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Date : 18 Jan 2024  
Topics : SQL hands on Practice  
Batch : Data Engineering Batch-1

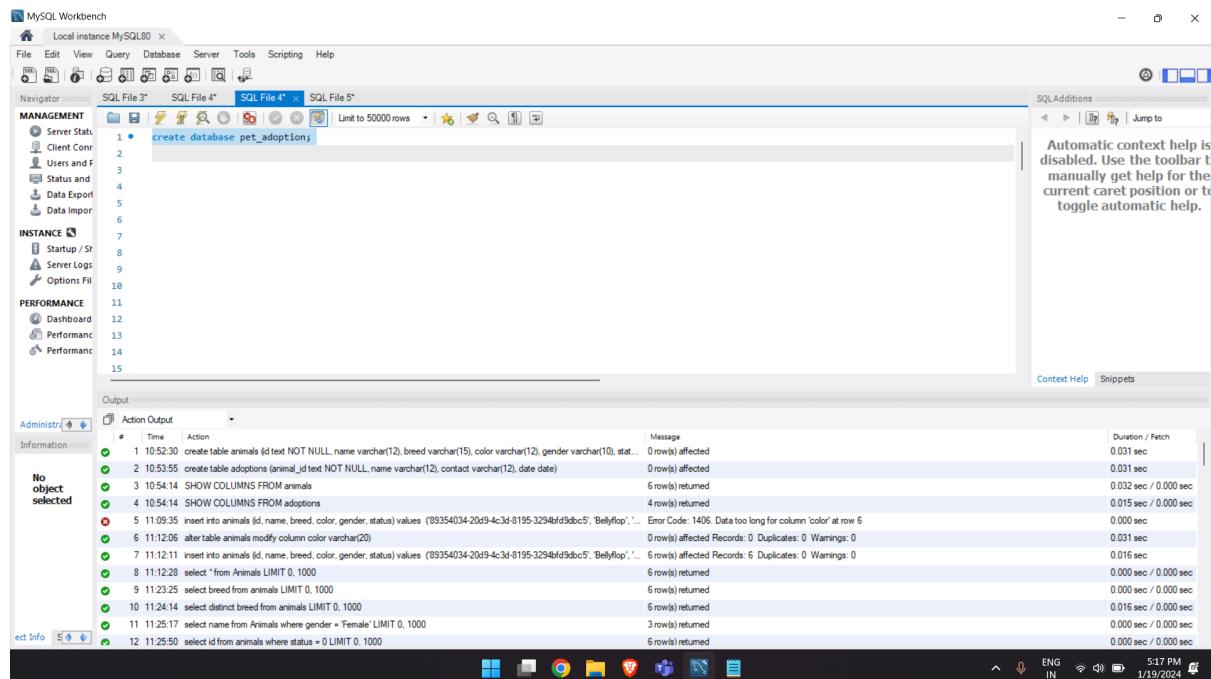
## SQL hands on Practice

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 with the following details:

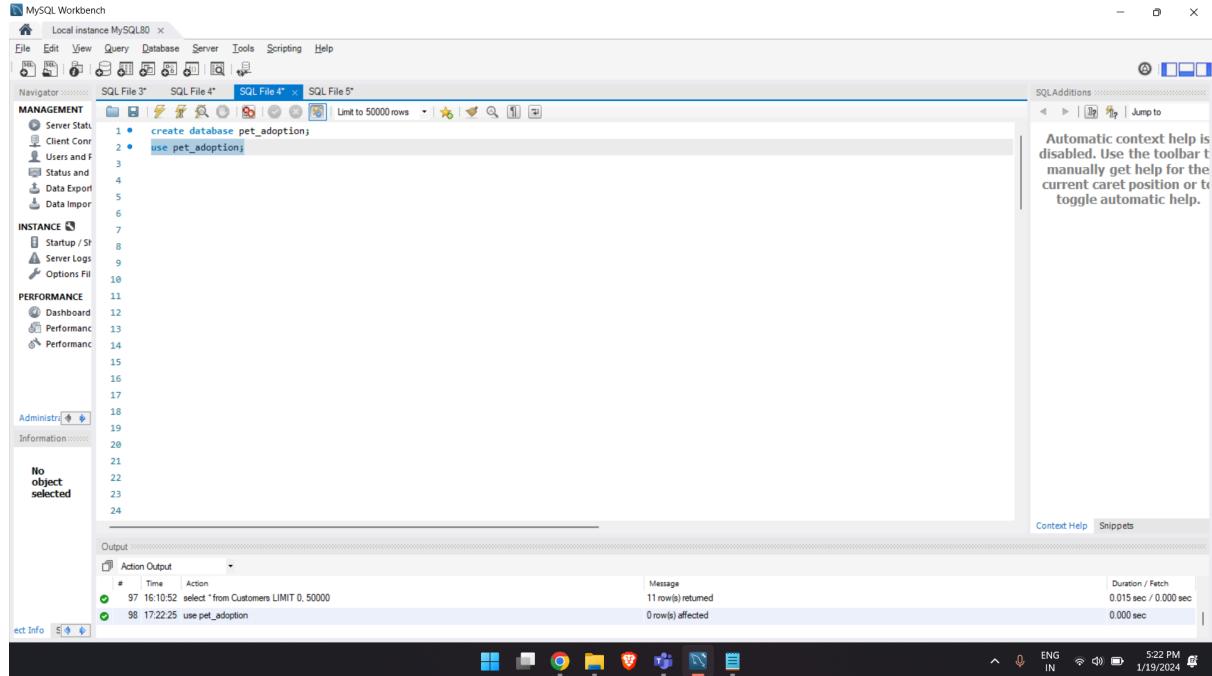
- File Bar:** Local instance MySQL80, File, Edit, View, Query, Database, Server, Tools, Scripting, Help.
- Navigator:** MANAGEMENT (Server Status, Client Conn, Users and F...), INSTANCE (Startup / S..., Server Logs, Options Fil...), PERFORMANCE (Dashboard, Performance, Perfomance).
- SQL Editor:** SQL File 4\*, SQL File 5\*. The SQL code is:

```
1 • create database pet_adoption;
2
3
4
5
6
7
8
9
10
11
12
13
14
15
```
- Output Window:** Action Output table showing the execution of the SQL statements:

#	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-0195-3294bf9dbc5', '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-0195-3294bf9dbc5', '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	11:23:25	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
- System Tray:** ENG IN, 5:17 PM, 1/19/2024

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\*

MANAGEMENT

- Server Status
- Client Conn
- Users and F
- Status and
- Data Export
- Data Import

INSTANCE

- Startup / Sf
- Server Logs
- Options Fil

PERFORMANCE

- 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

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	use pet_adoption;	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

524 PM 1/19/2024 ENG IN

## 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\*

MANAGEMENT

- Server Status
- Client Conn
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- Status and
- Data Export
- Data Import

INSTANCE

- Startup / Sf
- Server Logs
- Options Fil

PERFORMANCE

- Dashboard
- Performance
- Performance

Administrat

No object selected

Information

Action Output

```

1 • create database pet_adoption;
2 • use pet_adoption;
3
4 • show tables;
5

```

Result Grid | Filter Rows: Tables\_in\_pet\_adoption

Tables_in_pet_adoption
adoptions
animals
shelters

Result 20 x

Output

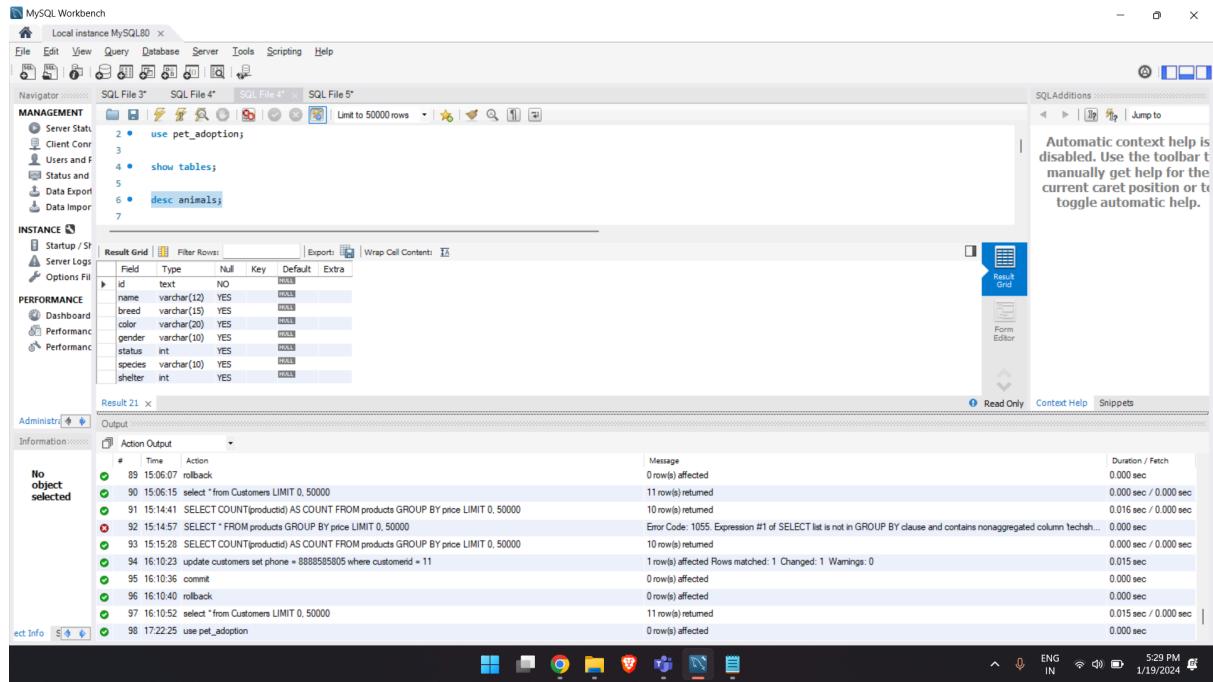
Time	Action	Message	Duration / Fetch
82 15:04:01	rollback	0 row(s) affected	0.000 sec
83 15:04:01	rollback	0 row(s) affected	0.000 sec
84 15:04:13	selected * from products LIMIT 0, 50000	10 row(s) returned	0.000 sec / 0.000 sec
85 15:04:19	selected * from inventory LIMIT 0, 50000	10 row(s) returned	0.000 sec / 0.000 sec
86 15:04:29	selected * 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	selected * 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	selected * 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

Result Grid Form Editor Read Only Context Help Snippets

529 PM 1/19/2024 ENG IN

## 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

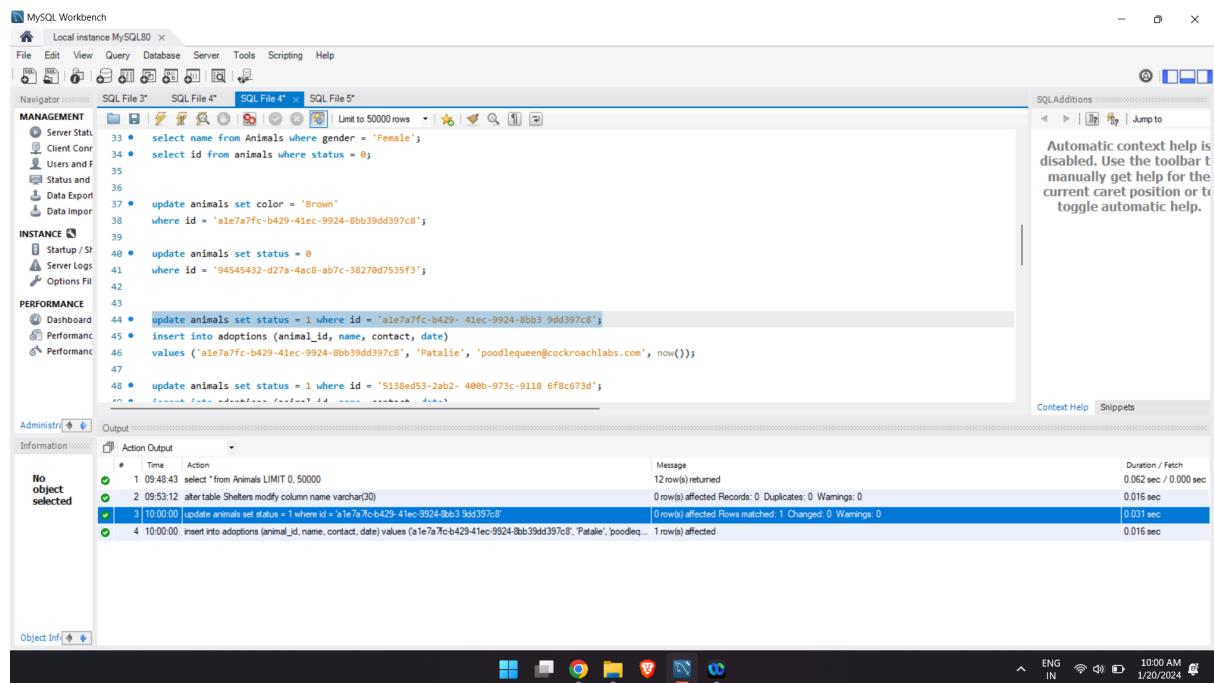
## Update table :

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
Navigator SQL File 3* SQL File 4* SQL File 4* SQL File 5*
MANAGEMENT
  Server Stats
  Client Conn
  Users and F...
  Status and ...
  Data Export
  Data Import
INSTANCE
  Startup / S...
  Server Logs
  Options Fil...
PERFORMANCE
  Dashboard
  Performanc...
  Performanc...
ADMINISTRATOR
  Information
    No object selected
  Object Info
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 selected, showing a table with 'No object selected'. The 'Object Info' button is also present. The main area contains a SQL editor with the following code:

```

89 •      select * from animals;
90 •      select * from adoptions;
91 •
92 •
93 •      create database Animals;
94 •      create database Animals;
95
96
97 •      delete from adoptions where date = '2024-01-20 10:00:00';
98
99
100
101
102
103
104

```

The status bar at the bottom right shows 'ENG IN 10:05 AM 1/20/2024'.

## 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
Navigator SQL File 3* SQL File 4* SQL File 4* SQL File 5*
MANAGEMENT
  Server Stats
  Client Conn
  Users and F...
  Status and ...
  Data Export
  Data Import
INSTANCE
  Startup / S...
  Server Logs
  Options Fil...
PERFORMANCE
  Dashboard
  Performanc...
  Performanc...
ADMINISTRATOR
  Information
    No object selected
  Object Info
Output
Result Grid | Filter Rows: | Export: | Wrap Cell Content: | Result Grid | Read Only | Context Help Snippets
max(TotalAmount)
▶ 2602
1815
1331
484
303
Result 5 x
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

```

The screenshot shows the MySQL Workbench interface. The 'Query' tab is active in the top navigation bar. The 'Navigator' pane on the left lists 'MANAGEMENT', 'INSTANCE', 'PERFORMANCE', and 'ADMINISTRATOR' sections. The 'Information' section under 'ADMINISTRATOR' is selected, showing a table with 'No object selected'. The 'Object Info' button is also present. The main area contains a SQL editor with the following code:

```

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

```

The status bar at the bottom right shows 'ENG US 10:11 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

MANAGEMENT

- Server Status
- Client Conn
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- Status and
- Data Export
- Data Import

INSTANCE

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- Server Logs
- Options Fil

PERFORMANCE

- Dashboard
- Performanc
- Performanc

Result 1 X

Output

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-9524-8bb39dd397c8'	0 row(s) affected Rows matched: 1 Changed: 1 Warnings: 0	0.031 sec
4	10:00:00	insert into adoption(animal_id, name, contact, date)	values ('a1e7a7c-b429-41ec-9524-8bb39dd397c8', 'Patalie', 'poolieg...')	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
9	10:08:19	use TechShop	0 row(s) affected	0.000 sec
10	10:08:34	select sum(TotalAmount) from Orders LIMIT 0, 50000	1 row(s) returned	0.000 sec / 0.000 sec

Object Inf X

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

SQLAdditions Read Only Context Help Snippets

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

MANAGEMENT

- Server Status
- Client Conn
- Users and F
- Status and
- Data Export
- Data Import

INSTANCE

- Startup / Sf
- Server Logs
- Options Fil

PERFORMANCE

- Dashboard
- Performanc
- Performanc

Result 3 X

Output

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 X

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

SQLAdditions Read Only Context Help Snippets

ENG US 10:11 AM 1/20/2024