Operation Analytics and Investigating Metric Spike

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Contents

Overview

- Operational Analytics is a crucial process that involves analyzing a company's end-to-end operations. This analysis helps identify areas for improvement within the company. As a Data Analyst, I'll be working closely with various teams, such as operations, support, and marketing, helping them derive valuable insights from the data they collect.
- Here, my goal is to use advance SQL skills to analyze the data and provide valuable insights that can help improve the company's operations and understand sudden changes in key metrics.

Tech-Stack Used

Microsoft Excel

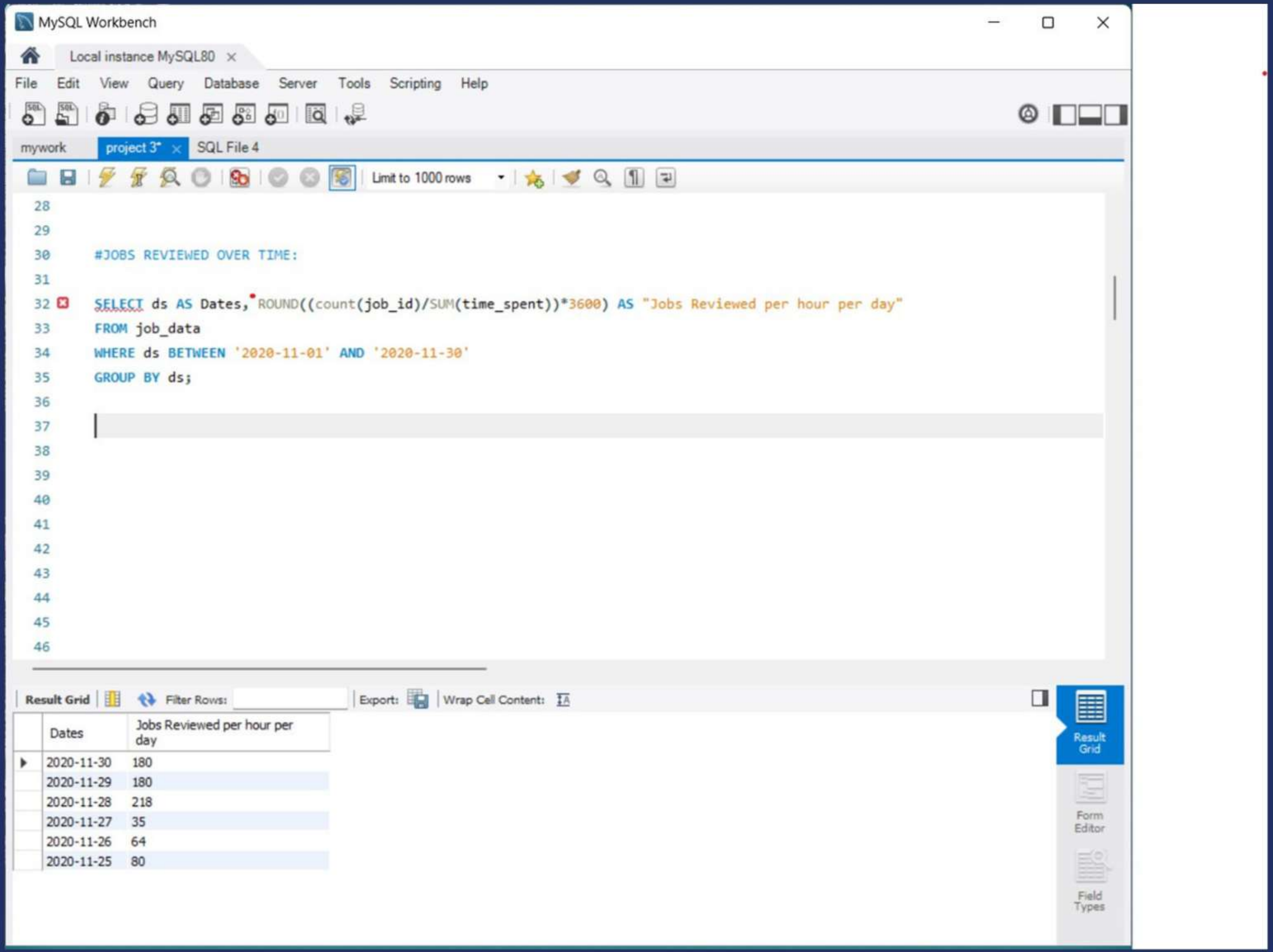
My SQL

Microsoft Powerpoint

Job Data Analysis

- Jobs Reviewed Over Time

Here, my objective is to calculate the number of jobs reviewed per hour for each day in November 2020.



```sql
#JOBS REVIEWED OVER TIME:

SELECT ds AS Dates, ROUND((count(job_id)/SUM(time_spent))*3600) AS "Jobs Reviewed per hour per day"
FROM job_data
WHERE ds BETWEEN '2020-11-01' AND '2020-11-30'
GROUP BY ds;
```

Dates	Jobs Reviewed per hour per day
2020-11-30	180
2020-11-29	180
2020-11-28	218
2020-11-27	35
2020-11-26	64
2020-11-25	80

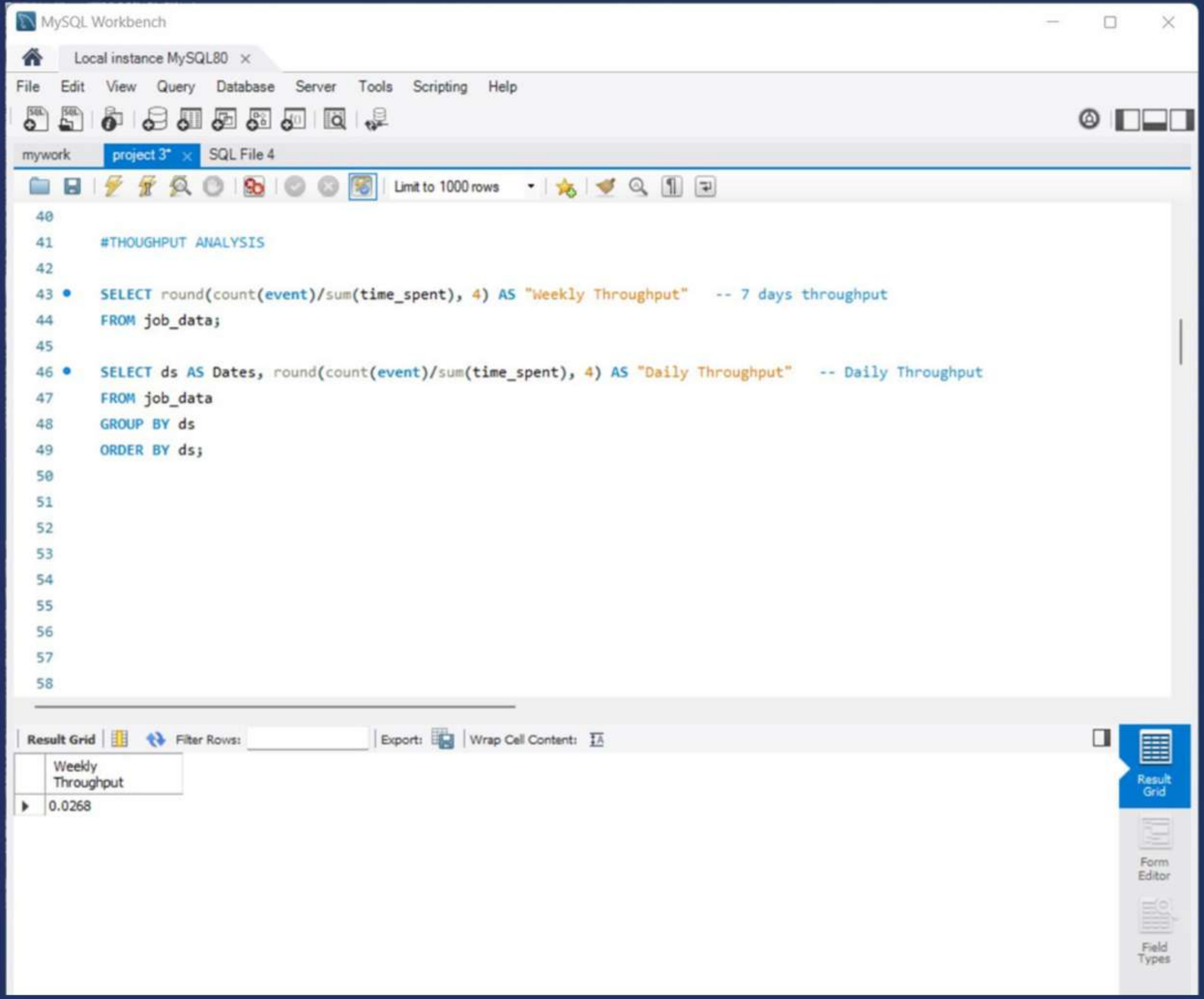
Insights

After analyzing the data it can be found that jobs reviewed per hour per day for the month of November 2020.
SQL Query used to find out the given output is mentioned in the previous slide.

Dates	Jobs Reviewed Per Hour
2020-11-30	180
2020-11-29	180
2020-11-28	218
2020-11-27	35
2020-11-26	64
2020-11-25	80

• Throughput Analysis

Here, my objective is to calculate the 7-day Rolling average of throughput analysis(number events per seconds

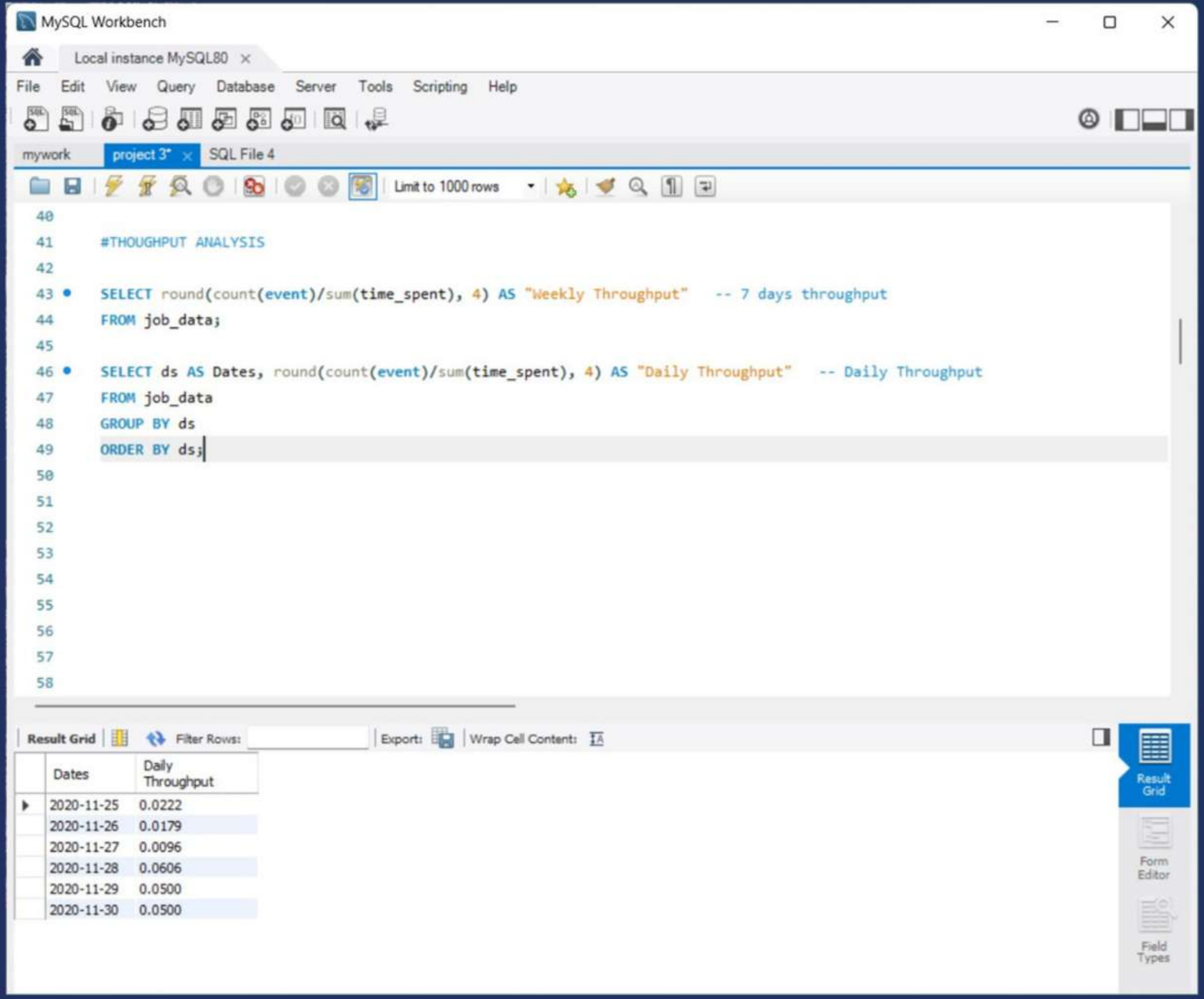


```
#THOUGHPUT ANALYSIS

SELECT round(count(event)/sum(time_spent), 4) AS "Weekly Throughput"   -- 7 days throughput
FROM job_data;

SELECT ds AS Dates, round(count(event)/sum(time_spent), 4) AS "Daily Throughput"   -- Daily Throughput
FROM job_data
GROUP BY ds
ORDER BY ds;
```

```
Weekly Throughput
0.0268
```



```
#THOUGHPUT ANALYSIS

SELECT round(count(event)/sum(time_spent), 4) AS "Weekly Throughput"   -- 7 days throughput
FROM job_data;

SELECT ds AS Dates, round(count(event)/sum(time_spent), 4) AS "Daily Throughput"   -- Daily Throughput
FROM job_data
GROUP BY ds
ORDER BY ds;
```

```
Dates        Daily Throughput
2020-11-25   0.0222
2020-11-26   0.0179
2020-11-27   0.0096
2020-11-28   0.0606
2020-11-29   0.0500
2020-11-30   0.0500
```

Insights

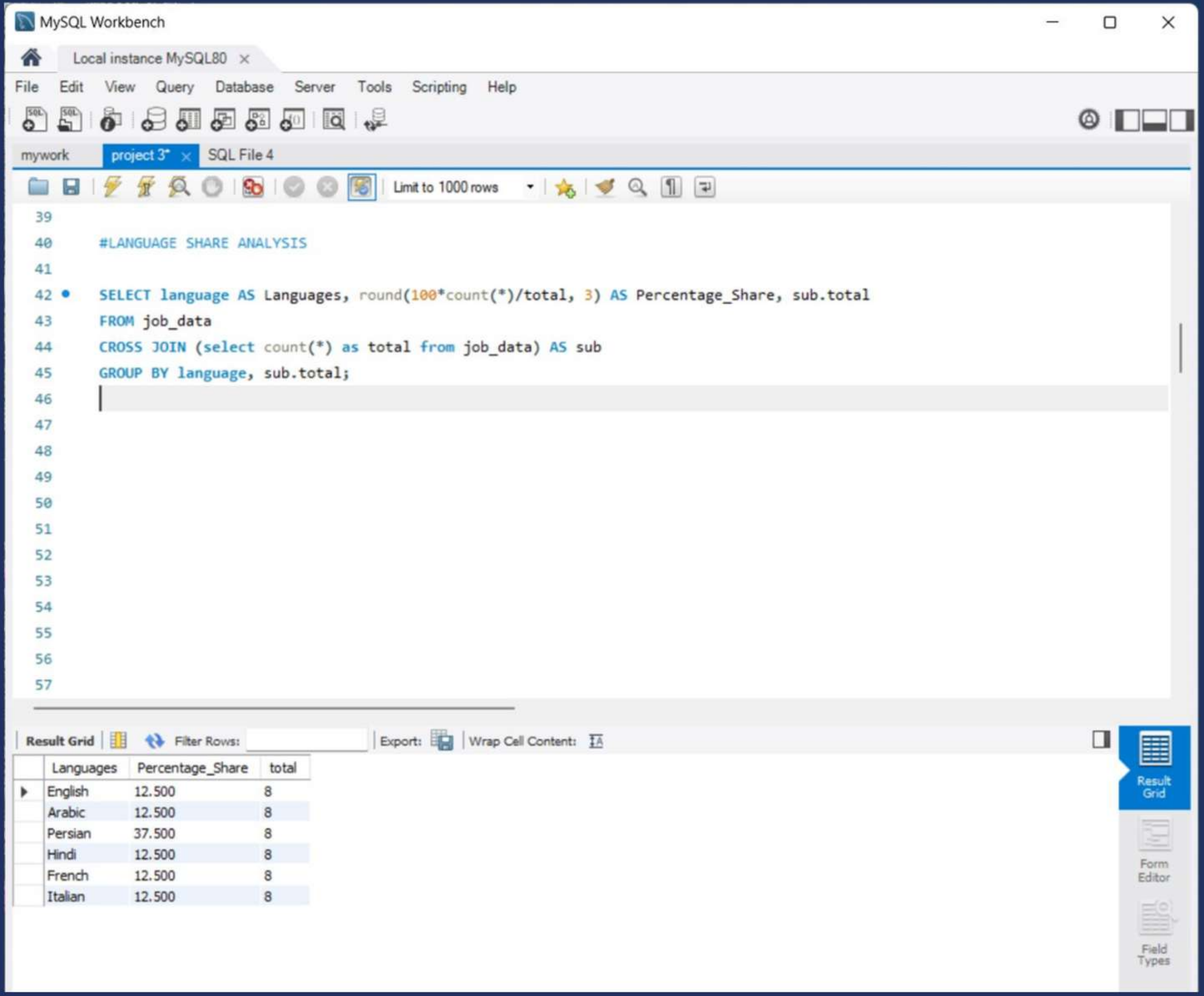
After analyzing the data it can be found that weekly throughput analysis is **0.0268.**
And if we see the daily throughout analysis the value comes as shown:

SQL Query used to find out the given output is mentioned in the previous slide.

Dates	Daily Throughout
2020-11-25	0.0222
2020-11-26	0.0179
2020-11-27	0.0096
2020-11-28	0.0606
2020-11-29	0.0500
2020-11-30	0.0500

- Language Share Analysis

Here, my objective is to calculate the percentage share of each language in the last 30 days.



```
#LANGUAGE SHARE ANALYSIS

SELECT language AS Languages, round(100*count(*)/total, 3) AS Percentage_Share, sub.total
FROM job_data
CROSS JOIN (select count(*) as total from job_data) AS sub
GROUP BY language, sub.total;
```

Languages	Percentage_Share	total
English	12.500	8
Arabic	12.500	8
Persian	37.500	8
Hindi	12.500	8
French	12.500	8
Italian	12.500	8

Insights

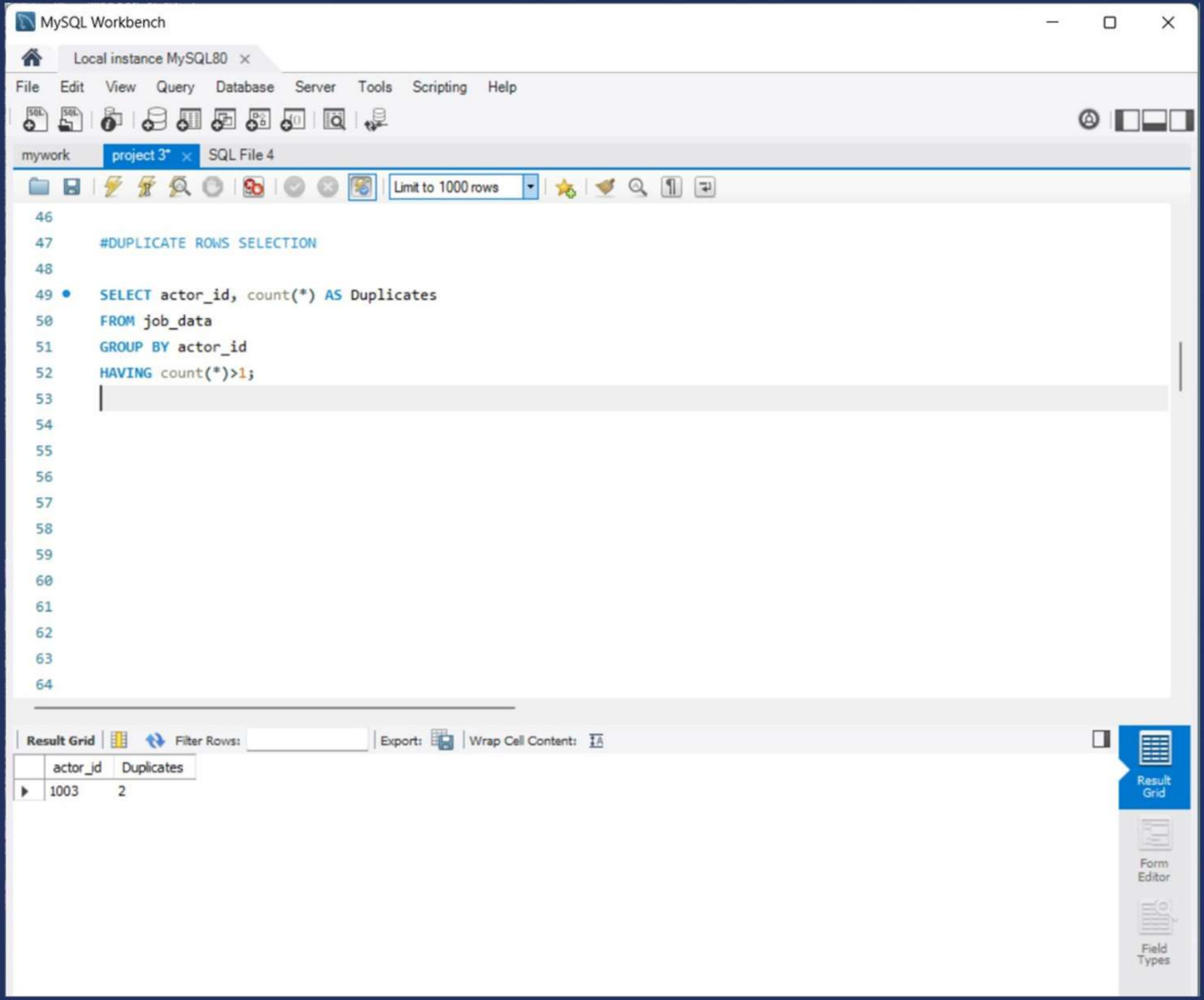
The percentage share of each language over the last 30 days is given below:

Languages	Percentage_Share	Total
English	12.500	8
Arabic	12.500	8
Persian	37.500	8
Hindi	12.500	8
French	12.500	8
Italian	12.500	8

SQL Query used to find out the given output is mentioned in the previous slide.

- Duplicate Rows Detection

Here, my objective is to identify duplicate rows in the data.



```
#DUPLICATE ROWS SELECTION

SELECT actor_id, count(*) AS Duplicates
FROM job_data
GROUP BY actor_id
HAVING count(*)>1;
```

```
actor_id  Duplicates
1003      2
```

Insights

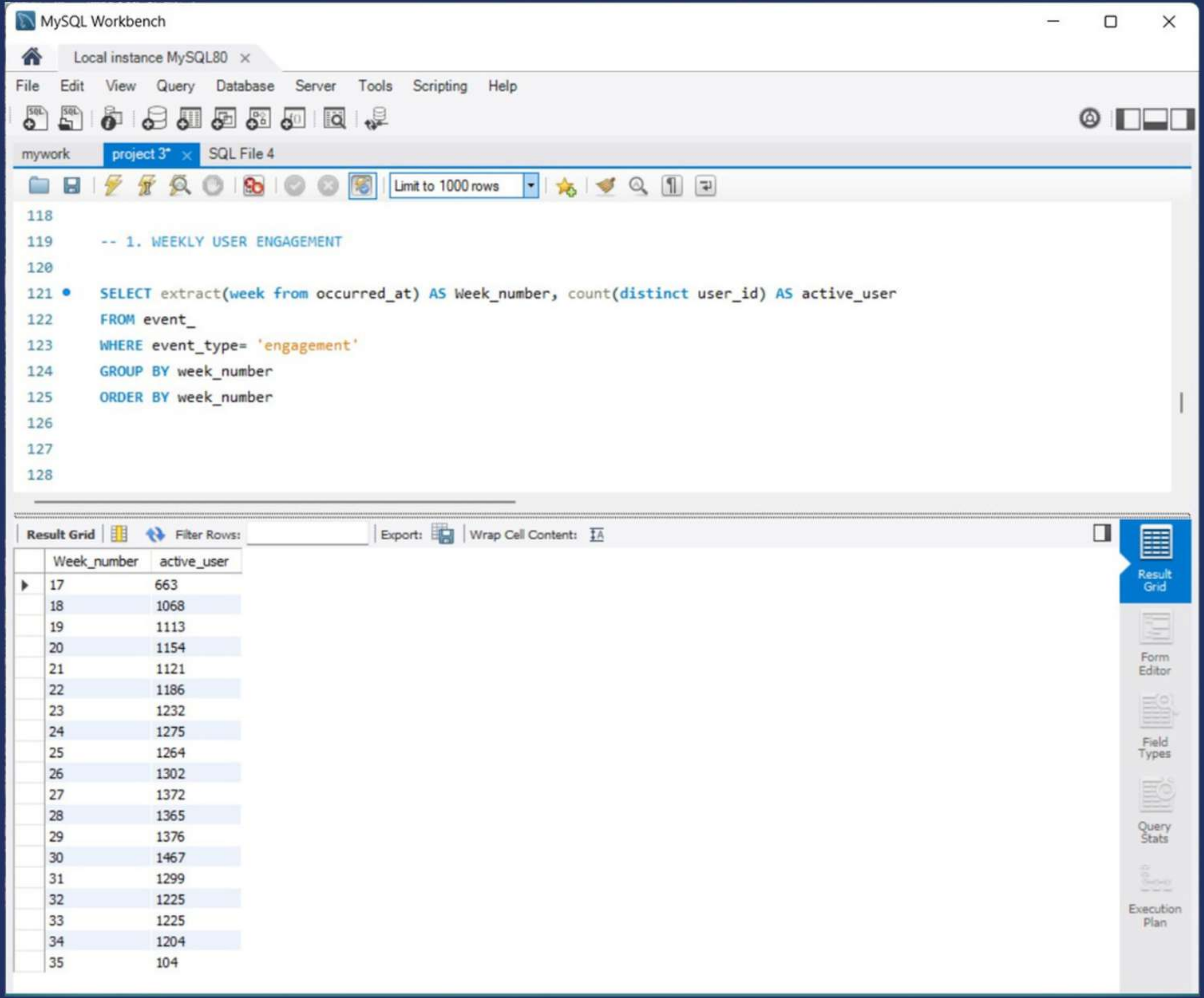
After analyzing the data it can be found that there are only **2 duplicate rows with the actor_id as ”1003”**

SQL Query used to find out the given output is mentioned in the previous slide.

Investigation Metric Spikes

- Weekly User Engagement

Here, my objective is to measure the activeness of users on a weekly basis.



```sql
-- 1. WEEKLY USER ENGAGEMENT

SELECT extract(week from occurred_at) AS Week_number, count(distinct user_id) AS active_user
FROM event_
WHERE event_type= 'engagement'
GROUP BY week_number
ORDER BY week_number
```

Week_number	active_user
17	663
18	1068
19	1113
20	1154
21	1121
22	1186
23	1232
24	1275
25	1264
26	1302
27	1372
28	1365
29	1376
30	1467
31	1299
32	1225
33	1225
34	1204
35	104

Insights

Week number and no. of active users according to that are mentioned below:

Week_number	Active_user
17	663
18	1068
19	1113
20	1154
21	1121
22	1186

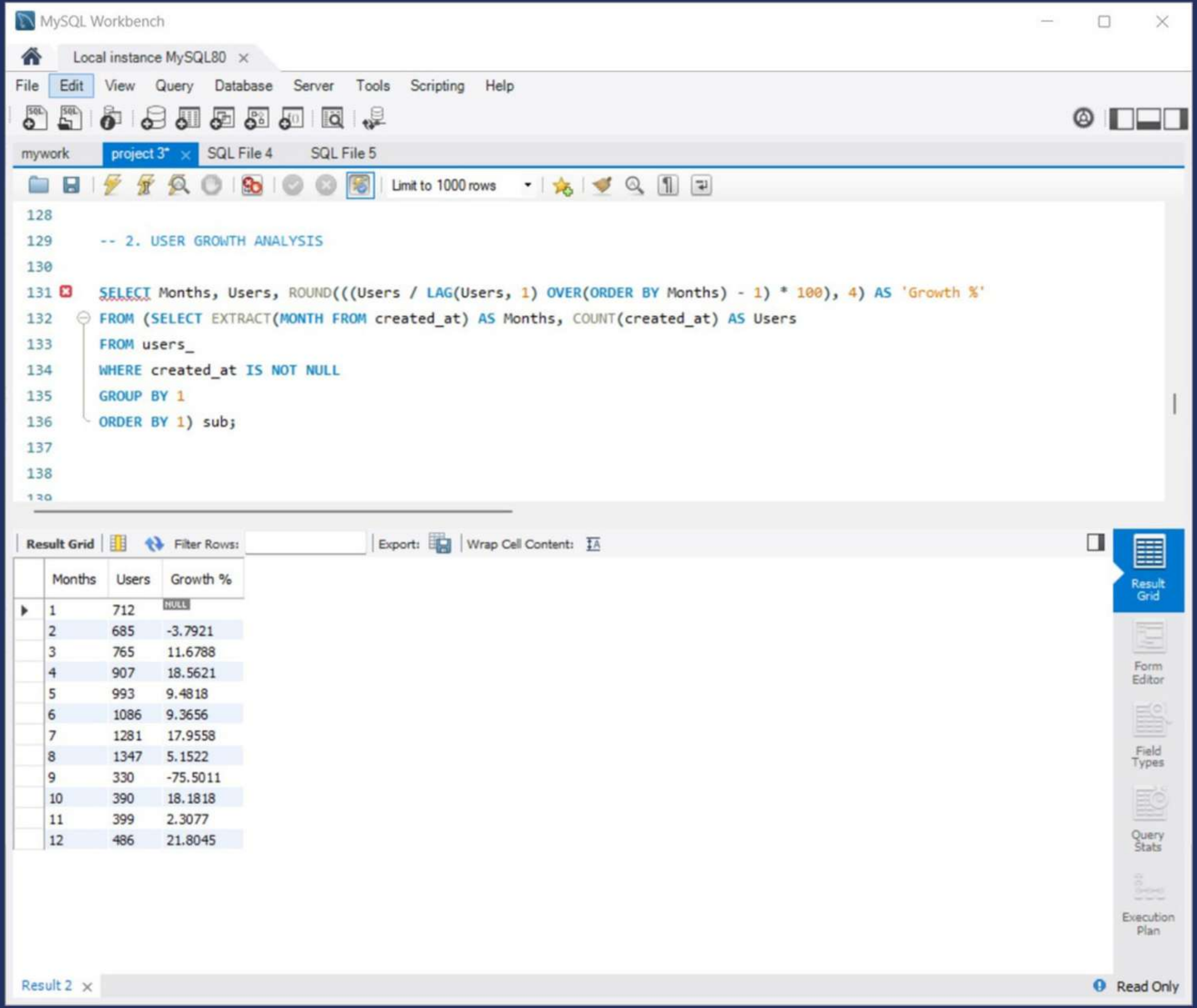
SQL Query used to find out the given output is mentioned in the previous slide.

Insights

Week_number	Active_user
23	1232
24	1275
25	1264
26	1302
27	1372
28	1365
29	1376
30	1467
31	1299
32	1225
33	1225
34	1204
35	104

- User Growth Analysis:

Here, my objective is to analyze the growth of users over time for a product.



```sql
-- 2. USER GROWTH ANALYSIS

SELECT Months, Users, ROUND(((Users / LAG(Users, 1) OVER(ORDER BY Months) - 1) * 100), 4) AS 'Growth %'
FROM (SELECT EXTRACT(MONTH FROM created_at) AS Months, COUNT(created_at) AS Users
FROM users_
WHERE created_at IS NOT NULL
GROUP BY 1
ORDER BY 1) sub;
```

Months	Users	Growth %
1	712	NULL
2	685	-3.7921
3	765	11.6788
4	907	18.5621
5	993	9.4818
6	1086	9.3656
7	1281	17.9558
8	1347	5.1522
9	330	-75.5011
10	390	18.1818
11	399	2.3077
12	486	21.8045

Insights

User growth is given according to the month from Jan-Dec according to the growth %. According, to that we can check in which month the growth was more or less.

SQL Query used to find out the given output is mentioned in the previous slide.

Months	Users	Growth %
1	712	NULL
2	685	-3.7921
3	765	11.6788
4	907	18.5621
5	993	9.4818
6	1086	9.3656
7	1281	17.9558
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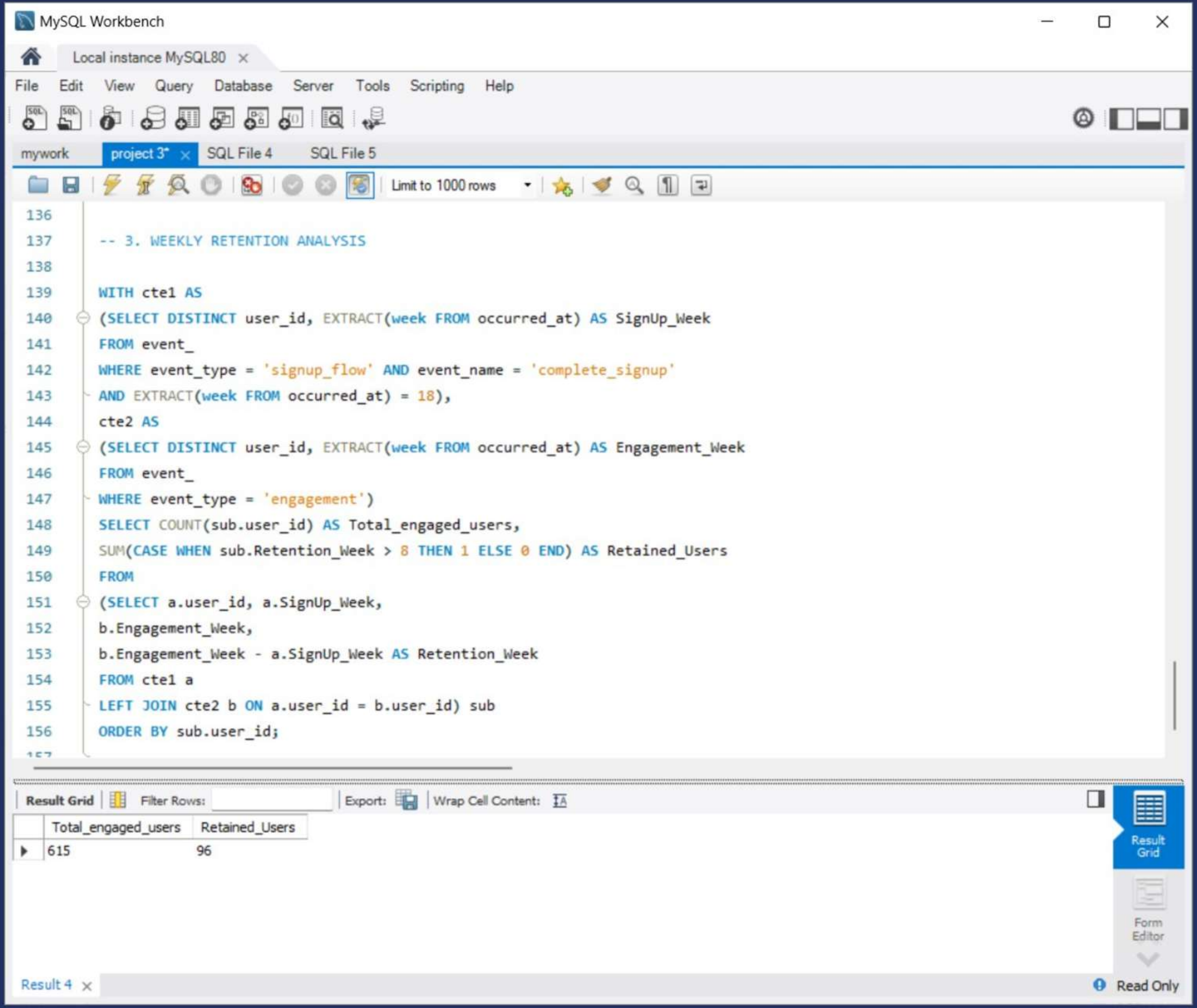
Insights

Months	Users	Growth %
9	330	-.75.5011
10	390	18.1818
11	399	2.3077
12	486	21.8045

- Weekly Retention Analysis:

Here, my objective is to measure the activeness of users on a weekly basis per device.


MySQL Workbench
Local instance MySQL80
File Edit View Query Database Server Tools Scripting Help
mywork project 3* SQL File 4 SQL File 5
Limit to 1000 rows
Result Grid Filter Rows: Export: Wrap Cell Content:
Result Grid
Form Editor
Result 4
Read Only

```sql
-- 3. WEEKLY RETENTION ANALYSIS

WITH cte1 AS
(SELECT DISTINCT user_id, EXTRACT(week FROM occurred_at) AS SignUp_Week
FROM event_
WHERE event_type = 'signup_flow' AND event_name = 'complete_signup'
AND EXTRACT(week FROM occurred_at) = 18),
cte2 AS
(SELECT DISTINCT user_id, EXTRACT(week FROM occurred_at) AS Engagement_Week
FROM event_
WHERE event_type = 'engagement')
SELECT COUNT(sub.user_id) AS Total_engaged_users,
SUM(CASE WHEN sub.Retention_Week > 8 THEN 1 ELSE 0 END) AS Retained_Users
FROM
(SELECT a.user_id, a.SignUp_Week,
b.Engagement_Week,
b.Engagement_Week - a.SignUp_Week AS Retention_Week
FROM cte1 a
LEFT JOIN cte2 b ON a.user_id = b.user_id) sub
ORDER BY sub.user_id;
```

Total_engaged_users	Retained_Users
615	96

Insights

SQL Query which is used to analyze the data is given in the previous slide

The number of users calculated after analyzing the weekly data of users is given below:

Total engaged users

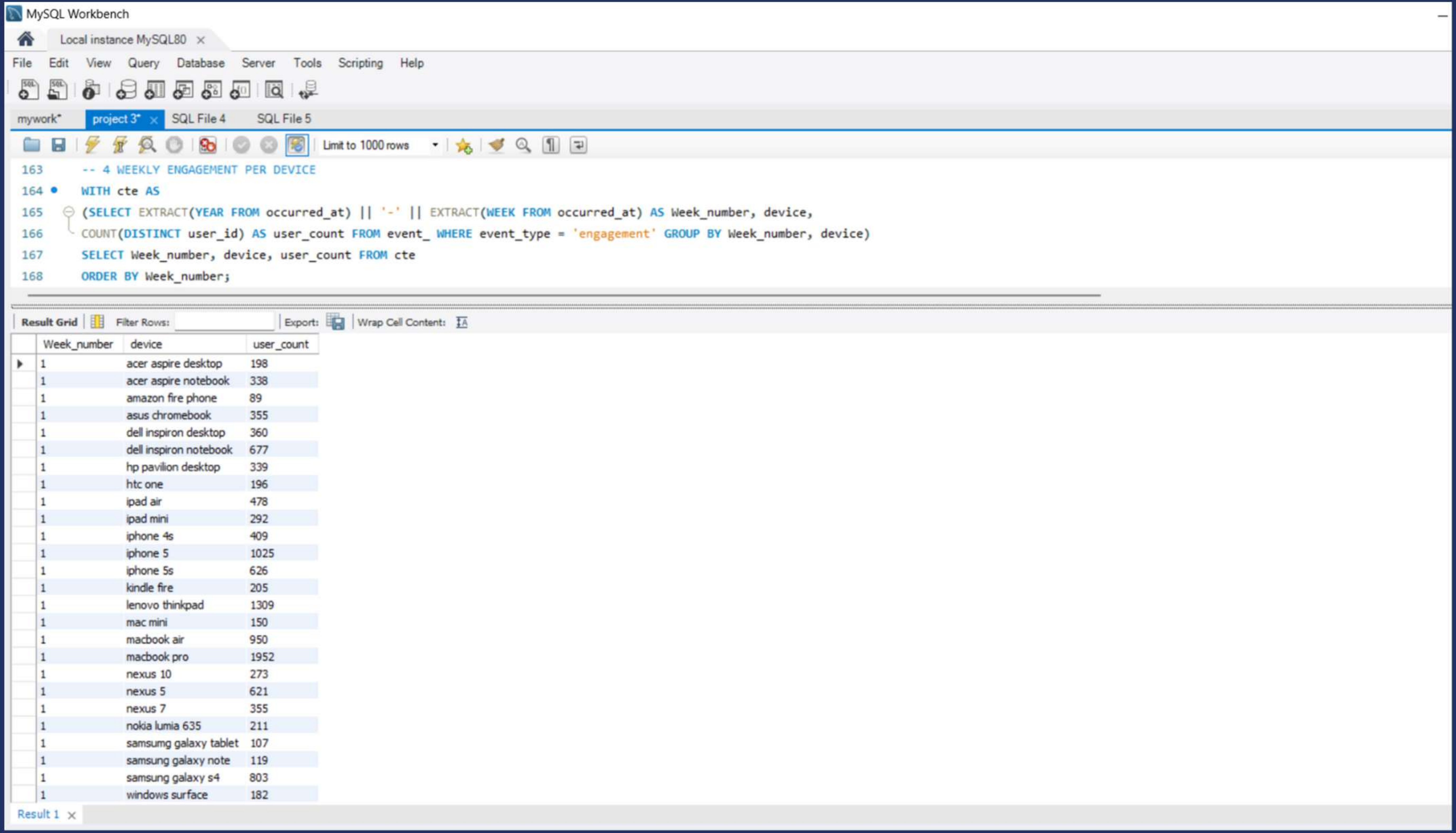
The total no. of users which where engaged weekly after signing up for a product is 615

Retained users

The no. of users which were retained weekly based on the sign-up cohort is 96.

- Weekly Engagement Per Device:

Here, my objective is to measure the activeness of users on a weekly basis per device.


MySQL Workbench
Local instance MySQL80
File Edit View Query Database Server Tools Scripting Help
mywork* project 3* SQL File 4 SQL File 5
Limit to 1000 rows
Result Grid Filter Rows: Export: Wrap Cell Content:
Result 1

```
-- 4 WEEKLY ENGAGEMENT PER DEVICE
WITH cte AS
(SELECT EXTRACT(YEAR FROM occurred_at) || '-' || EXTRACT(WEEK FROM occurred_at) AS Week_number, device,
COUNT(DISTINCT user_id) AS user_count FROM event_ WHERE event_type = 'engagement' GROUP BY Week_number, device)
SELECT Week_number, device, user_count FROM cte
ORDER BY Week_number;
```

Week_number	device	user_count
1	acer aspire desktop	198
1	acer aspire notebook	338
1	amazon fire phone	89
1	asus chromebook	355
1	dell inspiron desktop	360
1	dell inspiron notebook	677
1	hp pavilion desktop	339
1	htc one	196
1	ipad air	478
1	ipad mini	292
1	iphone 4s	409
1	iphone 5	1025
1	iphone 5s	626
1	kindle fire	205
1	lenovo thinkpad	1309
1	mac mini	150
1	macbook air	950
1	macbook pro	1952
1	nexus 10	273
1	nexus 5	621
1	nexus 7	355
1	nokia lumia 635	211
1	samsumg galaxy tablet	107
1	samsung galaxy note	119
1	samsung galaxy s4	803
1	windows surface	182

Insights

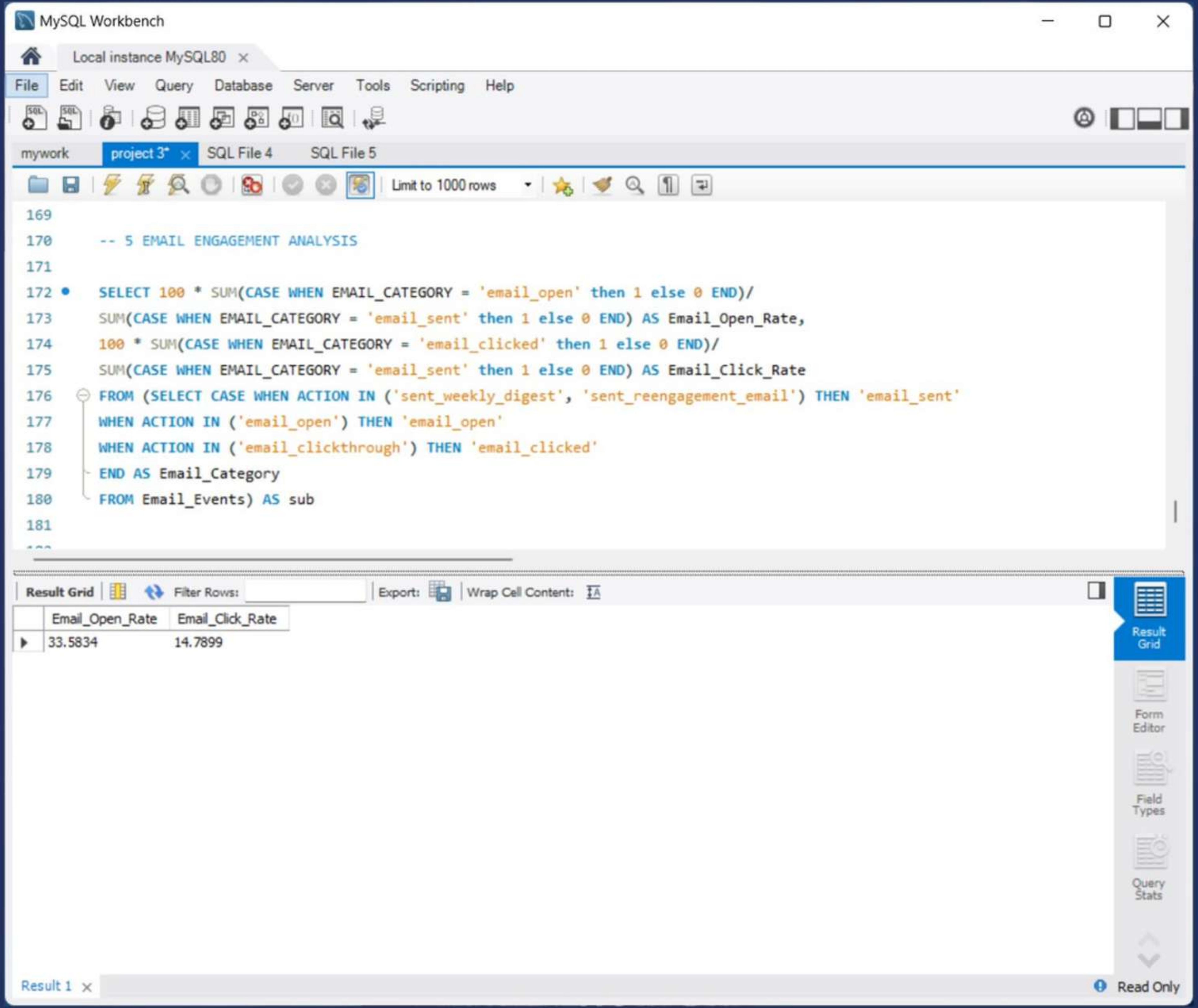
The activeness of users on weekly basis per device is found after analyzing the data from the table. And according to that the name of the device and no. of active users are mentioned below:

SQL query to analyze the find the result for the following objective is given in the previous slide.

Acer aspire notebook-338 ; Amazon fire phone- 89 ; Asus chromebook-355 ; Dell inspiron desktop- 360; Dell inspiron notebook- 677 ; Hp pavilion desktop- 339 ; Htc pne- 196 ; Ipad air- 478 ; Ipad mini- 292 ; Iphone 4s-409 ; Iphone 5- 1025 ; Kindle fire- 205 ; Lenovo thinkpad- 1309 ; Mac mini-150 ; Macbook air- 950 ; Macbook pro- 1952 ; Nexus 10- 273 ; Nexus 5- 621 ; Nexus 7- 355 ; Nokia lumia 635- 211 ; Samsung galaxy tablet- 107 ; Samsung galaxy note- 119 ; Samsung galaxy s4- 803 ; Window surface-182.

- Email Engagement Analysis:

Here, my objective is to analyze how users are engaged with the email service.



```
-- 5 EMAIL ENGAGEMENT ANALYSIS

SELECT 100 * SUM(CASE WHEN EMAIL_CATEGORY = 'email_open' then 1 else 0 END)/
SUM(CASE WHEN EMAIL_CATEGORY = 'email_sent' then 1 else 0 END) AS Email_Open_Rate,
100 * SUM(CASE WHEN EMAIL_CATEGORY = 'email_clicked' then 1 else 0 END)/
SUM(CASE WHEN EMAIL_CATEGORY = 'email_sent' then 1 else 0 END) AS Email_Click_Rate
FROM (SELECT CASE WHEN ACTION IN ('sent_weekly_digest', 'sent_reengagement_email') THEN 'email_sent'
WHEN ACTION IN ('email_open') THEN 'email_open'
WHEN ACTION IN ('email_clickthrough') THEN 'email_clicked'
END AS Email_Category
FROM Email_Events) AS sub
```

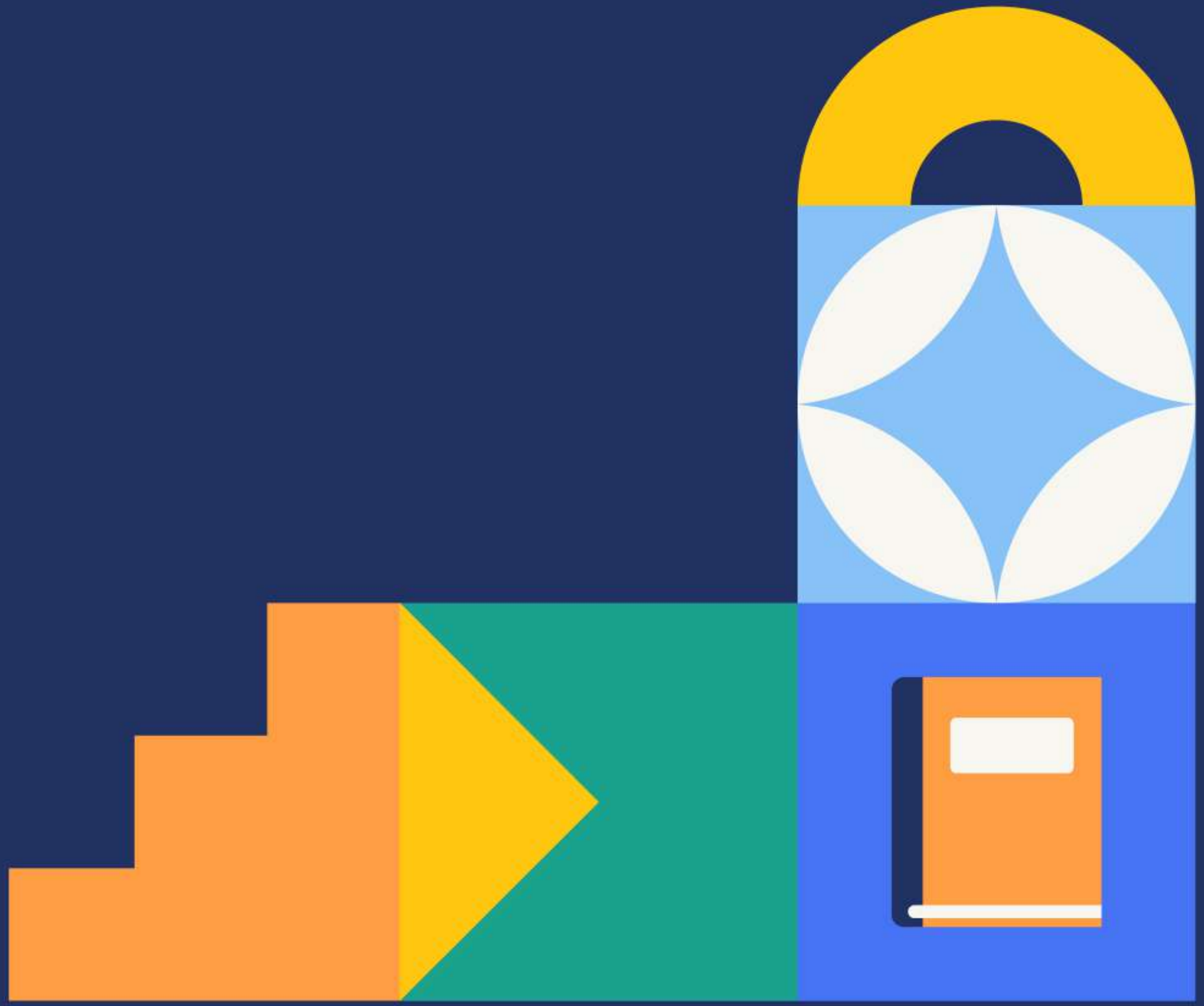
Email_Open_Rate	Email_Click_Rate
33.5834	14.7899

Insights

After analyzing the data from the table Email_events table the activeness of users how they were enaged with email service has been found as follows:

- Email Open Rate :- 33.5834
- Email Click Rate :- 14.7899

SQL query used to analyze the following objective is mentioned in the previous slide



Result

After analyzing the data from the information given into tables, various analysis has been made based upon which it will be easy to find the data which company wants for their employees as well as their product.

And by analyzing the data I’m able to learn advanced SQL and importing data directly from MS Excel to My SQL.

Thank you