CORONA VIRUS ANALYSIS WITH SQL

EXECUTED BY

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Batch Name:
MIP-DA-07

PROJECT OVERVIEW

- The COVID-19 pandemic has profoundly affected public health, necessitating data-driven insights to comprehend its spread.

- As a data analyst, the task is to analyze a COVID-19 dataset using SQL to derive meaningful insights and present findings effectively.

OBJECTIVE

The objective is to gain a deeper understanding of the COVID-19 pandemic's impact through SQL data analysis. Key metrics such as confirmed cases, deaths, and recoveries will be examined to identify trends, patterns, and correlations in the spread of the virus.

DATASET DESCRIPTION

Description of each column in the dataset (Corona Virus Dataset)

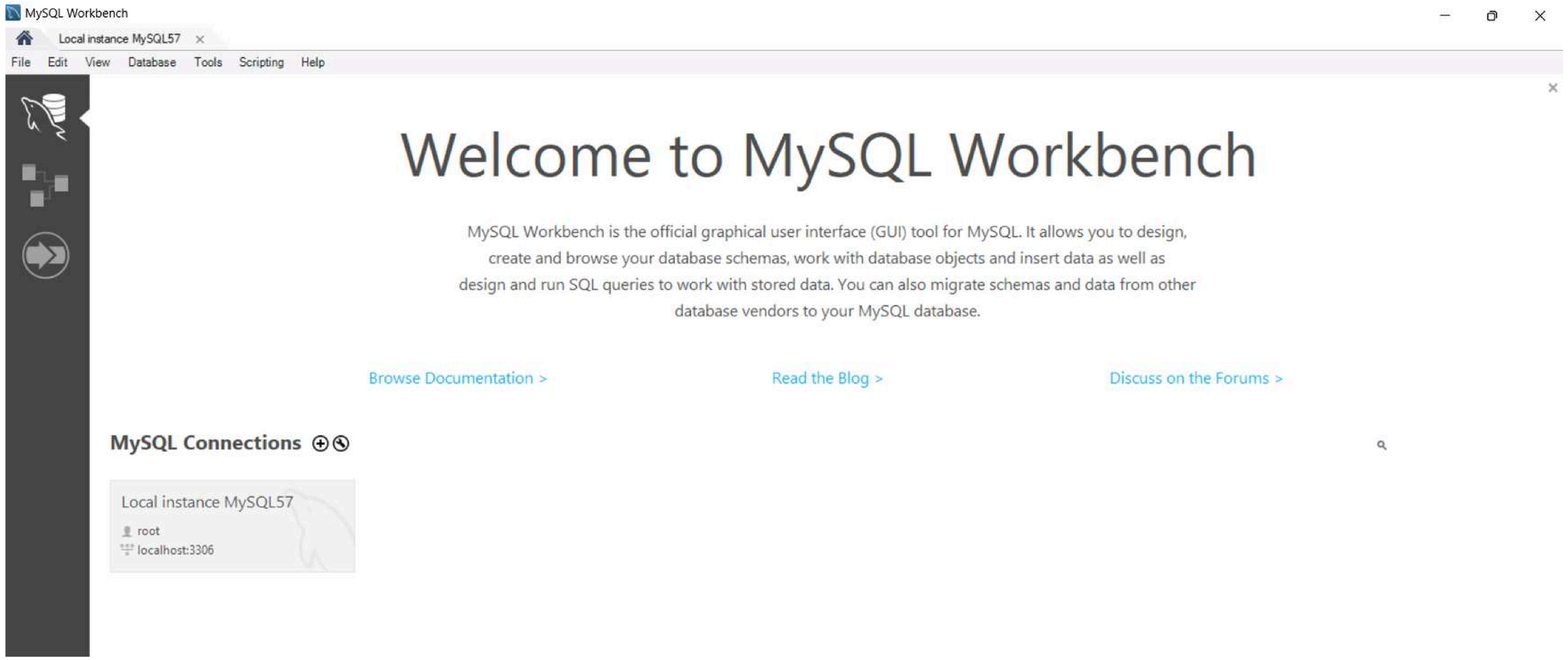
- Province: Geographic subdivision within a country/region.
- Country/Region: Geographic entity where data is recorded.
- Latitude: North-south position on Earth's surface.
- Longitude: East-west position on Earth's surface.
- Date: Recorded date of CORONA VIRUS data.
- Confirmed: Number of diagnosed CORONA VIRUS cases.
- Deaths: Number of CORONA VIRUS-related deaths.
- Recovered: Number of recovered CORONA VIRUS cases

DATABASE SETUP AND TOOL UTILIZED

Let's get into it!

DATABASE SETUP

The database management system utilized is MySQL Workbench.



Welcome to MySQL Workbench

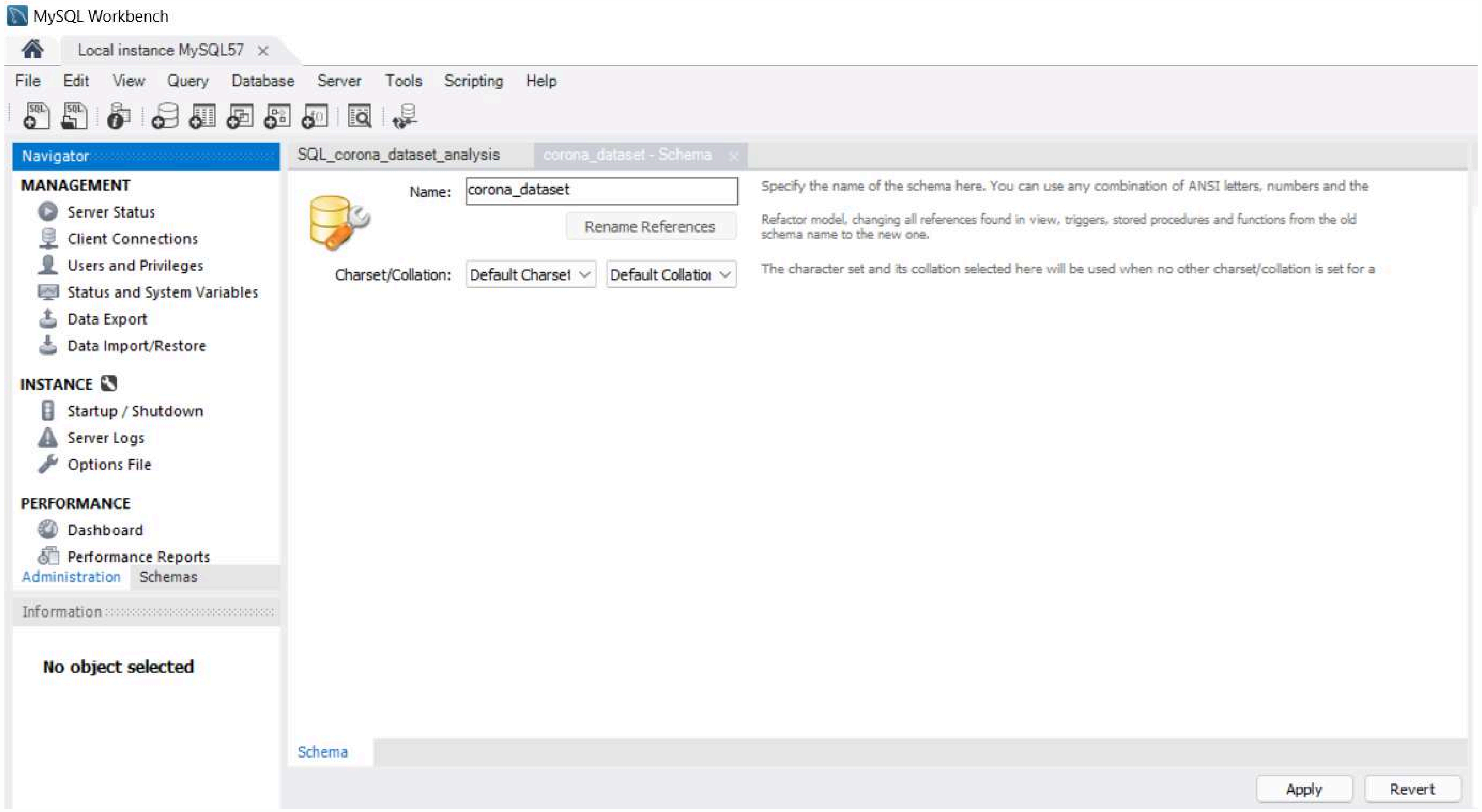
MySQL Workbench is the official graphical user interface (GUI) tool for MySQL. It allows you to design, create and browse your database schemas, work with database objects and insert data as well as design and run SQL queries to work with stored data. You can also migrate schemas and data from other database vendors to your MySQL database.

MySQL Connections

Local instance MySQL57
root
localhost:3306

CREATING DATABASE

The database name is "corona_dataset".



Name: corona_dataset

Specify the name of the schema here. You can use any combination of ANSI letters, numbers and the

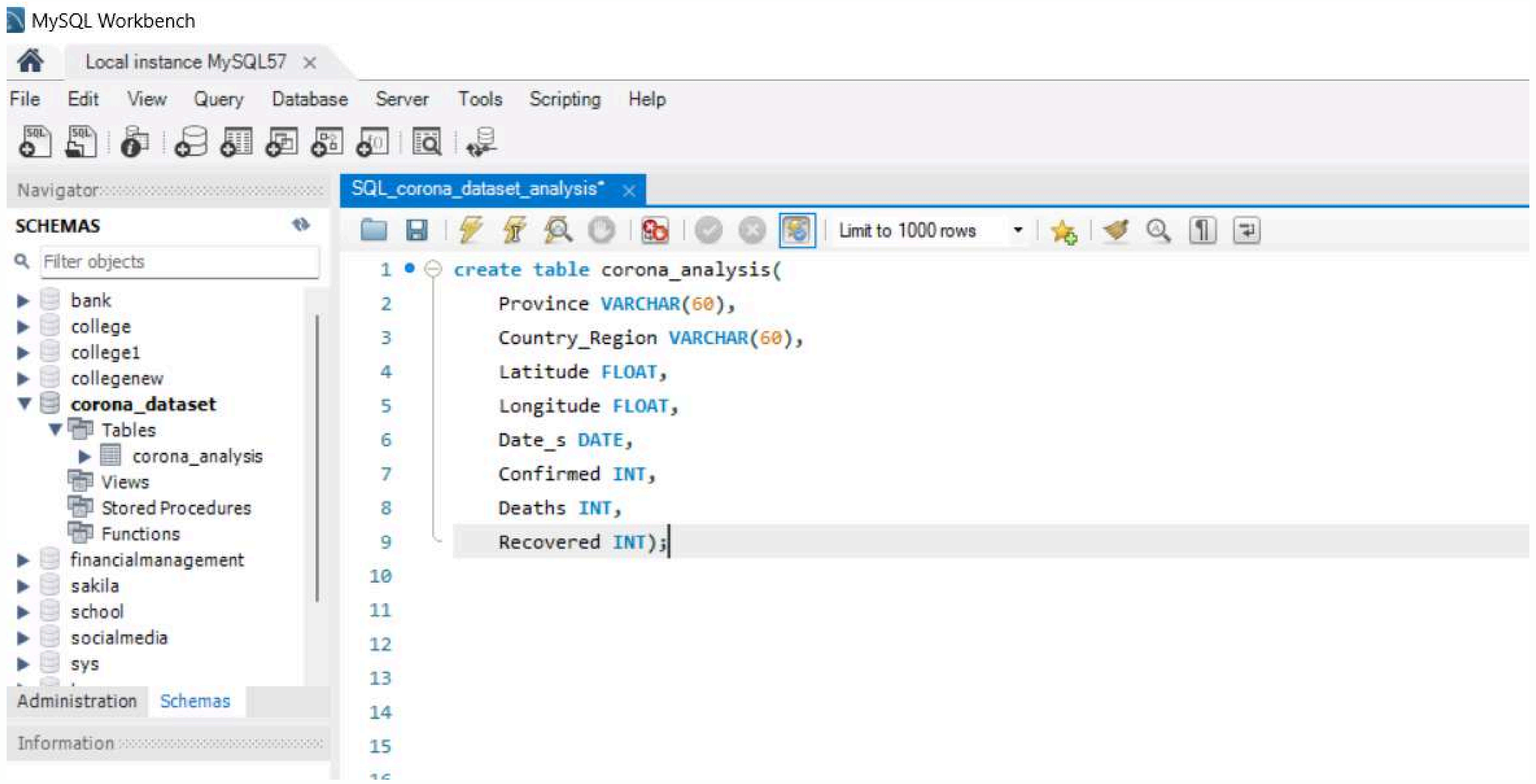
Refactor model, changing all references found in view, triggers, stored procedures and functions from the old schema name to the new one.

Charset/Collation: Default Charset Default Collation

The character set and its collation selected here will be used when no other charset/collation is set for a

CREATING TABLE AND DATA IMPORT

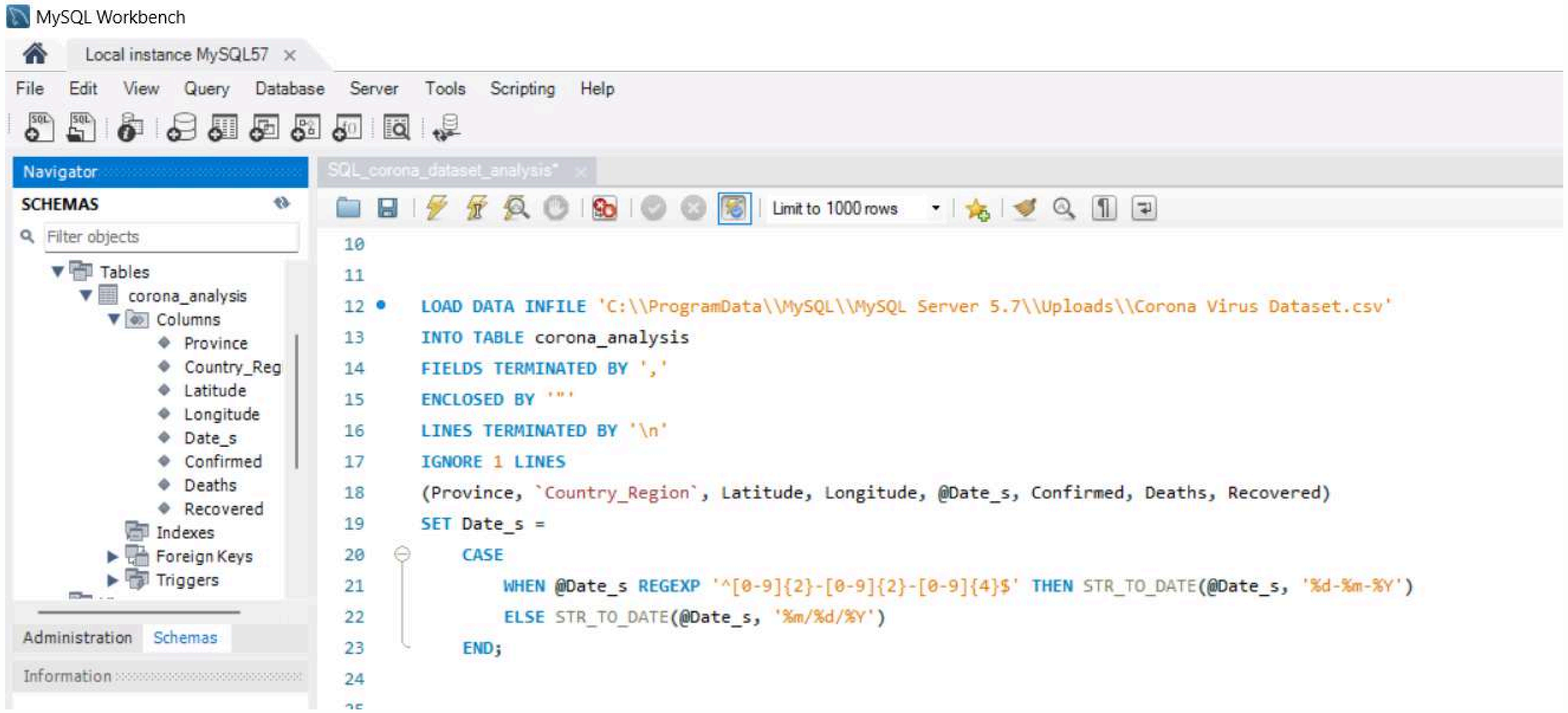
The provided code is a SQL query used to create a table named "corona_analysis"



```sql
create table corona_analysis(
    Province VARCHAR(60),
    Country_Region VARCHAR(60),
    Latitude FLOAT,
    Longitude FLOAT,
    Date_s DATE,
    Confirmed INT,
    Deaths INT,
    Recovered INT);
```

CREATING TABLE AND DATA IMPORT

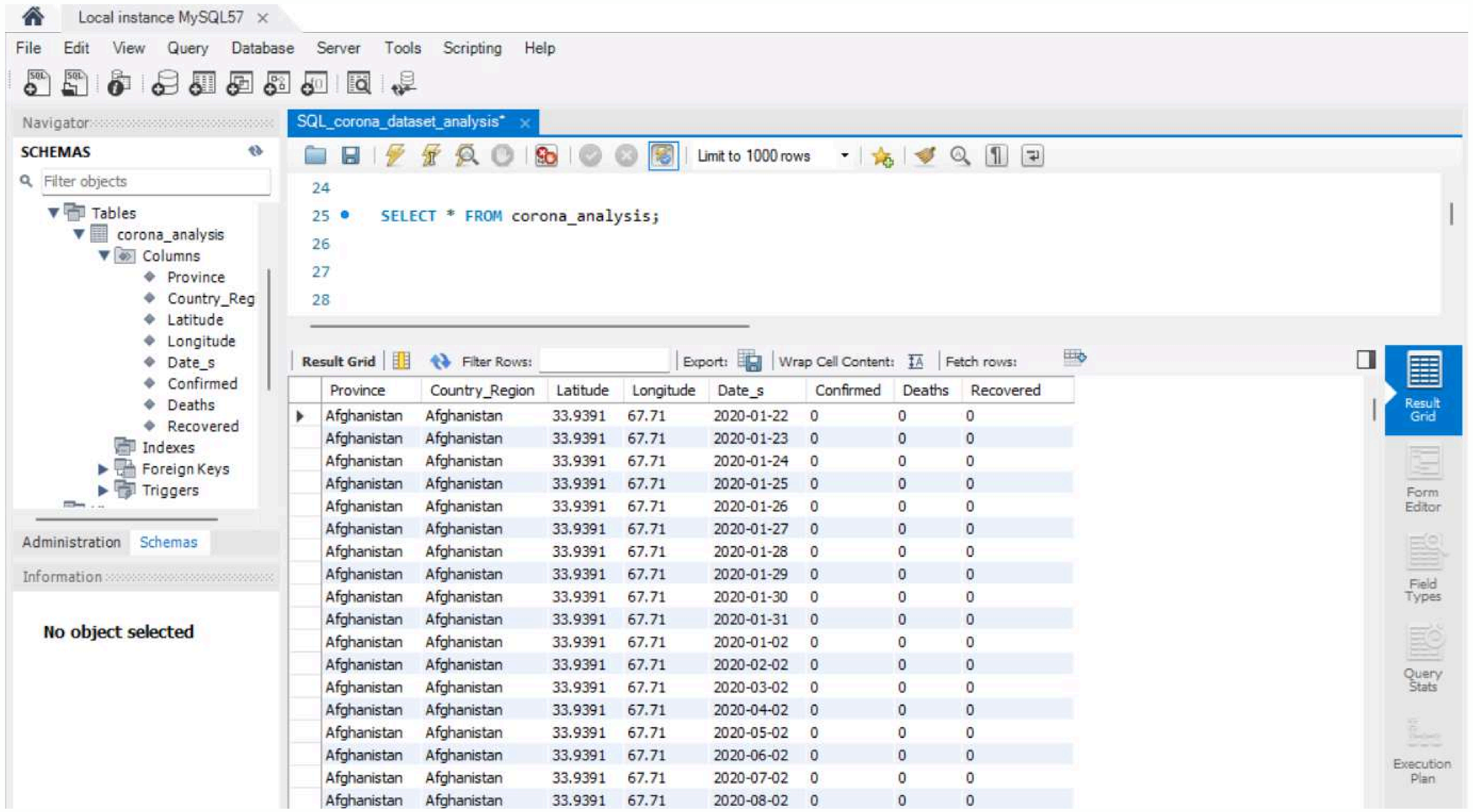
The provided code is a SQL query used to load data from a CSV file into the "corona_analysis" table.



```sql
LOAD DATA INFILE 'C:\\ProgramData\\MySQL\\MySQL Server 5.7\\Uploads\\Corona Virus Dataset.csv'
INTO TABLE corona_analysis
FIELDS TERMINATED BY ','
ENCLOSED BY '"'
LINES TERMINATED BY '\n'
IGNORE 1 LINES
(Province, `Country_Region`, Latitude, Longitude, @Date_s, Confirmed, Deaths, Recovered)
SET Date_s =
    CASE
        WHEN @Date_s REGEXP '^[0-9]{2}-[0-9]{2}-[0-9]{4}$' THEN STR_TO_DATE(@Date_s, '%d-%m-%Y')
        ELSE STR_TO_DATE(@Date_s, '%m/%d/%Y')
    END;
```

DISPLAY THE IMPORTED DATA

The provided SQL code is a query used to retrieve all records from the "corona_analysis" table



```sql
SELECT * FROM corona_analysis;
```

Province	Country_Region	Latitude	Longitude	Date_s	Confirmed	Deaths	Recovered
Afghanistan	Afghanistan	33.9391	67.71	2020-01-22	0	0	0
Afghanistan	Afghanistan	33.9391	67.71	2020-01-23	0	0	0
Afghanistan	Afghanistan	33.9391	67.71	2020-01-24	0	0	0
Afghanistan	Afghanistan	33.9391	67.71	2020-01-25	0	0	0
Afghanistan	Afghanistan	33.9391	67.71	2020-01-26	0	0	0
Afghanistan	Afghanistan	33.9391	67.71	2020-01-27	0	0	0
Afghanistan	Afghanistan	33.9391	67.71	2020-01-28	0	0	0
Afghanistan	Afghanistan	33.9391	67.71	2020-01-29	0	0	0
Afghanistan	Afghanistan	33.9391	67.71	2020-01-30	0	0	0
Afghanistan	Afghanistan	33.9391	67.71	2020-01-31	0	0	0
Afghanistan	Afghanistan	33.9391	67.71	2020-01-02	0	0	0
Afghanistan	Afghanistan	33.9391	67.71	2020-02-02	0	0	0
Afghanistan	Afghanistan	33.9391	67.71	2020-03-02	0	0	0
Afghanistan	Afghanistan	33.9391	67.71	2020-04-02	0	0	0
Afghanistan	Afghanistan	33.9391	67.71	2020-05-02	0	0	0
Afghanistan	Afghanistan	33.9391	67.71	2020-06-02	0	0	0
Afghanistan	Afghanistan	33.9391	67.71	2020-07-02	0	0	0
Afghanistan	Afghanistan	33.9391	67.71	2020-08-02	0	0	0

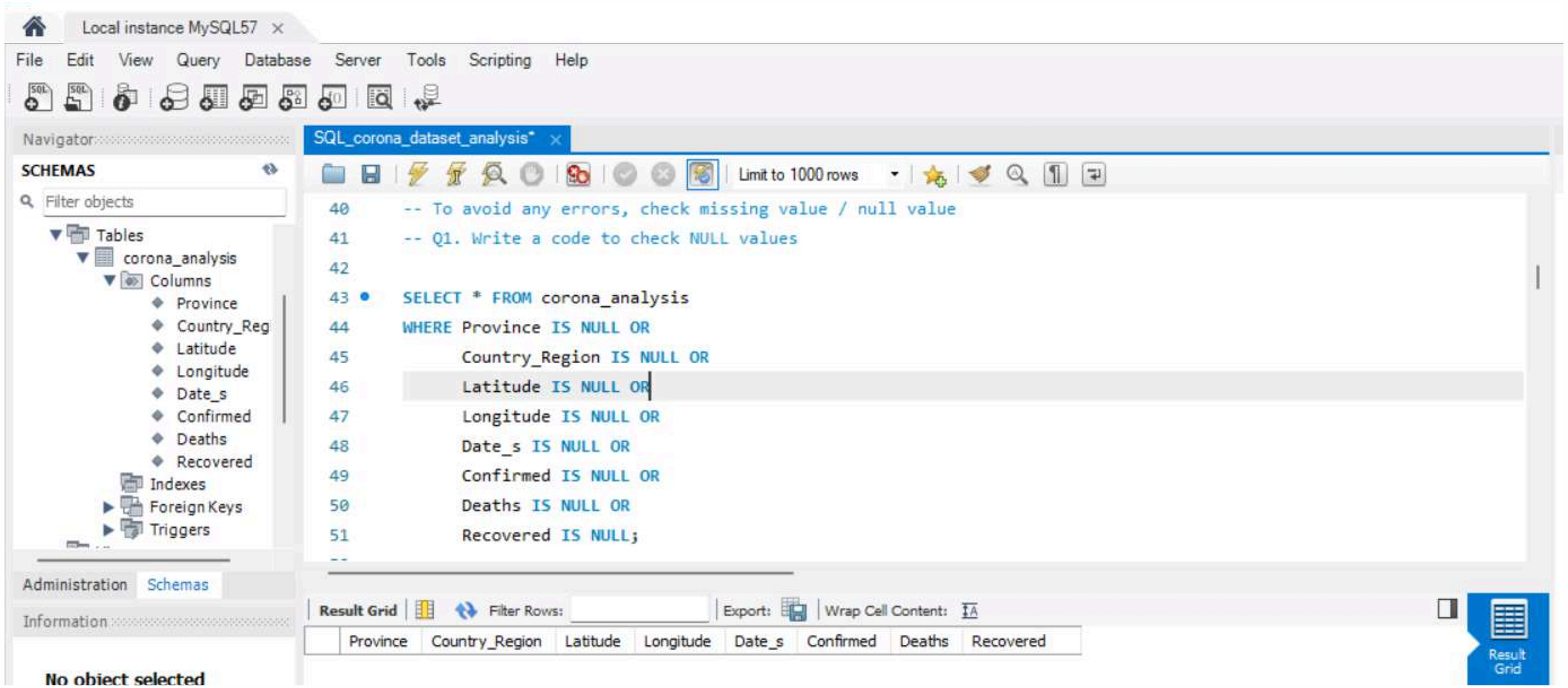
DATA ANALYSIS

Let's get into it!

DATA CLEANING

To prevent potential errors in the future, let's ensure there are no missing or null values in the dataset.

Q1. Write a code to check NULL values



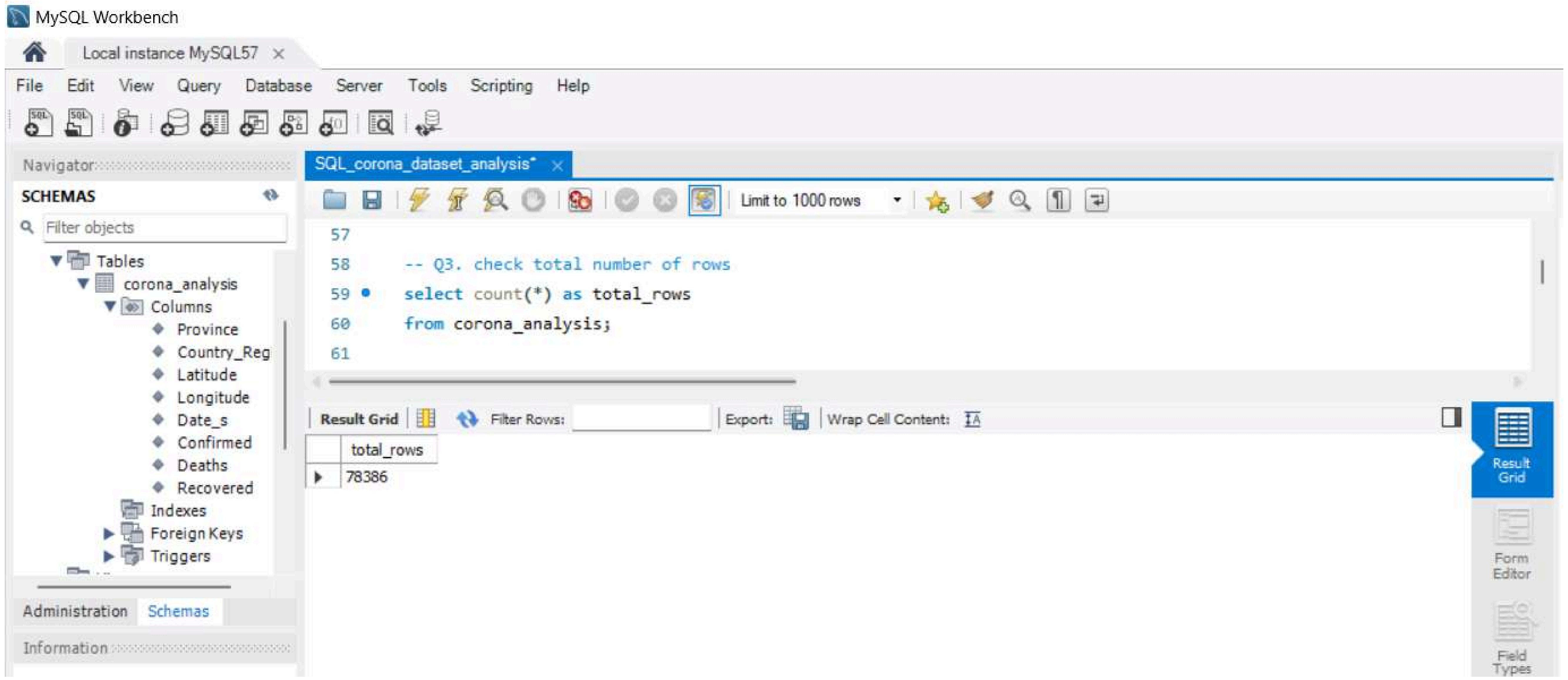
```sql
-- To avoid any errors, check missing value / null value
-- Q1. Write a code to check NULL values

SELECT * FROM corona_analysis
WHERE Province IS NULL OR
      Country_Region IS NULL OR
      Latitude IS NULL OR
      Longitude IS NULL OR
      Date_s IS NULL OR
      Confirmed IS NULL OR
      Deaths IS NULL OR
      Recovered IS NULL;
```

Province	Country_Region	Latitude	Longitude	Date_s	Confirmed	Deaths	Recovered

Q2. IF NULL VALUES ARE PRESENT, UPDATE THEM WITH ZEROS FOR ALL COLUMNS

Based on the Output: Since there are no NULL values present in the dataset, we don't need to perform any updates.

Q3. CHECK TOTAL NUMBER OF ROWS.

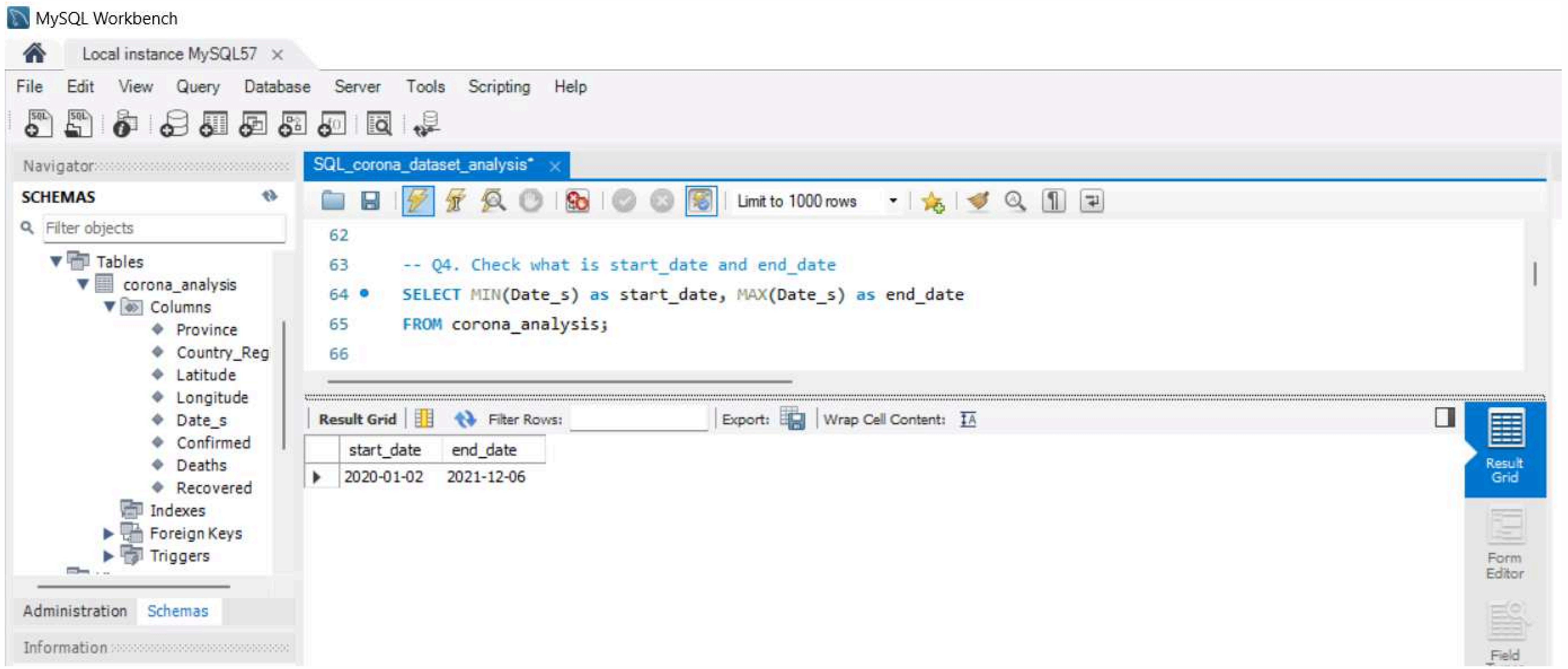


```
-- Q3. check total number of rows
select count(*) as total_rows
from corona_analysis;
```

```
total_rows
78386
```

Insight: The dataset contains a total of 78,386 records.

Q4. CHECK WHAT IS START_DATE AND END_DATE

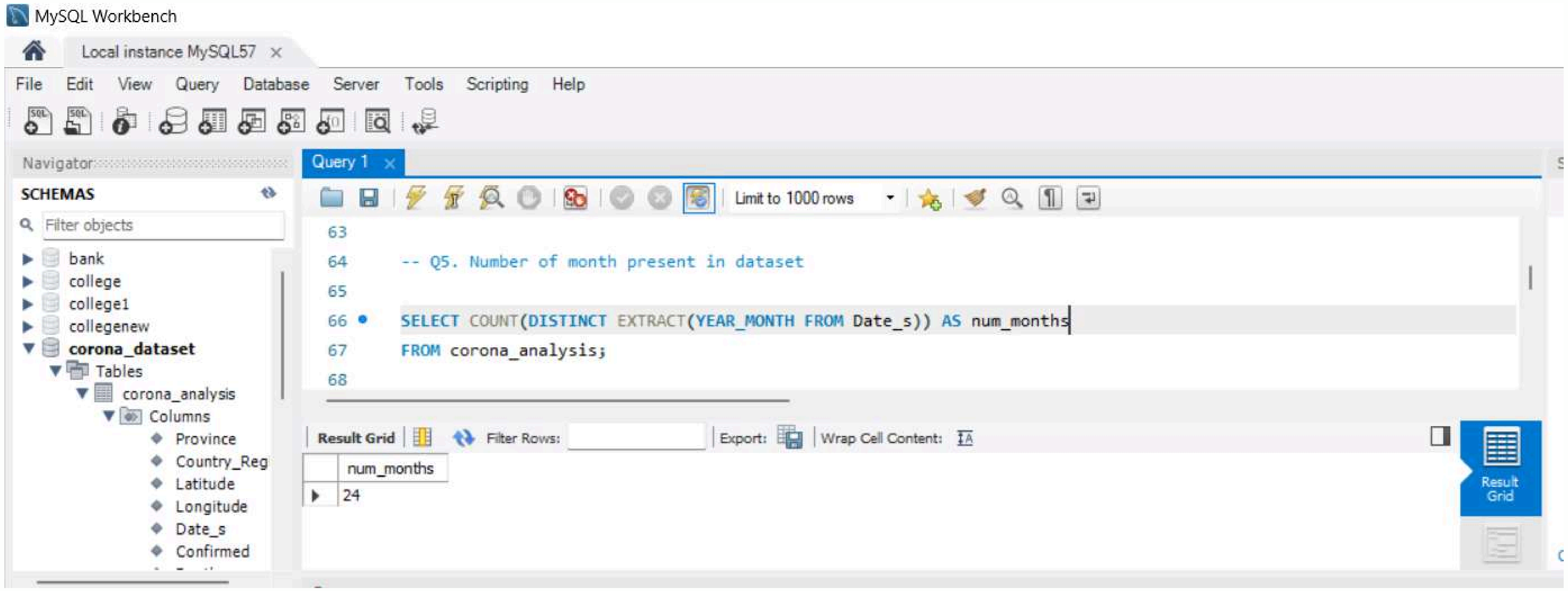


```
-- Q4. Check what is start_date and end_date
SELECT MIN(Date_s) as start_date, MAX(Date_s) as end_date
FROM corona_analysis;
```

```
start_date    end_date
2020-01-02    2021-12-06
```

Insight: Based on the Dataset the start date of the COVID-19 is recorded as January 02, 2020 with the end date as June 12, 2021

Q5. NUMBER OF MONTHS PRESENT IN THE DATASE

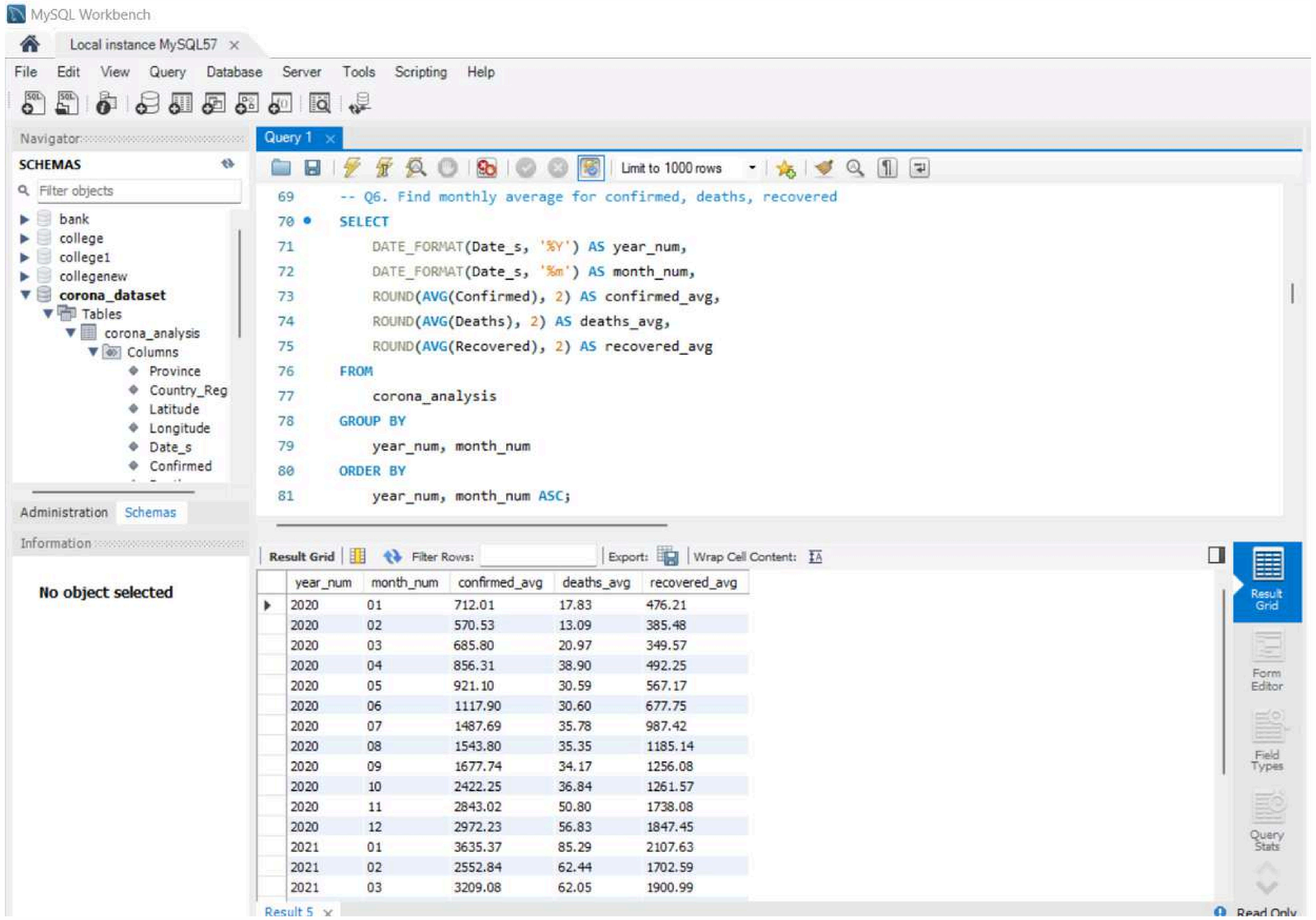


```
-- Q5. Number of month present in dataset

SELECT COUNT(DISTINCT EXTRACT(YEAR_MONTH FROM Date_s)) AS num_months
FROM corona_analysis;
```

```
num_months
24
```

Insight: The output of this query provides the total number of unique months present in the dataset.

Q6. FIND THE MONTHLY AVERAGE FOR CONFIRMED, DEATHS, RECOVERED

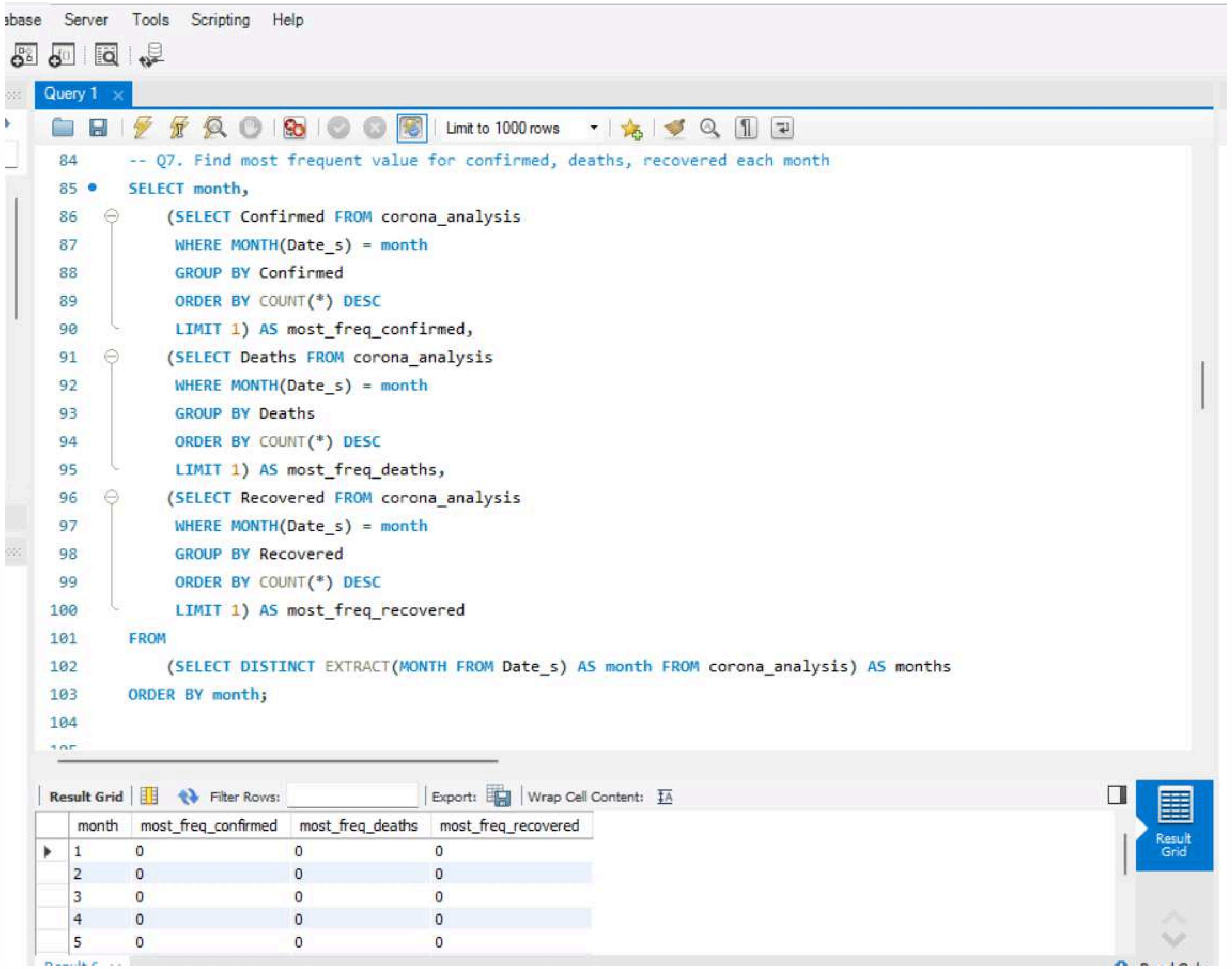


```sql
-- Q6. Find monthly average for confirmed, deaths, recovered
SELECT
    DATE_FORMAT(Date_s, '%Y') AS year_num,
    DATE_FORMAT(Date_s, '%m') AS month_num,
    ROUND(AVG(Confirmed), 2) AS confirmed_avg,
    ROUND(AVG(Deaths), 2) AS deaths_avg,
    ROUND(AVG(Recovered), 2) AS recovered_avg
FROM
    corona_analysis
GROUP BY
    year_num, month_num
ORDER BY
    year_num, month_num ASC;
```

year_num	month_num	confirmed_avg	deaths_avg	recovered_avg
2020	01	712.01	17.83	476.21
2020	02	570.53	13.09	385.48
2020	03	685.80	20.97	349.57
2020	04	856.31	38.90	492.25
2020	05	921.10	30.59	567.17
2020	06	1117.90	30.60	677.75
2020	07	1487.69	35.78	987.42
2020	08	1543.80	35.35	1185.14
2020	09	1677.74	34.17	1256.08
2020	10	2422.25	36.84	1261.57
2020	11	2843.02	50.80	1738.08
2020	12	2972.23	56.83	1847.45
2021	01	3635.37	85.29	2107.63
2021	02	2552.84	62.44	1702.59
2021	03	3209.08	62.05	1900.99

This query extracts the year and month from the Date_s column, calculates the average number of confirmed cases (Confirmed), deaths (Deaths), and recoveries (Recovered) for each month, and rounds the averages to two decimal places

Q7. FIND MOST FREQUENT VALUE FOR CONFIRMED, DEATHS, RECOVERED EACH MONTH.

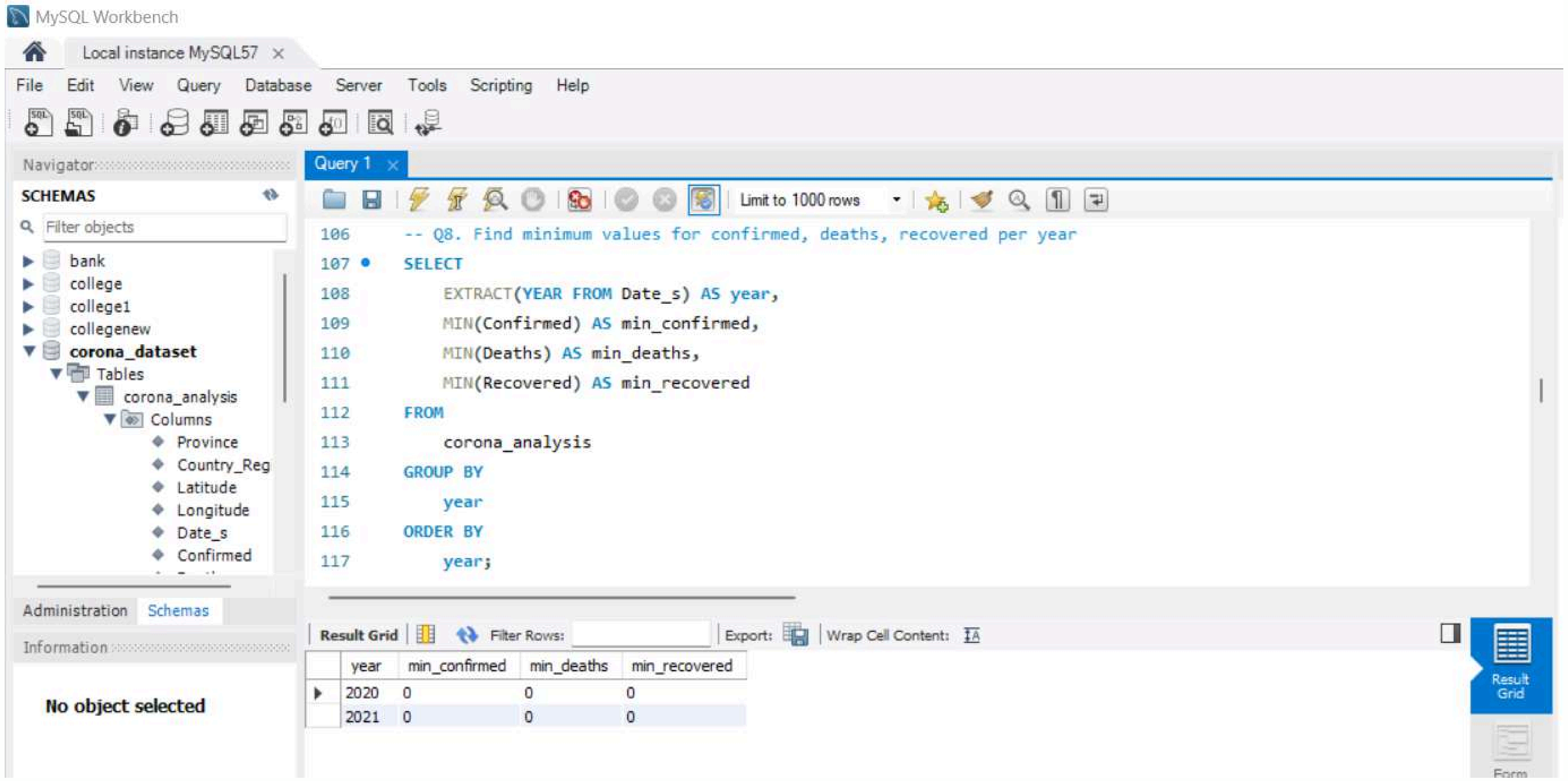


```sql
-- Q7. Find most frequent value for confirmed, deaths, recovered each month
SELECT month,
    (SELECT Confirmed FROM corona_analysis
     WHERE MONTH(Date_s) = month
     GROUP BY Confirmed
     ORDER BY COUNT(*) DESC
     LIMIT 1) AS most_freq_confirmed,
    (SELECT Deaths FROM corona_analysis
     WHERE MONTH(Date_s) = month
     GROUP BY Deaths
     ORDER BY COUNT(*) DESC
     LIMIT 1) AS most_freq_deaths,
    (SELECT Recovered FROM corona_analysis
     WHERE MONTH(Date_s) = month
     GROUP BY Recovered
     ORDER BY COUNT(*) DESC
     LIMIT 1) AS most_freq_recovered
FROM
    (SELECT DISTINCT EXTRACT(MONTH FROM Date_s) AS month FROM corona_analysis) AS months
ORDER BY month;
```

month	most_freq_confirmed	most_freq_deaths	most_freq_recovered
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0

The query extracts unique months, labels them, finds the most frequent values for confirmed cases, deaths, and recoveries, and sorts by month.

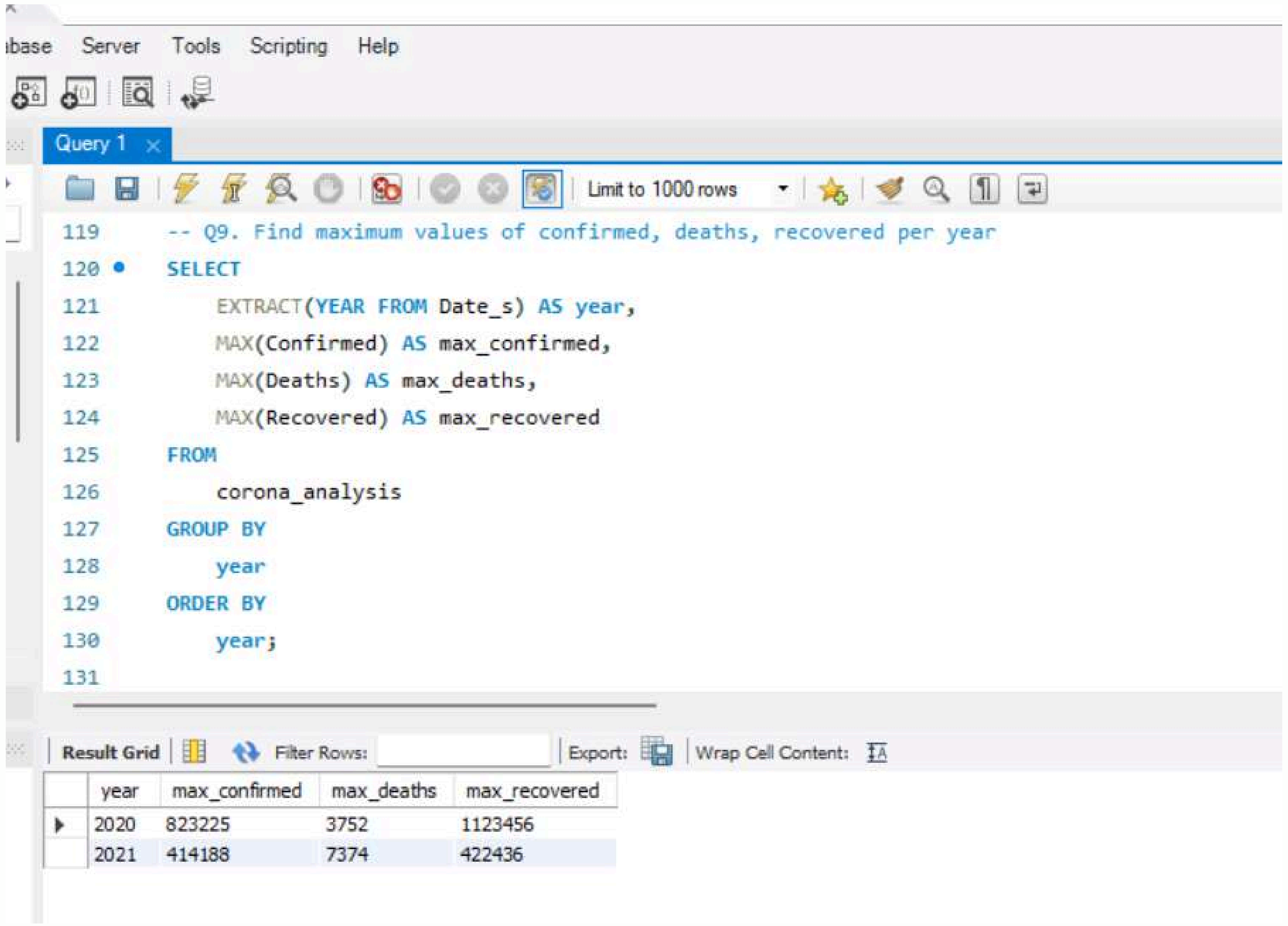
Q8. FIND MINIMUM VALUES FOR CONFIRMED, DEATHS, RECOVERED PER YEAR.



```
-- Q8. Find minimum values for confirmed, deaths, recovered per year
SELECT
    EXTRACT(YEAR FROM Date_s) AS year,
    MIN(Confirmed) AS min_confirmed,
    MIN(Deaths) AS min_deaths,
    MIN(Recovered) AS min_recovered
FROM
    corona_analysis
GROUP BY
    year
ORDER BY
    year;
```

year	min_confirmed	min_deaths	min_recovered
2020	0	0	0
2021	0	0	0

Q9. FIND MAXIMUM VALUES OF CONFIRMED, DEATHS, RECOVERED CASES PER YEAR.

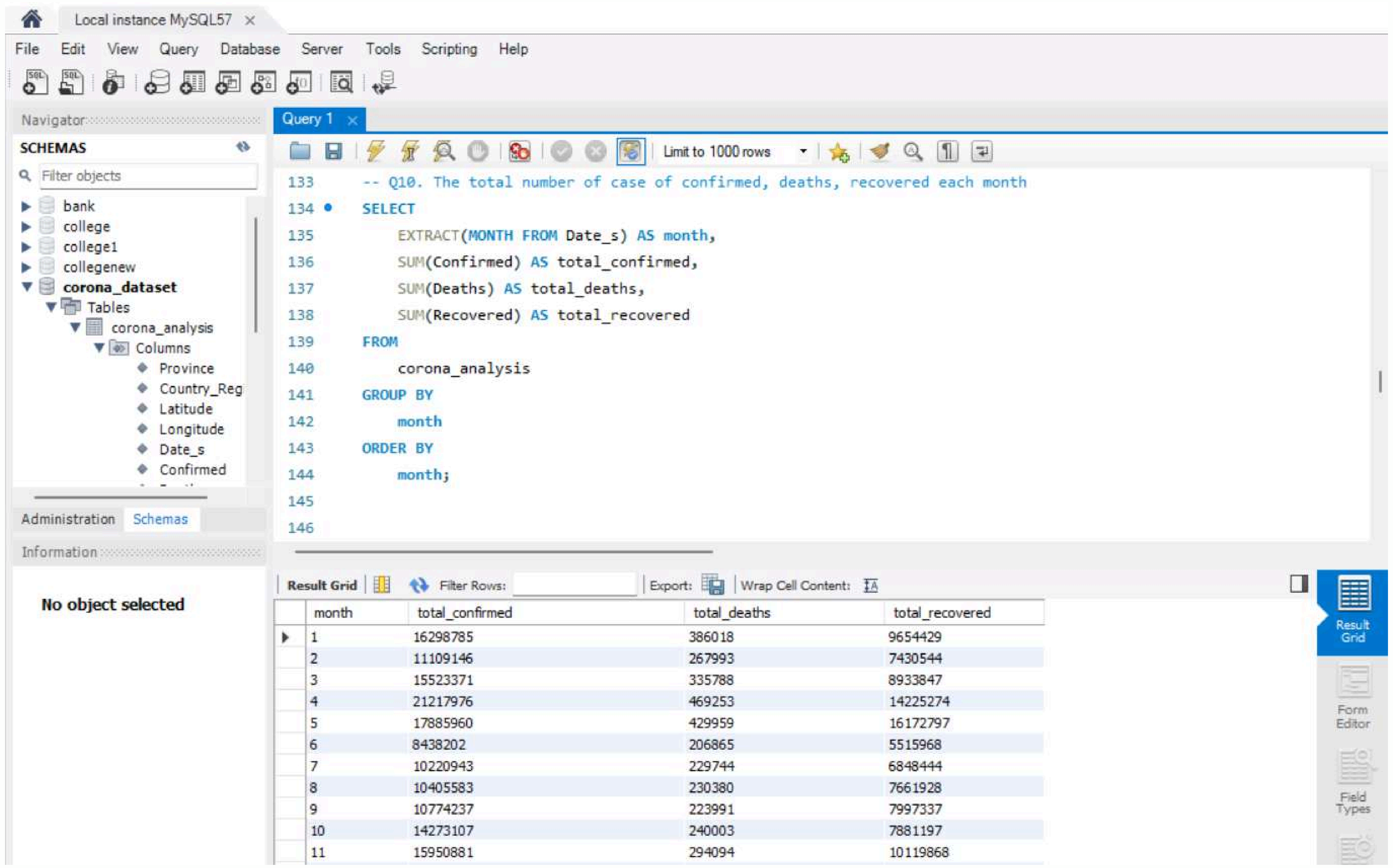


```
-- Q9. Find maximum values of confirmed, deaths, recovered per year
SELECT
    EXTRACT(YEAR FROM Date_s) AS year,
    MAX(Confirmed) AS max_confirmed,
    MAX(Deaths) AS max_deaths,
    MAX(Recovered) AS max_recovered
FROM
    corona_analysis
GROUP BY
    year
ORDER BY
    year;
```

year	max_confirmed	max_deaths	max_recovered
2020	823225	3752	1123456
2021	414188	7374	422436

- The year 2020 saw the highest count of confirmed cases, totaling 823,225.
- Conversely, 2021 documented the highest number of deaths at 7,374.
- However, 2020 also recorded the most recoveries, reaching 1,123,456.

Q10. THE TOTAL NUMBER OF CASE OF CONFIRMED, DEATHS, RECOVERED EACH MONTH.

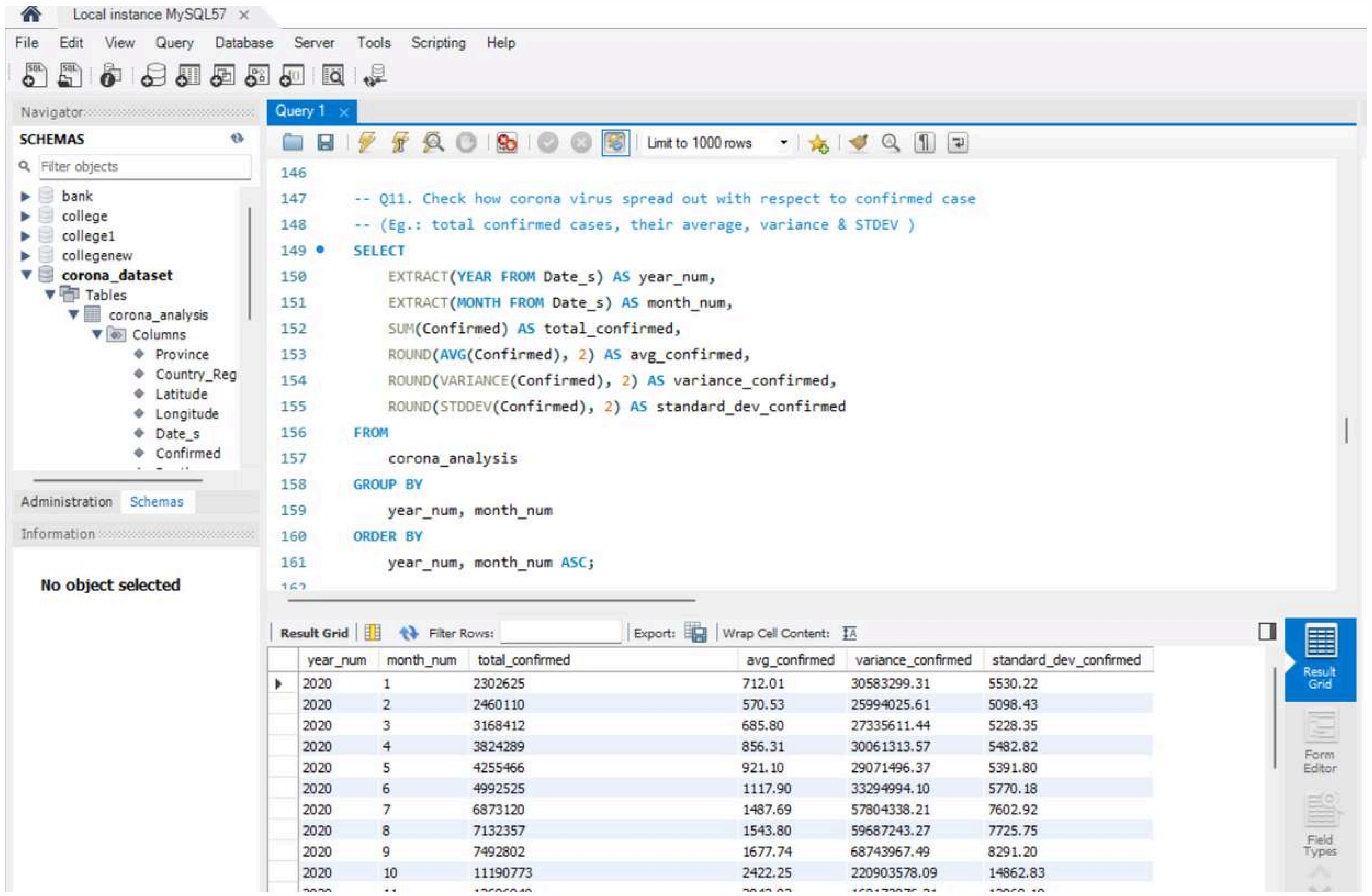


```
-- Q10. The total number of case of confirmed, deaths, recovered each month
SELECT
    EXTRACT(MONTH FROM Date_s) AS month,
    SUM(Confirmed) AS total_confirmed,
    SUM(Deaths) AS total_deaths,
    SUM(Recovered) AS total_recovered
FROM
    corona_analysis
GROUP BY
    month
ORDER BY
    month;
```

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

month	total_confirmed	total_deaths	total_recovered
1	16298785	386018	9654429
2	11109146	267993	7430544
3	15523371	335788	8933847
4	21217976	469253	14225274
5	17885960	429959	16172797
6	8438202	206865	5515968
7	10220943	229744	6848444
8	10405583	230380	7661928
9	10774237	223991	7997337
10	14273107	240003	7881197
11	15950881	294094	10119868

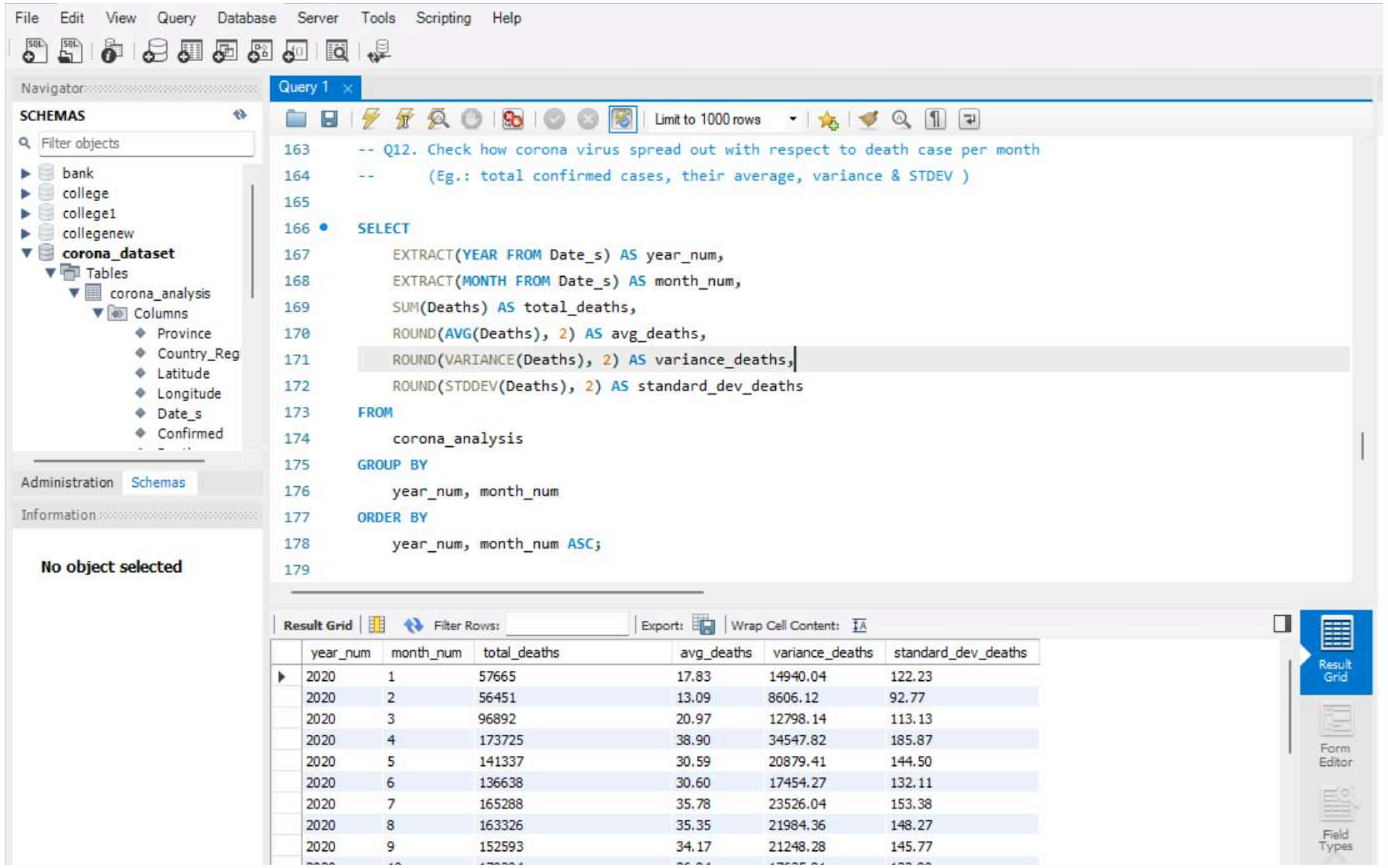
Q11. CHECK HOW CORONA VIRUS SPREAD OUT WITH RESPECT TO CONFIRMED CASES PER MONTH. (EG.: TOTAL CONFIRMED CASES, THEIR AVERAGE, VARIANCE & STDEV)



```sql
-- Q11. Check how corona virus spread out with respect to confirmed case
-- (Eg.: total confirmed cases, their average, variance & STDEV )
SELECT
    EXTRACT(YEAR FROM Date_s) AS year_num,
    EXTRACT(MONTH FROM Date_s) AS month_num,
    SUM(Confirmed) AS total_confirmed,
    ROUND(AVG(Confirmed), 2) AS avg_confirmed,
    ROUND(VARIANCE(Confirmed), 2) AS variance_confirmed,
    ROUND(STDDEV(Confirmed), 2) AS standard_dev_confirmed
FROM
    corona_analysis
GROUP BY
    year_num, month_num
ORDER BY
    year_num, month_num ASC;
```

year_num	month_num	total_confirmed	avg_confirmed	variance_confirmed	standard_dev_confirmed
2020	1	2302625	712.01	30583299.31	5530.22
2020	2	2460110	570.53	25994025.61	5098.43
2020	3	3168412	685.80	27335611.44	5228.35
2020	4	3824289	856.31	30061313.57	5482.82
2020	5	4255466	921.10	29071496.37	5391.80
2020	6	4992525	1117.90	33294994.10	5770.18
2020	7	6873120	1487.69	57804338.21	7602.92
2020	8	7132357	1543.80	59687243.27	7725.75
2020	9	7492802	1677.74	68743967.49	8291.20
2020	10	11190773	2422.25	220903578.09	14862.83

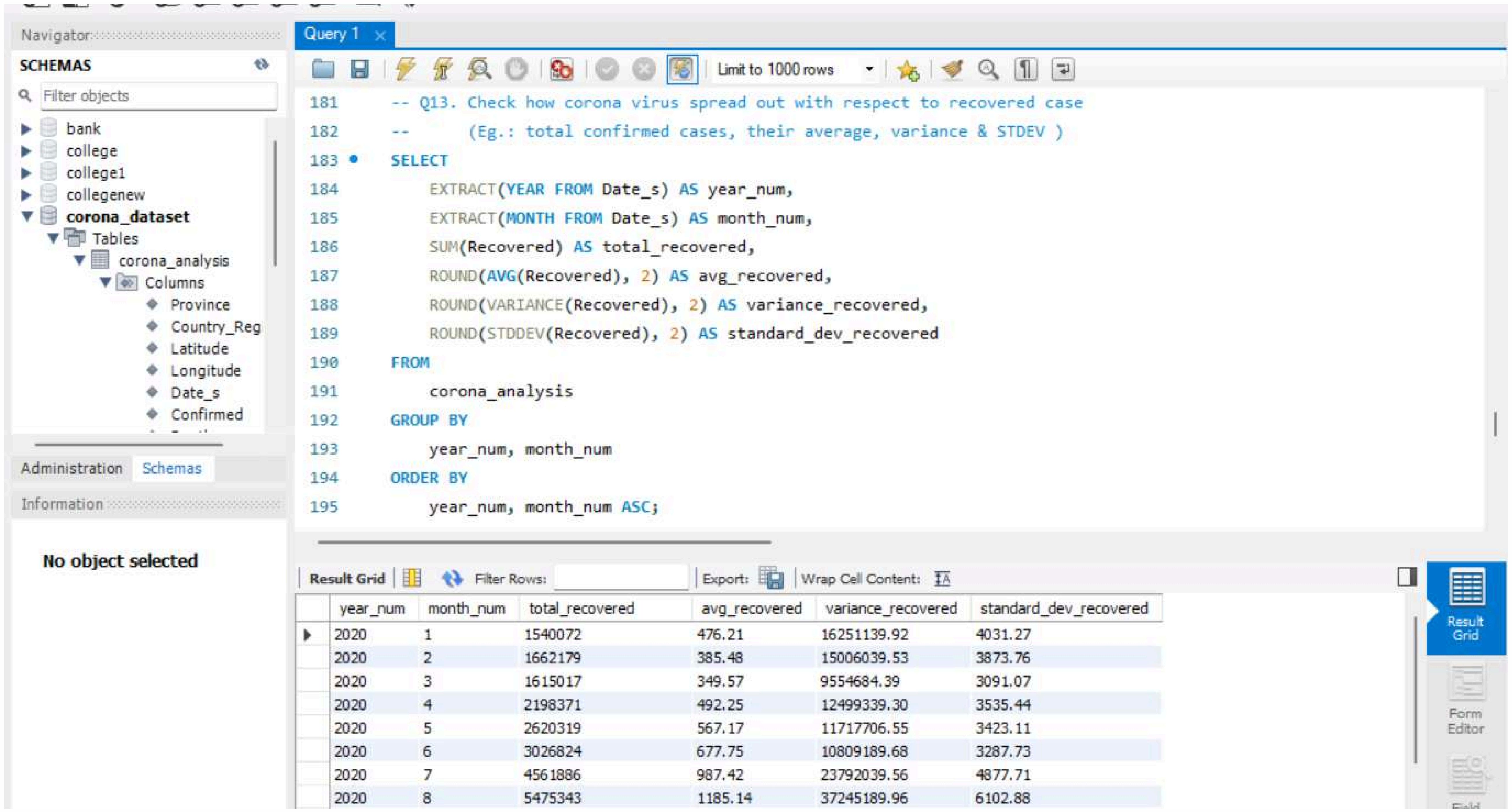
Q12. CHECK HOW CORONA VIRUS SPREAD OUT WITH RESPECT TO DEATH CASES PER MONTH. (EG.: TOTAL DEATH CASES, THEIR AVERAGE, VARIANCE & STDEV)



```sql
-- Q12. Check how corona virus spread out with respect to death case per month
--      (Eg.: total confirmed cases, their average, variance & STDEV )

SELECT
    EXTRACT(YEAR FROM Date_s) AS year_num,
    EXTRACT(MONTH FROM Date_s) AS month_num,
    SUM(Deaths) AS total_deaths,
    ROUND(AVG(Deaths), 2) AS avg_deaths,
    ROUND(VARIANCE(Deaths), 2) AS variance_deaths,
    ROUND(STDDEV(Deaths), 2) AS standard_dev_deaths
FROM
    corona_analysis
GROUP BY
    year_num, month_num
ORDER BY
    year_num, month_num ASC;
```

year_num	month_num	total_deaths	avg_deaths	variance_deaths	standard_dev_deaths
2020	1	57665	17.83	14940.04	122.23
2020	2	56451	13.09	8606.12	92.77
2020	3	96892	20.97	12798.14	113.13
2020	4	173725	38.90	34547.82	185.87
2020	5	141337	30.59	20879.41	144.50
2020	6	136638	30.60	17454.27	132.11
2020	7	165288	35.78	23526.04	153.38
2020	8	163326	35.35	21984.36	148.27
2020	9	152593	34.17	21248.28	145.77

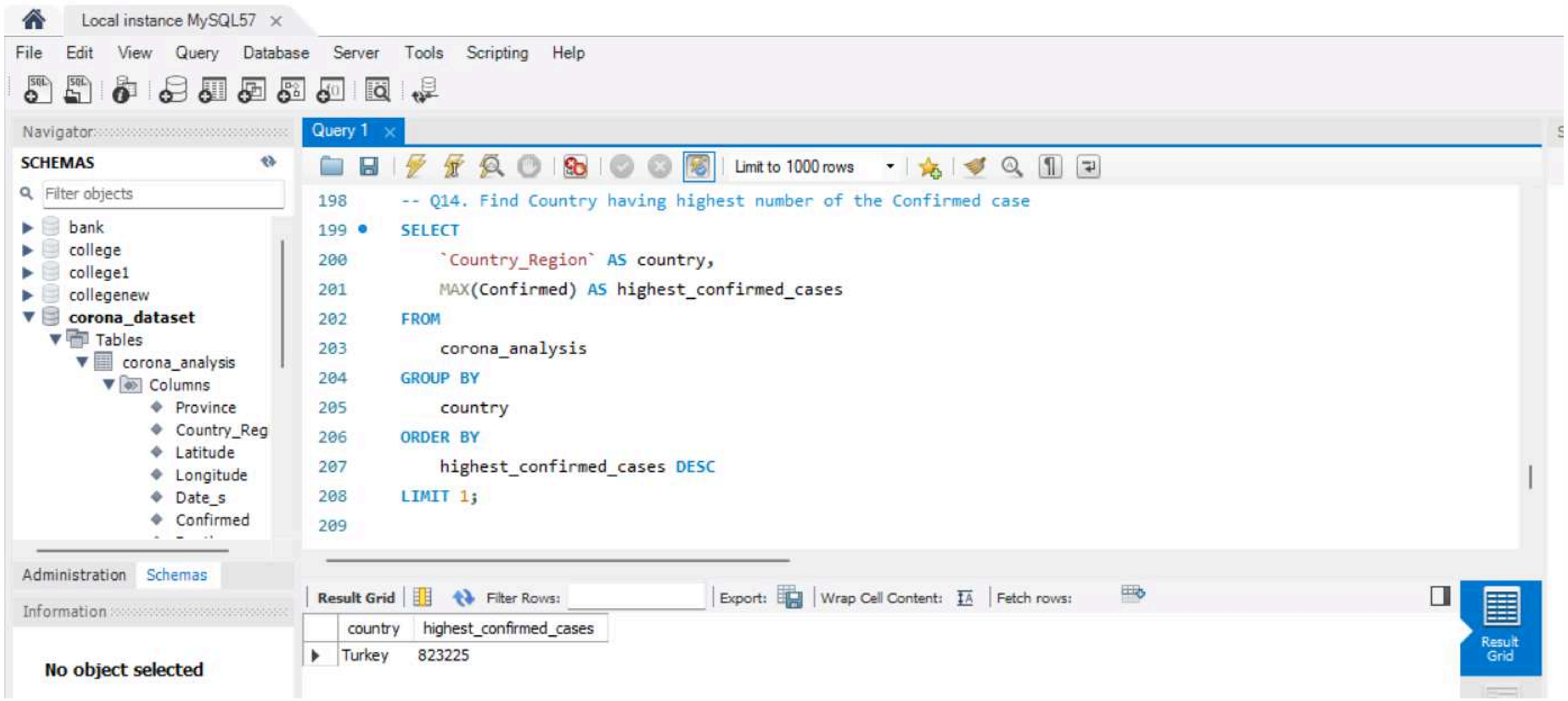
Q13. CHECK HOW CORONA VIRUS SPREAD OUT WITH RESPECT TO RECOVERED CASES PER MONTH.
(EG.: TOTAL RECOVERED CASES, THEIR AVERAGE, VARIANCE & STDEV)



```sql
-- Q13. Check how corona virus spread out with respect to recovered case
--      (Eg.: total confirmed cases, their average, variance & STDEV )
SELECT
    EXTRACT(YEAR FROM Date_s) AS year_num,
    EXTRACT(MONTH FROM Date_s) AS month_num,
    SUM(Recovered) AS total_recovered,
    ROUND(AVG(Recovered), 2) AS avg_recovered,
    ROUND(VARIANCE(Recovered), 2) AS variance_recovered,
    ROUND(STDDEV(Recovered), 2) AS standard_dev_recovered
FROM
    corona_analysis
GROUP BY
    year_num, month_num
ORDER BY
    year_num, month_num ASC;
```

year_num	month_num	total_recovered	avg_recovered	variance_recovered	standard_dev_recovered
2020	1	1540072	476.21	16251139.92	4031.27
2020	2	1662179	385.48	15006039.53	3873.76
2020	3	1615017	349.57	9554684.39	3091.07
2020	4	2198371	492.25	12499339.30	3535.44
2020	5	2620319	567.17	11717706.55	3423.11
2020	6	3026824	677.75	10809189.68	3287.73
2020	7	4561886	987.42	23792039.56	4877.71
2020	8	5475343	1185.14	37245189.96	6102.88

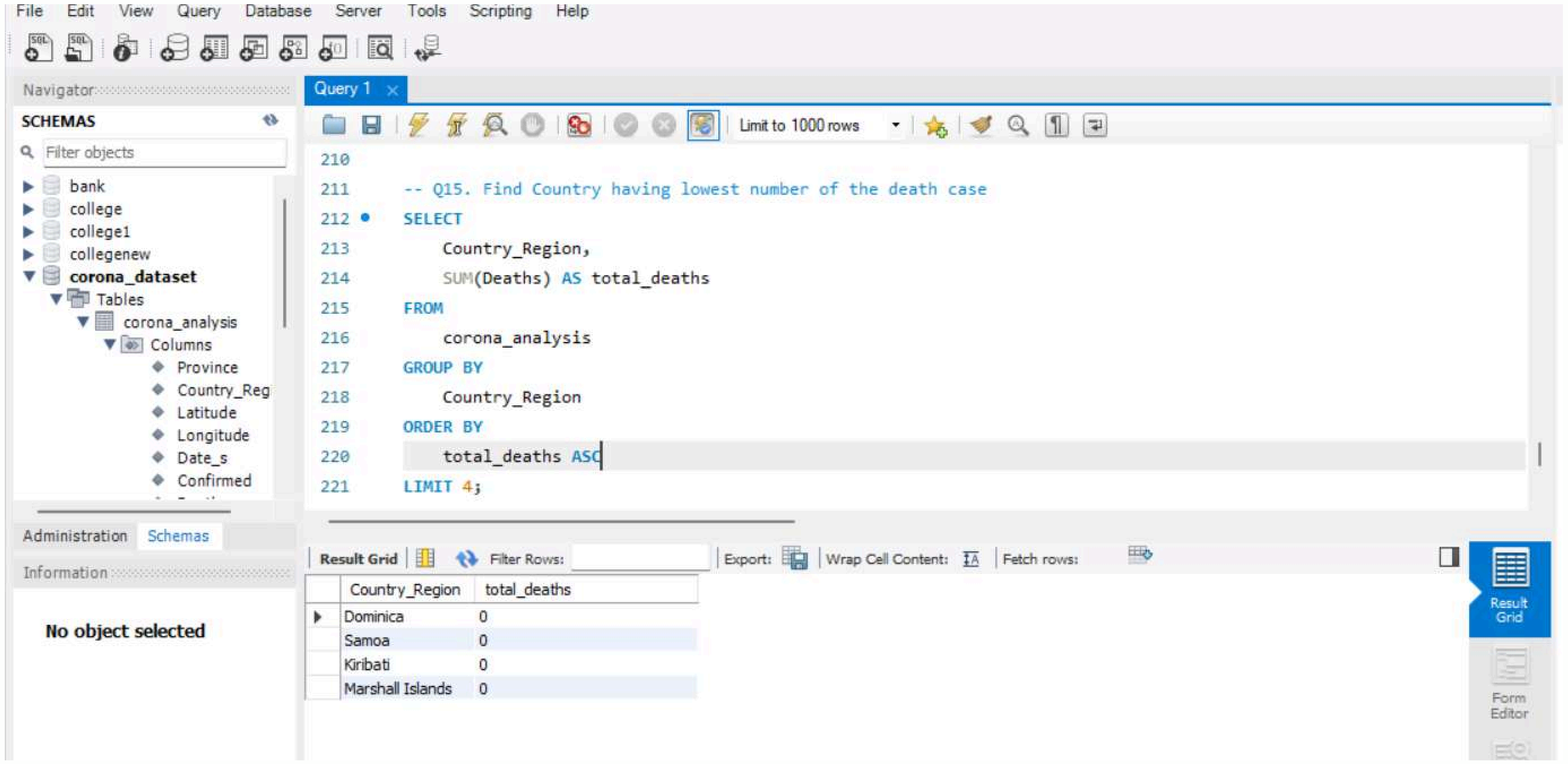
Q14. FIND COUNTRY HAVING HIGHEST NUMBER OF THE CONFIRMED CASE.



```sql
-- Q14. Find Country having highest number of the Confirmed case
SELECT
    `Country_Region` AS country,
    MAX(Confirmed) AS highest_confirmed_cases
FROM
    corona_analysis
GROUP BY
    country
ORDER BY
    highest_confirmed_cases DESC
LIMIT 1;
```

country	highest_confirmed_cases
Turkey	823225

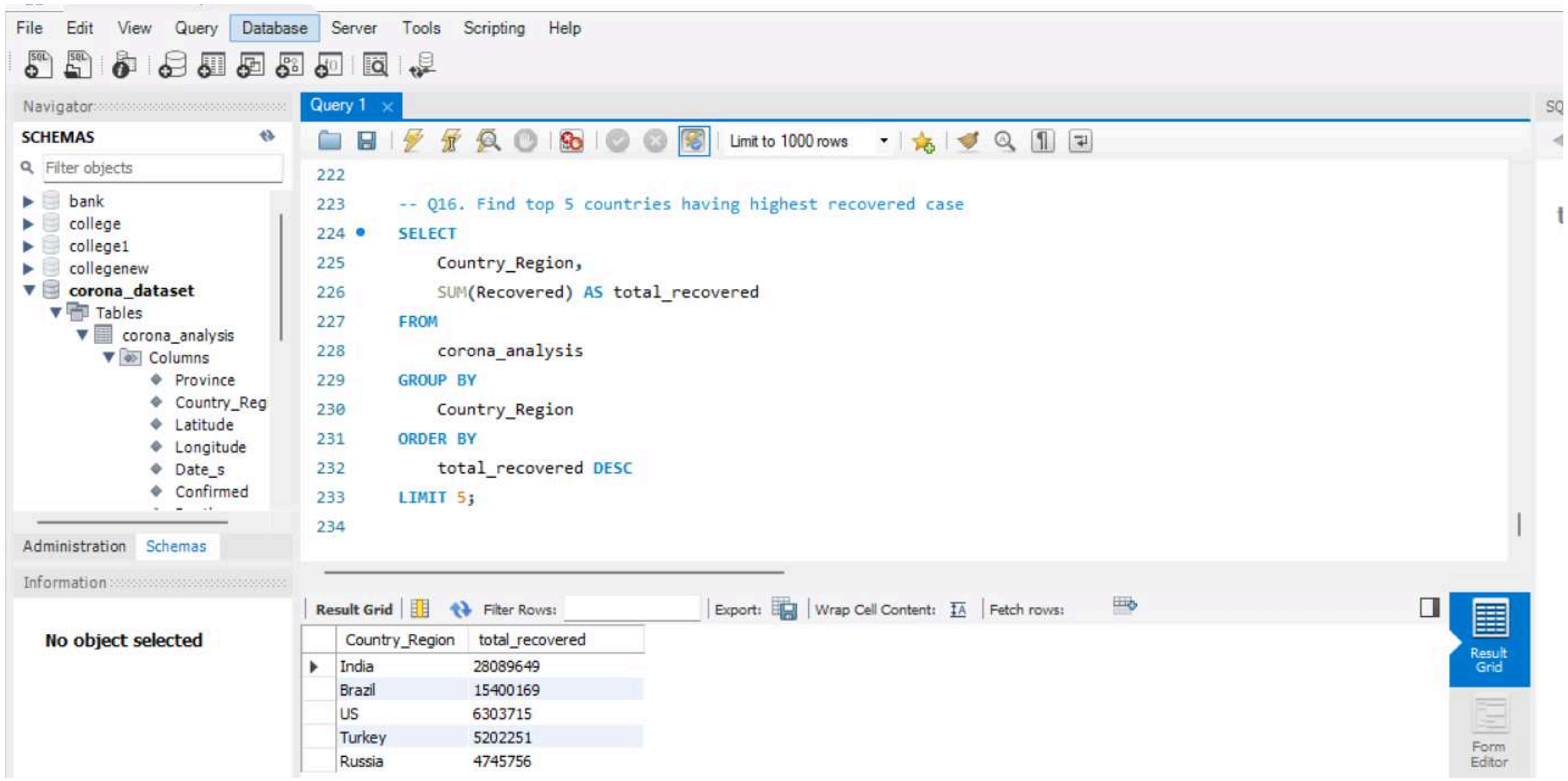
Q15. FIND COUNTRY HAVING LOWEST NUMBER OF THE DEATH CASES.



```sql
-- Q15. Find Country having lowest number of the death case
SELECT
    Country_Region,
    SUM(Deaths) AS total_deaths
FROM
    corona_analysis
GROUP BY
    Country_Region
ORDER BY
    total_deaths ASC
LIMIT 4;
```

```
Country_Region    total_deaths
Dominica          0
Samoa             0
Kiribati          0
Marshall Islands  0
```

Q16. FIND TOP 5 COUNTRIES HAVING HIGHEST RECOVERED CASES.



```
-- Q16. Find top 5 countries having highest recovered case
SELECT
    Country_Region,
    SUM(Recovered) AS total_recovered
FROM
    corona_analysis
GROUP BY
    Country_Region
ORDER BY
    total_recovered DESC
LIMIT 5;
```

Country_Region	total_recovered
India	28089649
Brazil	15400169
US	6303715
Turkey	5202251
Russia	4745756

THANK YOU!

IT'S Q & A TIME!