

Title: Introduction to MySQL

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Instructions: Fill in your answers in the space after each section. Include pictures of the query outputs where applicable.

What is SQL how it is useful

SQL is a computer language for storing, manipulating and retrieving data from a relational database.

It is mainly used as a:

1. Data definition language- To define and modify the structure of data. The commands here are used to add, remove or modify tables. One can create and structure a database here and drop it later.
2. Data control language- It mainly controls the permissions and rights to perform certain actions on the database.
3. Data manipulation language- These commands are used to make changes in a database; insert, update, delete.
4. Client server language and structuring internet architecture- Builds a connection between front-end to back-end, lending assistance to the design.

Subcounty Population density

SQL statement to display specific columns the county name, subcounty name, total population, square kilometers and population density for all records.

```
SELECT county_name, subcounty_name, total, square_kms, pop_density FROM  
subcounty_population_density;
```

MySQL Workbench

Local instance MySQL80 x unconnected x

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

Administration Schemas

Information

No object selected

SQL File 1* SQL File 2* SQL File 3* SQL File 5*

```

366 ("Nairobi", "MATHARE", 206564, 106522, 100028, 3, 68940),
367 (
Execute the selected portion of the script or everything, if there is no selection
368 ("Nairobi", "STAREHE", 210423, 109173, 101238, 21, 10205),
369 ("Nairobi", "WESTLANDS", 308854, 153818, 155021, 98, 3167);
370 SELECT * FROM subcounty_population_density;
371 SELECT county_name, subcounty_name, total, square_kms, pop_density FROM subcounty_population_density;

```

Result Grid

county_name	subcounty_name	total	square_kms	pop_density
Mombasa	CHANGAMWE	131882	18	7457
Mombasa	JOMU	163415	37	4432
Mombasa	KISALINI	291930	88	3328
Mombasa	LIKONI	250358	40	6187
Mombasa	MVITA	154171	15	10543
Mombasa	NYALI	216577	23	9610
Kwale	KINANGO	94220	1612	58

subcounty_population_density 3 x

Output

Action Output

#	Time	Action	Message	Duration / Fetch
2	13:35:15	use new	0 row(s) affected	0.000 sec
3	13:35:15	SHOW TABLES	0 row(s) returned	0.094 sec / 0.000 sec
4	13:35:15	CREATE TABLE subcounty_population_density (id INT NOT NULL AUTO_INCREMENT P...	0 row(s) affected	1.218 sec
5	13:35:17	INSERT INTO subcounty_population_density (county_name, subcounty_name, total, male, ...	350 row(s) affected Records: 350 Duplicates: 0 Warnings: 0	0.219 sec
6	13:36:04	SELECT * FROM subcounty_population_density LIMIT 0, 1000	350 row(s) returned	0.000 sec / 0.000 sec
7	13:37:52	SELECT county_name, subcounty_name, total, square_kms, pop_density FROM subcounty...	350 row(s) returned	0.000 sec / 0.000 sec

Query Completed

Type here to search

1:37 PM 3/9/2022

SQL Query to display the county_name, subcounty_name, total, male, female sorted by female population. Subcounty with highest female population is on top.

SELECT county_name, subcounty_name, total, male, female FROM subcounty_population_density ORDER BY female DESC;

MySQL Workbench

Local instance MySQL80 x unconnected x

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No object selected

SQL File 1* SQL File 2* SQL File 3* SQL File 5*

```

367 ("Nairobi", "NJIRU", 626482, 307642, 318809, 130, 4821),
368 (
Execute the selected portion of the script or everything, if there is no selection
369 ("Nairobi", "WESTLANDS", 308854, 153818, 155021, 98, 3167);
370 SELECT * FROM subcounty_population_density;
371 SELECT county_name, subcounty_name, total, square_kms, pop_density FROM subcounty_population_density;
372 SELECT county_name, subcounty_name, total, male, female FROM subcounty_population_density ORDER BY female DESC;

```

Result Grid

county_name	subcounty_name	total	male	female
Nairobi	EMBAKASI	988808	492476	496270
Nairobi	KASARANI	780656	381234	399385
Nairobi	NJIRU	626482	307642	318809
Nairobi	DAGORETTI	434208	217651	216526
Tharaka Nithi	THARAKANITHI	393177	193764	199406
Kiambu	RUIRU	371111	180947	190144
Nakuru	NAIVASHA	355383	179222	176132

subcounty_population_density 4 x

Output

Action Output

#	Time	Action	Message	Duration / Fetch
3	13:35:15	SHOW TABLES	0 row(s) returned	0.094 sec / 0.000 sec
4	13:35:15	CREATE TABLE subcounty_population_density (id INT NOT NULL AUTO_INCREMENT P...	0 row(s) affected	1.218 sec
5	13:35:17	INSERT INTO subcounty_population_density (county_name, subcounty_name, total, male, ...	350 row(s) affected Records: 350 Duplicates: 0 Warnings: 0	0.219 sec
6	13:36:04	SELECT * FROM subcounty_population_density LIMIT 0, 1000	350 row(s) returned	0.000 sec / 0.000 sec
7	13:37:52	SELECT county_name, subcounty_name, total, square_kms, pop_density FROM subcounty...	350 row(s) returned	0.000 sec / 0.000 sec
8	13:38:41	SELECT county_name, subcounty_name, total, male, female FROM subcounty_population...	350 row(s) returned	0.000 sec / 0.000 sec

Query Completed

Type here to search

1:38 PM 3/9/2022

SQL query to calculate total population of all sub counties. (Use SQL aggregate functions)

```
SELECT SUM(total) FROM subcounty_population_density;
```

The screenshot shows the MySQL Workbench interface. The SQL editor contains the following queries:

```
368 ("Nairobi", "STARBUCK", 210423, 109173, 101238, 21, 10205),
369 (Execute the selected portion of the script or everything, if there is no selection)
370 SELECT * FROM subcounty_population_density;
371 SELECT county_name, subcounty_name, total, square_kms, pop_density FROM subcounty_population_density;
372 SELECT county_name, subcounty_name, total, male, female FROM subcounty_population_density ORDER BY female DESC;
373 SELECT SUM(total) FROM subcounty_population_density;
```

The Result Grid shows the output of the last query:

SUM(total)
47957473

The Action Output pane shows the execution log:

#	Time	Action	Message	Duration / Fetch
4	13:35:15	CREATE TABLE subcounty_population_density (id INT NOT NULL AUTO_INCREMENT P...	0 row(s) affected	1.218 sec
5	13:35:17	INSERT INTO subcounty_population_density (county_name, subcounty_name, total, male, ...	350 row(s) affected Records: 350 Duplicates: 0 Warnings: 0	0.219 sec
6	13:36:04	SELECT * FROM subcounty_population_density LIMIT 0, 1000	350 row(s) returned	0.000 sec / 0.000 sec
7	13:37:52	SELECT county_name, subcounty_name, total, square_kms, pop_density FROM subcounty...	350 row(s) returned	0.000 sec / 0.000 sec
8	13:38:41	SELECT county_name, subcounty_name, total, male, female FROM subcounty_population_...	350 row(s) returned	0.000 sec / 0.000 sec
9	13:40:12	SELECT SUM(total) FROM subcounty_population_density LIMIT 0, 1000	1 row(s) returned	0.031 sec / 0.000 sec

SQL query that retrieves the county_name, the average population density of the subcounties. Order the retrieved results by county name first and then population density descending. (Group by aggregate function)

```
SELECT county_name, pop_density FROM subcounty_population_density ORDER BY pop_density DESC;
```

The screenshot shows MySQL Workbench with several SQL queries in the editor. The result grid displays the following data:

county_name	pop_density
Nairobi	68940
Nairobi	25455
Nairobi	16150
Nairobi	15311
Nairobi	14908
Nairobi	11460
Mombasa	10543

The Action Output pane shows the following messages:

#	Time	Action	Message	Duration / Fetch
5	13:35:17	INSERT INTO subcounty_population_density (county_name, subcounty_name, total, male, ...	350 row(s) affected Records: 350 Duplicates: 0 Warnings: 0	0.219 sec
6	13:36:04	SELECT * FROM subcounty_population_density LIMIT 0, 1000	350 row(s) returned	0.000 sec / 0.000 sec
7	13:37:52	SELECT county_name, subcounty_name, total, square_kms, pop_density FROM subcounty...	350 row(s) returned	0.000 sec / 0.000 sec
8	13:38:41	SELECT county_name, subcounty_name, total, male, female FROM subcounty_population_...	350 row(s) returned	0.000 sec / 0.000 sec
9	13:40:12	SELECT SUM(total) FROM subcounty_population_density LIMIT 0, 1000	1 row(s) returned	0.031 sec / 0.000 sec
10	13:40:55	SELECT county_name, pop_density FROM subcounty_population_density ORDER BY pop_...	350 row(s) returned	0.000 sec / 0.000 sec

SQL query to retrieve rows where the subcounty is in Nyandarua county. Notice some of these subcounties have typing mistakes. Update the names of the subcounties without typing mistakes. (SQL UPDATE query)

`SELECT county_name, subcounty_name FROM subcounty_population_density WHERE county_name = "Nyandarua";`

The screenshot shows MySQL Workbench with a SQL query editor and a results grid. The query is:

```

370 SELECT * FROM subcounty_population_density;
371 SELECT county_name, subcounty_name, total, square_kms, pop_density FROM subcounty_population_density;
372 SELECT county_name, subcounty_name, total, male, female FROM subcounty_population_density ORDER BY female DESC;
373 SELECT SUM(total) FROM subcounty_population_density;
374 SELECT county_name, pop_density FROM subcounty_population_density ORDER BY pop_density DESC;
375 SELECT county_name, subcounty_name FROM subcounty_population_density WHERE county_name = "Nyandarua";

```

The results grid shows the following data:

county_name	subcounty_name
Nyandarua	KINANGOP
Nyandarua	NYANDARUASOUTH
Nyandarua	MIRANGINE
Nyandarua	KIPIPIRI
Nyandarua	NYANDARUACENTRAL
Nyandarua	NYANDARUAWEST
Nyandarua	NYANDARUANORTH

The action output shows the following messages:

#	Time	Action	Message	Duration / Fetch
7	13:37:52	SELECT county_name, subcounty_name, total, square_kms, pop_density FROM subcounty...	350 row(s) returned	0.000 sec / 0.000 sec
8	13:38:41	SELECT county_name, subcounty_name, total, male, female FROM subcounty_populatio...	350 row(s) returned	0.000 sec / 0.000 sec
9	13:40:12	SELECT SUM(total) FROM subcounty_population_density LIMIT 0, 1000	1 row(s) returned	0.031 sec / 0.000 sec
10	13:40:55	SELECT county_name, pop_density FROM subcounty_population_density ORDER BY pop...	350 row(s) returned	0.000 sec / 0.000 sec
11	13:41:38	SELECT county_name, subcounty_name FROM subcounty_population_density WHERE co...	Error Code: 1054. Unknown column "Nyandarua" in 'where clause'	0.047 sec
12	13:42:00	SELECT county_name, subcounty_name FROM subcounty_population_density WHERE co...	8 row(s) returned	0.016 sec / 0.000 sec

UPDATE subcounty_population_density SET subcounty_name = "NYANDARUA SOUTH" WHERE subcounty_name = "NYANDARUASOUTH";

UPDATE subcounty_population_density SET subcounty_name = "NYANDARUA CENTRAL" WHERE subcounty_name = "NYANDARUACENTRAL";

UPDATE subcounty_population_density SET subcounty_name = "NYANDARUA WEST" WHERE subcounty_name = "NYANDARUAWEST";

UPDATE subcounty_population_density SET subcounty_name = "NYANDARUA WEST" WHERE subcounty_name = "NYANDARUAWEST";

UPDATE subcounty_population_density SET subcounty_name = "NYANDARUA NORTH" WHERE subcounty_name = "NYANDARUANORTH";

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Administration Schemas

No object selected

```
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367
368 ("Nairobi", "STAREHE", 210423, 109173, 101238, 21, 10205),
369 ("Nairobi", "WESTLANDS", 308854, 153818, 155021, 90, 3167);
370 SELECT * FROM subcounty_population_density;
371 SELECT county_name, subcounty_name, total, square_kms, pop_density FROM subcounty_population_density;
372 SELECT county_name, subcounty_name, total, male, female FROM subcounty_population_density ORDER BY female DESC;
373 SELECT SUM(total) FROM subcounty_population_density;
374 SELECT county_name, pop_density FROM subcounty_population_density ORDER BY pop_density DESC;
375 SELECT county_name, subcounty_name FROM subcounty_population_density WHERE county_name = "Nyandarua";
376 UPDATE subcounty_population_density SET subcounty_name = "NYANDARUA SOUTH" WHERE subcounty_name = "NYANDARUASOUTH";
377 UPDATE subcounty_population_density SET subcounty_name = "NYANDARUA CENTRAL" WHERE subcounty_name = "NYANDARUACENTRAL";
378 UPDATE subcounty_population_density SET subcounty_name = "NYANDARUA WEST" WHERE subcounty_name = "NYANDARUAWEST";
379 UPDATE subcounty_population_density SET subcounty_name = "NYANDARUA WEST" WHERE subcounty_name = "NYANDARUAWEST";
380 UPDATE subcounty_population_density SET subcounty_name = "NYANDARUA NORTH" WHERE subcounty_name = "NYANDARUANORTH";
381
```

Output

Action Output

#	Time	Action	Message	Duration / Fetch
3	13:51:20	UPDATE subcounty_population_density SET subcounty_name = "NYANDARUA SOUTH" W...	1 row(s) affected Rows matched: 1 Changed: 1 Warnings: 0	0.078 sec
4	13:52:01	UPDATE subcounty_population_density SET subcounty_name = "NYANDARUA SOUTH" W...	0 row(s) affected Rows matched: 0 Changed: 0 Warnings: 0	0.000 sec
5	13:52:01	UPDATE subcounty_population_density SET subcounty_name = "NYANDARUA CENTRAL" W...	1 row(s) affected Rows matched: 1 Changed: 1 Warnings: 0	0.031 sec
6	13:52:01	UPDATE subcounty_population_density SET subcounty_name = "NYANDARUA WEST" W...	1 row(s) affected Rows matched: 1 Changed: 1 Warnings: 0	0.063 sec
7	13:52:01	UPDATE subcounty_population_density SET subcounty_name = "NYANDARUA WEST" W...	0 row(s) affected Rows matched: 0 Changed: 0 Warnings: 0	0.000 sec
8	13:52:01	UPDATE subcounty_population_density SET subcounty_name = "NYANDARUA NORTH" W...	1 row(s) affected Rows matched: 1 Changed: 1 Warnings: 0	0.062 sec