TRAINITY ASSIGNMENT 3

Operation Analytics and Investigating Metric Spike

Description :- This project focuses on Operational Analytics which is a critical process used to analyse and improve a company's daily operations. This is done by deriving insights from data. My role as a Lead Data Analyst will involve collaborating with cross-functional teams to answer questions which will help identify areas of improvement and understand sudden metric spikes, such as dips in user engagement or sales. I will be working with advanced SQL queries to analyse the given datasets to gain valuable insights about user activity, retention, throughput, and engagement.

Approach :- My approach will include data cleaning and validation. I will be using powerful SQL features like window functions and cross joins to build sophisticated queries. In the final step I will communicate the insights derived, helping the company make data-driven decisions which will help the company gain operational efficiency.

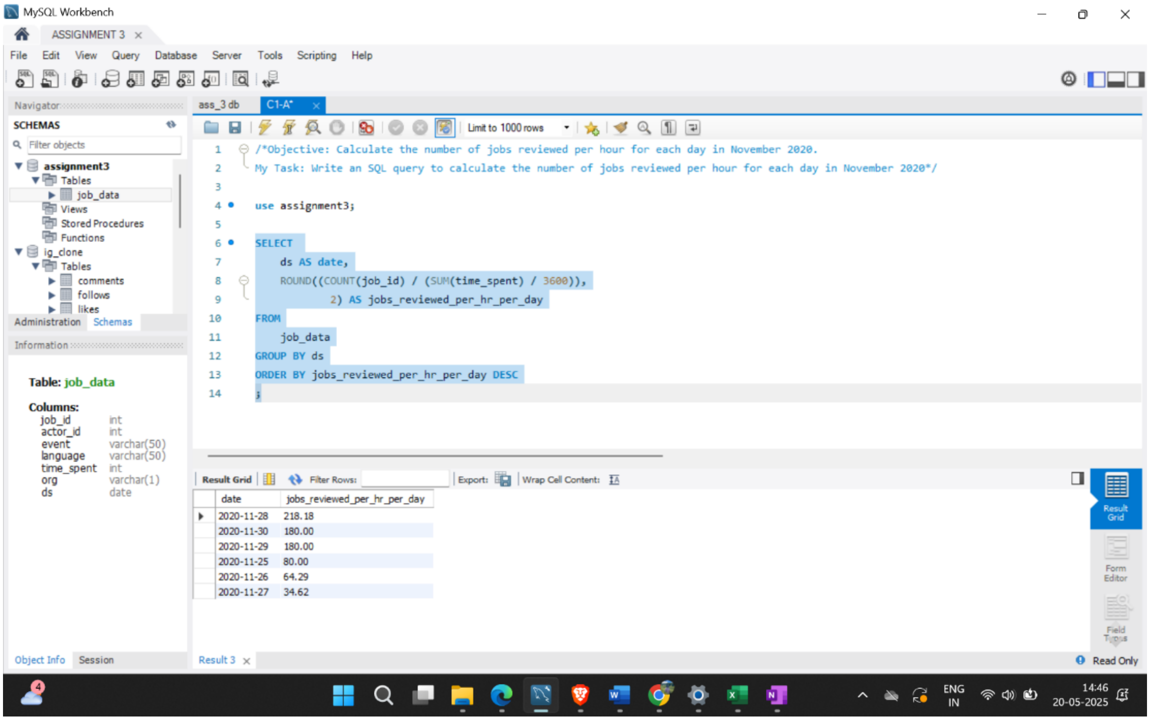
Tech-Stack used :- My SQL Workbench 8.0 is being used.

Case Study 1: Job Data Analysis

Task 1 :- **Jobs Reviewed Over Time:**

- Objective: Calculate the number of jobs reviewed per hour for each day in November 2020.
- My Task: Write an SQL query to calculate the number of jobs reviewed per hour for each day in November 2020.
- Code Written:

```
use assignment3;
SELECT
   ds AS date,
   ROUND((COUNT(job_id) / (SUM(time_spent) / 3600)),
         2) AS jobs_reviewed_per_hr_per_day
FROM
   job_data
GROUP BY ds
ORDER BY jobs_reviewed_per_hr_per_day DESC ;
```



```sql
/*Objective: Calculate the number of jobs reviewed per hour for each day in November 2020.
My Task: Write an SQL query to calculate the number of jobs reviewed per hour for each day in November 2020*/

use assignment3;

SELECT
    ds AS date,
    ROUND((COUNT(job_id) / (SUM(time_spent) / 3600)),
          2) AS jobs_reviewed_per_hr_per_day
FROM
    job_data
GROUP BY ds
ORDER BY jobs_reviewed_per_hr_per_day DESC
;
```

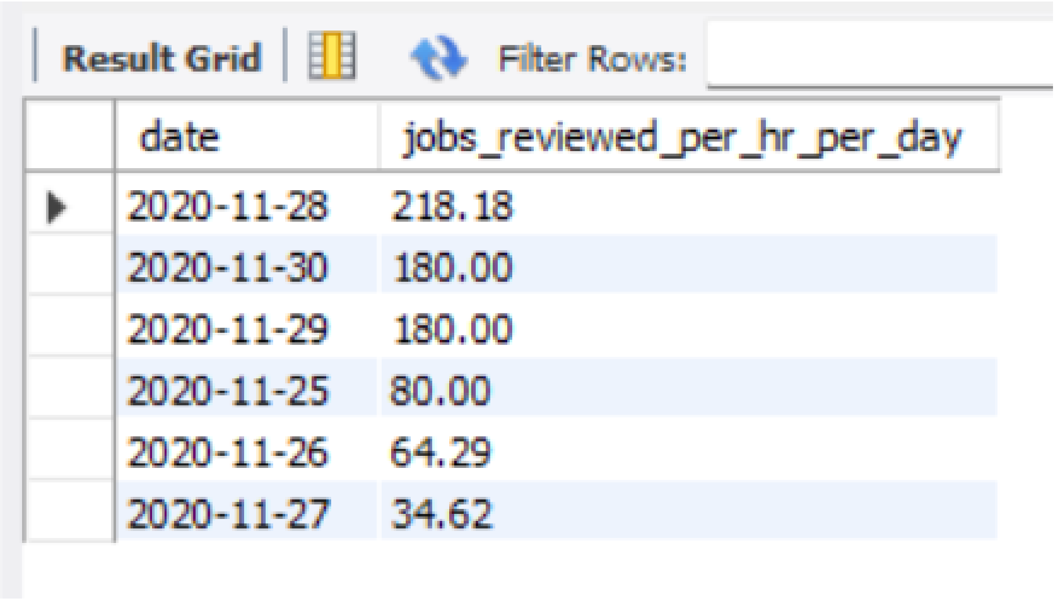
Table: job_data

Columns:

job_id	int
actor_id	int
event	varchar(50)
language	varchar(50)
time_spent	int
org	varchar(1)
ds	date

date	jobs_reviewed_per_hr_per_day
2020-11-28	218.18
2020-11-30	180.00
2020-11-29	180.00
2020-11-25	80.00
2020-11-26	64.29
2020-11-27	34.62

- <u>Output</u>:-



Result Grid
Filter Rows:

date	jobs_reviewed_per_hr_per_day
2020-11-28	218.18
2020-11-30	180.00
2020-11-29	180.00
2020-11-25	80.00
2020-11-26	64.29
2020-11-27	34.62

- <u>Insights derived</u>:-

  a) The jobs reviewed per hour per day was the highest on 28th November, 2020

  b) The jobs reviewed per hour per day was the lowest on 27th November, 2020

  c) The jobs reviewed per hour per day was the same on 30th and 29th of the aforesaid month

Task 2 :- Throughput Analysis:

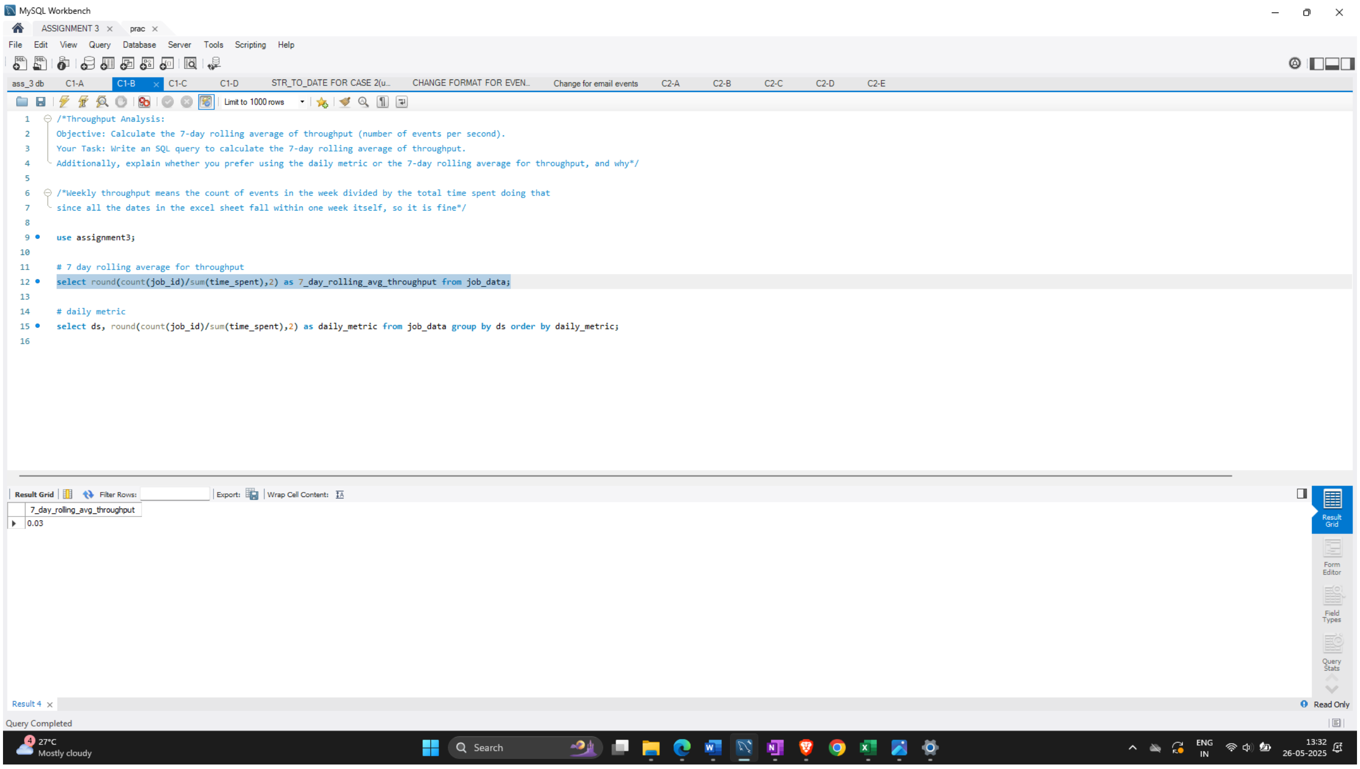
- Objective: Calculate the 7-day rolling average of throughput (number of events per second).

- My task: Write an SQL query to calculate the 7-day rolling average of throughput. Additionally, explain whether I prefer using the daily metric or the 7-day rolling average for throughput, and why.

- Code Written:

```
use assignment3;


# 7 day rolling average for throughput

select round(count(job_id)/sum(time_spent),2) as 7_day_rolling_avg_throughput from job_data;


# daily metric

select ds, round(count(job_id)/sum(time_spent),2) as daily_metric from job_data group by ds order by daily_metric;
```

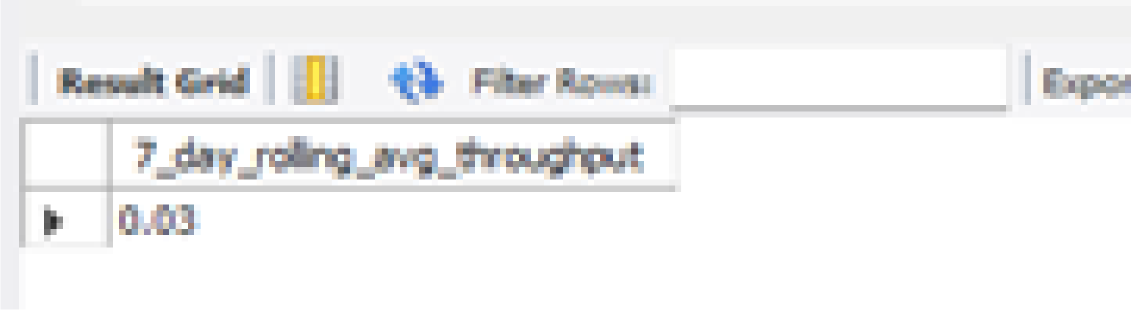
For 7 day rolling average:-



```
/*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 throughput, and why*/

/*Weekly throughput means the count of events in the week divided by the total time spent doing that
since all the dates in the excel sheet fall within one week itself, so it is fine*/

use assignment3;

# 7 day rolling average for throughput
select round(count(job_id)/sum(time_spent),2) as 7_day_rolling_avg_throughput from job_data;

# daily metric
select ds, round(count(job_id)/sum(time_spent),2) as daily_metric from job_data group by ds order by daily_metric;
```

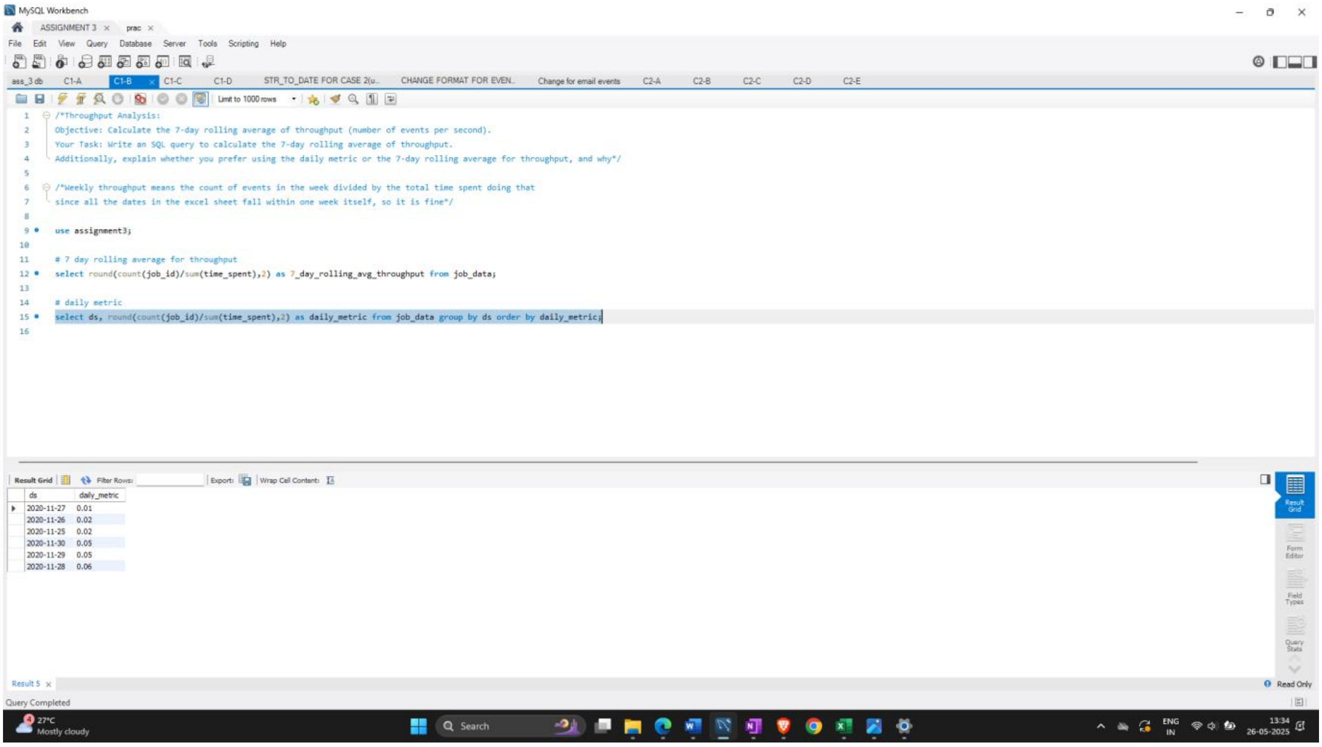
7_day_rolling_avg_throughput
0.03

<u>Output</u>:-



	7_day_rolling_avg_throughput
▶	0.03

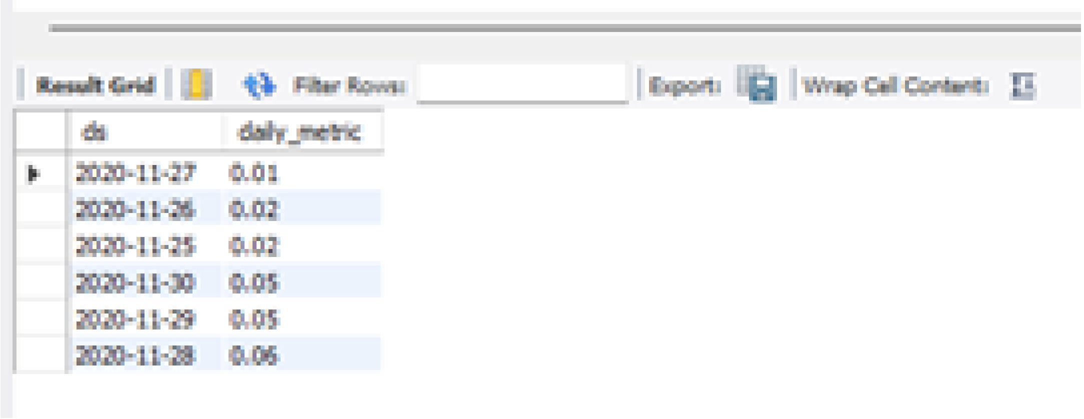
<u>For Daily Metric</u>:-



```
/*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 throughput, and why*/

/*Weekly throughput means the count of events in the week divided by the total time spent doing that
since all the dates in the excel sheet fall within one week itself, so it is fine*/

use assignment3;

# 7 day rolling average for throughput
select round(count(job_id)/sum(time_spent),2) as 7_day_rolling_avg_throughput from job_data;

# daily metric
select ds, round(count(job_id)/sum(time_spent),2) as daily_metric from job_data group by ds order by daily_metric;
```

	ds	daily_metric
▶	2020-11-27	0.01
	2020-11-26	0.02
	2020-11-25	0.02
	2020-11-30	0.05
	2020-11-29	0.05
	2020-11-28	0.06

<u>Output</u>:-



	ds	daily_metric
▶	2020-11-27	0.01
	2020-11-26	0.02
	2020-11-25	0.02
	2020-11-30	0.05
	2020-11-29	0.05
	2020-11-28	0.06

Whether I prefer using the daily metric or the 7-day rolling average for throughput?

For the throughput analysis, I will prefer the 7-day rolling average because it gives the average for all the days right from day 1 to day 7. On the other hand, daily metric gives us the average for only that day itself.

Task 3:- 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.

- Code Written:-

```
SELECT
   language,
   (individual_occ_lang * 100 / total_occurence_languages) AS
percentage_distribution
FROM
   (SELECT
      COUNT(language) AS total_occurence_languages
   FROM
      job_data) table1
      CROSS JOIN
   (SELECT
      language, COUNT(language) AS individual_occ_lang
   FROM
      job_data
   GROUP BY language) table2;
```

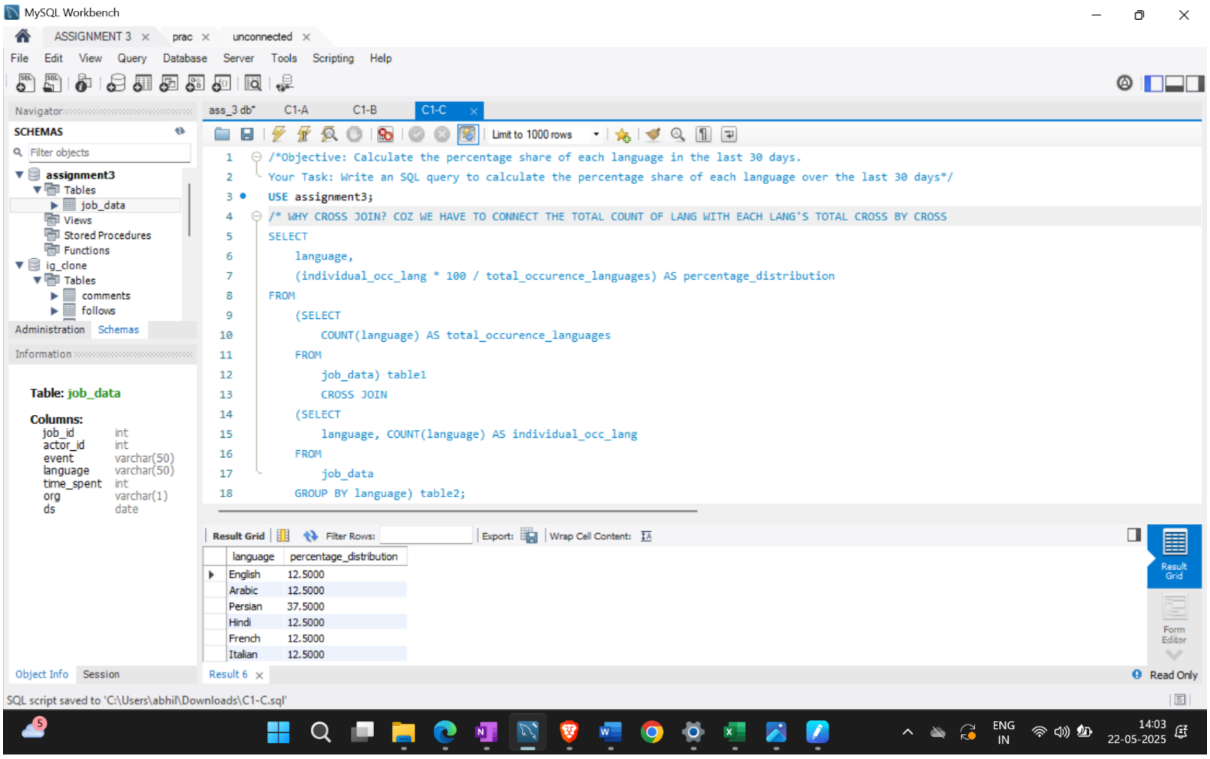


Table: job_data

Columns:

job_id	int
actor_id	int
event	varchar(50)
language	varchar(50)
time_spent	int
org	varchar(1)
ds	date

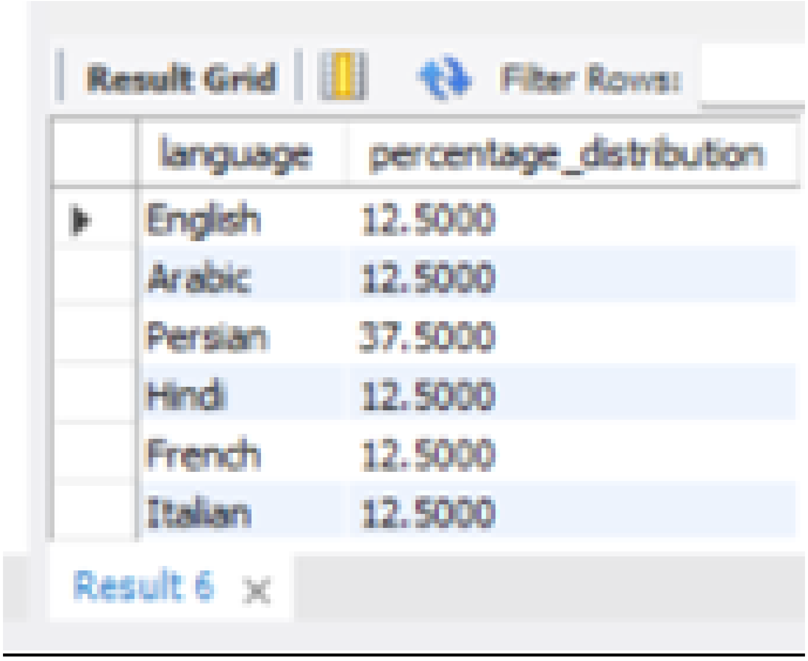
```
/*Objective: Calculate the percentage share of each language in the last 30 days.
Your Task: Write an SQL query to calculate the percentage share of each language over the last 30 days*/
USE assignment3;
/* WHY CROSS JOIN? COZ WE HAVE TO CONNECT THE TOTAL COUNT OF LANG WITH EACH LANG'S TOTAL CROSS BY CROSS
SELECT
    language,
    (individual_occ_lang * 100 / total_occurence_languages) AS percentage_distribution
FROM
    (SELECT
        COUNT(language) AS total_occurence_languages
    FROM
        job_data) table1
        CROSS JOIN
    (SELECT
        language, COUNT(language) AS individual_occ_lang
    FROM
        job_data
    GROUP BY language) table2;
```

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

language	percentage_distribution
English	12.5000
Arabic	12.5000
Persian	37.5000
Hindi	12.5000
French	12.5000
Italian	12.5000

SQL script saved to 'C:\Users\abhil\Downloads\C1-C.sql'

Output:-



Result Grid
Filter Rows:
Result 6

language	percentage_distribution
English	12.5000
Arabic	12.5000
Persian	37.5000
Hindi	12.5000
French	12.5000
Italian	12.5000

Derived Insights:-

- It was observed that the Persian language had the highest percentage distribution amongst all i.e. 37.5%
- Whereas all other languages had an equal percentage distribution of 12.5%.

Task 4:- Duplicate Rows Detection:

- Objective: Identify duplicate rows in the data.

- My Task: Write an SQL query to display duplicate rows from the job_data table

- Code Written:

  #This is based on actor_id

  SELECT actor_id, COUNT(*) AS duplicate FROM job_data GROUP BY actor_id HAVING COUNT(*) > 1;

  #OR

  SELECT * FROM job_data a JOIN job_data b ON a.actor_id = b.actor_id WHERE a.ds > b.ds;

  #OR

  SELECT a.* FROM job_data a JOIN job_data b ON a.actor_id = b.actor_id WHERE a.ds > b.ds;

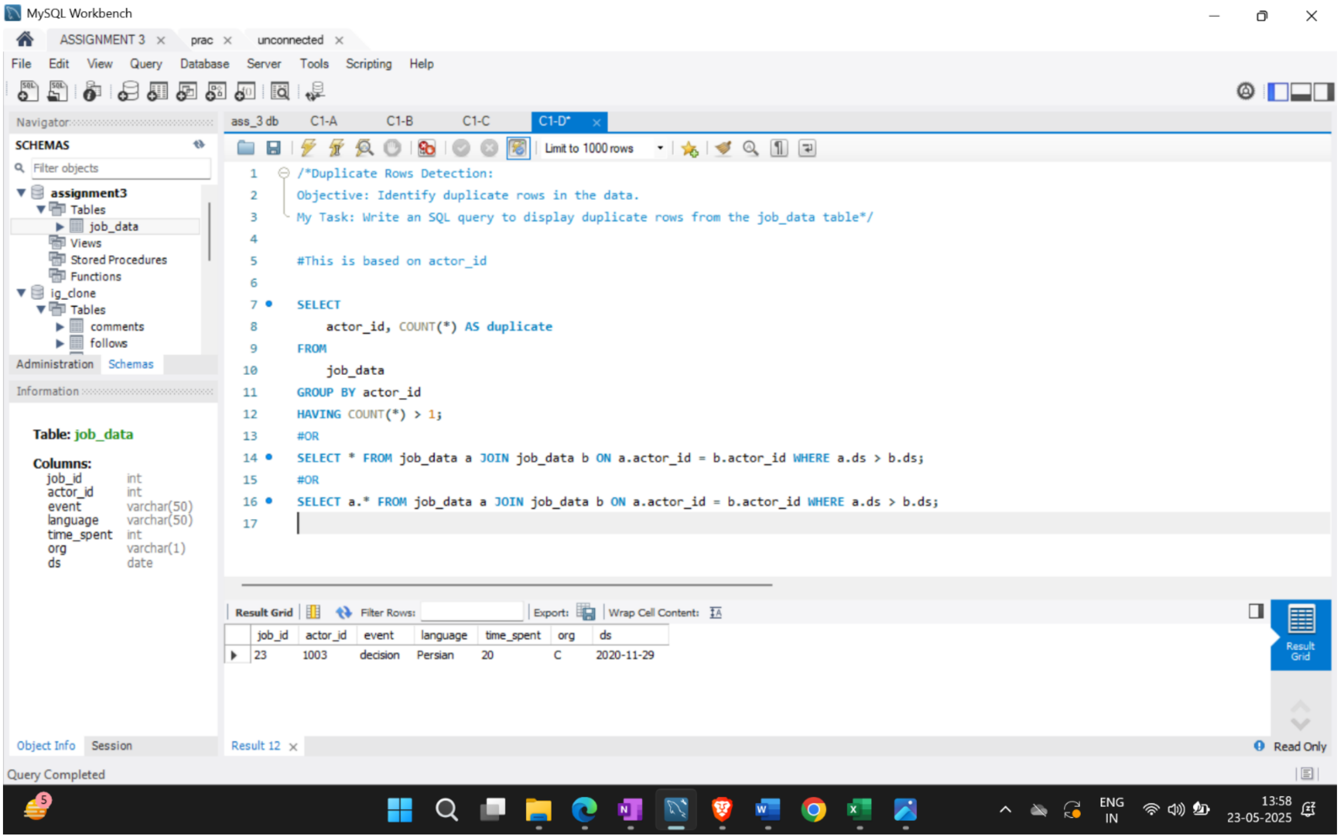


Table: job_data

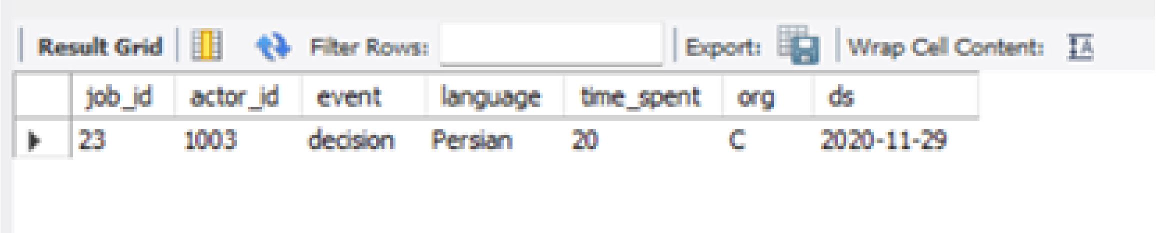
Columns:

job_id	int
actor_id	int
event	varchar(50)
language	varchar(50)
time_spent	int
org	varchar(1)
ds	date

```
/*Duplicate Rows Detection:
Objective: Identify duplicate rows in the data.
My Task: Write an SQL query to display duplicate rows from the job_data table*/

#This is based on actor_id

SELECT
    actor_id, COUNT(*) AS duplicate
FROM
    job_data
GROUP BY actor_id
HAVING COUNT(*) > 1;
#OR
SELECT * FROM job_data a JOIN job_data b ON a.actor_id = b.actor_id WHERE a.ds > b.ds;
#OR
SELECT a.* FROM job_data a JOIN job_data b ON a.actor_id = b.actor_id WHERE a.ds > b.ds;
```

job_id	actor_id	event	language	time_spent	org	ds
23	1003	decision	Persian	20	C	2020-11-29

Output:-



job_id	actor_id	event	language	time_spent	org	ds
23	1003	decision	Persian	20	C	2020-11-29

Insights Derived:-

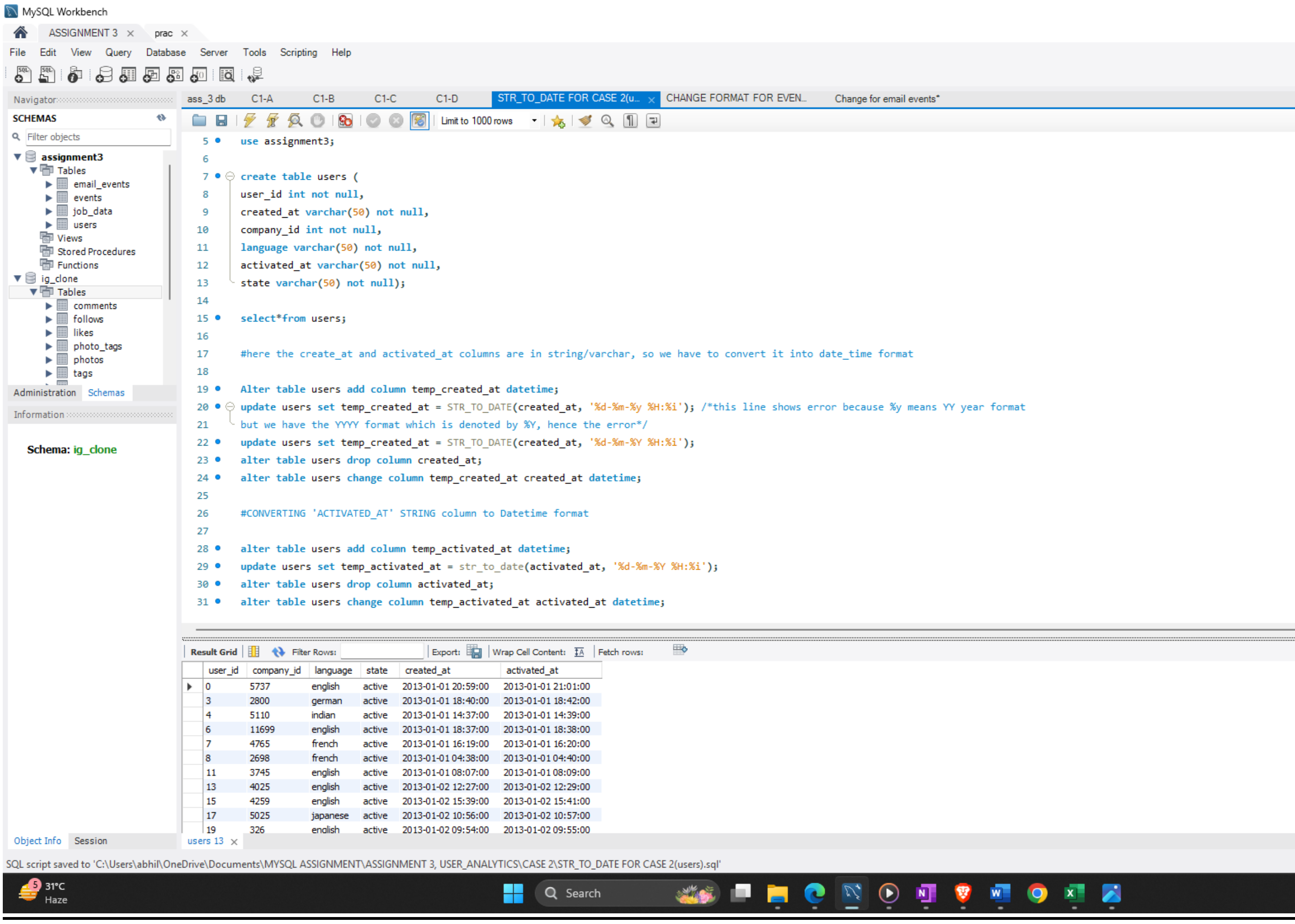
- There was one duplicate row having the job-id 23.

Case Study 2: Investigating Metric Spike

Before proceeding we assign the proper format to the given datasets.

Users table format Change:-

We use the STR_TO_DATE function for this. Converting the String format to DateTime format for columns ‘Created_at’ and ‘occurred_at’.

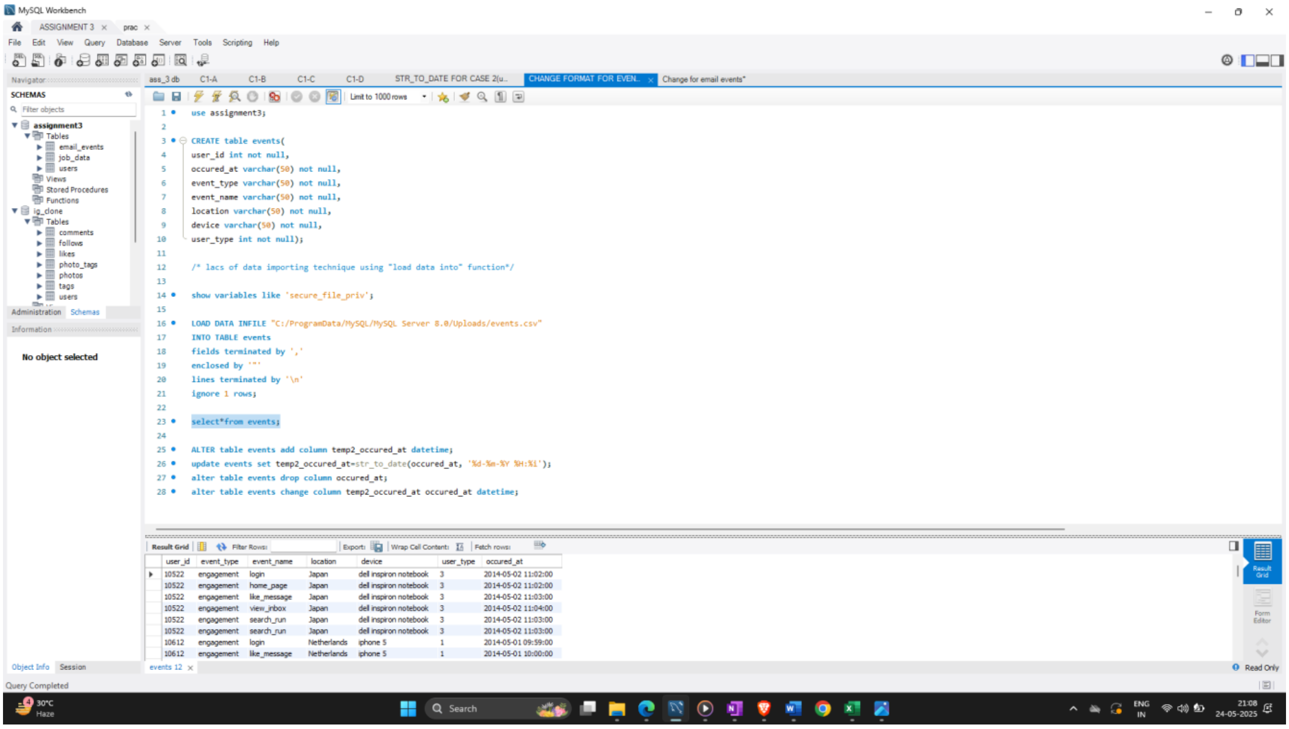


```sql
use assignment3;

create table users (
user_id int not null,
created_at varchar(50) not null,
company_id int not null,
language varchar(50) not null,
activated_at varchar(50) not null,
state varchar(50) not null);

select*from users;

#here the create_at and activated_at columns are in string/varchar, so we have to convert it into date_time format

Alter table users add column temp_created_at datetime;
update users set temp_created_at = STR_TO_DATE(created_at, '%d-%m-%y %H:%i'); /*this line shows error because %y means YY year format
but we have the YYYY format which is denoted by %Y, hence the error*/
update users set temp_created_at = STR_TO_DATE(created_at, '%d-%m-%Y %H:%i');
alter table users drop column created_at;
alter table users change column temp_created_at created_at datetime;

#CONVERTING 'ACTIVATED_AT' STRING column to Datetime format

alter table users add column temp_activated_at datetime;
update users set temp_activated_at = str_to_date(activated_at, '%d-%m-%Y %H:%i');
alter table users drop column activated_at;
alter table users change column temp_activated_at activated_at datetime;
```

user_id	company_id	language	state	created_at	activated_at
0	5737	english	active	2013-01-01 20:59:00	2013-01-01 21:01:00
3	2800	german	active	2013-01-01 18:40:00	2013-01-01 18:42:00
4	5110	indian	active	2013-01-01 14:37:00	2013-01-01 14:39:00
6	11699	english	active	2013-01-01 18:37:00	2013-01-01 18:38:00
7	4765	french	active	2013-01-01 16:19:00	2013-01-01 16:20:00
8	2698	french	active	2013-01-01 04:38:00	2013-01-01 04:40:00
11	3745	english	active	2013-01-01 08:07:00	2013-01-01 08:09:00
13	4025	english	active	2013-01-02 12:27:00	2013-01-02 12:29:00
15	4259	english	active	2013-01-02 15:39:00	2013-01-02 15:41:00
17	5025	japanese	active	2013-01-02 10:56:00	2013-01-02 10:57:00
19	326	english	active	2013-01-02 09:54:00	2013-01-02 09:55:00

SQL script saved to 'C:\Users\abhil\OneDrive\Documents\MYSQL ASSIGNMENT\ASSIGNMENT 3, USER_ANALYTICS\CASE 2\STR_TO_DATE FOR CASE 2(users).sql'

<u>Events table format Change</u>:- We use the STR_TO_DATE function for this. Converting the String format to DateTime format for column ‘occurred_at’.

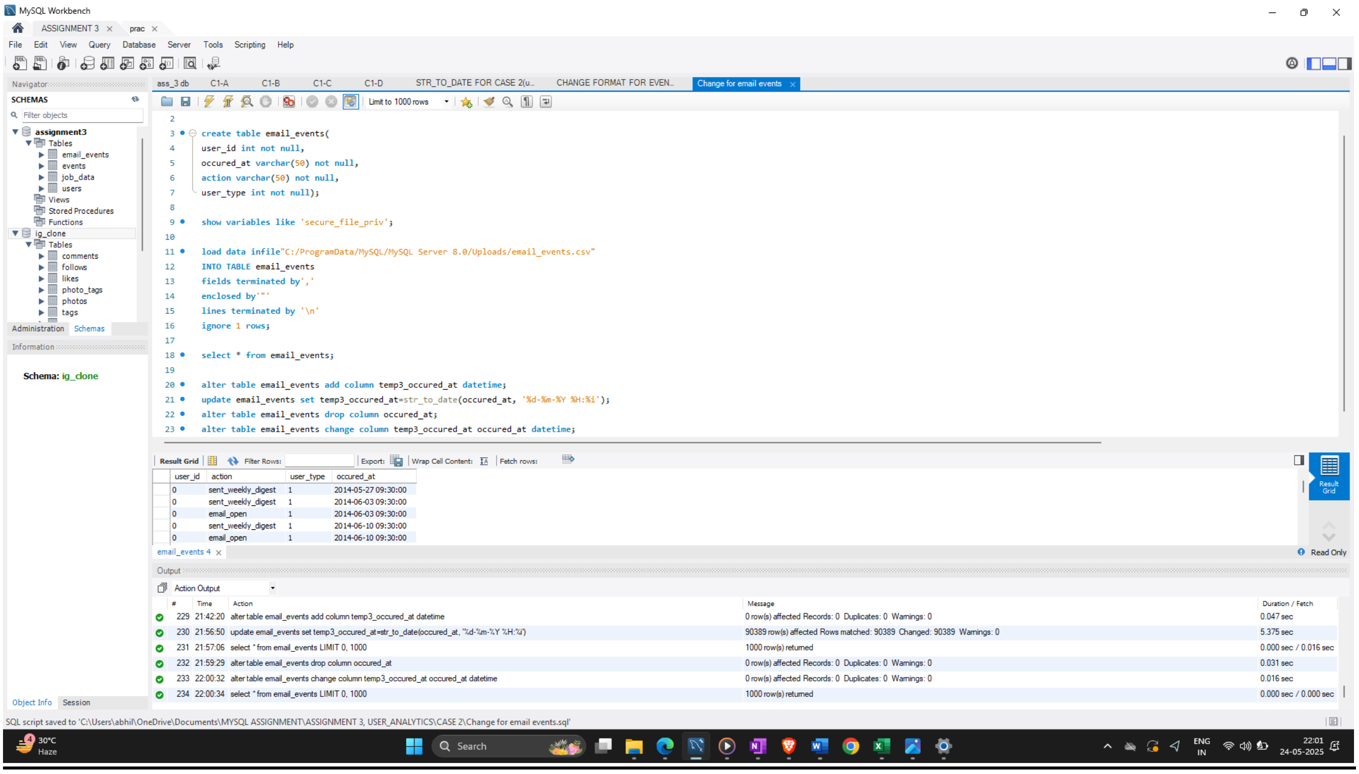


```sql
use assignment3;

CREATE table events(
user_id int not null,
occured_at varchar(50) not null,
event_type varchar(50) not null,
event_name varchar(50) not null,
location varchar(50) not null,
device varchar(50) not null,
user_type int not null);

/* lacs of data importing technique using "load data into" function*/

show variables like 'secure_file_priv';

LOAD DATA INFILE "C:/ProgramData/MySQL/MySQL Server 8.0/Uploads/events.csv"
INTO TABLE events
fields terminated by ','
enclosed by '"'
lines terminated by '\n'
ignore 1 rows;

select*from events;

ALTER table events add column temp2_occured_at datetime;
update events set temp2_occured_at=str_to_date(occured_at, '%d-%m-%Y %H:%i');
alter table events drop column occured_at;
alter table events change column temp2_occured_at occured_at datetime;
```

user_id	event_type	event_name	location	device	user_type	occured_at
10522	engagement	login	Japan	dell inspiron notebook	3	2014-05-02 11:02:00
10522	engagement	home_page	Japan	dell inspiron notebook	3	2014-05-02 11:02:00
10522	engagement	like_message	Japan	dell inspiron notebook	3	2014-05-02 11:03:00
10522	engagement	view_inbox	Japan	dell inspiron notebook	3	2014-05-02 11:04:00
10522	engagement	search_run	Japan	dell inspiron notebook	3	2014-05-02 11:03:00
10522	engagement	search_run	Japan	dell inspiron notebook	3	2014-05-02 11:03:00
10612	engagement	login	Netherlands	iphone 5	1	2014-05-01 09:59:00
10612	engagement	like_message	Netherlands	iphone 5	1	2014-05-01 10:00:00

Query Completed

<u>Email_Events table format Change:-</u> We use the STR_TO_DATE function for this. Converting the String format to DateTime format for column ‘occurred_at’.



```sql
create table email_events(
user_id int not null,
occured_at varchar(50) not null,
action varchar(50) not null,
user_type int not null);

show variables like 'secure_file_priv';

load data infile"C:/ProgramData/MySQL/MySQL Server 8.0/Uploads/email_events.csv"
INTO TABLE email_events
fields terminated by','
enclosed by'"'
lines terminated by '\n'
ignore 1 rows;

select * from email_events;

alter table email_events add column temp3_occured_at datetime;
update email_events set temp3_occured_at=str_to_date(occured_at, '%d-%m-%Y %H:%i');
alter table email_events drop column occured_at;
alter table email_events change column temp3_occured_at occured_at datetime;
```

user_id	action	user_type	occured_at
0	sent_weekly_digest	1	2014-05-27 09:30:00
0	sent_weekly_digest	1	2014-06-03 09:30:00
0	email_open	1	2014-06-03 09:30:00
0	sent_weekly_digest	1	2014-06-10 09:30:00
0	email_open	1	2014-06-10 09:30:00

```
#    Time      Action                                                                           Message                                                               Duration / Fetch
229  21:42:20  alter table email_events add column temp3_occured_at datetime                    0 row(s) affected Records: 0  Duplicates: 0  Warnings: 0              0.047 sec
230  21:56:50  update email_events set temp3_occured_at=str_to_date(occured_at, '%d-%m-%Y %H:%i')  90389 row(s) affected Rows matched: 90389  Changed: 90389  Warnings: 0  5.375 sec
231  21:57:06  select * from email_events LIMIT 0, 1000                                         1000 row(s) returned                                                  0.000 sec / 0.016 sec
232  21:59:29  alter table email_events drop column occured_at                                  0 row(s) affected Records: 0  Duplicates: 0  Warnings: 0              0.031 sec
233  22:00:32  alter table email_events change column temp3_occured_at occured_at datetime      0 row(s) affected Records: 0  Duplicates: 0  Warnings: 0              0.016 sec
234  22:00:34  select * from email_events LIMIT 0, 1000                                         1000 row(s) returned                                                  0.000 sec / 0.000 sec
```

SQL script saved to 'C:\Users\abhil\OneDrive\Documents\MYSQL ASSIGNMENT\ASSIGNMENT 3, USER_ANALYTICS\CASE 2\Change for email events.sql'

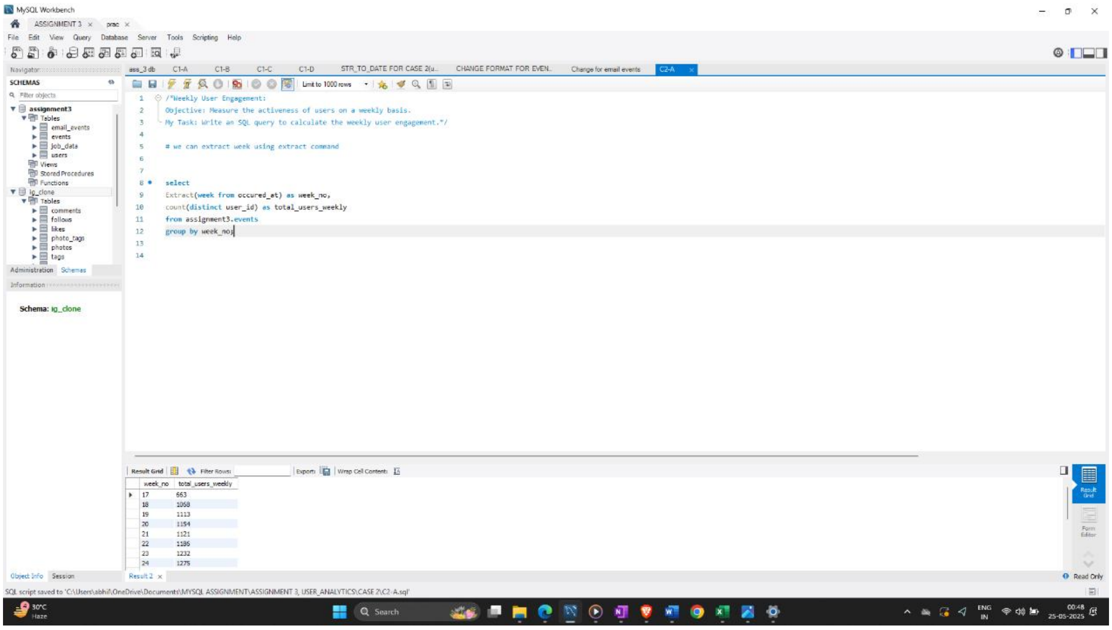
Task 1: Weekly User Engagement

Objective: Measure the activeness of users on a weekly basis.

My Task: Write an SQL query to calculate the weekly user engagement

Code Written:

```
select
Extract(week from occured_at) as week_no,
count(distinct user_id) as total_users_weekly
from assignment3.events
group by week_no;
```

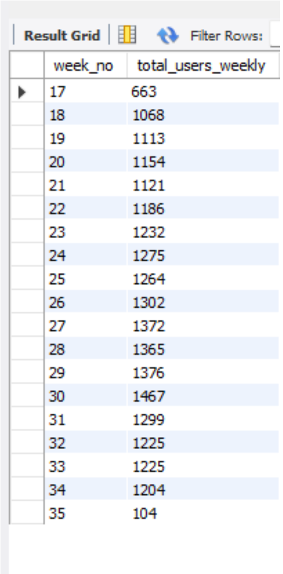


```
/*Weekly User Engagement:
Objective: Measure the activeness of users on a weekly basis.
My Task: Write an SQL query to calculate the weekly user engagement.*/

# we can extract week using extract command


select
Extract(week from occured_at) as week_no,
count(distinct user_id) as total_users_weekly
from assignment3.events
group by week_no;
```

```
week_no  total_users_weekly
17       663
18       1068
19       1113
20       1154
21       1121
22       1186
23       1232
24       1275
```

SQL script saved to 'C:\Users\abhi\OneDrive\Documents\MYSQL ASSIGNMENT\ASSIGNMENT 3_USER_ANALYTICS\CASE 2\C2-A.sql'

Output:



week_no	total_users_weekly
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 Derived:

- The total users weekly was highest in week 30 whereas lowest in week 35
- The highest total users weekly was recorded as 1467, whereas the lowest recorded was 105.

Task 2: User Growth Analysis:

- Objective: Analyse the growth of users over time for a product.
- My Task: Write an SQL query to calculate the user growth for the product.
- Code Written:

SELECT year, week_num, num_of_users, sum(num_of_users) over(order by year, week_num) as cumulative_users

from (

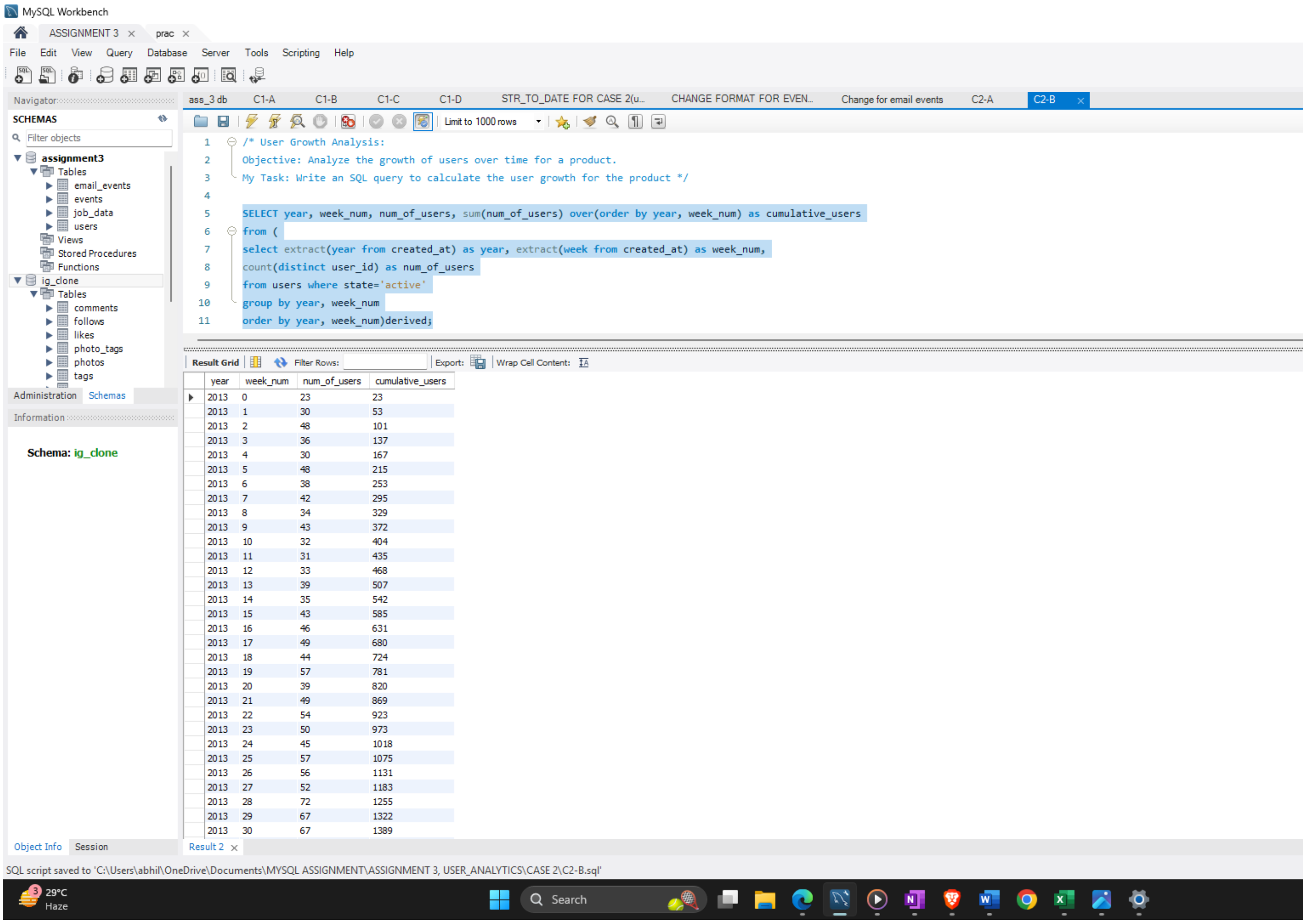
select extract(year from created_at) as year, extract(week from created_at) as week_num,

count(distinct user_id) as num_of_users

from users where state='active'

group by year, week_num

order by year, week_num)derived;

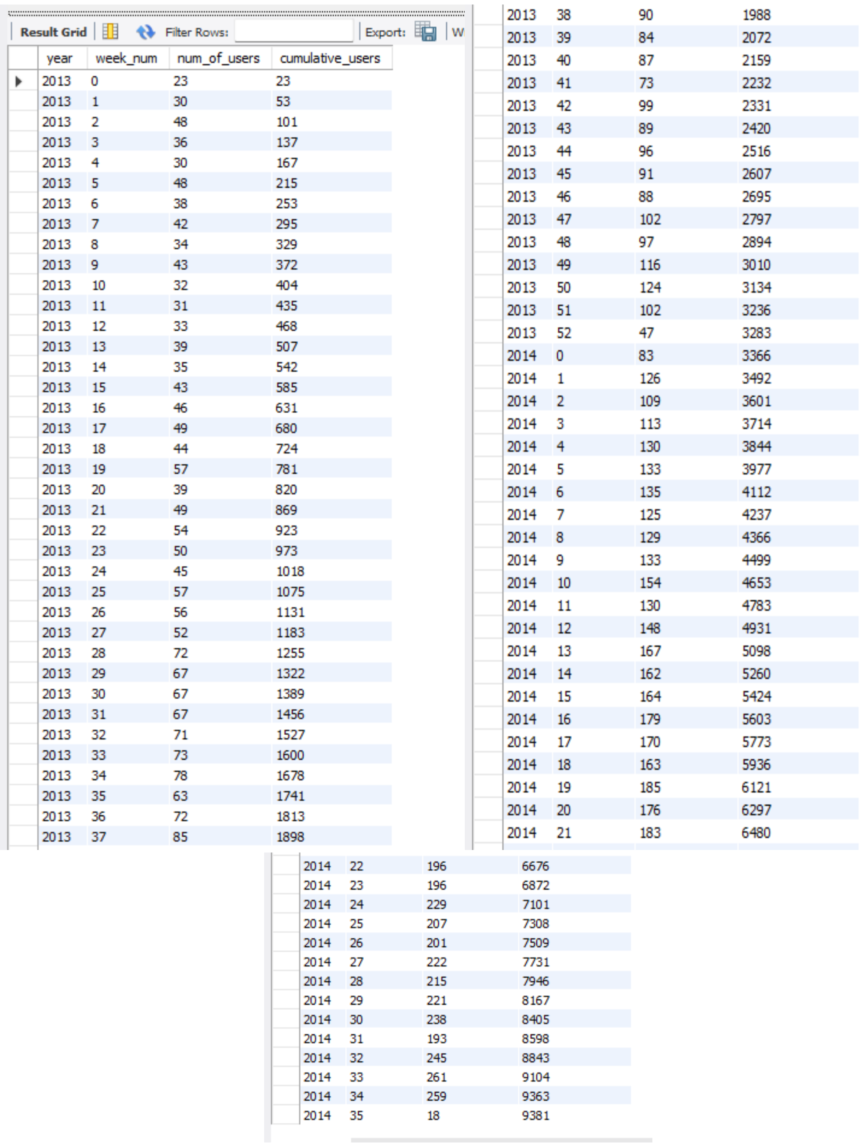


```
/* User Growth Analysis:
Objective: Analyze the growth of users over time for a product.
My Task: Write an SQL query to calculate the user growth for the product */

SELECT year, week_num, num_of_users, sum(num_of_users) over(order by year, week_num) as cumulative_users
from (
select extract(year from created_at) as year, extract(week from created_at) as week_num,
count(distinct user_id) as num_of_users
from users where state='active'
group by year, week_num
order by year, week_num)derived;
```

year	week_num	num_of_users	cumulative_users
2013	0	23	23
2013	1	30	53
2013	2	48	101
2013	3	36	137
2013	4	30	167
2013	5	48	215
2013	6	38	253
2013	7	42	295
2013	8	34	329
2013	9	43	372
2013	10	32	404
2013	11	31	435
2013	12	33	468
2013	13	39	507
2013	14	35	542
2013	15	43	585
2013	16	46	631
2013	17	49	680
2013	18	44	724
2013	19	57	781
2013	20	39	820
2013	21	49	869
2013	22	54	923
2013	23	50	973
2013	24	45	1018
2013	25	57	1075
2013	26	56	1131
2013	27	52	1183
2013	28	72	1255
2013	29	67	1322
2013	30	67	1389

SQL script saved to 'C:\Users\abhil\OneDrive\Documents\MYSQL ASSIGNMENT\ASSIGNMENT 3, USER_ANALYTICS\CASE 2\C2-B.sql'

- Output:



year	week_num	num_of_users	cumulative_users
2013	0	23	23
2013	1	30	53
2013	2	48	101
2013	3	36	137
2013	4	30	167
2013	5	48	215
2013	6	38	253
2013	7	42	295
2013	8	34	329
2013	9	43	372
2013	10	32	404
2013	11	31	435
2013	12	33	468
2013	13	39	507
2013	14	35	542
2013	15	43	585
2013	16	46	631
2013	17	49	680
2013	18	44	724
2013	19	57	781
2013	20	39	820
2013	21	49	869
2013	22	54	923
2013	23	50	973
2013	24	45	1018
2013	25	57	1075
2013	26	56	1131
2013	27	52	1183
2013	28	72	1255
2013	29	67	1322
2013	30	67	1389
2013	31	67	1456
2013	32	71	1527
2013	33	73	1600
2013	34	78	1678
2013	35	63	1741
2013	36	72	1813
2013	37	85	1898
2013	38	90	1988
2013	39	84	2072
2013	40	87	2159
2013	41	73	2232
2013	42	99	2331
2013	43	89	2420
2013	44	96	2516
2013	45	91	2607
2013	46	88	2695
2013	47	102	2797
2013	48	97	2894
2013	49	116	3010
2013	50	124	3134
2013	51	102	3236
2013	52	47	3283
2014	0	83	3366
2014	1	126	3492
2014	2	109	3601
2014	3	113	3714
2014	4	130	3844
2014	5	133	3977
2014	6	135	4112
2014	7	125	4237
2014	8	129	4366
2014	9	133	4499
2014	10	154	4653
2014	11	130	4783
2014	12	148	4931
2014	13	167	5098
2014	14	162	5260
2014	15	164	5424
2014	16	179	5603
2014	17	170	5773
2014	18	163	5936
2014	19	185	6121
2014	20	176	6297
2014	21	183	6480
2014	22	196	6676
2014	23	196	6872
2014	24	229	7101
2014	25	207	7308
2014	26	201	7509
2014	27	222	7731
2014	28	215	7946
2014	29	221	8167
2014	30	238	8405
2014	31	193	8598
2014	32	245	8843
2014	33	261	9104
2014	34	259	9363
2014	35	18	9381

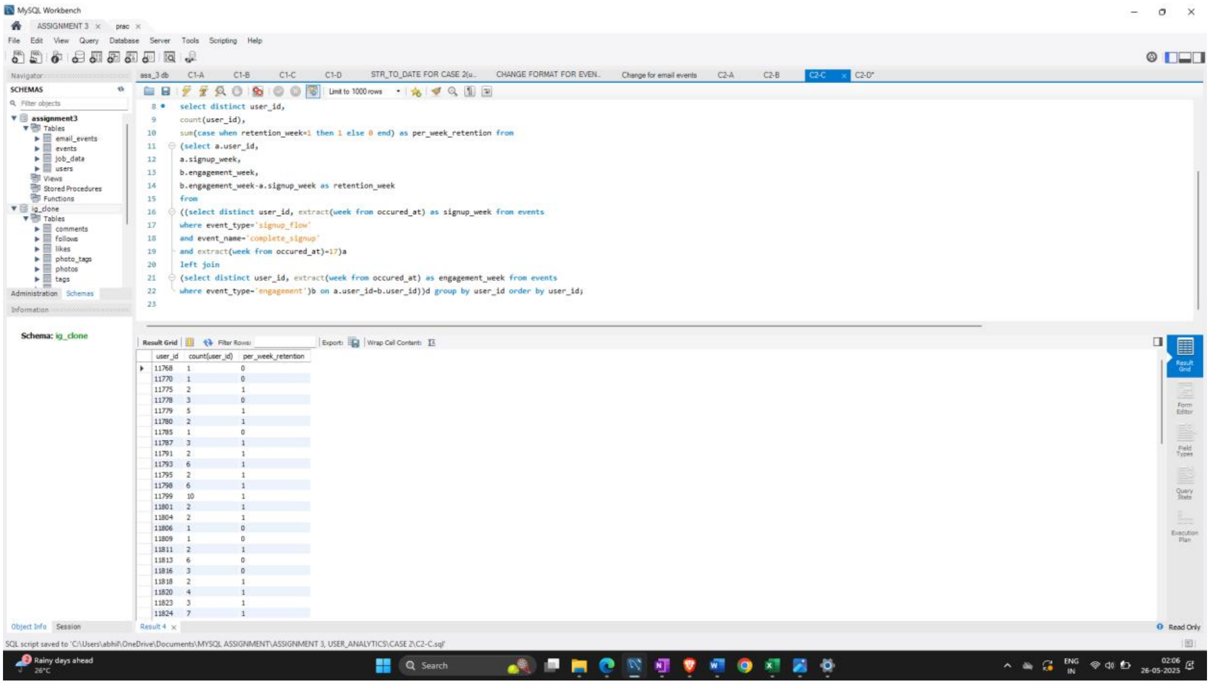
Derived Insights:-

- Week no 33 had the highest number of users i.e. 261 number of users
- Whereas Week 25 had the lowest number of users i.e. 18 number of users

Task 3: Weekly Retention Analysis:

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

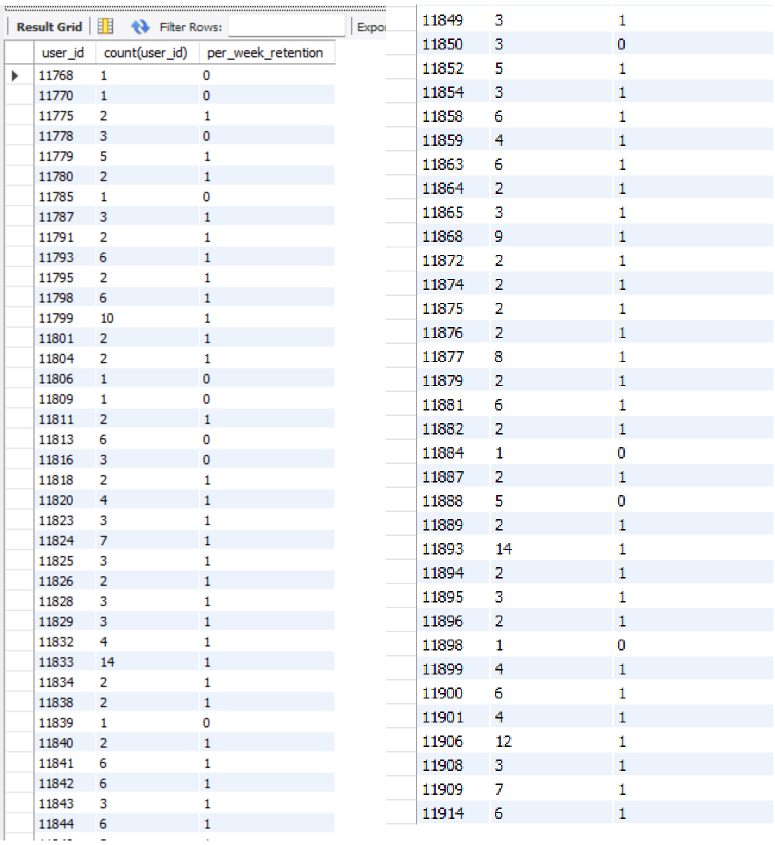
```
SELECT DISTINCT
    user_id,
    COUNT(user_id),
    SUM(CASE
        WHEN retention_week = 1 THEN 1
        ELSE 0
    END) AS per_week_retention
FROM
    (SELECT
        a.user_id,
            a.signup_week,
            b.engagement_week,
            b.engagement_week - a.signup_week AS retention_week
    FROM
        ((SELECT DISTINCT
        user_id, EXTRACT(WEEK FROM occured_at) AS signup_week
    FROM
        events
    WHERE
        event_type = 'signup_flow'
            AND event_name = 'complete_signup'
            AND EXTRACT(WEEK FROM occured_at) = 17) a
    LEFT JOIN (SELECT DISTINCT
        user_id, EXTRACT(WEEK FROM occured_at) AS engagement_week
    FROM
        events
    WHERE
        event_type = 'engagement') b ON a.user_id = b.user_id)) d
GROUP BY user_id
ORDER BY user_id;
```



```
select distinct user_id,
count(user_id),
sum(case when retention_week=1 then 1 else 0 end) as per_week_retention from
(select a.user_id,
a.signup_week,
b.engagement_week,
b.engagement_week-a.signup_week as retention_week
from
((select distinct user_id, extract(week from occured_at) as signup_week from events
where event_type='signup_flow'
and event_name='complete_signup'
and extract(week from occured_at)=17)a
left join
(select distinct user_id, extract(week from occured_at) as engagement_week from events
where event_type='engagement')b on a.user_id=b.user_id))d group by user_id order by user_id;
```

SQL script saved to 'C:\Users\abhil\OneDrive\Documents\MYSQL ASSIGNMENT\ASSIGNMENT 3, USER_ANALYTICS\CASE 2\C2-C.sql'

<u>Output:</u>



user_id	count(user_id)	per_week_retention
11768	1	0
11770	1	0
11775	2	1
11778	3	0
11779	5	1
11780	2	1
11785	1	0
11787	3	1
11791	2	1
11793	6	1
11795	2	1
11798	6	1
11799	10	1
11801	2	1
11804	2	1
11806	1	0
11809	1	0
11811	2	1
11813	6	0
11816	3	0
11818	2	1
11820	4	1
11823	3	1
11824	7	1
11825	3	1
11826	2	1
11828	3	1
11829	3	1
11832	4	1
11833	14	1
11834	2	1
11838	2	1
11839	1	0
11840	2	1
11841	6	1
11842	6	1
11843	3	1
11844	6	1
11849	3	1
11850	3	0
11852	5	1
11854	3	1
11858	6	1
11859	4	1
11863	6	1
11864	2	1
11865	3	1
11868	9	1
11872	2	1
11874	2	1
11875	2	1
11876	2	1
11877	8	1
11879	2	1
11881	6	1
11882	2	1
11884	1	0
11887	2	1
11888	5	0
11889	2	1
11893	14	1
11894	2	1
11895	3	1
11896	2	1
11898	1	0
11899	4	1
11900	6	1
11901	4	1
11906	12	1
11908	3	1
11909	7	1
11914	6	1

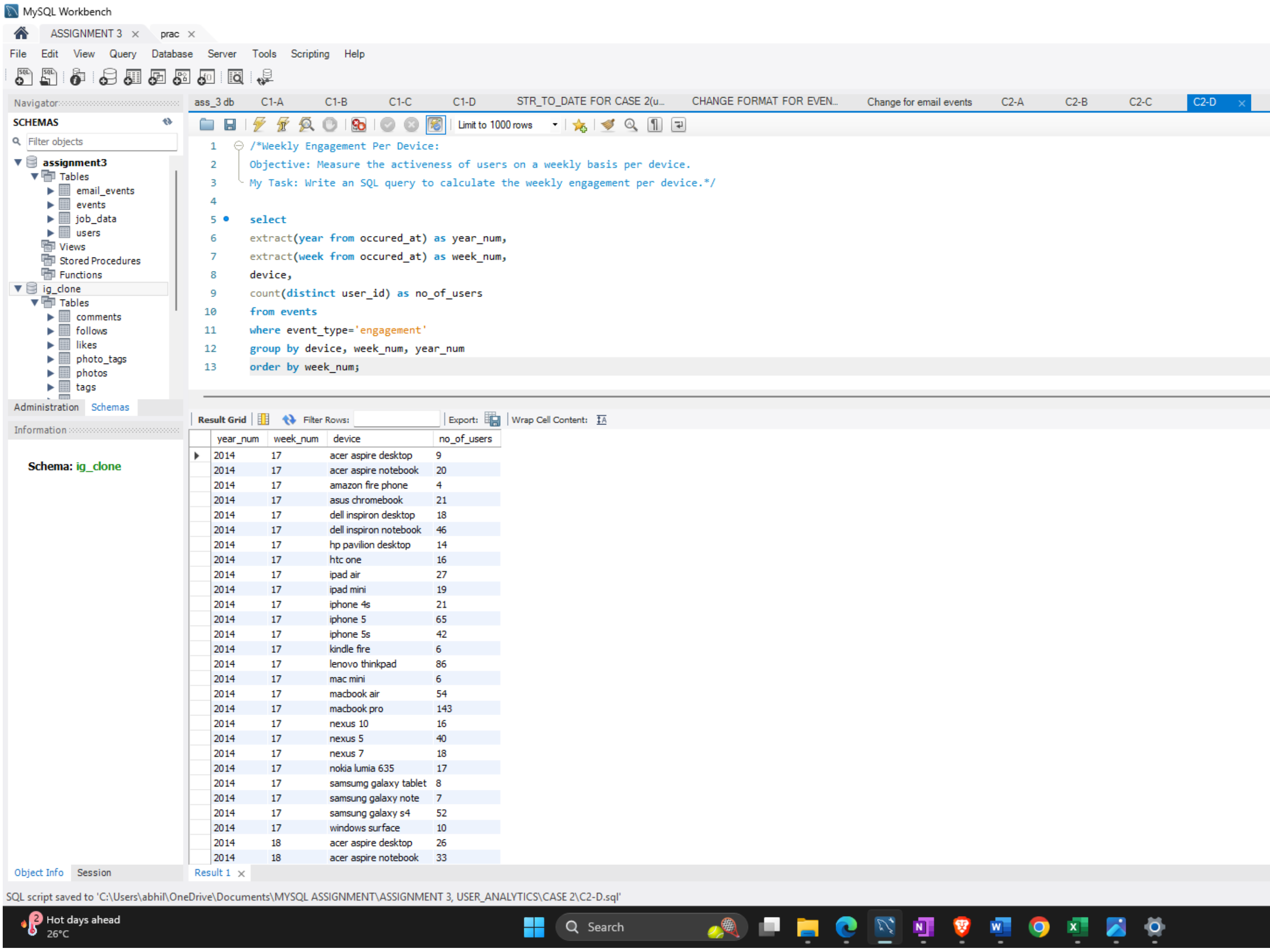
<u>Insights Derived</u>:

- User id 11893 & 11833 had the highest count i.e. 14

Task 4: Weekly Engagement Per Device:

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

```
select
extract(year from occured_at) as year_num,
extract(week from occured_at) as week_num,
device,
count(distinct user_id) as no_of_users
from events
where event_type='engagement'
group by device, week_num, year_num
order by week_num;
```



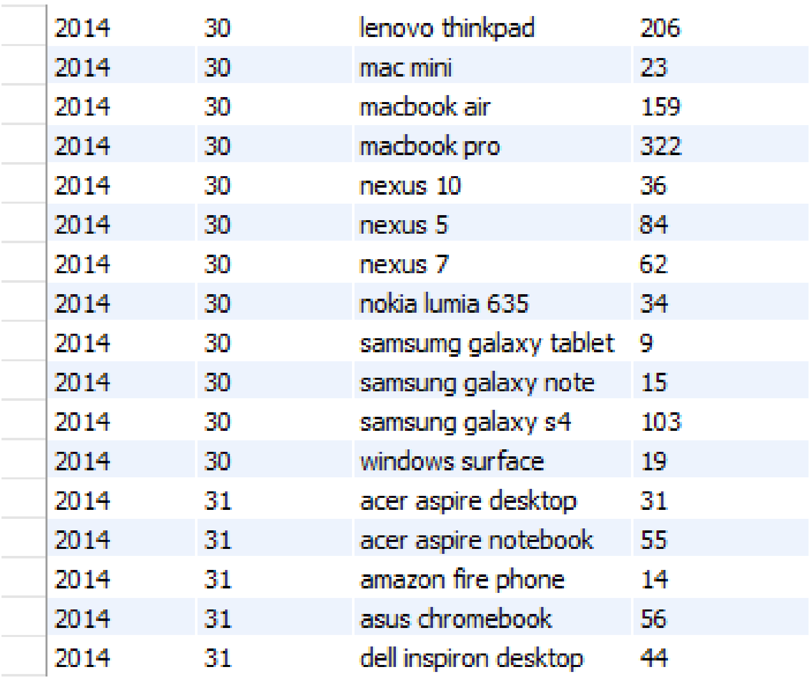
Schema: ig_clone

```
/*Weekly Engagement Per Device:
Objective: Measure the activeness of users on a weekly basis per device.
My Task: Write an SQL query to calculate the weekly engagement per device.*/

select
extract(year from occured_at) as year_num,
extract(week from occured_at) as week_num,
device,
count(distinct user_id) as no_of_users
from events
where event_type='engagement'
group by device, week_num, year_num
order by week_num;
```

year_num	week_num	device	no_of_users
2014	17	acer aspire desktop	9
2014	17	acer aspire notebook	20
2014	17	amazon fire phone	4
2014	17	asus chromebook	21
2014	17	dell inspiron desktop	18
2014	17	dell inspiron notebook	46
2014	17	hp pavilion desktop	14
2014	17	htc one	16
2014	17	ipad air	27
2014	17	ipad mini	19
2014	17	iphone 4s	21
2014	17	iphone 5	65
2014	17	iphone 5s	42
2014	17	kindle fire	6
2014	17	lenovo thinkpad	86
2014	17	mac mini	6
2014	17	macbook air	54
2014	17	macbook pro	143
2014	17	nexus 10	16
2014	17	nexus 5	40
2014	17	nexus 7	18
2014	17	nokia lumia 635	17
2014	17	samsumg galaxy tablet	8
2014	17	samsung galaxy note	7
2014	17	samsung galaxy s4	52
2014	17	windows surface	10
2014	18	acer aspire desktop	26
2014	18	acer aspire notebook	33

SQL script saved to 'C:\Users\abhil\OneDrive\Documents\MYSQL ASSIGNMENT\ASSIGNMENT 3, USER_ANALYTICS\CASE 2\C2-D.sql'

Output:-



2014	30	lenovo thinkpad	206
2014	30	mac mini	23
2014	30	macbook air	159
2014	30	macbook pro	322
2014	30	nexus 10	36
2014	30	nexus 5	84
2014	30	nexus 7	62
2014	30	nokia lumia 635	34
2014	30	samsumg galaxy tablet	9
2014	30	samsung galaxy note	15
2014	30	samsung galaxy s4	103
2014	30	windows surface	19
2014	31	acer aspire desktop	31
2014	31	acer aspire notebook	55
2014	31	amazon fire phone	14
2014	31	asus chromebook	56
2014	31	dell inspiron desktop	44

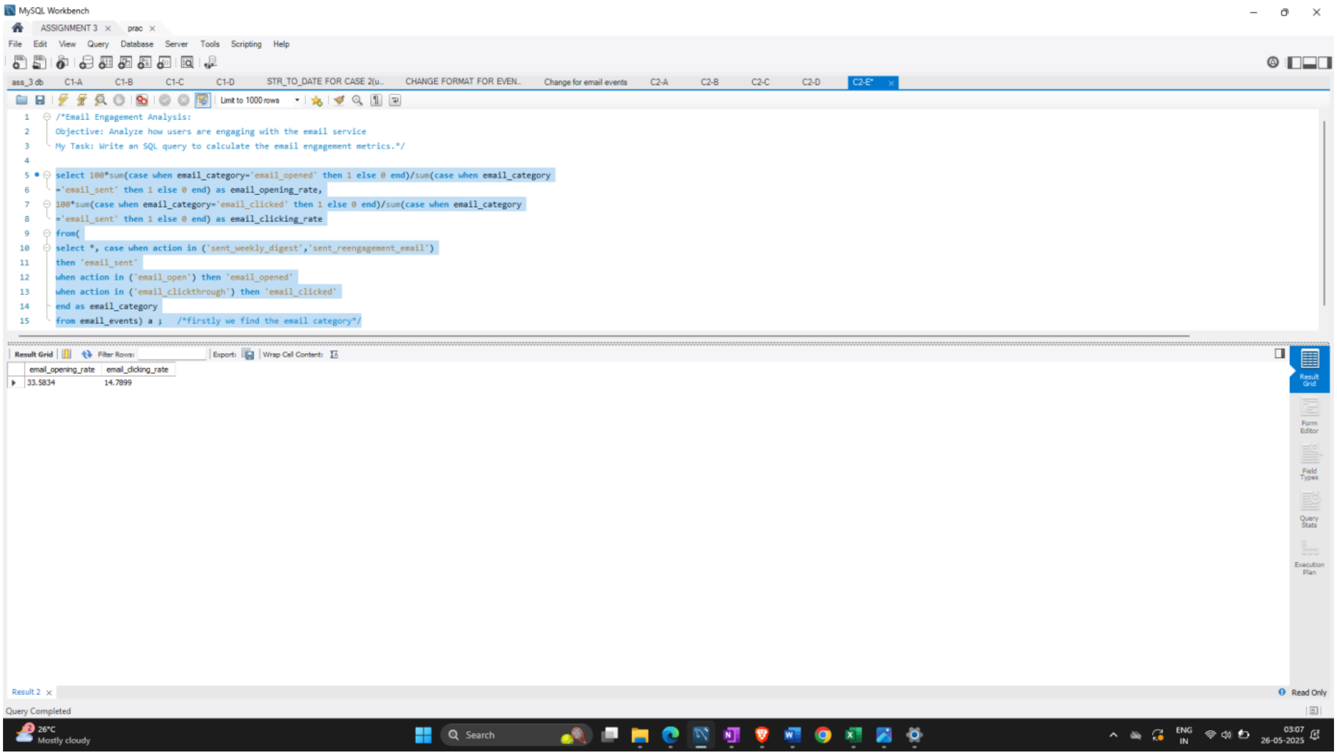
Insights Derived:-

- Week 30 has the highest number of users i.e. 322
- The most number of users are for MacBook Pro

Task 5:- Email Engagement Analysis:

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

```
select 100*sum(case when email_category='email_opened' then 1 else 0 end)/sum(case when email_category

='email_sent' then 1 else 0 end) as email_opening_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_clicking_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_clicked'

end as email_category

from email_events) a ;   /*firstly we find the email category*/
```

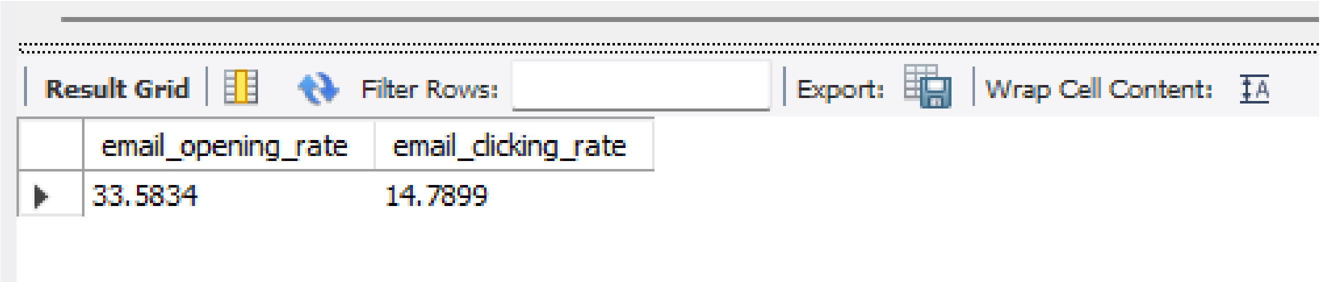


```
/*Email Engagement Analysis:
Objective: Analyze how users are engaging with the email service
My Task: Write an SQL query to calculate the email engagement metrics.*/

select 100*sum(case when email_category='email_opened' then 1 else 0 end)/sum(case when email_category
='email_sent' then 1 else 0 end) as email_opening_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_clicking_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_clicked'
end as email_category
from email_events) a ;   /*firstly we find the email category*/
```

email_opening_rate	email_clicking_rate
33.5834	14.7899

Query Completed

Output:-



email_opening_rate	email_clicking_rate
33.5834	14.7899

Insights Derived:-

- It was observed that the email opening rate was 33.5834
- The email clicking rate was 14.7899

Overall Insights, Results and Observations:

Insights:-

a) Practical knowledge gained on implementing SQL to real world scenarios
b) Gained in-depth knowledge on joins
c) Helped to gain insights into how MySQL can be used to solve real world problems coming up in the corporate world

Result:-

a) Gained confidence on MySQL and how to use it in different scenarios and what different methods/codes can be used for a particular problem
b) Helped to gain a grip on the different syntaxes to be used, what errors need to be avoided while coding in MySQL, I learnt how some common syntax errors can be avoided and what to look for.
c) Thorough understanding of how to use different Window Functions to solve real world business problems.