Operation Analytics and Investigating Metric Spike

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1. Project Description

In this project we are going to understand how the operations are work in a organization and analyze the company operations and helps organization to take many decisions based on the previous data

Making the data driven decisions helps organizations to understand the business performance and their processes exactly, and it helps to mitigate the losses comes in future and understand where the company need to improve their Operations exactly.

And one of the major problem in a company is investigating the metrics of an operations of a company. It involves Understanding and exploring the sudden changes in the major metrics of operations.

So In this project we are gonna understand a lot about operaton analytics and the investigation of them and their metrics.

In this project we are working with 4 Major tables of database
Named as

1. Jobdata
2. Users
3. Email_events
4. Events_users

Each table has it's specific attributes and their valid data In them,

2. **Approach**

Case Study I

➢ Working with the jobdata table

Task A: Reviewing Job Over Time

In this task we are going to make some calculations on number of jobs are reviewed per hour in each day in November 2020.

➢ These are total no of jobs reviewed per hour in each day of November 2020

ds	job_per_day	hrs_spent
2020-11-28 00:00:00	2	0.0092
2020-11-30 00:00:00	2	0.0111
2020-11-29 00:00:00	1	0.0056
2020-11-25 00:00:00	1	0.0125
2020-11-26 00:00:00	1	0.0156
2020-11-27 00:00:00	1	0.0289

➢ this is the sql Query has used to extract them,

Code:

```
select ds,count(job_id) as job_per_day, sum(time_spent)/3600 as
hrs_spent
from jobdata
where ds>='2020-11-01' and ds<='2020-11-30'
group by ds;
```

➢ this is the screen shot of the out put
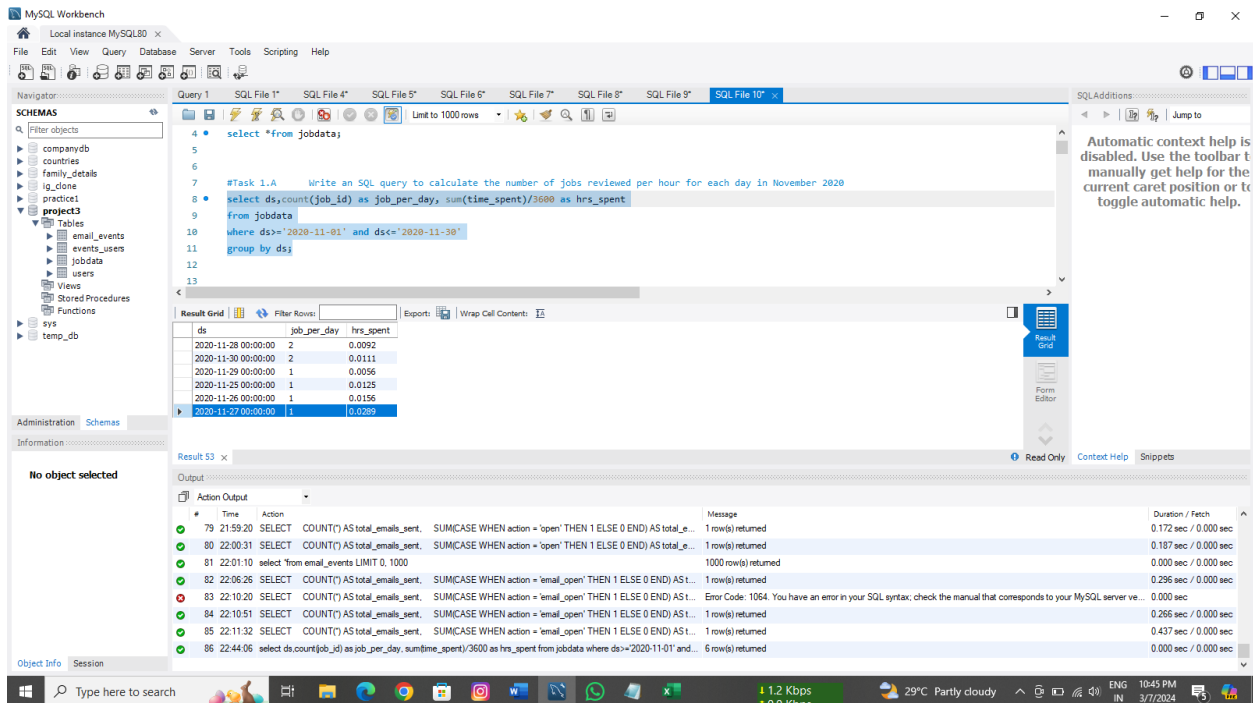
Task B: Throughput Analysis

In this task we are going to Calculate the 7-day rolling average of throughput and decide which payment method is suitable

> ➢ these are the results of 7 days rolling average of the throughput

Date	7 days rolling average
2020-11-25 00:00:00	1.00
2020-11-26 00:00:00	1.00
2020-11-27 00:00:00	1.00
2020-11-28 00:00:00	1.25
2020-11-29 00:00:00	1.20
2020-11-30 00:00:00	1.33

➢ and based on analysis I would prefer to pay or use the method of paying for 7 day rolling rather than daily basis or metric, this is because compare to daily metrics it has high stability and less fluctuations.

➢ So I would prefer the mode of 7 day pay role.

➢ this is the sql Query has used to extract and decide them

Code:

```
select *from jobdata;
select ds,
round(avg(throughput) over (order by ds rows between 6 preceding
and current row),2) as 7d_rlng_avg
from(
select ds,count(job_id) as throughput
from jobdata
group by ds) as t;
```

➢ this is the screen shot of the output
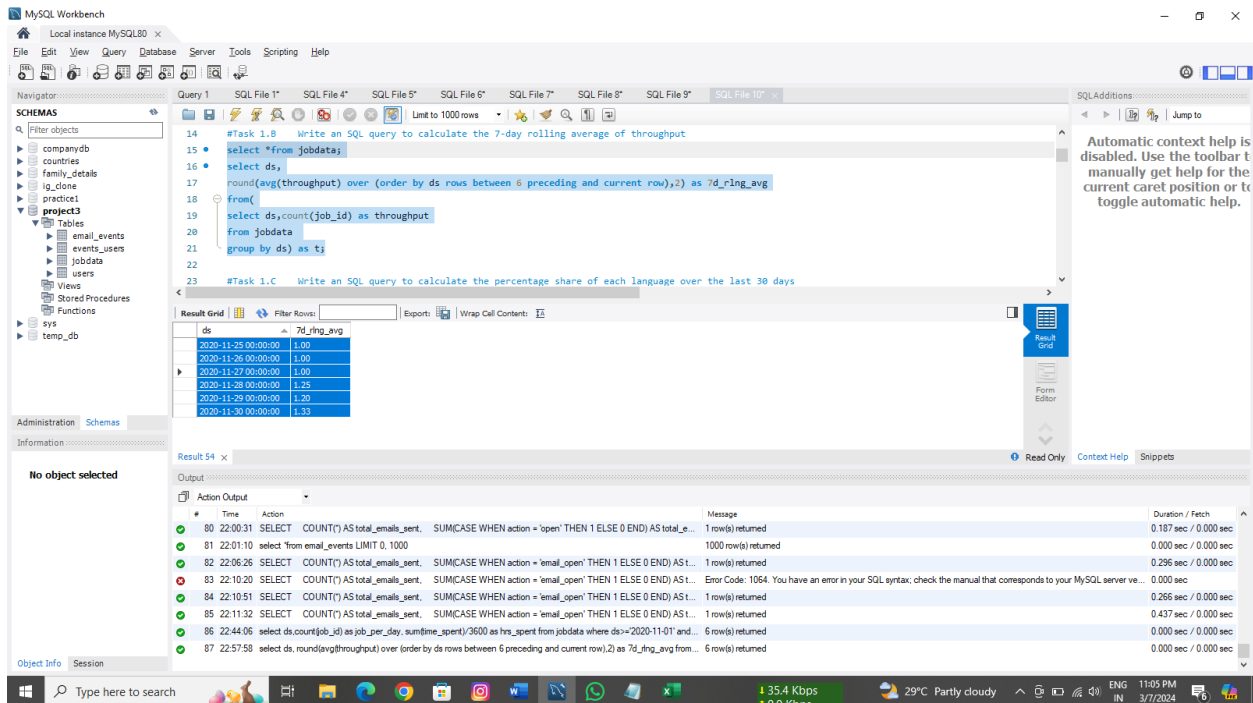
Task C: **Language Share Analysis**

In this task we are going to understand the percentage share of each language in the last 30 days.

> ➤ these are the results of percentage share of each language in the last 30 days.

Language	Percentage_Share
Hindi	100.00
English	100.00
Persian	100.00
Arabic	100.00
Italian	100.00
French	100.00

➢ this is the sql Query has used to extract and decide them,

Code:

select *from jobdata;
SELECT language,
*   ROUND(100 * SUM(CASE WHEN event IN ('decision', 'skip', 'transfer') THEN 1 ELSE 0 END) / COUNT(*), 2) AS*
percentage_share
FROM jobdata
WHERE ds BETWEEN '2020-11-25' AND '2020-11-30'
GROUP BY language;

➢ this is the screen shot of the output

Task D: **Duplicate Rows Detection**

In this task we are going to understand duplicate rows in the data.

 ➢ these are the results of duplicate rows in the data,

Job_id	date	Actor_id	event	language	Time_spent	oraganisation
23	2020-11-29 00:00:00	1003	decision	Persian	20	C
23	2020-11-28 00:00:00	1005	transfer	Persian	22	D
23	2020-11-26 00:00:00	1004	skip	Persian	56	A

 ➢ this is the sql Query has used to extract and decide them,

Code:

```
SELECT *
FROM jobdata
WHERE job_id IN (
    SELECT job_id
    FROM jobdata
    GROUP BY job_id
    HAVING COUNT(*) > 1
);
```

 ➢ this is the screen shot of the output
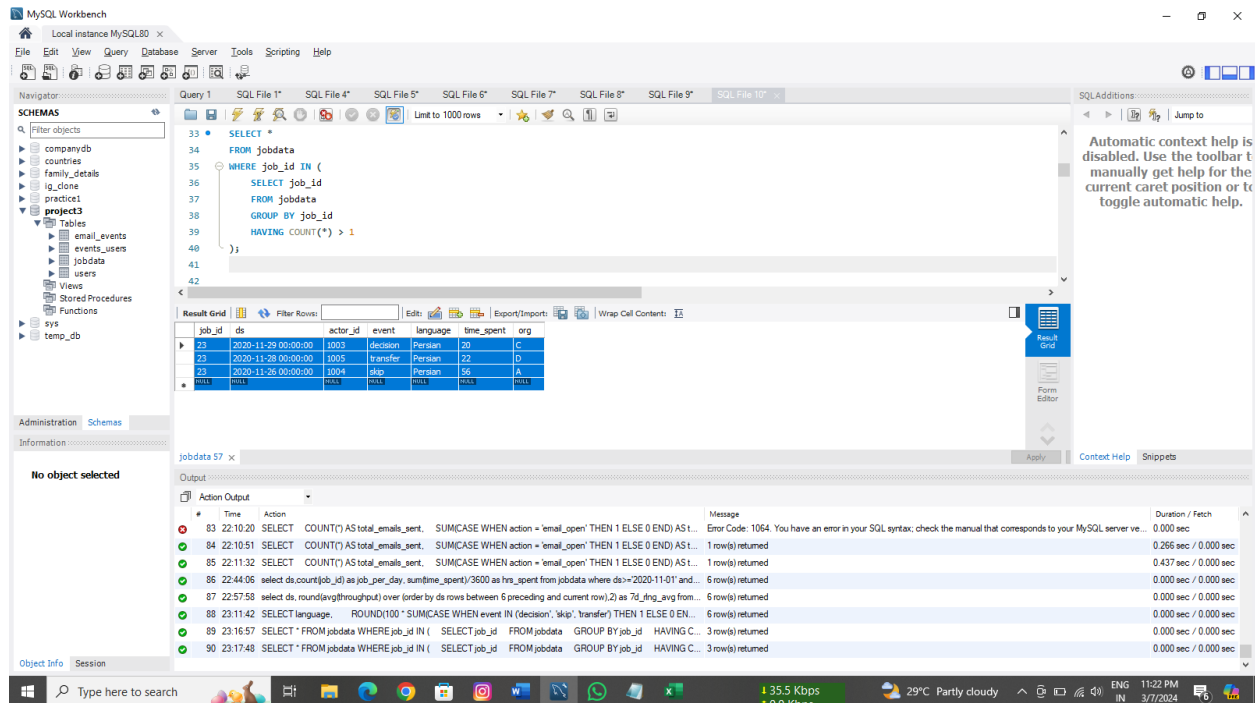
Case Study II

In this case study we are going to work with three tables

1. users
2. events
3. email_events

Task A: **Weekly User Engagement**

In this task we are going to Measure the activeness of users on a weekly basis

➤ these are the results of duplicate rows in the data,

Week	Active Users	Total_events
2014-18	1408	10315
2014-19	2916	21811

2014-20	3004	21523
2014-21	3082	22472
2014-22	3153	21859
2014-23	3264	23400
2014-24	3355	23227
2014-25	3468	24261
2014-26	3556	24077
2014-27	3656	24409
2014-28	3767	25653
2014-29	3880	26530
2014-30	3987	25953
2014-31	4122	27661
2014-32	4178	24297
2014-33	4320	22770
2014-34	4458	22594
2014-35	4577	22832

➢ this is the sql Query has used to extract and decide them,

Code:

```
SELECT
    DATE_FORMAT(occurred_at, '%x-%v') AS week,
    COUNT(DISTINCT user_id) AS active_users,
    COUNT(*) AS total_events
FROM (
    SELECT user_id, occurred_at FROM events_users
    UNION ALL
    SELECT user_id, occurred_at FROM email_events
```

) AS combined_events

GROUP BY week

ORDER BY week;

➤ this is the screen shot of the output,

Task B: <u>**User Growth Analysis**</u>

In this task we are going to Analyze the growth of users over time for a product.

➤ these are the results of duplicate rows in the data,

week	New users	Previous_users	Users_growth
2013-01	26	26	0
2013-02	29	29	0
2013-03	47	47	0
2013-04	36	36	0
2013-05	30	30	0
2013-06	48	48	0
2013-07	41	41	0
2013-08	39	39	0
2013-09	33	33	0
2013-10	43	43	0
2013-11	33	33	0
2013-12	32	32	0
2013-13	33	33	0
2013-14	40	40	0
2013-15	35	35	0
2013-16	42	42	0
2013-17	48	48	0
2013-18	48	48	0
2013-19	45	45	0
2013-20	55	55	0
2013-21	41	41	0
2013-22	49	49	0
2013-23	51	51	0
2013-24	51	51	0
2013-25	46	46	0
2013-26	57	57	0
2013-27	57	57	0
2013-28	52	52	0
2013-29	71	71	0
2013-30	66	66	0
2013-31	69	69	0
2013-32	66	66	0
2013-33	73	73	0
2013-34	71	71	0
2013-35	79	79	0

2013-36	65	65	0
2013-37	71	71	0
2013-38	84	84	0
2013-39	92	92	0
2013-40	81	81	0
2013-41	88	88	0
2013-42	74	74	0
2013-43	97	97	0
2013-44	92	92	0
2013-45	97	97	0
2013-46	94	94	0
2013-47	82	82	0
2013-48	103	103	0
2013-49	96	96	0
2013-50	117	117	0
2013-51	123	123	0
2013-52	104	104	0
2014-01	132	132	0
2014-02	122	122	0
2014-03	112	112	0
2014-04	113	113	0
2014-05	130	130	0
2014-06	132	132	0
2014-07	135	135	0
2014-08	127	127	0
2014-09	127	127	0
2014-10	135	135	0
2014-11	152	152	0
2014-12	132	132	0
2014-13	151	151	0
2014-14	161	161	0
2014-15	166	166	0
2014-16	165	165	0
2014-17	176	176	0
2014-18	172	172	0
2014-19	160	160	0

2014-20	186	186	0
2014-21	177	177	0
2014-22	186	186	0
2014-23	197	197	0
2014-24	198	198	0
2014-25	222	222	0
2014-26	210	210	0
2014-27	199	199	0
2014-28	223	223	0
2014-29	215	215	0
2014-30	228	228	0
2014-31	234	234	0
2014-32	189	189	0
2014-33	250	250	0
2014-34	259	259	0
2014-35	266	266	0

➢ this is the sql Query has used to extract and decide them,

Code:

```
WITH user_growth AS (
    SELECT
        DATE_FORMAT(created_at, '%x-%v') AS week,
        COUNT(DISTINCT user_id) AS new_users
    FROM users
    GROUP BY week
),
previous_week_users AS (
```

```
SELECT
    DATE_FORMAT(created_at, '%x-%v') AS week,
    COUNT(DISTINCT user_id) AS previous_users
FROM users
WHERE created_at < CURRENT_DATE - INTERVAL 1 WEEK
GROUP BY week
)
SELECT
    ug.week,
    ug.new_users,
    pwu.previous_users,
    (ug.new_users - COALESCE(pwu.previous_users, 0)) AS user_growth
FROM user_growth ug
LEFT JOIN previous_week_users pwu ON ug.week = pwu.week
ORDER BY ug.week;
```

➤ this is the screen shot of the output,
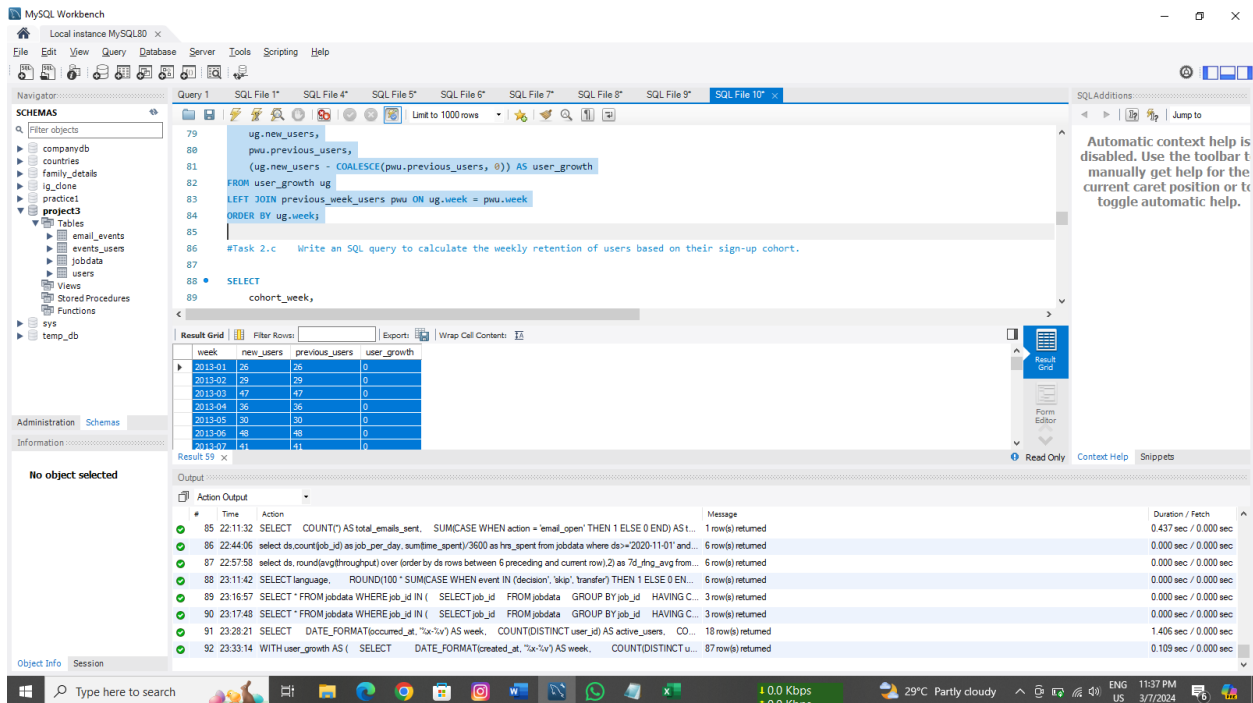
Task C: **Weekly Retention Analysis**

In this task we are going to Analyze the retention of users on a weekly basis after signing up for a product.

> ➤ these are the results of retention of users on a weekly basis after signing up for a product.

Cohort_week	Week_number	Retention numner
2013-01	69	0.00
2013-01	70	0.00
2013-01	71	0.00
2013-01	72	0.00
2013-01	73	0.00
2013-01	74	0.00
2013-01	75	0.00
2013-01	76	0.00

2013-01	77	0.00
2013-01	78	0.00
2013-01	79	0.00
2013-01	80	0.00
2013-01	82	0.00
2013-01	83	0.00
2013-01	84	0.00
2013-01	85	0.00
2013-01	86	0.00
2013-02	68	0.00
2013-02	69	0.00
2013-02	70	0.00
2013-02	71	0.00
2013-02	72	0.00
2013-02	73	0.00
2013-02	74	0.00
2013-02	75	0.00
2013-02	76	0.00
2013-02	77	0.00
2013-02	78	0.00
2013-02	79	0.00
2013-02	80	0.00
2013-02	81	0.00
2013-02	82	0.00
2013-02	83	0.00
2013-02	84	0.00
2013-02	85	0.00
2013-03	67	0.00
2013-03	68	0.00
2013-03	69	0.00
2013-03	70	0.00
2013-03	71	0.00
2013-03	72	0.00
2013-03	73	0.00
2013-03	74	0.00
2013-03	75	0.00

2013-03	76	0.00
2013-03	77	0.00
2013-03	78	0.00
2013-03	79	0.00
2013-03	80	0.00
2013-03	81	0.00
2013-03	83	0.00
2013-03	84	0.00
2013-04	66	0.00
2013-04	67	0.00
2013-04	68	0.00
2013-04	69	0.00
2013-04	70	0.00
2013-04	71	0.00
2013-04	72	0.00
2013-04	73	0.00
2013-04	74	0.00
2013-04	75	0.00
2013-04	76	0.00
2013-04	77	0.00
2013-04	78	0.00
2013-04	79	0.00
2013-04	80	0.00
2013-04	81	0.00
2013-04	82	0.00
2013-04	83	0.00
2013-05	65	0.00
2013-05	66	0.00
2013-05	67	0.00
2013-05	68	0.00
2013-05	69	0.00
2013-05	70	0.00
2013-05	71	0.00
2013-05	72	0.00
2013-05	73	0.00
2013-05	74	0.00

2013-05	75	0.00
2013-05	76	0.00
2013-05	77	0.00
2013-05	78	0.00
2013-05	79	0.00
2013-05	80	0.00
2013-05	81	0.00
2013-06	63	0.00
2013-06	64	0.00
2013-06	65	0.00
2013-06	66	0.00
2013-06	67	0.00
2013-06	68	0.00
2013-06	69	0.00
2013-06	70	0.00
2013-06	71	0.00
2013-06	72	0.00
2013-06	73	0.00
2013-06	74	0.00
2013-06	75	0.00
2013-06	76	0.00
2013-06	77	0.00
2013-06	78	0.00
2013-06	79	0.00
2013-06	80	0.00
2013-06	81	0.00
2013-07	63	0.00
2013-07	64	0.00
2013-07	65	0.00
2013-07	66	0.00
2013-07	67	0.00
2013-07	68	0.00
2013-07	69	0.00
2013-07	70	0.00
2013-07	71	0.00
2013-07	72	0.00

2013-07	73	0.00
2013-07	74	0.00
2013-07	75	0.00
2013-07	76	0.00
2013-07	77	0.00
2013-07	78	0.00
2013-07	80	0.00
2013-08	62	0.00
2013-08	63	0.00
2013-08	64	0.00
2013-08	65	0.00
2013-08	66	0.00
2013-08	67	0.00
2013-08	68	0.00
2013-08	69	0.00
2013-08	70	0.00
2013-08	71	0.00
2013-08	72	0.00
2013-08	73	0.00
2013-08	74	0.00
2013-08	75	0.00
2013-08	76	0.00
2013-08	77	0.00
2013-08	78	0.00
2013-08	79	0.00
2013-09	61	0.00
2013-09	62	0.00
2013-09	63	0.00
2013-09	64	0.00
2013-09	65	0.00
2013-09	66	0.00
2013-09	67	0.00
2013-09	68	0.00
2013-09	69	0.00
2013-09	70	0.00
2013-09	71	0.00

2013-09	72	0.00
2013-09	73	0.00
2013-09	74	0.00
2013-09	75	0.00
2013-09	76	0.00
2013-09	77	0.00
2013-09	78	0.00
2013-10	59	0.00
2013-10	60	0.00
2013-10	61	0.00
2013-10	62	0.00
2013-10	63	0.00
2013-10	64	0.00
2013-10	65	0.00
2013-10	66	0.00
2013-10	67	0.00
2013-10	68	0.00
2013-10	69	0.00
2013-10	70	0.00
2013-10	71	0.00
2013-10	72	0.00
2013-10	73	0.00
2013-10	74	0.00
2013-10	75	0.00
2013-10	76	0.00
2013-10	77	0.00
2013-11	59	0.00
2013-11	60	0.00
2013-11	61	0.00
2013-11	62	0.00
2013-11	63	0.00
2013-11	64	0.00
2013-11	65	0.00
2013-11	66	0.00
2013-11	67	0.00
2013-11	68	0.00

2013-11	69	0.00
2013-11	70	0.00
2013-11	71	0.00
2013-11	72	0.00
2013-11	73	0.00
2013-11	74	0.00
2013-11	75	0.00
2013-11	76	0.00
2013-12	58	0.00
2013-12	59	0.00
2013-12	60	0.00
2013-12	61	0.00
2013-12	62	0.00
2013-12	63	0.00
2013-12	64	0.00
2013-12	65	0.00
2013-12	66	0.00
2013-12	67	0.00
2013-12	68	0.00
2013-12	69	0.00
2013-12	70	0.00
2013-12	71	0.00
2013-12	72	0.00
2013-12	73	0.00
2013-12	74	0.00
2013-12	75	0.00
2013-13	57	0.00
2013-13	58	0.00
2013-13	59	0.00
2013-13	60	0.00
2013-13	61	0.00
2013-13	62	0.00
2013-13	63	0.00
2013-13	64	0.00
2013-13	65	0.00
2013-13	66	0.00

2013-13	67	0.00
2013-13	68	0.00
2013-13	69	0.00
2013-13	70	0.00
2013-13	71	0.00
2013-13	72	0.00
2013-13	73	0.00
2013-13	74	0.00
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2013-14	56	0.00
2013-14	57	0.00
2013-14	58	0.00
2013-14	59	0.00
2013-14	60	0.00
2013-14	61	0.00
2013-14	62	0.00
2013-14	63	0.00
2013-14	64	0.00
2013-14	65	0.00
2013-14	66	0.00
2013-14	67	0.00
2013-14	68	0.00
2013-14	69	0.00
2013-14	70	0.00
2013-14	71	0.00
2013-14	72	0.00
2013-14	73	0.00
2013-15	55	0.00
2013-15	56	0.00
2013-15	57	0.00
2013-15	58	0.00
2013-15	59	0.00
2013-15	60	0.00
2013-15	61	0.00
2013-15	62	0.00
2013-15	63	0.00

2013-15	64	0.00
2013-15	65	0.00
2013-15	66	0.00
2013-15	67	0.00
2013-15	68	0.00
2013-15	69	0.00
2013-15	70	0.00
2013-15	71	0.00
2013-15	72	0.00
2013-16	53	0.00
2013-16	54	0.00
2013-16	55	0.00
2013-16	56	0.00
2013-16	57	0.00
2013-16	58	0.00
2013-16	59	0.00
2013-16	60	0.00
2013-16	61	0.00
2013-16	62	0.00
2013-16	63	0.00
2013-16	64	0.00
2013-16	65	0.00
2013-16	66	0.00
2013-16	67	0.00
2013-16	68	0.00
2013-16	69	0.00
2013-16	70	0.00
2013-16	71	0.00
2013-17	52	0.00
2013-17	53	0.00
2013-17	54	0.00
2013-17	55	0.00
2013-17	56	0.00
2013-17	57	0.00
2013-17	58	0.00
2013-17	59	0.00

2013-17	60	0.00
2013-17	61	0.00
2013-17	62	0.00
2013-17	63	0.00
2013-17	64	0.00
2013-17	65	0.00
2013-17	66	0.00
2013-17	67	0.00
2013-17	68	0.00
2013-17	69	0.00
2013-17	70	0.00
2013-18	51	0.00
2013-18	52	0.00
2013-18	53	0.00
2013-18	54	0.00
2013-18	55	0.00
2013-18	56	0.00
2013-18	57	0.00
2013-18	58	0.00
2013-18	59	0.00
2013-18	60	0.00
2013-18	61	0.00
2013-18	62	0.00
2013-18	63	0.00
2013-18	64	0.00
2013-18	65	0.00
2013-18	66	0.00
2013-18	67	0.00
2013-18	68	0.00
2013-18	69	0.00
2013-19	50	0.00
2013-19	51	0.00
2013-19	52	0.00
2013-19	53	0.00
2013-19	54	0.00
2013-19	55	0.00

2013-19	56	0.00
2013-19	57	0.00
2013-19	58	0.00
2013-19	59	0.00
2013-19	60	0.00
2013-19	61	0.00
2013-19	62	0.00
2013-19	63	0.00
2013-19	64	0.00
2013-19	65	0.00
2013-19	66	0.00
2013-19	67	0.00
2013-19	68	0.00
2013-20	50	0.00
2013-20	51	0.00
2013-20	52	0.00
2013-20	53	0.00
2013-20	54	0.00
2013-20	55	0.00
2013-20	56	0.00
2013-20	57	0.00
2013-20	58	0.00
2013-20	59	0.00
2013-20	60	0.00
2013-20	61	0.00
2013-20	62	0.00
2013-20	63	0.00
2013-20	64	0.00
2013-20	65	0.00
2013-20	66	0.00
2013-20	67	0.00
2013-21	49	0.00
2013-21	50	0.00
2013-21	51	0.00
2013-21	52	0.00
2013-21	53	0.00

2013-21	54	0.00
2013-21	56	0.00
2013-21	57	0.00
2013-21	58	0.00
2013-21	59	0.00
2013-21	60	0.00
2013-21	61	0.00
2013-21	62	0.00
2013-21	63	0.00
2013-21	64	0.00
2013-21	65	0.00
2013-21	66	0.00
2013-22	48	0.00
2013-22	49	0.00
2013-22	50	0.00
2013-22	51	0.00
2013-22	52	0.00
2013-22	53	0.00
2013-22	54	0.00
2013-22	56	0.00
2013-22	57	0.00
2013-22	58	0.00
2013-22	59	0.00
2013-22	60	0.00
2013-22	61	0.00
2013-22	62	0.00
2013-22	63	0.00
2013-22	64	0.00
2013-22	65	0.00
2013-23	47	0.00
2013-23	48	0.00
2013-23	49	0.00
2013-23	50	0.00
2013-23	51	0.00
2013-23	52	0.00
2013-23	53	0.00

2013-23	54	0.00
2013-23	55	0.00
2013-23	56	0.00
2013-23	57	0.00
2013-23	58	0.00
2013-23	59	0.00
2013-23	60	0.00
2013-23	61	0.00
2013-23	62	0.00
2013-23	63	0.00
2013-23	64	0.00
2013-24	45	0.00
2013-24	46	0.00
2013-24	47	0.00
2013-24	48	0.00
2013-24	49	0.00
2013-24	50	0.00
2013-24	51	0.00
2013-24	52	0.00
2013-24	53	0.00
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2014-02	18	0.00
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2014-02	23	0.00
2014-02	24	0.00

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2014-02	26	0.00
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2014-02	28	0.00
2014-02	29	0.00
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2014-02	31	0.00
2014-02	32	0.00
2014-02	33	0.00
2014-03	15	0.00
2014-03	16	0.00
2014-03	17	0.00
2014-03	18	0.00
2014-03	19	0.00
2014-03	20	0.00
2014-03	21	0.00
2014-03	22	0.00
2014-03	23	0.00
2014-03	24	0.00
2014-03	25	0.00

➢ this is the sql Query has used to extract and decide them,

Code:

SELECT

cohort_week,

week_number,

*ROUND((COUNT(DISTINCT CASE WHEN week_number = 0 THEN user_event_data.user_id END) / NULLIF(COUNT(DISTINCT user_event_data.user_id), 0)) * 100, 2) AS retention_rate*

FROM (

SELECT

events_users.user_id,

DATE_FORMAT(users.created_at, '%x-%v') AS cohort_week,

DATEDIFF(events_users.occurred_at, users.created_at) DIV 7 AS
week_number

FROM

events_users

JOIN

users ON events_users.user_id = users.user_id

) AS user_event_data

GROUP BY

cohort_week, week_number

ORDER BY

cohort_week, week_number;

➢ this is the screen shot of the output,

Task D: **Weekly Engagement Per Device**

In this task we are going to Measure the activeness of users on a weekly basis per device.

> ➢ these are the results of activeness of users on a weekly basis per device.

2014-18	acer aspire desktop	71
2014-18	acer aspire notebook	215
2014-18	amazon fire phone	84
2014-18	asus chromebook	286
2014-18	dell inspiron desktop	198
2014-18	dell inspiron notebook	569
2014-18	hp pavilion desktop	141
2014-18	htc one	192
2014-18	ipad air	358
2014-18	ipad mini	229
2014-18	iphone 4s	219
2014-18	iphone 5	774
2014-18	iphone 5s	512
2014-18	kindle fire	64
2014-18	lenovo thinkpad	858
2014-18	mac mini	64
2014-18	macbook air	538
2014-18	macbook pro	1705
2014-18	nexus 10	145
2014-18	nexus 5	452
2014-18	nexus 7	185
2014-18	nokia lumia 635	137
2014-18	samsumg galaxy tablet	71
2014-18	samsung galaxy note	117
2014-18	samsung galaxy s4	519

2014-18	windows surface	87
2014-19	acer aspire desktop	300
2014-19	acer aspire notebook	386
2014-19	amazon fire phone	179
2014-19	asus chromebook	498
2014-19	dell inspiron desktop	700
2014-19	dell inspiron notebook	931
2014-19	hp pavilion desktop	372
2014-19	htc one	176
2014-19	ipad air	537
2014-19	ipad mini	296
2014-19	iphone 4s	509
2014-19	iphone 5	1336
2014-19	iphone 5s	809
2014-19	kindle fire	266
2014-19	lenovo thinkpad	1828
2014-19	mac mini	156
2014-19	macbook air	1643
2014-19	macbook pro	3405
2014-19	nexus 10	372
2014-19	nexus 5	937
2014-19	nexus 7	274
2014-19	nokia lumia 635	347
2014-19	samsumg galaxy tablet	79
2014-19	samsung galaxy note	143
2014-19	samsung galaxy s4	1092
2014-19	windows surface	121
2014-20	acer aspire desktop	252
2014-20	acer aspire notebook	399
2014-20	amazon fire phone	149
2014-20	asus chromebook	286
2014-20	dell inspiron desktop	426
2014-20	dell inspiron notebook	1197
2014-20	hp pavilion desktop	390
2014-20	htc one	307
2014-20	ipad air	602

2014-20	ipad mini	386
2014-20	iphone 4s	506
2014-20	iphone 5	1190
2014-20	iphone 5s	986
2014-20	kindle fire	257
2014-20	lenovo thinkpad	2073
2014-20	mac mini	260
2014-20	macbook air	1312
2014-20	macbook pro	3076
2014-20	nexus 10	235
2014-20	nexus 5	969
2014-20	nexus 7	356
2014-20	nokia lumia 635	215
2014-20	samsumg galaxy tablet	66
2014-20	samsung galaxy note	120
2014-20	samsung galaxy s4	1046
2014-20	windows surface	172
2014-21	acer aspire desktop	228
2014-21	acer aspire notebook	487
2014-21	amazon fire phone	104
2014-21	asus chromebook	467
2014-21	dell inspiron desktop	516
2014-21	dell inspiron notebook	998
2014-21	hp pavilion desktop	302
2014-21	htc one	341
2014-21	ipad air	585
2014-21	ipad mini	261
2014-21	iphone 4s	613
2014-21	iphone 5	1334
2014-21	iphone 5s	994
2014-21	kindle fire	211
2014-21	lenovo thinkpad	2291
2014-21	mac mini	270
2014-21	macbook air	1498
2014-21	macbook pro	3144
2014-21	nexus 10	226

2014-21	nexus 5	1254
2014-21	nexus 7	346
2014-21	nokia lumia 635	149
2014-21	samsumg galaxy tablet	78
2014-21	samsung galaxy note	168
2014-21	samsung galaxy s4	1028
2014-21	windows surface	174
2014-22	acer aspire desktop	318
2014-22	acer aspire notebook	480
2014-22	amazon fire phone	26
2014-22	asus chromebook	565
2014-22	dell inspiron desktop	582
2014-22	dell inspiron notebook	952
2014-22	hp pavilion desktop	449
2014-22	htc one	258
2014-22	ipad air	437
2014-22	ipad mini	319
2014-22	iphone 4s	555
2014-22	iphone 5	1627
2014-22	iphone 5s	790
2014-22	kindle fire	358
2014-22	lenovo thinkpad	1897
2014-22	mac mini	288
2014-22	macbook air	1270
2014-22	macbook pro	3011
2014-22	nexus 10	264
2014-22	nexus 5	1087
2014-22	nexus 7	217
2014-22	nokia lumia 635	201
2014-22	samsumg galaxy tablet	66
2014-22	samsung galaxy note	202
2014-22	samsung galaxy s4	974
2014-22	windows surface	186
2014-23	acer aspire desktop	261
2014-23	acer aspire notebook	407
2014-23	amazon fire phone	48

2014-23	asus chromebook	639
2014-23	dell inspiron desktop	752
2014-23	dell inspiron notebook	1120
2014-23	hp pavilion desktop	380
2014-23	htc one	325
2014-23	ipad air	600
2014-23	ipad mini	319
2014-23	iphone 4s	455
2014-23	iphone 5	1369
2014-23	iphone 5s	942
2014-23	kindle fire	279
2014-23	lenovo thinkpad	1795
2014-23	mac mini	282
2014-23	macbook air	1774
2014-23	macbook pro	3190
2014-23	nexus 10	340
2014-23	nexus 5	1184
2014-23	nexus 7	438
2014-23	nokia lumia 635	310
2014-23	samsumg galaxy tablet	81
2014-23	samsung galaxy note	285
2014-23	samsung galaxy s4	1040
2014-23	windows surface	190
2014-24	acer aspire desktop	258
2014-24	acer aspire notebook	474
2014-24	amazon fire phone	193
2014-24	asus chromebook	704
2014-24	dell inspiron desktop	537
2014-24	dell inspiron notebook	958
2014-24	hp pavilion desktop	694
2014-24	htc one	243
2014-24	ipad air	422
2014-24	ipad mini	262
2014-24	iphone 4s	482
2014-24	iphone 5	1760
2014-24	iphone 5s	890

2014-24	kindle fire	322
2014-24	lenovo thinkpad	1904
2014-24	mac mini	162
2014-24	macbook air	1468
2014-24	macbook pro	3059
2014-24	nexus 10	513
2014-24	nexus 5	1019
2014-24	nexus 7	313
2014-24	nokia lumia 635	301
2014-24	samsumg galaxy tablet	90
2014-24	samsung galaxy note	153
2014-24	samsumg galaxy s4	1059
2014-24	windows surface	191
2014-25	acer aspire desktop	279
2014-25	acer aspire notebook	526
2014-25	amazon fire phone	145
2014-25	asus chromebook	442
2014-25	dell inspiron desktop	682
2014-25	dell inspiron notebook	1101
2014-25	hp pavilion desktop	732
2014-25	htc one	144
2014-25	ipad air	633
2014-25	ipad mini	315
2014-25	iphone 4s	606
2014-25	iphone 5	1520
2014-25	iphone 5s	950
2014-25	kindle fire	240
2014-25	lenovo thinkpad	1854
2014-25	mac mini	306
2014-25	macbook air	1697
2014-25	macbook pro	3081
2014-25	nexus 10	373
2014-25	nexus 5	1156
2014-25	nexus 7	431
2014-25	nokia lumia 635	455
2014-25	samsumg galaxy tablet	104

2014-25	samsung galaxy note	236
2014-25	samsung galaxy s4	963
2014-25	windows surface	227
2014-26	acer aspire desktop	278
2014-26	acer aspire notebook	599
2014-26	amazon fire phone	125
2014-26	asus chromebook	461
2014-26	dell inspiron desktop	682
2014-26	dell inspiron notebook	1233
2014-26	hp pavilion desktop	552
2014-26	htc one	276
2014-26	ipad air	646
2014-26	ipad mini	245
2014-26	iphone 4s	481
2014-26	iphone 5	1639
2014-26	iphone 5s	989
2014-26	kindle fire	206
2014-26	lenovo thinkpad	2176
2014-26	mac mini	243
2014-26	macbook air	1309
2014-26	macbook pro	3054
2014-26	nexus 10	273
2014-26	nexus 5	935
2014-26	nexus 7	543
2014-26	nokia lumia 635	475
2014-26	samsumg galaxy tablet	172
2014-26	samsung galaxy note	134
2014-26	samsung galaxy s4	1135
2014-26	windows surface	208
2014-27	acer aspire desktop	308
2014-27	acer aspire notebook	327
2014-27	amazon fire phone	137
2014-27	asus chromebook	609
2014-27	dell inspiron desktop	642
2014-27	dell inspiron notebook	1073
2014-27	hp pavilion desktop	537

2014-27	htc one	226
2014-27	ipad air	573
2014-27	ipad mini	463
2014-27	iphone 4s	470
2014-27	iphone 5	1673
2014-27	iphone 5s	1060
2014-27	kindle fire	277
2014-27	lenovo thinkpad	2173
2014-27	mac mini	134
2014-27	macbook air	1499
2014-27	macbook pro	3300
2014-27	nexus 10	269
2014-27	nexus 5	928
2014-27	nexus 7	438
2014-27	nokia lumia 635	463
2014-27	samsumg galaxy tablet	127
2014-27	samsung galaxy note	101
2014-27	samsung galaxy s4	1141
2014-27	windows surface	210
2014-28	acer aspire desktop	326
2014-28	acer aspire notebook	605
2014-28	amazon fire phone	109
2014-28	asus chromebook	528
2014-28	dell inspiron desktop	569
2014-28	dell inspiron notebook	1014
2014-28	hp pavilion desktop	596
2014-28	htc one	242
2014-28	ipad air	509
2014-28	ipad mini	350
2014-28	iphone 4s	759
2014-28	iphone 5	1866
2014-28	iphone 5s	940
2014-28	kindle fire	268
2014-28	lenovo thinkpad	2263
2014-28	mac mini	177
2014-28	macbook air	1648

2014-28	macbook pro	3559
2014-28	nexus 10	327
2014-28	nexus 5	1050
2014-28	nexus 7	386
2014-28	nokia lumia 635	306
2014-28	samsumg galaxy tablet	165
2014-28	samsung galaxy note	130
2014-28	samsung galaxy s4	1191
2014-28	windows surface	305
2014-29	acer aspire desktop	268
2014-29	acer aspire notebook	590
2014-29	amazon fire phone	52
2014-29	asus chromebook	547
2014-29	dell inspiron desktop	736
2014-29	dell inspiron notebook	1172
2014-29	hp pavilion desktop	636
2014-29	htc one	304
2014-29	ipad air	557
2014-29	ipad mini	365
2014-29	iphone 4s	770
2014-29	iphone 5	1643
2014-29	iphone 5s	1041
2014-29	kindle fire	329
2014-29	lenovo thinkpad	2616
2014-29	mac mini	381
2014-29	macbook air	1674
2014-29	macbook pro	3498
2014-29	nexus 10	255
2014-29	nexus 5	894
2014-29	nexus 7	348
2014-29	nokia lumia 635	438
2014-29	samsumg galaxy tablet	86
2014-29	samsung galaxy note	120
2014-29	samsung galaxy s4	1309
2014-29	windows surface	309
2014-30	acer aspire desktop	231

2014-30	acer aspire notebook	539
2014-30	amazon fire phone	94
2014-30	asus chromebook	570
2014-30	dell inspiron desktop	570
2014-30	dell inspiron notebook	1218
2014-30	hp pavilion desktop	751
2014-30	htc one	242
2014-30	ipad air	614
2014-30	ipad mini	374
2014-30	iphone 4s	653
2014-30	iphone 5	1609
2014-30	iphone 5s	969
2014-30	kindle fire	296
2014-30	lenovo thinkpad	2449
2014-30	mac mini	293
2014-30	macbook air	1749
2014-30	macbook pro	3184
2014-30	nexus 10	263
2014-30	nexus 5	867
2014-30	nexus 7	411
2014-30	nokia lumia 635	440
2014-30	samsumg galaxy tablet	121
2014-30	samsung galaxy note	175
2014-30	samsung galaxy s4	1408
2014-30	windows surface	270
2014-31	acer aspire desktop	408
2014-31	acer aspire notebook	662
2014-31	amazon fire phone	185
2014-31	asus chromebook	494
2014-31	dell inspiron desktop	709
2014-31	dell inspiron notebook	1483
2014-31	hp pavilion desktop	439
2014-31	htc one	301
2014-31	ipad air	699
2014-31	ipad mini	389
2014-31	iphone 4s	754

2014-31	iphone 5	1572
2014-31	iphone 5s	1180
2014-31	kindle fire	239
2014-31	lenovo thinkpad	2648
2014-31	mac mini	320
2014-31	macbook air	1731
2014-31	macbook pro	3584
2014-31	nexus 10	327
2014-31	nexus 5	960
2014-31	nexus 7	598
2014-31	nokia lumia 635	354
2014-31	samsumg galaxy tablet	142
2014-31	samsung galaxy note	145
2014-31	samsung galaxy s4	1201
2014-31	windows surface	182
2014-32	acer aspire desktop	370
2014-32	acer aspire notebook	554
2014-32	amazon fire phone	147
2014-32	asus chromebook	677
2014-32	dell inspiron desktop	432
2014-32	dell inspiron notebook	1262
2014-32	hp pavilion desktop	621
2014-32	htc one	113
2014-32	ipad air	574
2014-32	ipad mini	213
2014-32	iphone 4s	567
2014-32	iphone 5	1503
2014-32	iphone 5s	691
2014-32	kindle fire	131
2014-32	lenovo thinkpad	2057
2014-32	mac mini	233
2014-32	macbook air	1563
2014-32	macbook pro	3660
2014-32	nexus 10	235
2014-32	nexus 5	682
2014-32	nexus 7	434

2014-32	nokia lumia 635	333
2014-32	samsumg galaxy tablet	78
2014-32	samsung galaxy note	100
2014-32	samsung galaxy s4	1094
2014-32	windows surface	206
2014-33	acer aspire desktop	377
2014-33	acer aspire notebook	604
2014-33	amazon fire phone	163
2014-33	asus chromebook	590
2014-33	dell inspiron desktop	558
2014-33	dell inspiron notebook	1215
2014-33	hp pavilion desktop	575
2014-33	htc one	149
2014-33	ipad air	442
2014-33	ipad mini	270
2014-33	iphone 4s	346
2014-33	iphone 5	1314
2014-33	iphone 5s	724
2014-33	kindle fire	71
2014-33	lenovo thinkpad	1980
2014-33	mac mini	127
2014-33	macbook air	1307
2014-33	macbook pro	3366
2014-33	nexus 10	353
2014-33	nexus 5	682
2014-33	nexus 7	212
2014-33	nokia lumia 635	326
2014-33	samsumg galaxy tablet	80
2014-33	samsung galaxy note	114
2014-33	samsung galaxy s4	831
2014-33	windows surface	86
2014-34	acer aspire desktop	362
2014-34	acer aspire notebook	482
2014-34	amazon fire phone	117
2014-34	asus chromebook	616
2014-34	dell inspiron desktop	398

2014-34	dell inspiron notebook	1086
2014-34	hp pavilion desktop	355
2014-34	htc one	152
2014-34	ipad air	385
2014-34	ipad mini	268
2014-34	iphone 4s	367
2014-34	iphone 5	1197
2014-34	iphone 5s	755
2014-34	kindle fire	124
2014-34	lenovo thinkpad	2160
2014-34	mac mini	338
2014-34	macbook air	1660
2014-34	macbook pro	3240
2014-34	nexus 10	148
2014-34	nexus 5	655
2014-34	nexus 7	267
2014-34	nokia lumia 635	210
2014-34	samsumg galaxy tablet	88
2014-34	samsung galaxy note	131
2014-34	samsung galaxy s4	726
2014-34	windows surface	130
2014-35	acer aspire desktop	278
2014-35	acer aspire notebook	594
2014-35	amazon fire phone	111
2014-35	asus chromebook	563
2014-35	dell inspiron desktop	452
2014-35	dell inspiron notebook	1087
2014-35	hp pavilion desktop	359
2014-35	htc one	285
2014-35	ipad air	296
2014-35	ipad mini	267
2014-35	iphone 4s	503
2014-35	iphone 5	957
2014-35	iphone 5s	707
2014-35	kindle fire	152
2014-35	lenovo thinkpad	1956

|		
2014-35	mac mini	420
2014-35	macbook air	1446
2014-35	macbook pro	3179
2014-35	nexus 10	221
2014-35	nexus 5	791
2014-35	nexus 7	343
2014-35	nokia lumia 635	152
2014-35	samsumg galaxy tablet	117
2014-35	samsung galaxy note	103
2014-35	samsung galaxy s4	896
2014-35	windows surface	197

➢ this is the sql Query has used to extract and decide them,

Code:

```
SELECT
    DATE_FORMAT(occurred_at, '%x-%v') AS week,
    device,
    COUNT(*) AS total_events
FROM
    events_users
GROUP BY
    week, device
ORDER BY
    week, device;
```

➢ this is the screen shot of the output,
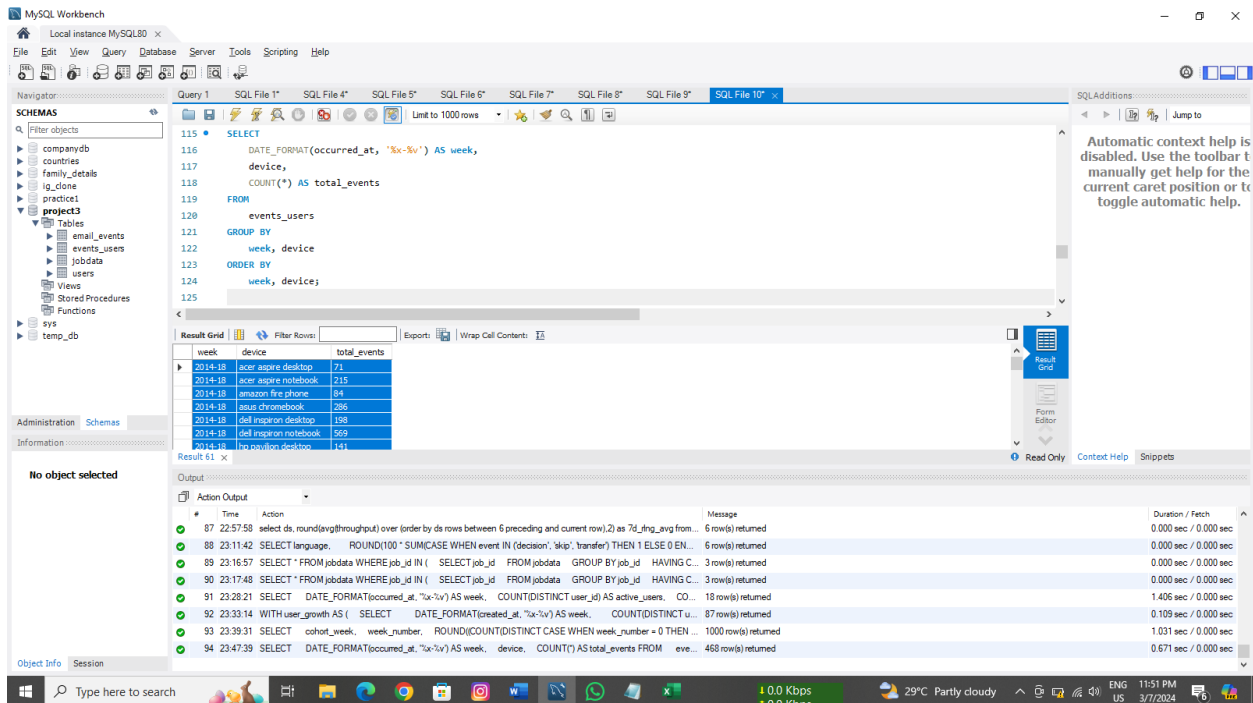
Task E **Email Engagement Analysis**:

In this task we are going to Analyze how users are engaging with the email service.

➢ these are the results users are engaging with the email service,

Total_email_sent	Total_emails_opened	Total_emails_clicked	Reengagement_mails	Digest_mails	Open_rate	Clickthrough_rate	Reengagement_rate	Digest_rate
90389	20459	9010	3653	57267	22.63	9.97	4.04	63.36

➢ this is the sql Query has used to extract and decide them,

Code:

```sql
SELECT
    COUNT(*) AS total_emails_sent,
    SUM(CASE WHEN action = 'email_open' THEN 1 ELSE 0 END) AS
total_emails_opened,
    SUM(CASE WHEN action = 'email_clickthrough' THEN 1 ELSE 0 END) AS
total_emails_clicked,
        SUM(CASE WHEN action = 'sent_reengagement_email' THEN 1 ELSE 0
END) AS reengagement_mails,
    SUM(CASE WHEN action = 'sent_weekly_digest' THEN 1 ELSE 0 END) AS
digest_mails,
    ROUND((SUM(CASE WHEN action = 'email_open' THEN 1 ELSE 0 END) /
NULLIF(COUNT(*), 0)) * 100, 2) AS open_rate,
    ROUND((SUM(CASE WHEN action = 'email_clickthrough' THEN 1 ELSE 0
END) / NULLIF(COUNT(*), 0)) * 100, 2) AS click_through_rate,
    ROUND((SUM(CASE WHEN action = 'sent_reengagement_email' THEN 1
ELSE 0 END) / NULLIF(COUNT(*), 0)) * 100, 2) AS reengagement_rate,
    ROUND((SUM(CASE WHEN action = 'sent_weekly_digest' THEN 1 ELSE 0
END) / NULLIF(COUNT(*), 0)) * 100, 2) AS digest_rate
FROM
    email_events;
```

  ➤ this is the screen shot of the output,
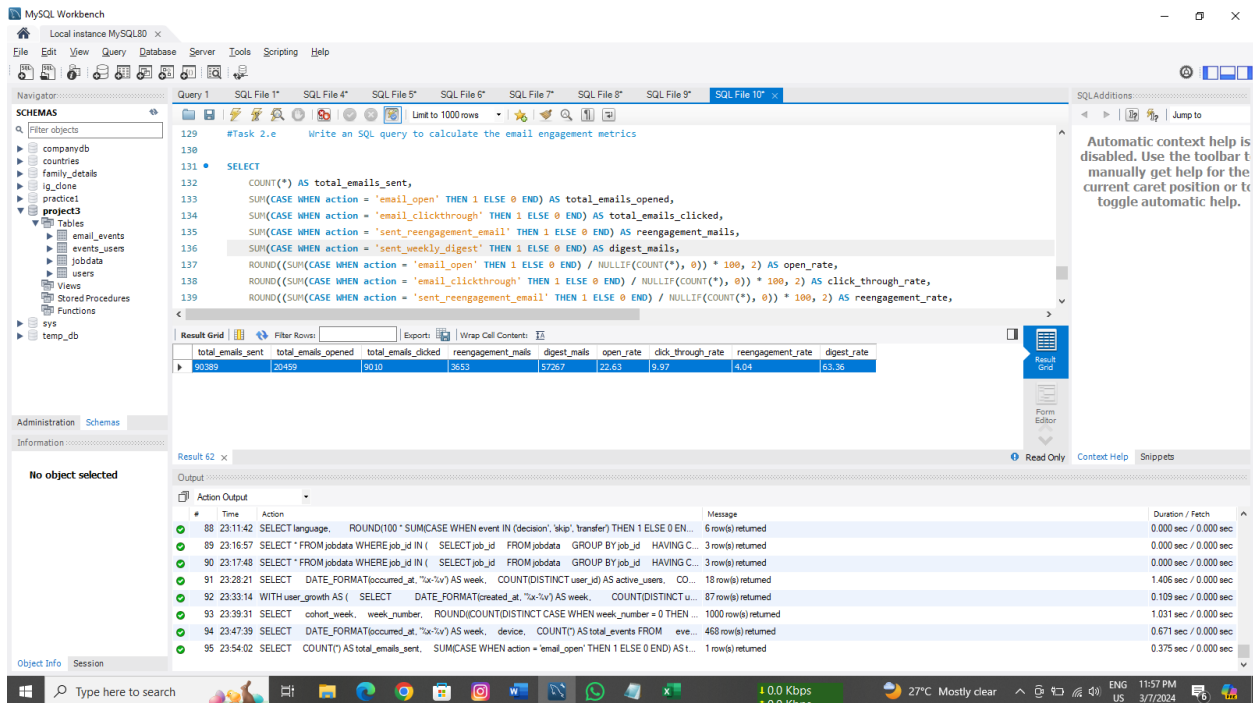
All these about the project of operational analytics and metrics of them

3. **Tech-Stack Used**

Windows 10
My sql workbench

4. **Insights**

All insights are covered above

5. **Result**

It's important to undetrstand the operational analytics