PROJECT DESCRIPTION:

This project deals with the process of analyzing a company's end to end operations which helps identify areas for improvement within the company. This involved understanding and explaining sudden change in key metrics, such as a dip in daily user engagement. Here, I'm supposed to work as a lead data analyst in a company like Microsoft. This project involves two tasks having two case studies where analysis is to be done .

APPROACH:

I have used MYSQL Workbench 8.0 CE for the database creation and finding the answers for the tasks using the SQL queries in an appropriate way to get the best answers for the questions asked. I have did separate analysis for both the test cases using various SQL queries to get analysis done for the various tasks assigned.The dataset provided has been involved using the 'load data infile' command of SQL.

TECH-STACK USED:

I have used SQL WORKBENCH and various SQL DML and other SQL commands to get the desired output . I have used the 8.0 CE version of the workbench. Also , I used excel to check for any empty data in tn the datasheet provided to prevent any issues while running the SQL commands.

INSIGHTS:

Here, I will be providing insights about the data regarding the tasks assigned along with the SQL query I used as well as outputs I received for those queries.

CASE STUDY 1:

SQL QUERY for job_data table creation

CREATE TABLE job_data (

ds DATE,

job_id INT NOT NULL,

actor_id INT NOT NULL,

event VARCHAR(10) NOT NULL,

language VARCHAR(10) NOT NULL,

time_spent INT NOT NULL,

org CHAR(2)

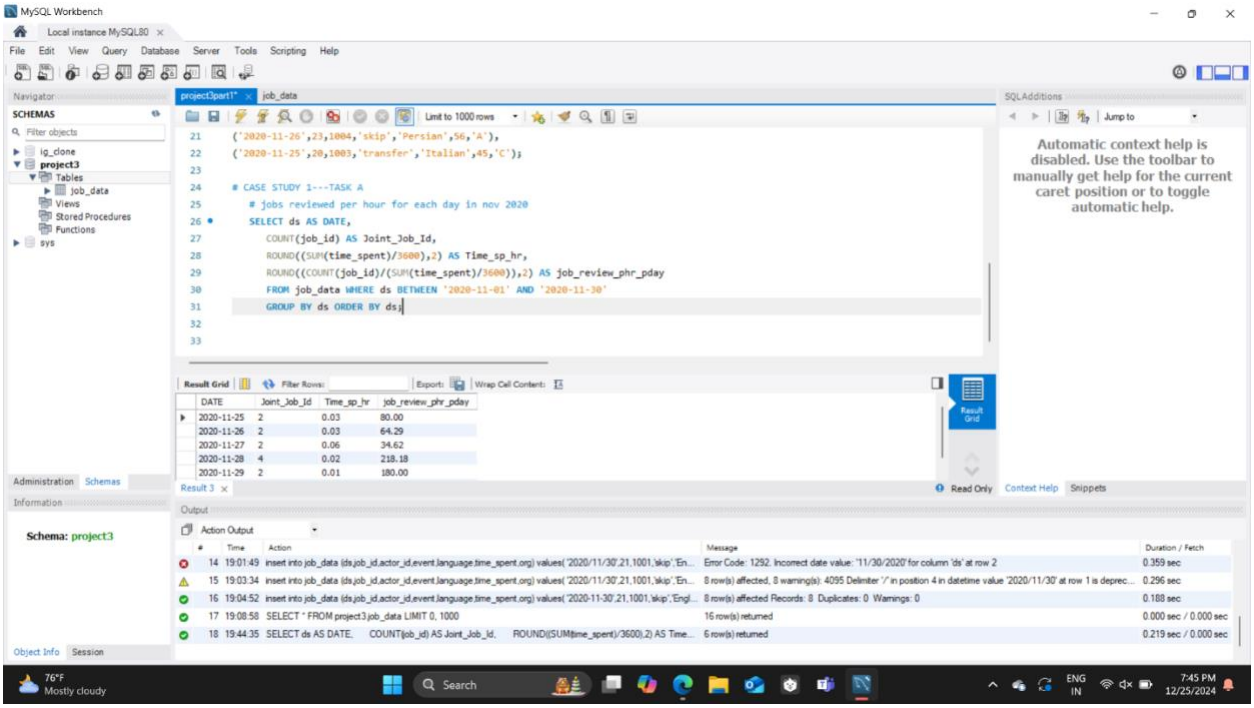
);

TASK A: JOBS REVIEWED PER HOUR FOR EACH DAY IN NOVEMBER 2020

SQL QUERY:

```
SELECT ds AS DATE,
    COUNT(job_id) AS Joint_Job_Id,
    ROUND((SUM(time_spent)/3600),2) AS Time_sp_hr,
    ROUND((COUNT(job_id)/(SUM(time_spent)/3600)),2) AS job_review_phr_pday
    FROM job_data WHERE ds BETWEEN '2020-11-01' AND '2020-11-30'
    GROUP BY ds ORDER BY ds;
```

SQL OUTPUT:



RESULT :

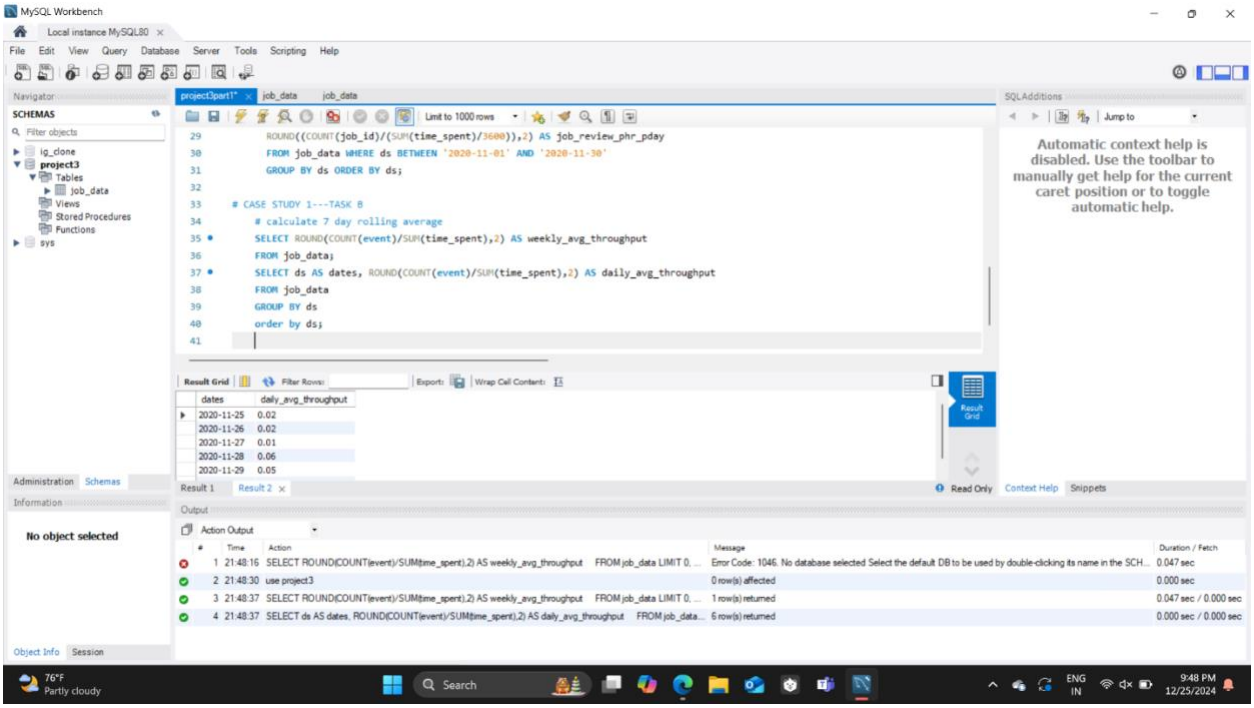
The above screenshot shows the tabulated data about the number of jobs reviewed per hour in November 2020.

TASK B : To calculate 7-day rolling average of throughput.

SQL QUERY:

```
SELECT ROUND(COUNT(event)/SUM(time_spent),2) AS weekly_avg_throughput
    FROM job_data;
    SELECT ds AS dates, ROUND(COUNT(event)/SUM(time_spent),2) AS daily_avg_throughput
    FROM job_data
    GROUP BY ds
    order by ds;
```

SQL OUTPUT:



RESULT: The above output shows the daily average throughput for the seven days of the week. I would prefer the daily average throughput in order to get the exact daily average to avoid the data misconception that could have happened taking the weekend offs as consideration in calculating the weekly average throughput.

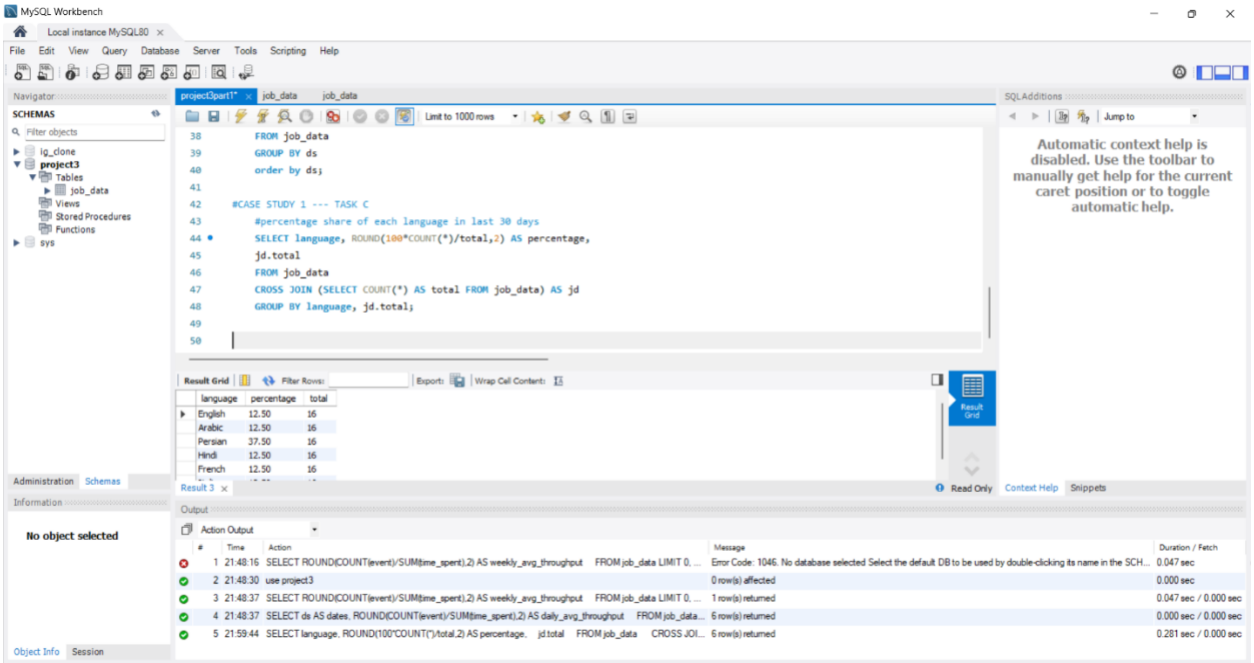
TASK C :

To calculate the percentage share of each language in the last 30 days

SQL QUERY**:**

```
SELECT language, ROUND(100*COUNT(*)/total,2) AS percentage,
    jd.total
    FROM job_data
    CROSS JOIN (SELECT COUNT(*) AS total FROM job_data) AS jd
    GROUP BY language, jd.total;
```

SQL OUTPUT:



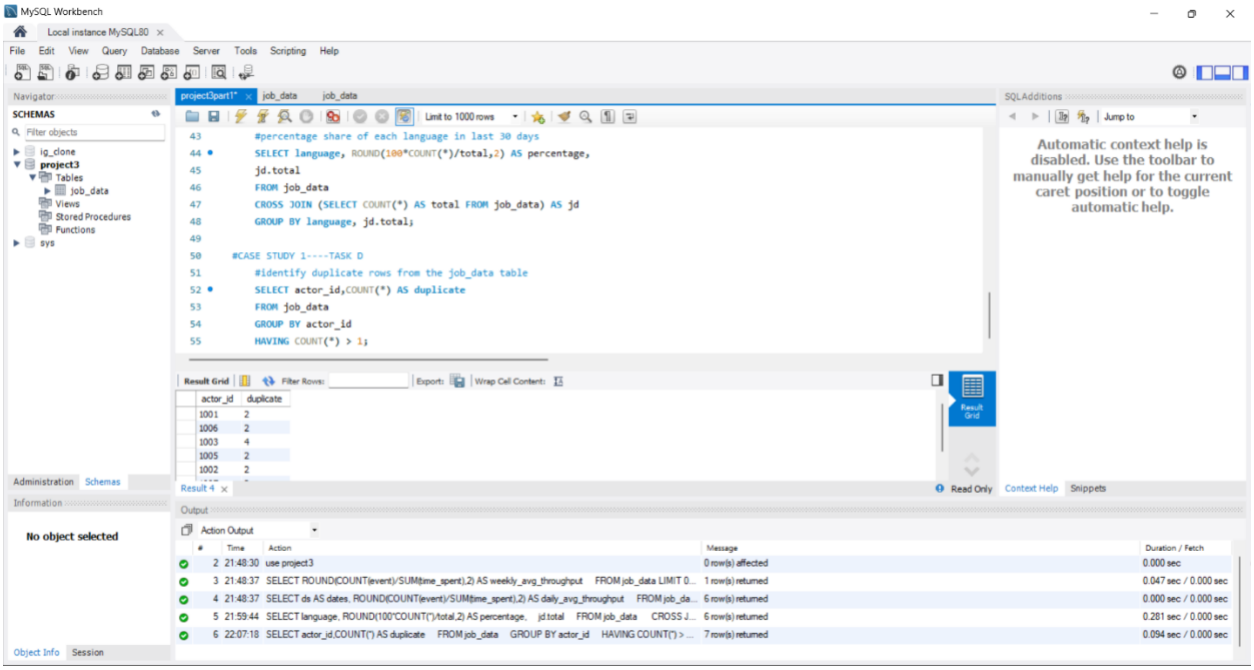
RESULT : The above screenshot shows the SQL output about the percentage share of each language such as 12.50% for ENGLISH and ARABIC and so on for other languages.

TASK D : Display duplicate rows from the job_data table:

SQL QUERY:

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

SQL OUTPUT:



RESULT: The above screenshot shows the output for the given SQL query about the number of duplicate rows in the job_data table.

CASE STUDY 2: Investigating metric spike

It involved creating three tables namely users,events,email_events.

<u>SQL QUERY for creating the three tables are as follows:</u>

```
# users table
    create table users(
    user_id int,
    created_at varchar(100),
    company_id int,
    language varchar(50),
    activated_at varchar(100),
    state varchar(50));
# events table
     CREATE TABLE events(
```

```
    user_id INT,
    occurred_at VARCHAR(100),
    event_type VARCHAR(50),
    event_name VARCHAR(100),
    loacation VARCHAR(50),
    device VARCHAR(100),
    user_type INT);
# email-events table
    CREATE TABLE email_events(
    user_id INT,
    occurred_at VARCHAR(100),
    action_type VARCHAR(100),
    user_type INT);
```

TASK A: Calculate weekly user engagement

SQL QUERY:

```
SELECT EXTRACT(WEEK FROM occurred_at) AS week_num,
   COUNT(DISTINCT user_id) AS active_users
   FROM events WHERE event_type = 'engagement' AND occurred_at IS NOT NULL
   GROUP BY week_num
   ORDER BY week_num;
```

SQL OUTPUT:

Result Grid | Filter Rows: | Export:

year	week_number	num_of_users	cumulative_users
2014	33	261	9104
2014	34	259	9363
2014	32	245	8843
2014	30	238	8405
2014	24	229	7101
2014	27	222	7731
2014	29	221	8167

RESULT: The above screenshot shows the activeness of users on a weekly basis according to the week numbers. The screenshot includes a part of the output to show how the query works and gives the desired results.

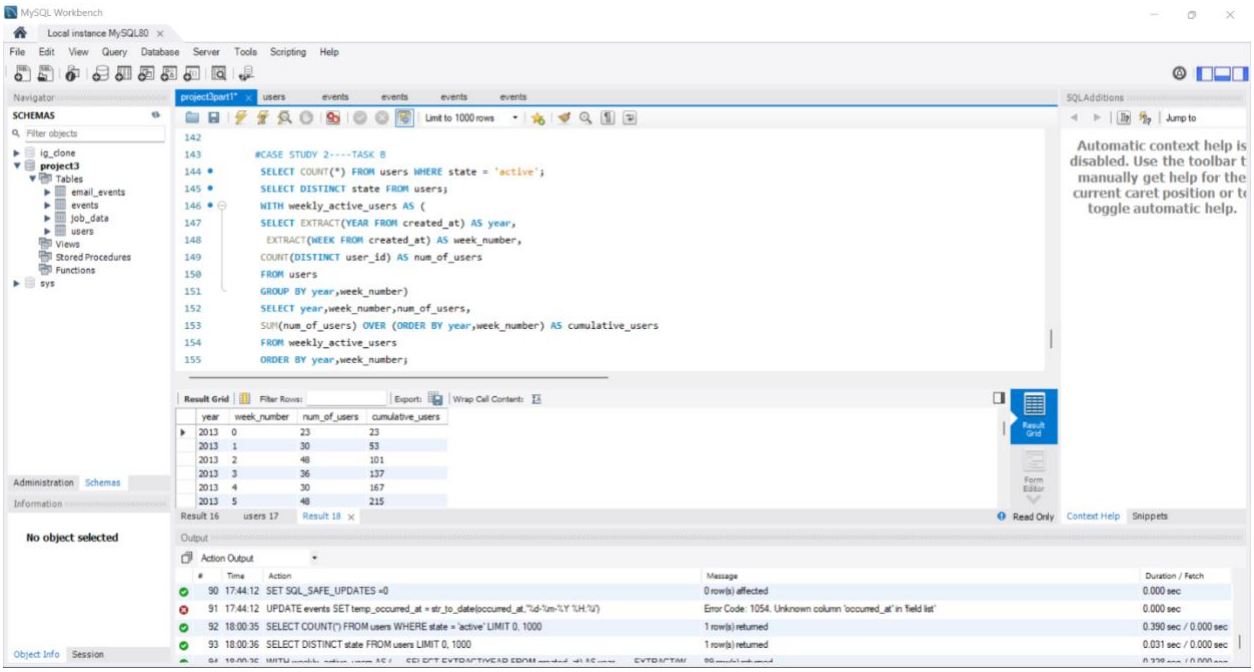
TASK B: Calculating user growth for the product

SQL QUERY:

```
SELECT COUNT(*) FROM users WHERE state = 'active';
    SELECT DISTINCT state FROM users;
    WITH weekly_active_users AS (
    SELECT EXTRACT(YEAR FROM created_at) AS year,
     EXTRACT(WEEK FROM created_at) AS week_number,
    COUNT(DISTINCT user_id) AS num_of_users
    FROM users
    GROUP BY year,week_number)
    SELECT year,week_number,num_of_users,
    SUM(num_of_users) OVER (ORDER BY year,week_number) AS cumulative_users
    FROM weekly_active_users
```

ORDER BY year,week_number;

SQL OUTPUT:



RESULT: The above screenshot show the output for the above applied query about the growth of users over time for a product. It tabulates the data regarding the week number and number of users along with the cumulative users.

TASK C: Calculate weekly retention of users based on their sign-up cohort

SQL QUERY:

SELECT first AS "week_numbers",

SUM(CASE WHEN week_number=0 THEN 1 ELSE 0 END) AS "week_0",

SUM(CASE WHEN week_number=1 THEN 1 ELSE 0 END) AS "week_1",

SUM(CASE WHEN week_number=2 THEN 1 ELSE 0 END) AS "week_2",

SUM(CASE WHEN week_number=3 THEN 1 ELSE 0 END) AS "week_3",

SUM(CASE WHEN week_number=4 THEN 1 ELSE 0 END) AS "week_4",

SUM(CASE WHEN week_number=5 THEN 1 ELSE 0 END) AS "week_5",

```
SUM(CASE WHEN week_number=6 THEN 1 ELSE 0 END) AS "week_6",
SUM(CASE WHEN week_number=7 THEN 1 ELSE 0 END) AS "week_7",
SUM(CASE WHEN week_number=8 THEN 1 ELSE 0 END) AS "week_8",
SUM(CASE WHEN week_number=9 THEN 1 ELSE 0 END) AS "week_9",
SUM(CASE WHEN week_number=10 THEN 1 ELSE 0 END) AS "week_10",
SUM(CASE WHEN week_number=11 THEN 1 ELSE 0 END) AS "week_11",
SUM(CASE WHEN week_number=12 THEN 1 ELSE 0 END) AS "week_12",
SUM(CASE WHEN week_number=13 THEN 1 ELSE 0 END) AS "week_13",
SUM(CASE WHEN week_number=14 THEN 1 ELSE 0 END) AS "week_14",
SUM(CASE WHEN week_number=15 THEN 1 ELSE 0 END) AS "week_15",
SUM(CASE WHEN week_number=16 THEN 1 ELSE 0 END) AS "week_16",
SUM(CASE WHEN week_number=17 THEN 1 ELSE 0 END) AS "week_17",
SUM(CASE WHEN week_number=18 THEN 1 ELSE 0 END) AS "week_18"
FROM ( SELECT m.user_id,m.login_week,n.first,m.login_week-n.first AS week_nuumber
FROM ( SELECT user_id,EXTRACT(WEEK FROM occurred_at) AS login_week
FROM events
GROUP BY user_id,login_week)m
JOIN (SELECT user_id,MIN(EXTRACT(WEEK FROM occurred_at)) AS first
FROM events
GROUP BY user_id)n
ON m.user_id=n.user_id
)sub
GROUP BY first
ORDER BY first;
```

SQL OUTPUT:

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

week_numbers	week_0	week_1	week_2	week_3	week_4	week_5	week_6	week_7	week_8	week_9	week_10	week_11	week_12
17	663	472	324	251	205	187	167	146	145	145	136	131	132
18	596	362	261	203	168	147	144	127	113	122	106	118	127
19	427	284	173	153	114	95	91	81	95	82	68	65	63
20	358	223	165	121	91	72	63	67	63	65	67	41	40
21	317	187	131	91	74	63	75	72	58	48	45	39	35
22	326	224	150	107	87	73	63	60	55	48	41	39	31

Result Grid

Form Editor

RESULT: The above screenshot shows the output of the query about the weekly retention of users according to their sign-up cohort.

TASK D: Calculating the weekly engagement per device

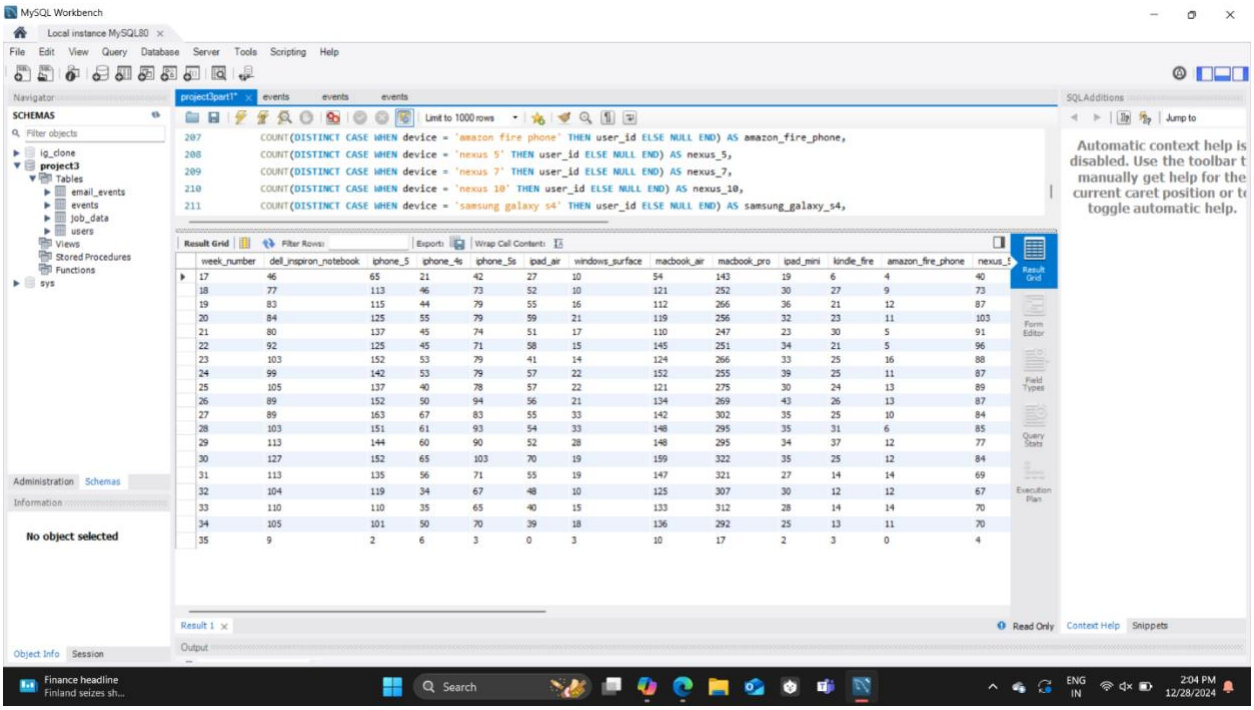
SQL QUERY:

```
SELECT

    EXTRACT(WEEK FROM occurred_at) AS week_number,

    COUNT(DISTINCT CASE WHEN device = 'dell inspiron notebook' THEN user_id ELSE NULL END) AS dell_inspiron_notebook,

  COUNT(DISTINCT CASE WHEN device = 'iphone 5' THEN user_id ELSE NULL END) AS iphone_5,

   COUNT(DISTINCT CASE WHEN device = 'iphone 4s' THEN user_id ELSE NULL END) AS iphone_4s,

   COUNT(DISTINCT CASE WHEN device = 'iphone 5s' THEN user_id ELSE NULL END) AS iphone_5s,

   COUNT(DISTINCT CASE WHEN device = 'ipad air' THEN user_id ELSE NULL END) AS ipad_air,

   COUNT(DISTINCT CASE WHEN device = 'windows surface' THEN user_id ELSE NULL END) AS windows_surface,

   COUNT(DISTINCT CASE WHEN device = 'macbook air' THEN user_id ELSE NULL END) AS macbook_air,

   COUNT(DISTINCT CASE WHEN device = 'macbook pro' THEN user_id ELSE NULL END) AS macbook_pro,

   COUNT(DISTINCT CASE WHEN device = 'ipad mini' THEN user_id ELSE NULL END) AS ipad_mini,

   COUNT(DISTINCT CASE WHEN device = 'kindle fire' THEN user_id ELSE NULL END) AS kindle_fire,
```

```
    COUNT(DISTINCT CASE WHEN device = 'amazon fire phone' THEN user_id ELSE
NULL END) AS amazon_fire_phone,

    COUNT(DISTINCT CASE WHEN device = 'nexus 5' THEN user_id ELSE NULL END) AS
nexus_5,

    COUNT(DISTINCT CASE WHEN device = 'nexus 7' THEN user_id ELSE NULL END) AS
nexus_7,

    COUNT(DISTINCT CASE WHEN device = 'nexus 10' THEN user_id ELSE NULL END)
AS nexus_10,

    COUNT(DISTINCT CASE WHEN device = 'samsung galaxy s4' THEN user_id ELSE
NULL END) AS samsung_galaxy_s4,

    COUNT(DISTINCT CASE WHEN device = 'samsung galaxy tablet' THEN user_id ELSE
NULL END) AS samsung_galaxy_tablet,

    COUNT(DISTINCT CASE WHEN device = 'samsung galaxy note' THEN user_id ELSE
NULL END) AS samsung_galaxy_note,

    COUNT(DISTINCT CASE WHEN device = 'lenovo thinkpad' THEN user_id ELSE NULL
END) AS lenovo_thinkpad,

    COUNT(DISTINCT CASE WHEN device = 'acer aspire notebook' THEN user_id ELSE
NULL END) AS acer_aspire_notebook,

    COUNT(DISTINCT CASE WHEN device = 'asus chromebook' THEN user_id ELSE NULL
END) AS asus_chromebook,

    COUNT(DISTINCT CASE WHEN device = 'htc one' THEN user_id ELSE NULL END) AS
htc_one,

    COUNT(DISTINCT CASE WHEN device = 'nokia lumia 635' THEN user_id ELSE NULL
END) AS nokia_lumia635,

    COUNT(DISTINCT CASE WHEN device = 'mac mini' THEN user_id ELSE NULL END)
AS mac_mini,

    COUNT(DISTINCT CASE WHEN device = 'hp pavilion desktop' THEN user_id ELSE
NULL END) AS hp_pavilion_desktop,

    COUNT(DISTINCT CASE WHEN device = 'dell inspiron desktop' THEN user_id ELSE
NULL END) AS dell_inspiron_desktop

    FROM events WHERE event_type = 'engagement'

    GROUP BY week_number
```

ORDER BY week_number;

SQL OUTPUT:



RESULT: The above screenshot shows the output about the query for the activeness of users on a weekly basis per device.

TASK E : Calculate the email engagement metrics

SQL QUERY:

SELECT

100 * SUM(CASE WHEN email_action = 'email_open' THEN 1 ELSE 0 END) /

SUM(CASE WHEN email_action = 'email_sent' THEN 1 ELSE 0 END) AS email_open_rate,

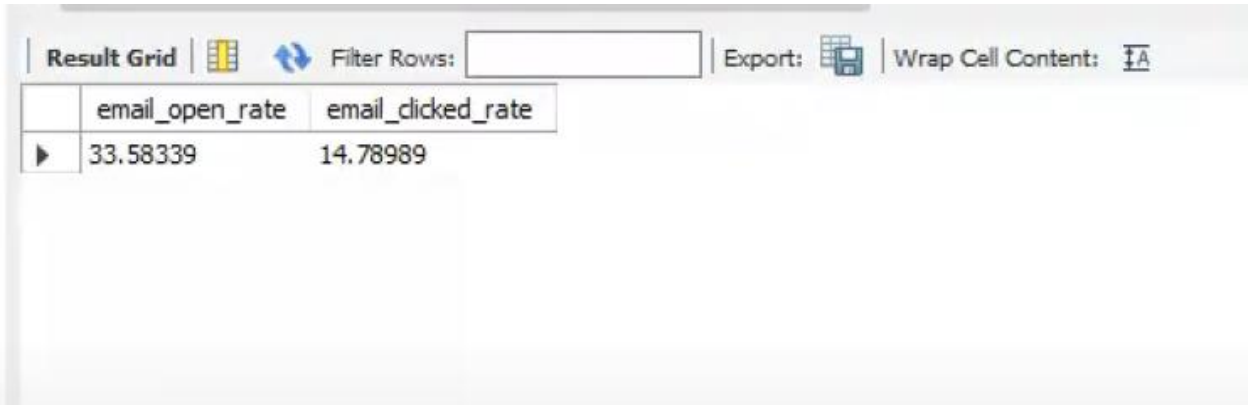
100 * SUM(CASE WHEN email_action = 'email_clicked' THEN 1 ELSE 0 END) /

SUM(CASE WHEN email_action = 'email_sent' THEN 1 ELSE 0 END) AS email_clicked_rate

FROM (

```
  SELECT *,
    CASE
      WHEN action IN ('sent_weekly_digest', 'sent_reengagement_email') THEN 'email_sent'
      WHEN action = 'email_open' THEN 'email_open'
      WHEN action = 'email_clickthrough' THEN 'email_clicked'
      ELSE NULL
    END AS email_action
  FROM project3.email_events
) a;
```

SQL OUTPUT:



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

	email_open_rate	email_clicked_rate
▶	33.58339	14.78989

RESULT: The above screenshot shows the email engagement metrics in the form of email_clicked_rate and email_open_rate. It helped to analyze how users are engaging with the email service.

RESULT OF THE PROJECT:

I improved my learning of MYSQL and EXCEL through this project while working as a data lead analyst. I explored how to tackle data to get various answers about your queries using SQL. I also learned to create databases and am confident enough to work as a lead data analyst in such firms. We got to know the various insights of the data such as user engagement as well as use of services as email by the users. It also involved job data analysis including the throughput analysis as

well as cleaning the dataset by identifying any duplicate rows. I would like to thank trainity team to provide me such a nice project to work on and gain experience.