	21:50:05	SELECT * FROM Products WHERE Price > ANY (SELECT Price FROM Products WHERE SupplierID = 2)	1 row(s) returned	0.047 sec / 0.000 sec

Object Info Session

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

ProductID ProductName SupplierID CategoryID Unit Price
4 Chef Antons Cajun Seasoning 2 2 10 boxes x 20 bags 22

SQL Additions | Jump to |

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

Result Grid | Form Editor | Read Only | Context Help | Snippets

ENG US 9:50 PM 1/22/2024

ALL :

Syntax :

```
SELECT column_name(s)
FROM table_name
WHERE column_name operator ALL
(SELECT column_name
FROM table_name
WHERE condition);
```

The screenshot shows the MySQL Workbench interface with a query editor window. The SQL code is:

```
88 SELECT Price
89   FROM Products
90  WHERE SupplierID = 2
91 ;
92
93 • SELECT *
94   FROM Products
95  WHERE Price > ALL (
96    SELECT Price
97      FROM Products
98     WHERE SupplierID = 1
99 );
100
```

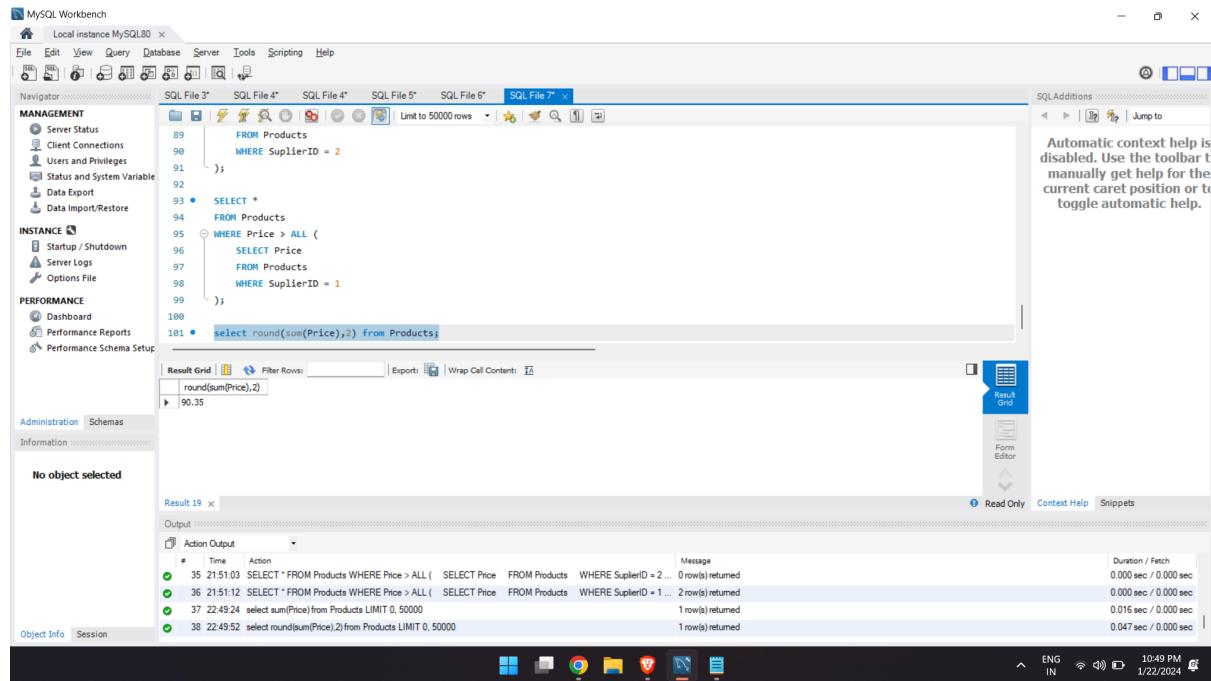
The result grid shows two rows of data:

ProductID	ProductName	SupplierID	CategoryID	Unit	Price
4	Chef Antons Cejun Seasoning	2	2	10 boxes x 20 bags	22
5	Chef Antons Gumbo Mix	2	2	10 boxes x 20 bags	21.35

The output pane shows the execution log:

#	Time	Action	Message	Duration / Fetch
33	21:47:26	SELECT SupplierName FROM Suppliers WHERE EXISTS (SELECT ProductName FROM Products WHERE Pro...	1 row(s) returned	0.015 sec / 0.000 sec
34	21:50:05	SELECT * FROM Products WHERE Price > ANY (SELECT Price FROM Products WHERE SupplierID = 2 ...	1 row(s) returned	0.047 sec / 0.000 sec
35	21:51:03	SELECT * FROM Products WHERE Price > ALL (SELECT Price FROM Products WHERE SupplierID = 2 ...	0 row(s) returned	0.000 sec / 0.000 sec
36	21:51:12	SELECT * FROM Products WHERE Price > ALL (SELECT Price FROM Products WHERE SupplierID = 1 ...	2 row(s) returned	0.000 sec / 0.000 sec

Aggregate Functions :

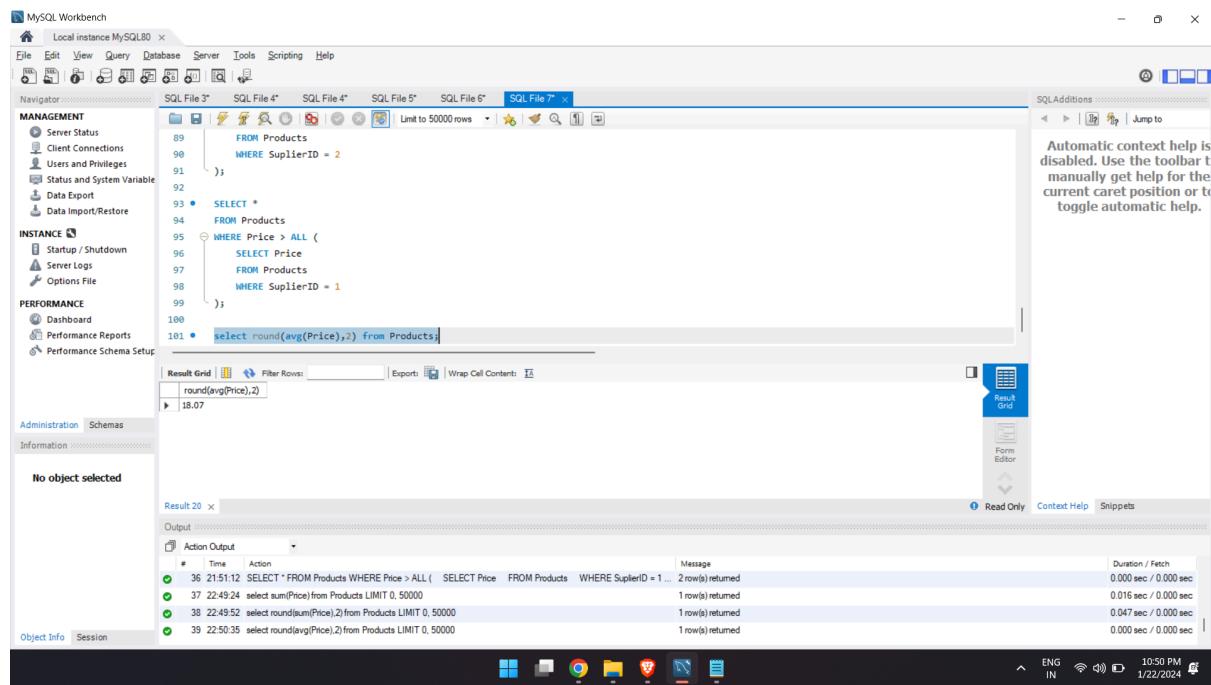


The screenshot shows the MySQL Workbench interface with the following details:

- File Bar:** File, Edit, View, Query, Database, Server, Tools, Scripting, Help.
- Toolbar:** Standard icons for opening files, saving, running queries, and navigating.
- Navigator:** MANAGEMENT (Server Status, Client Connections, Users and Privileges, Status and System Variable, Data Export, Data Import/Restore), INSTANCE (Startup / Shutdown, Server Logs, Options File), PERFORMANCE (Dashboard, Performance Reports, Performance Schema Setup).
- SQL Editor:** Contains the following SQL code:

```
89 FROM Products
90 WHERE SuplierID = 2
91 );
92
93 •   SELECT *
94   FROM Products
95   WHERE Price > ALL (
96     SELECT Price
97     FROM Products
98     WHERE SuplierID = 1
99   );
100
101 •   select round(sum(Price),2) from Products
```
- Result Grid:** Shows the result of the last query: `round(sum(Price),2)` with value `90.35`.
- Action Output:** Displays the execution log with the following entries:

#	Time	Action	Message	Duration / Fetch
35	21:51:03	SELECT * FROM Products WHERE Price > ALL (SELECT Price FROM Products WHERE SuplierID = 1)	0 row(s) returned	0.000 sec / 0.000 sec
36	21:51:12	SELECT * FROM Products WHERE Price > ALL (SELECT Price FROM Products WHERE SuplierID = 1)	2 row(s) returned	0.000 sec / 0.000 sec
37	22:49:24	select sum(Price) from Products LIMIT 0, 50000	1 row(s) returned	0.016 sec / 0.000 sec
38	22:49:52	select round(sum(Price),2) from Products LIMIT 0, 50000	1 row(s) returned	0.047 sec / 0.000 sec
- System Bar:** Shows the system status (ENG IN), date (1/22/2024), and time (10:49 PM).



The screenshot shows the MySQL Workbench interface with the following details:

- File Bar:** File, Edit, View, Query, Database, Server, Tools, Scripting, Help.
- Toolbar:** Standard icons for opening files, saving, running queries, and navigating.
- Navigator:** MANAGEMENT (Server Status, Client Connections, Users and Privileges, Status and System Variable, Data Export, Data Import/Restore), INSTANCE (Startup / Shutdown, Server Logs, Options File), PERFORMANCE (Dashboard, Performance Reports, Performance Schema Setup).
- SQL Editor:** Contains the following SQL code:

```
89 FROM Products
90 WHERE SuplierID = 2
91 );
92
93 •   SELECT *
94   FROM Products
95   WHERE Price > ALL (
96     SELECT Price
97     FROM Products
98     WHERE SuplierID = 1
99   );
100
101 •   select round(avg(Price),2) from Products
```
- Result Grid:** Shows the result of the last query: `round(avg(Price),2)` with value `18.07`.
- Action Output:** Displays the execution log with the following entries:

#	Time	Action	Message	Duration / Fetch
36	21:51:12	SELECT * FROM Products WHERE Price > ALL (SELECT Price FROM Products WHERE SuplierID = 1)	2 row(s) returned	0.000 sec / 0.000 sec
37	22:49:24	select sum(Price) from Products LIMIT 0, 50000	1 row(s) returned	0.016 sec / 0.000 sec
38	22:49:52	select round(sum(Price),2) from Products LIMIT 0, 50000	1 row(s) returned	0.047 sec / 0.000 sec
39	22:50:35	select round(avg(Price),2) from Products LIMIT 0, 50000	1 row(s) returned	0.000 sec / 0.000 sec
- System Bar:** Shows the system status (ENG IN), date (1/22/2024), and time (10:50 PM).

Subqueries :

MySQL Workbench - Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator SQL File 3* SQL File 4* SQL File 4* SQL File 5* SQL File 6* SQL File 7*

MANAGEMENT

- Server Status
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- Users and Privileges
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- Data Import/Restore

INSTANCE

- Startup / Shutdown
- Server Logs
- Options File

PERFORMANCE

- Dashboard
- Performance Reports
- Performance Schema Setup

Administration Schemas Information

No object selected

Courier 16 x

Output

Action Output

#	Time	Action	Message	Duration / Fetch
39	22:50:35	select round(avg(price),2) from Products LIMIT 0, 50000	1 row(s) returned	0.000 sec / 0.000 sec
40	22:56:21	show databases	24 row(s) returned	0.016 sec / 0.000 sec
41	22:56:37	use couriers	0 row(s) affected	0.000 sec
42	22:57:24	SELECT * FROM Courier WHERE Weight > (SELECT AVG(Weight) FROM Courier) LIMIT 0, 50000	2 row(s) returned	0.015 sec / 0.000 sec

Object Info Session

Result Grid | Filter Rows: | Export: | Wrap Cell Content: | Read Only | Context Help | Snippets

11:01 PM 1/22/2024 ENG IN

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

```
67 • show databases;
68 • use sisdb;
69
70 • SELECT s.student_id, s.first_name, s.last_name
FROM Students s
JOIN Payments p ON s.student_id = p.student_id
GROUP BY s.student_id, s.first_name, s.last_name HAVING COUNT(p.payment_id) > 0;
71
72
73
74
75 • show databases;
76 • use couriers;
77
78 • SELECT * FROM Courier WHERE Weight > (SELECT AVG(Weight) FROM Courier);
79
```

MySQL Workbench - Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator SQL File 3* SQL File 4* SQL File 4* SQL File 5* SQL File 6* SQL File 7*

MANAGEMENT

- Server Status
- Client Connections
- Users and Privileges
- Status and System Variable
- 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

Result 17 x

Output

Action Output

#	Time	Action	Message	Duration / Fetch
43	22:59:21	SELECT SUM(Cost) AS TotalCost FROM Courier Services WHERE Cost < (SELECT MAX(Cost) FROM Courier ...	Error Code: 1054. You have an error in your SQL syntax; check the manual that corresponds to your MySQL server ...	0.000 sec
44	23:00:18	SELECT SUM(Cost) AS TotalCost FROM Courier Services WHERE Cost < (SELECT MAX(Cost) FROM Courier S...	Error Code: 1054. Unknown column 'Cost' in field list'	0.000 sec
45	23:00:38	SELECT SUM(Cost) AS TotalCost FROM Courier Services WHERE Cost < (SELECT MAX(Cost) FROM CourierS...	Error Code: 1054. Unknown column 'Cost' in field list'	0.000 sec
46	23:01:03	SELECT SUM(Cost) AS TotalCost FROM CourierServices WHERE Cost < (SELECT MAX(Cost) FROM CourierSe...	1 row(s) returned	0.047 sec / 0.000 sec

Object Info Session

Result Grid | Filter Rows: | Export: | Wrap Cell Content: | Read Only | Context Help | Snippets

11:01 PM 1/22/2024 ENG IN

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

```
69
70 • SELECT s.student_id, s.first_name, s.last_name
FROM Students s
JOIN Payments p ON s.student_id = p.student_id
GROUP BY s.student_id, s.first_name, s.last_name HAVING COUNT(p.payment_id) > 0;
71
72
73
74
75 • show databases;
76 • use couriers;
77
78 • SELECT * FROM Courier WHERE Weight > (SELECT AVG(Weight) FROM Courier);
79
80 • SELECT SUM(Cost) AS TotalCost FROM CourierServices WHERE Cost < (SELECT MAX(Cost) FROM CourierServices);
81
```