Operation Analytics and Investigating Metric Spike

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Project 3

1. **Project Description:** As per the instructions and report, I have assigned a task to perform the data analysis of the **Operation Analytics and Investigating Metric Spike.** We have to work on the provided dataset and collect the useful insights that can help the marketing team for further campaigns. The primary focus is on optimizing workflows ,enhance automation, and predicting the company's overall growth or decline.

2. **Approach** :To perform all the queries and complete the given task. According to the instructions . In MYSQL Workbench, execute all the queries , analyze the uncover patterns, trends,anomalies it and collect the useful insights out of it

3. **Tech Stack used :** To perform the queries I have used MYSQL workbench because it is a powerful tool for database development, management, and administration specifically designed for MySQL databases , and Google docs to make the analysis of the project

4. **Insights:** As a beginner, it helped me to understand how the complex queries work and how to understand the business and that insights actually works.

5. **Results:** Following are all the executed queries with the Output

A) Case Study 1: Job Data Analysis

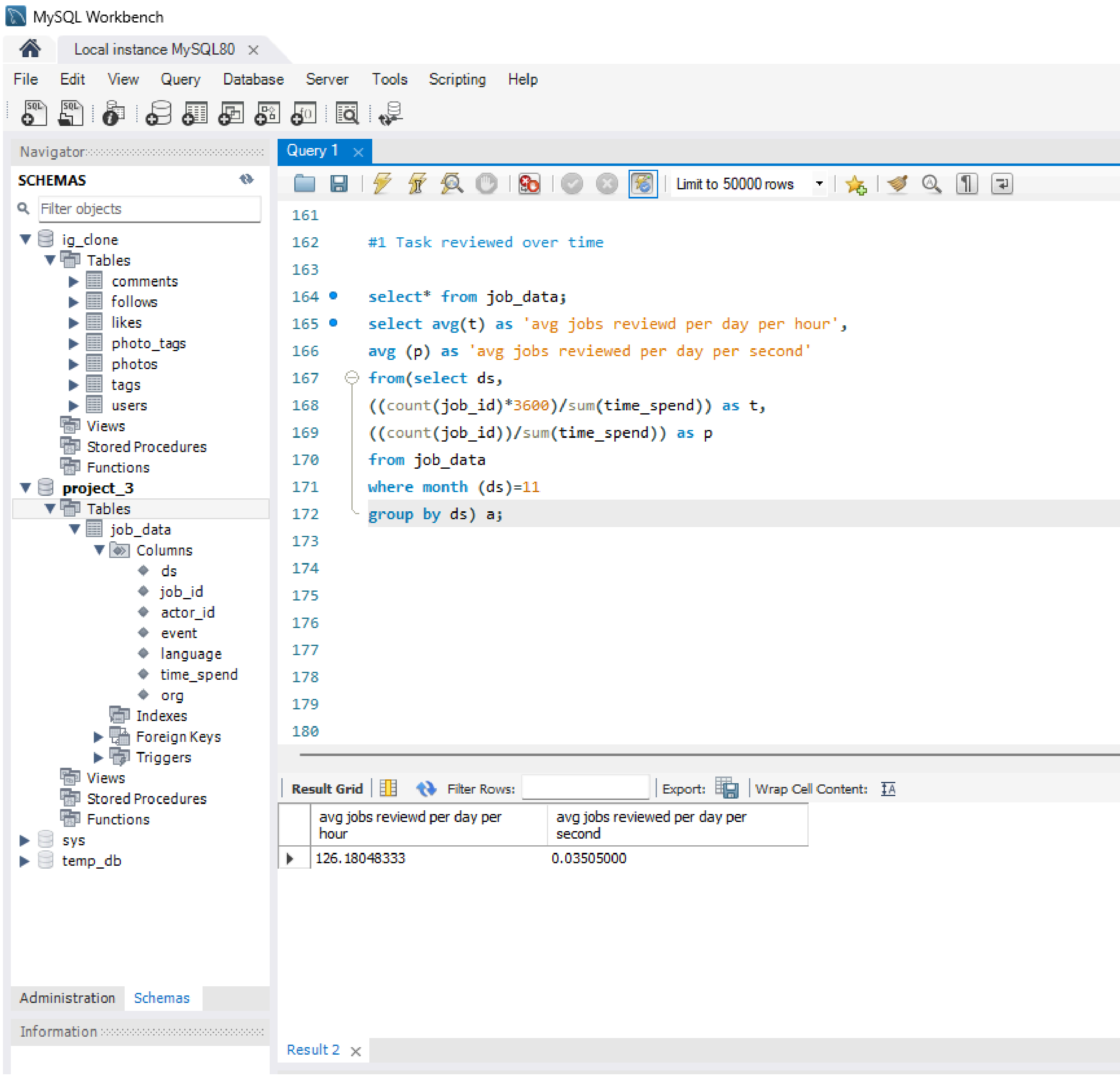
- **Jobs Reviewed Over Time:**
    - Objective: Calculate the number of jobs reviewed per hour for each day in November 2020.
    - Your Task: Write an SQL query to calculate the number of jobs reviewed per hour for each day in November 2020.

●

Syntax:

```
select avg(t) as 'avg jobs reviewd per day per hour',

avg (p) as 'avg jobs reviewed per day per second'

from(select ds,

((count(job_id)*3600)/sum(time_spend)) as t,

((count(job_id))/sum(time_spend)) as p

from job_data

where month (ds)=11

group by ds) a;
```

Insights of the below query : The number of jobs reviewed per hour per day in November 2020 varies, with higher activity on some days and lower activity on others.



```
#1 Task reviewed over time

select* from job_data;
select avg(t) as 'avg jobs reviewd per day per hour',
avg (p) as 'avg jobs reviewed per day per second'
from(select ds,
((count(job_id)*3600)/sum(time_spend)) as t,
((count(job_id))/sum(time_spend)) as p
from job_data
where month (ds)=11
group by ds) a;
```

avg jobs reviewd per day per hour	avg jobs reviewed per day per second
126.18048333	0.03505000

B.Throughput Analysis:

- Objective: Calculate the 7-day rolling average of throughput (number of events per second).
- Your Task: Write an SQL query to calculate the 7-day rolling average of throughput. Additionally, explain whether you prefer using the daily metric or the 7-day rolling average for

Syntax:

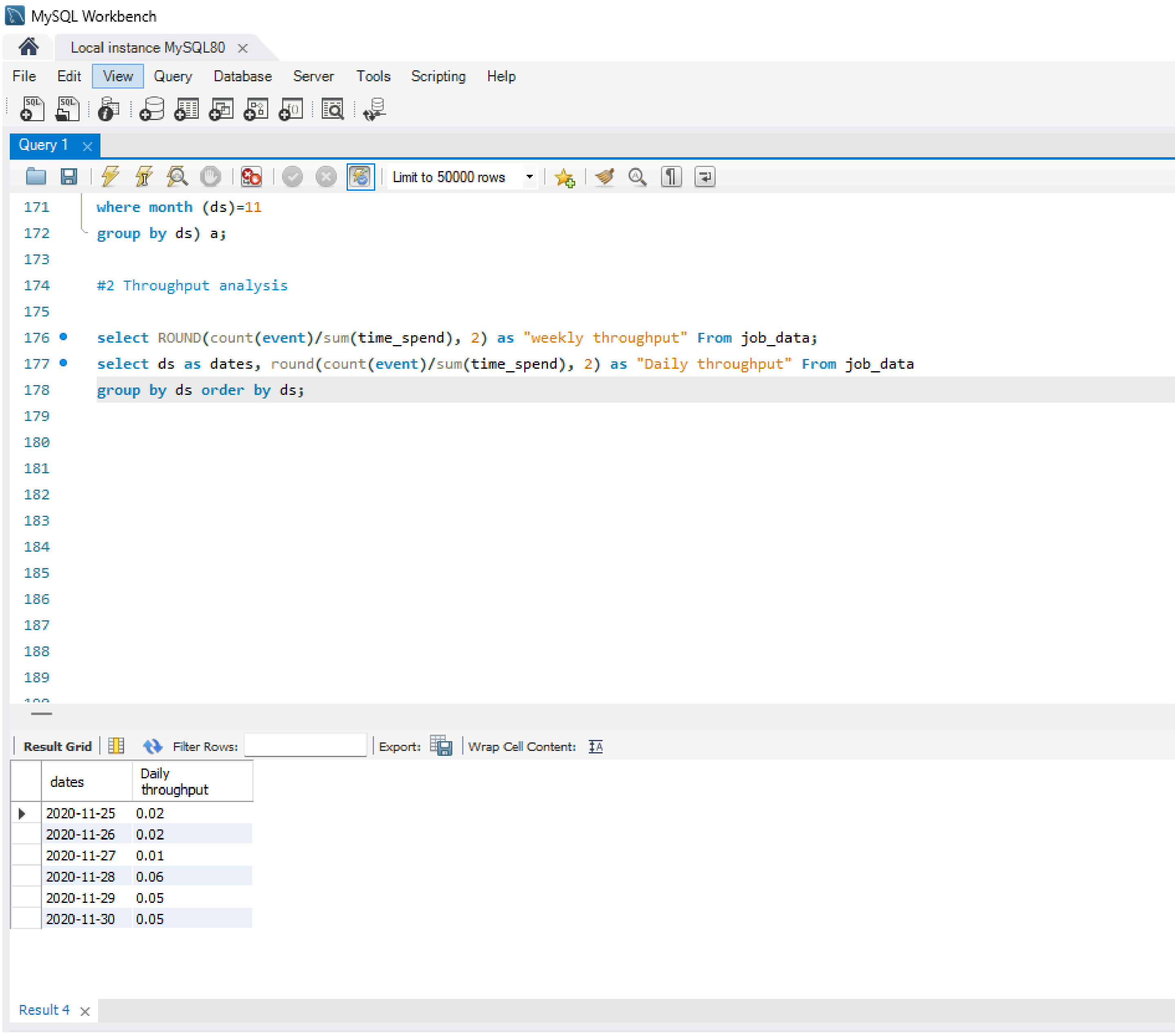
select ROUND(count(event)/sum(time_spend), 2) as "weekly throughput" From job_data;

select ds as dates, round(count(event)/sum(time_spend), 2) as "Daily throughput" From job_data

group by ds order by ds;

Insights of the below query: **Insights: The 7-day rolling average of throughput provides a smoothed view of the data, allowing you to observe trends over time without being affected by daily fluctuations.**

Continue using the 7-day rolling average for throughput analysis, as it provides a more stable representation of performance trends. This can help in identifying long-term patterns and making more informed decisions.



```
where month (ds)=11
group by ds) a;

#2 Throughput analysis

select ROUND(count(event)/sum(time_spend), 2) as "weekly throughput" From job_data;
select ds as dates, round(count(event)/sum(time_spend), 2) as "Daily throughput" From job_data
group by ds order by ds;
```

dates	Daily throughput
2020-11-25	0.02
2020-11-26	0.02
2020-11-27	0.01
2020-11-28	0.06
2020-11-29	0.05
2020-11-30	0.05

C. Language Share Analysis:

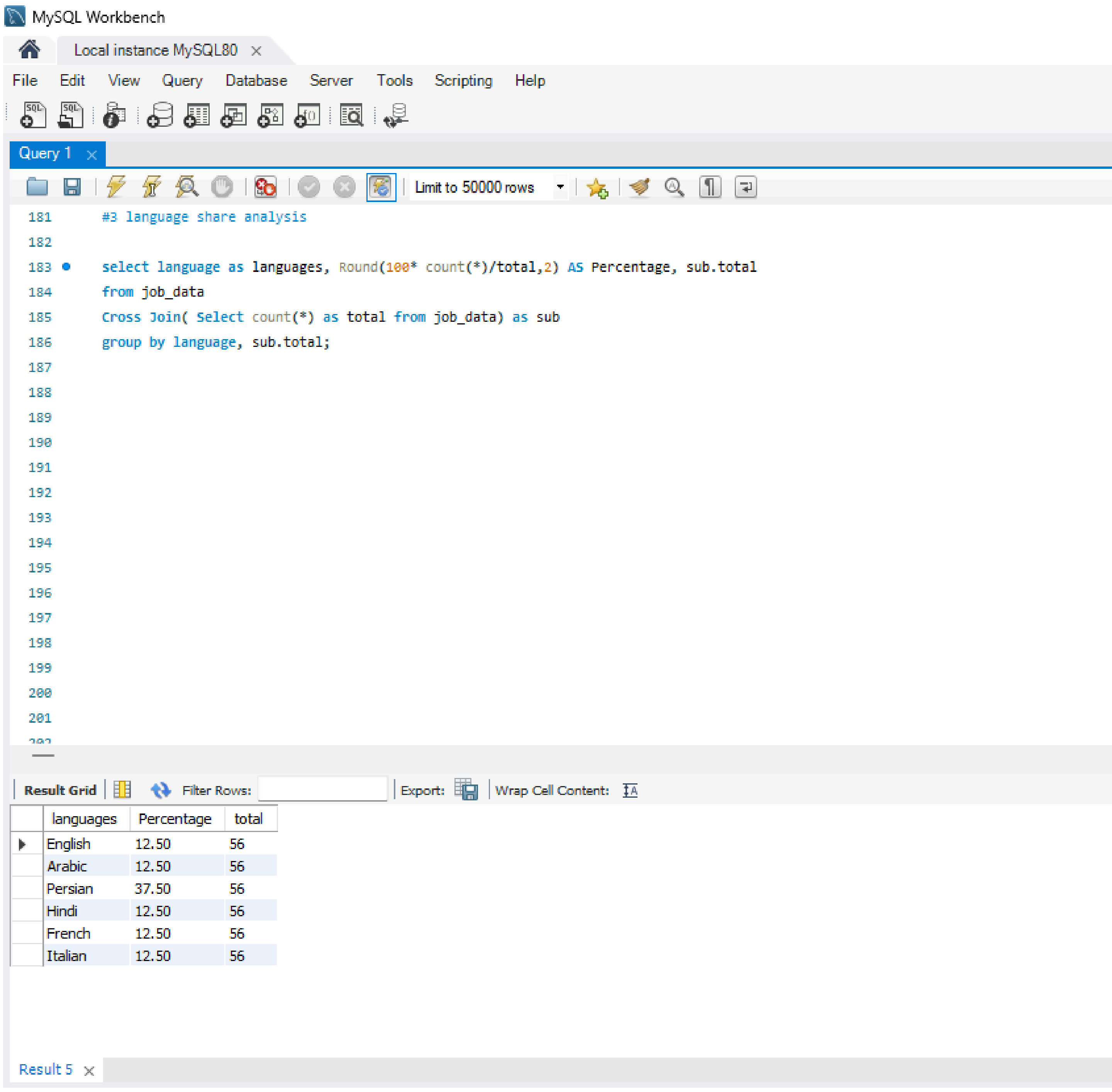
- Objective: Calculate the percentage share of each language in the last 30 days.
- Your Task: Write an SQL query to calculate the percentage share of each language over the last 30 days.

Syntax:

```
select language as languages, Round (100* count(*)/total, 2) AS Percentage,
sub.total

from job_data

Cross Join(select count(*) as total from job_data) as sub

group by language, sub.total;
```

Insights of the below query: The language distribution in the last 30 days is relatively balanced, with Persian having the highest share.

Consider investing in language-specific content or features to enhance user engagement in languages with lower shares.



```
#3 language share analysis

select language as languages, Round(100* count(*)/total,2) AS Percentage, sub.total
from job_data
Cross Join( Select count(*) as total from job_data) as sub
group by language, sub.total;
```

languages	Percentage	total
English	12.50	56
Arabic	12.50	56
Persian	37.50	56
Hindi	12.50	56
French	12.50	56
Italian	12.50	56

D.Duplicate Rows Detection:

- Objective: Identify duplicate rows in the data.
- Your Task: Write an SQL query to display duplicate rows from the job_data table.

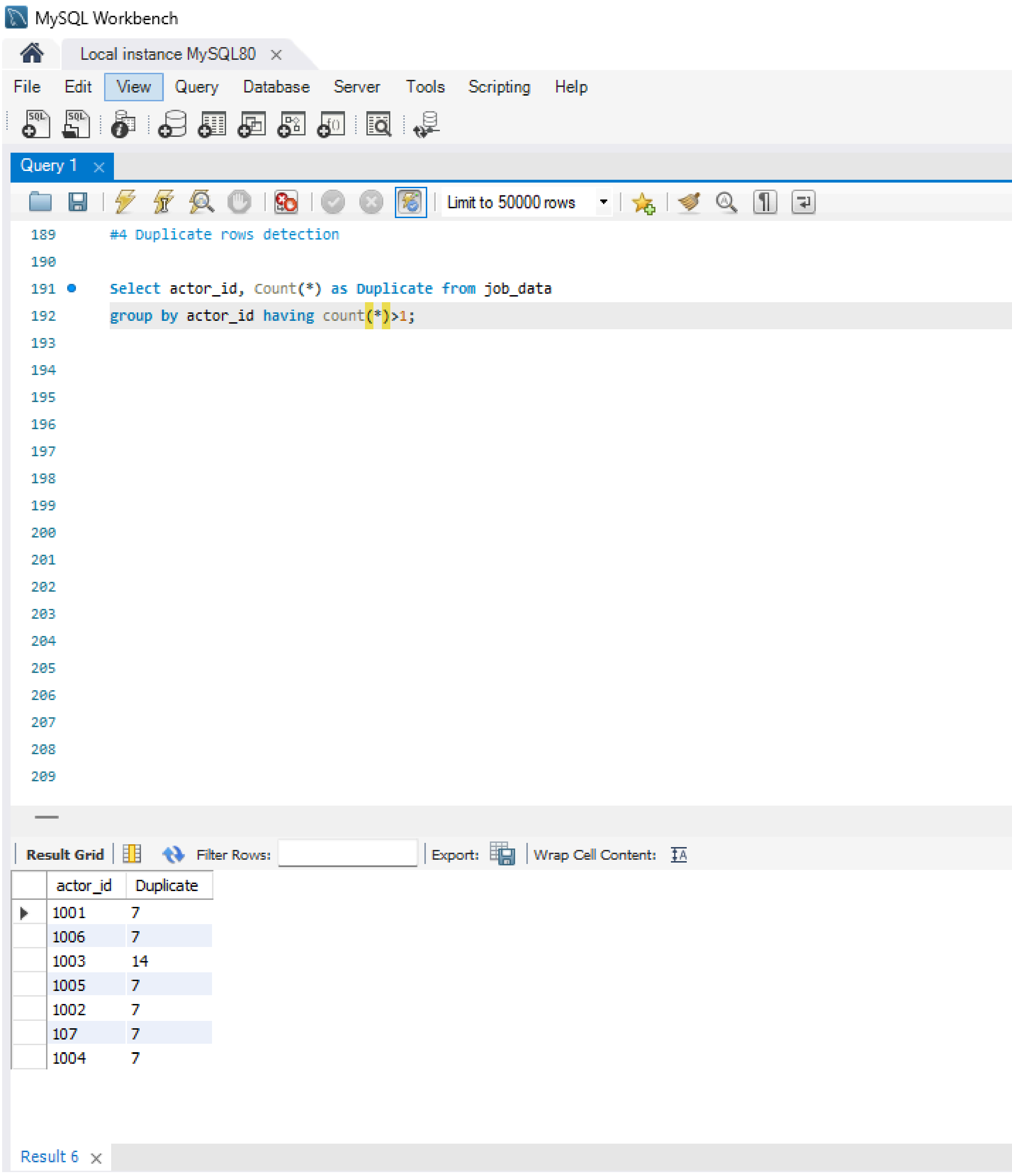
Syntax:

Select actor_id, Count(*) as Duplicate from job_data

group by actor_id having count(*)>1;

Insights of the below query:

There are total of 7 duplicate rows in the table, and the actor_id 1003 has 14 duplicate rows



```
#4 Duplicate rows detection

Select actor_id, Count(*) as Duplicate from job_data
group by actor_id having count(*)>1;
```

actor_id	Duplicate
1001	7
1006	7
1003	14
1005	7
1002	7
107	7
1004	7

Case Study 2: Investigating Metric Spike

Tasks:

1. **Weekly User Engagement:**
    - Objective: Measure the activeness of users on a weekly basis.
    - Your Task: Write an SQL query to calculate the weekly user engagement.

Syntax:

select extract (week from occurred_at) as weeks, count(distinct user_id) as no_of_users from events where event_type="engagement"

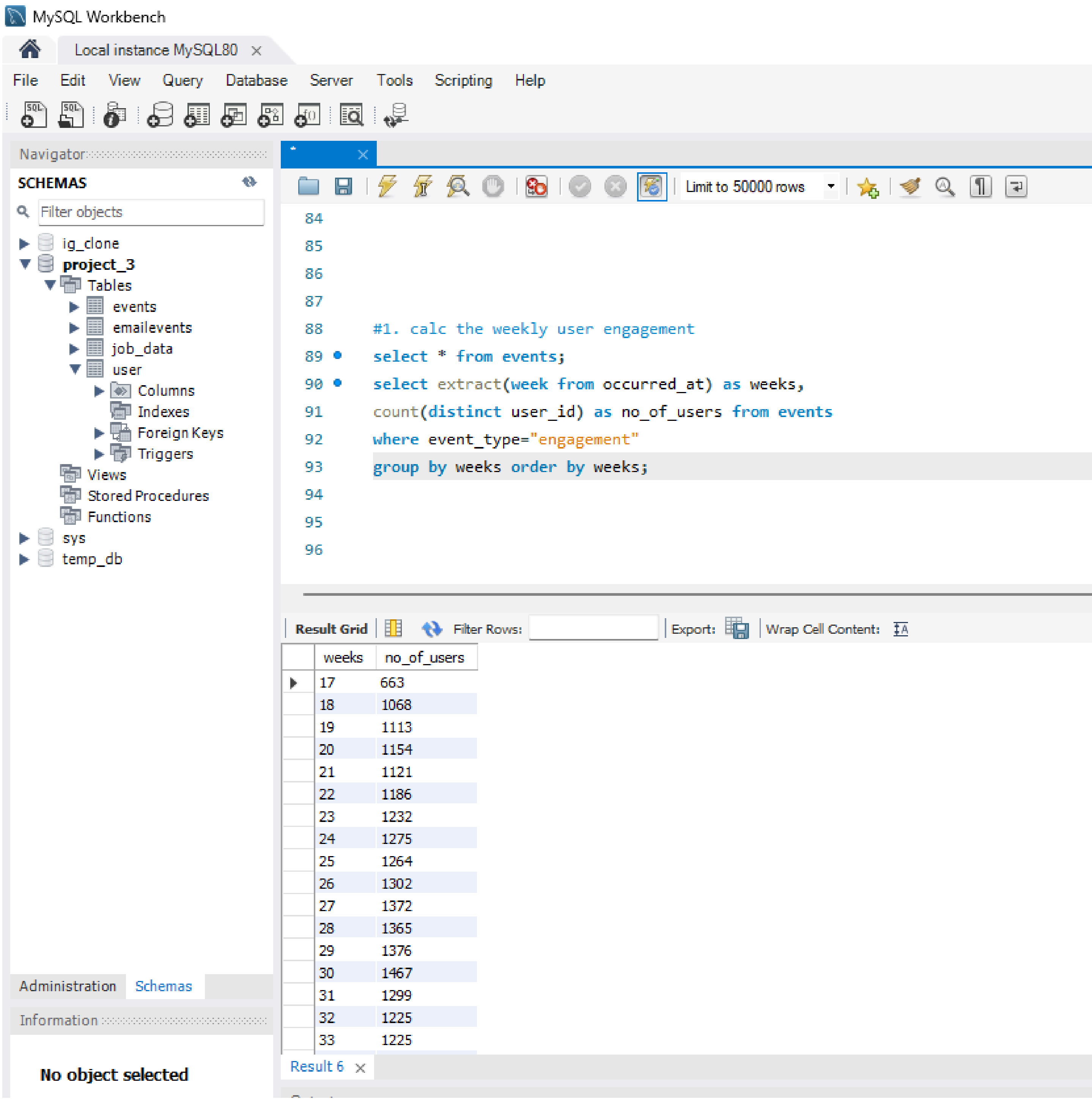
group by weeks order by weeks;

Insights of the below query:

User engagement seems to have peaked around week 30 and has shown some fluctuations over the observed period.

Look for patterns related to content updates, marketing campaigns, or any external events that might have influenced user behavior.

Use these insights to plan future engagement strategies



```
#1. calc the weekly user engagement
select * from events;
select extract(week from occurred_at) as weeks,
count(distinct user_id) as no_of_users from events
where event_type="engagement"
group by weeks order by weeks;
```

weeks	no_of_users
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

2. Weekly Retention Analysis:

a. Objective: Analyze the retention of users on a weekly basis after signing up for a product.
b. Your Task: Write an SQL query to calculate the weekly retention of users based on their sign-up cohort.

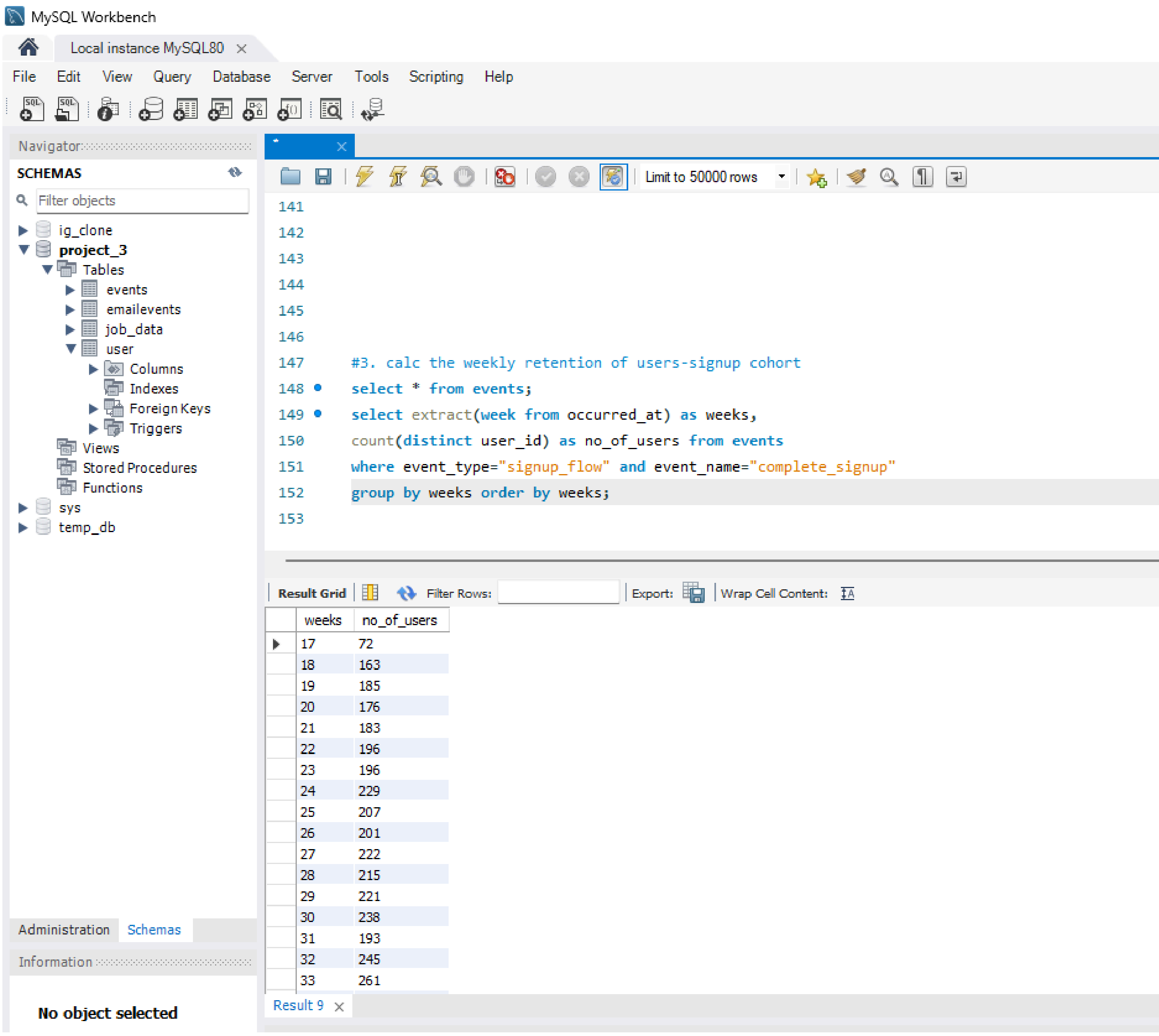
Syntax:

```
select extract(week from occurred_at) as weeks,

count(distinct user_id) as no_of_users from events

where event_type="signup_flow" and event_name="complete_signup"

group by weeks order by weeks;
```

Insight of the below query:

Weekly user retention shows a gradual decline over time.

Focus on improving user retention strategies. Identify key touchpoints in the user journey where users might be dropping off and work on enhancing user experience, engagement, and value during those stages.



```
#3. calc the weekly retention of users-signup cohort
select * from events;
select extract(week from occurred_at) as weeks,
count(distinct user_id) as no_of_users from events
where event_type="signup_flow" and event_name="complete_signup"
group by weeks order by weeks;
```

weeks	no_of_users
17	72
18	163
19	185
20	176
21	183
22	196
23	196
24	229
25	207
26	201
27	222
28	215
29	221
30	238
31	193
32	245
33	261

3.Weekly Engagement Per Device:

- Objective: Measure the activeness of users on a weekly basis per device.
- Your Task: Write an SQL query to calculate the weekly engagement per device.

Syntax:

select device, extract (week from occurred_at) as weeks, count(distinct user_id) as no_of_users from events

where event_type="engagement"

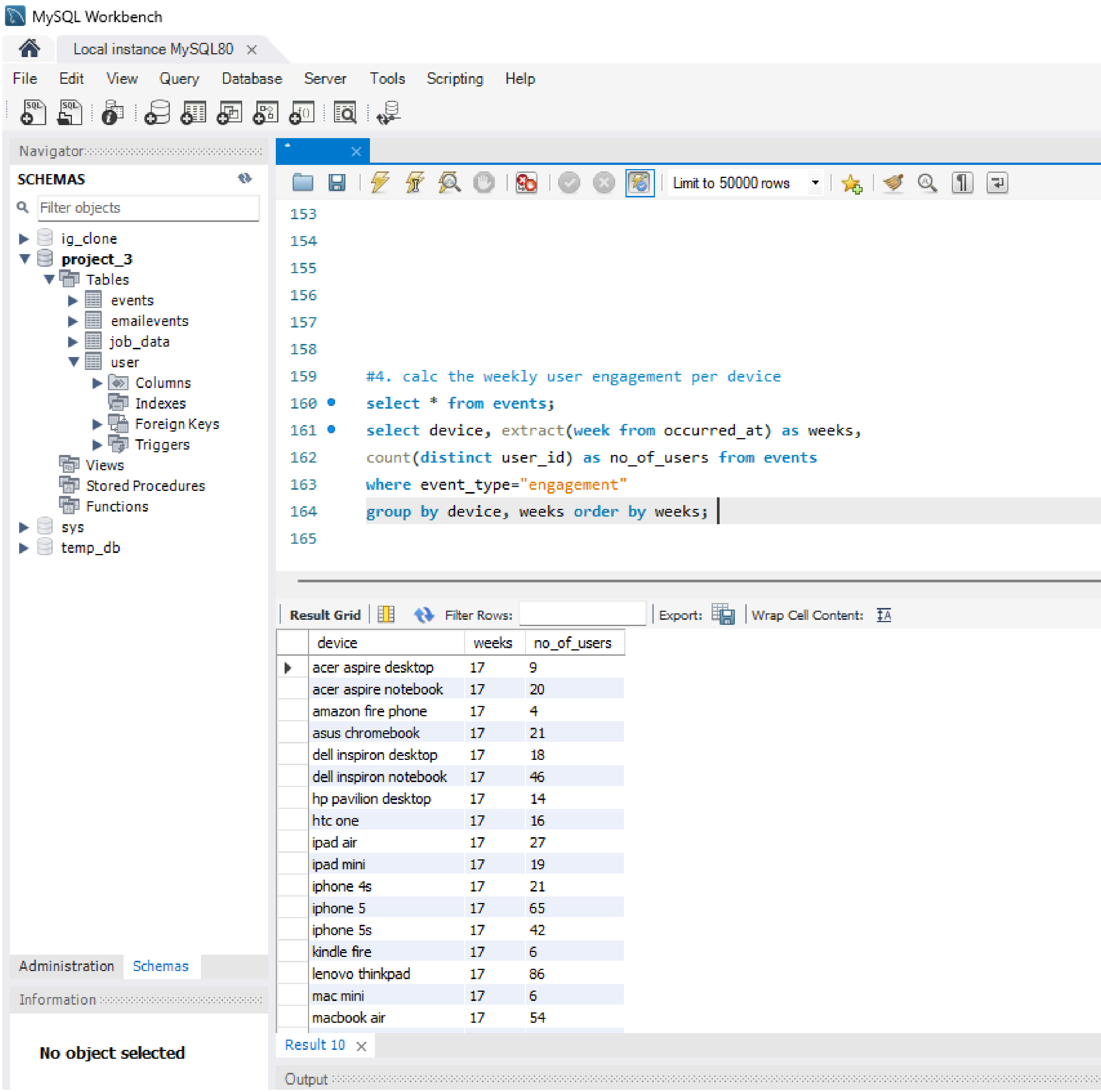
group by device, weeks order by weeks;

Insights of the below query:

Engagement varies across different devices and weeks. Some devices consistently show higher engagement than others.

Consider optimizing the user experience for devices that show lower engagement. Additionally, monitor device trends over time to adapt your strategies and prioritize user engagement on devices with the highest potential.

*This is sample output of 22 rows only. There 491 rows returned to the query, which could not be accommodated in single page.



```
#4. calc the weekly user engagement per device
select * from events;
select device, extract(week from occurred_at) as weeks,
count(distinct user_id) as no_of_users from events
where event_type="engagement"
group by device, weeks order by weeks;
```

device	weeks	no_of_users
acer aspire desktop	17	9
acer aspire notebook	17	20
amazon fire phone	17	4
asus chromebook	17	21
dell inspiron desktop	17	18
dell inspiron notebook	17	46
hp pavilion desktop	17	14
htc one	17	16
ipad air	17	27
ipad mini	17	19
iphone 4s	17	21
iphone 5	17	65
iphone 5s	17	42
kindle fire	17	6
lenovo thinkpad	17	86
mac mini	17	6
macbook air	17	54

4.Email Engagement Analysis:

- Objective: Analyze how users are engaging with the email service.
- Your Task: Write an SQL query to calculate the email engagement metrics.

<u>Syntax:</u>

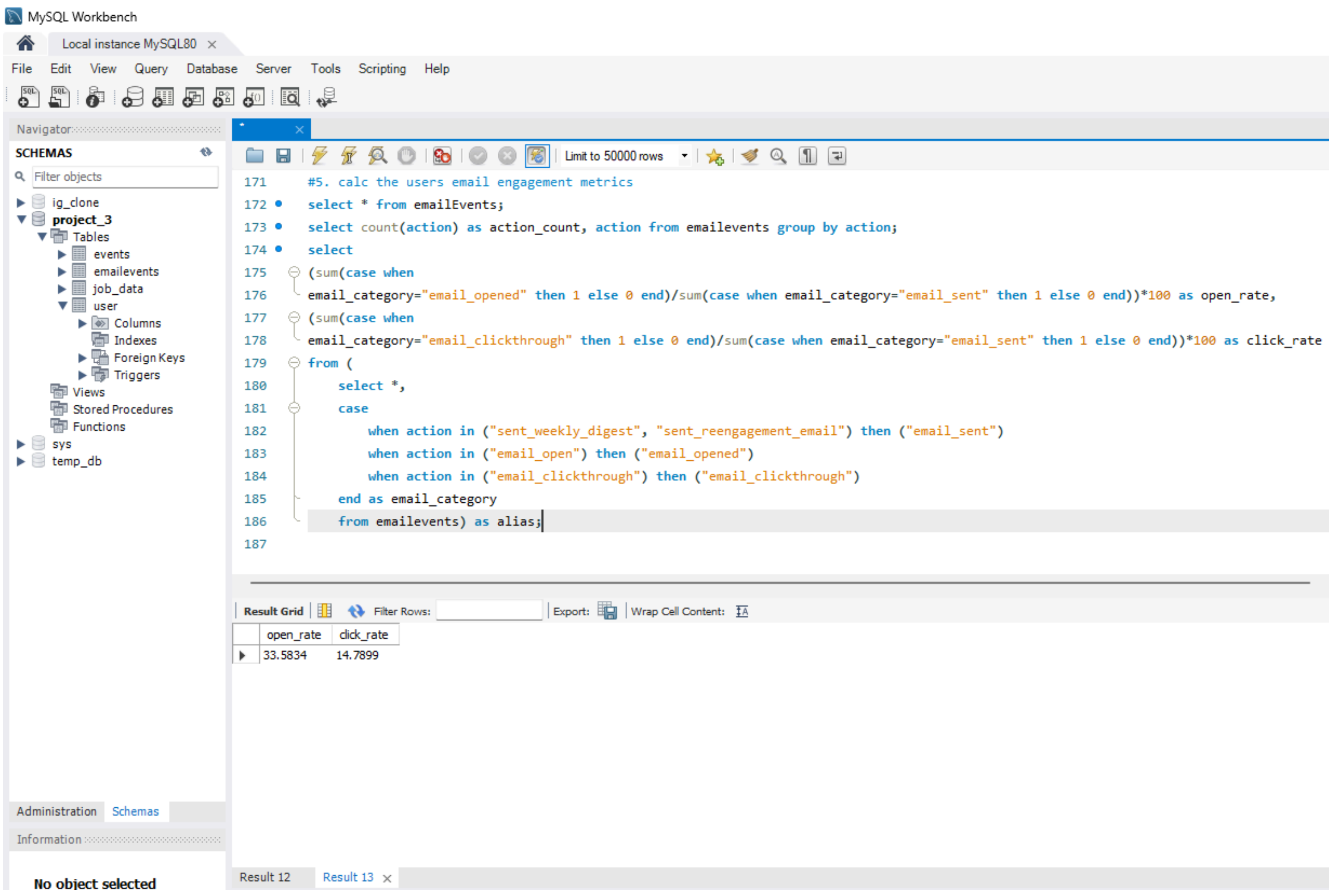
```
select * from email_events_table;

select count(action) as action_count, action from email_events_table group
by action;

select

(sum(case when

email_category="email_opened" then 1 else 0 end)/sum(case when
email_category="email_sent" then 1 else 0 end))*100 as open_rate,

(sum(case when

email_category="email_clickthrough" then 1 else 0 end)/sum(case when
email_category="email_sent" then 1 else 0 end))*100 as click_rate

from (

        select *,

        case

                when action in ("sent_weekly_digest",
"sent_reengagement_email") then ("email_sent")

                when action in ("email_open") then ("email_opened")
```

when action in ("email_clickthrough") then ("email_clickthrough")

end as email_category

from email_events_table) as alias;

Insights of the below query: The users are engaging as the open rate of email is 33.58% per user and the click of those is 14.78 % per user.



```
#5. calc the users email engagement metrics
select * from emailEvents;
select count(action) as action_count, action from emailevents group by action;
select
(sum(case when
email_category="email_opened" then 1 else 0 end)/sum(case when email_category="email_sent" then 1 else 0 end))*100 as open_rate,
(sum(case when
email_category="email_clickthrough" then 1 else 0 end)/sum(case when email_category="email_sent" then 1 else 0 end))*100 as click_rate
from (
    select *,
    case
        when action in ("sent_weekly_digest", "sent_reengagement_email") then ("email_sent")
        when action in ("email_open") then ("email_opened")
        when action in ("email_clickthrough") then ("email_clickthrough")
    end as email_category
    from emailevents) as alias;
```

	open_rate	click_rate
▶	33.5834	14.7899

Drive link:
Summary of the project:

During this project , I have learned a lot about . It helped me to understand the analysis , it provides useful and complex queries that made me understand more about the project. It also helped me to learn professionally based on what I have learned. Overall, the project was really beneficial. It improved my skills, gave me useful information, and helped me make better decisions