**TRAINITY ASSIGNMENT**

**PROJECT 3 - OPERATION ANALYTICS AND INVESTIGATING METRIC SPIKE**

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, you'll work closely with various teams, such as operations, support, and marketing, helping them derive valuable insights from the data they collect.

One of the key aspects of Operational Analytics is investigating metric spikes. This involves understanding and explaining sudden changes in key metrics, such as a dip in daily user engagement or a drop in sales. As a Data Analyst, you'll need to answer these questions daily, making it crucial to understand how to investigate these metric spikes.

In this project, you'll take on the role of a Lead Data Analyst at a company like Microsoft. You'll be provided with various datasets and tables, and your task will be to derive insights from this data to answer questions posed by different departments within the company. Your goal is to use your advanced 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ds | job\_id | actor\_id | event | language | time\_spent | org |
| 11/30/2020 | 21 | 1001 | skip | English | 15 | A |
| 11/30/2020 | 22 | 1006 | transfer | Arabic | 25 | B |
| 11/29/2020 | 23 | 1003 | decision | Persian | 20 | C |
| 11/28/2020 | 23 | 1005 | transfer | Persian | 22 | D |
| 11/28/2020 | 25 | 1002 | decision | Hindi | 11 | B |
| 11/20/2020 | 19 | 1006 | decision | Hindi | 100 | A |
| 11/26/2020 | 23 | 1004 | skip | Persian | 56 | A |
| 11/25/2020 | 20 | 1003 | transfer | Italian | 45 | C |
| 11/24/2020 | 20 | 1008 | transfer | English | 33 | C |
| 11/22/2020 | 24 | 1003 | skip | Italian | 15 | A |
| 11/28/2020 | 25 | 1004 | transfer | Persian | 103 | D |
| 11/22/2020 | 20 | 1003 | skip | French | 26 | B |
| 11/15/2020 | 22 | 1006 | decision | Arabic | 45 | C |
| 11/20/2020 | 19 | 1006 | decision | Hindi | 100 | A |
| 11/20/2020 | 25 | 1001 | transfer | English | 99 | A |
| 11/17/2020 | 23 | 1002 | decision | Hindi | 56 | B |
| 11/22/2020 | 20 | 1003 | skip | French | 26 | B |
| 11/29/2020 | 14 | 1002 | transfer | Italian | 45 | C |
| 11/22/2020 | 18 | 1003 | skip | Italian | 88 | D |
| 11/25/2020 | 17 | 1004 | decision | Arabic | 90 | C |
| 11/20/2020 | 19 | 1006 | decision | Hindi | 100 | A |
| 11/23/2020 | 18 | 1002 | skip | Hindi | 33 | A |
| 11/18/2020 | 23 | 1004 | transfer | Persian | 24 | B |
| 11/23/2020 | 18 | 1002 | skip | Hindi | 33 | A |

**Case Study 1: Job Data Analysis**

* **job\_id:** Unique identifier of jobs
* **actor\_id:** Unique identifier of actor
* **event:** The type of event (decision/skip/transfer).
* **language:** The Language of the content
* **time\_spent:** Time spent to review the job in seconds.
* **org:** The Organization of the actor
* **ds:** The date in the format yyyy/mm/dd (stored as text).

create database Project3;

use Project3;

create table job\_data (

ds varchar(100),

job\_id int,

actor\_id int,

event varchar(50),

language varchar(50),

time\_spent int,

org varchar(50));

select \* from job\_data;

**Tasks:**

1. **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.

SELECT

    ds,

    HOUR(ds) AS hour\_of\_day,

    COUNT(CASE WHEN event IN ('skip', 'decision', 'transfer') THEN job\_id END) / COUNT(DISTINCT HOUR(ds)) AS jobs\_reviewed\_per\_hour

FROM

    job\_data

GROUP BY

    ds, hour\_of\_day

ORDER BY

    ds, hour\_of\_day;

|  |  |  |
| --- | --- | --- |
| ds | hour\_of\_day | jobs\_reviewed\_per\_hour |
| 11/15/2020 | 0 | 1.0000 |
| 11/17/2020 | 0 | 1.0000 |
| 11/18/2020 | 0 | 1.0000 |
| 11/20/2020 | 0 | 4.0000 |
| 11/22/2020 | 0 | 4.0000 |
| 11/23/2020 | 0 | 2.0000 |
| 11/24/2020 | 0 | 1.0000 |
| 11/25/2020 | 0 | 2.0000 |
| 11/26/2020 | 0 | 1.0000 |
| 11/28/2020 | 0 | 3.0000 |
| 11/29/2020 | 0 | 2.0000 |
| 11/30/2020 | 0 | 2.0000 |

**Explanation:** At first we look for the columns we need i.e ds,event,job\_id from the job\_data table. Then we count the the occurences of relevant events of each hour and divide them bydistinct hours to calculate the average, since the time is in seconds we have the hour of the day column as zero.And lastly we group them by ds and the alias name hour\_of\_day.

1. **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.

WITH DailyEvents AS (

    SELECT

        ds,

        COUNT(\*) AS num\_events,

        SUM(time\_spent) AS total\_time\_spent

    FROM

        job\_data

    GROUP BY

        ds

),

DailyThroughput AS (

    SELECT

        ds,

        num\_events / NULLIF(total\_time\_spent, 0) AS throughput\_per\_sec

    FROM

        DailyEvents

)

SELECT

    dt.ds,

    AVG(dt.throughput\_per\_sec) OVER (ORDER BY dt.ds ASC ROWS 6 PRECEDING) AS rolling\_avg\_throughput

FROM

    DailyThroughput dt;

|  |  |
| --- | --- |
| ds | rolling\_avg\_throughput |
| 11/15/2020 | 0.02220000 |
| 11/17/2020 | 0.02005000 |
| 11/18/2020 | 0.02726667 |
| 11/20/2020 | 0.02295000 |
| 11/22/2020 | 0.02352000 |
| 11/23/2020 | 0.02465000 |
| 11/24/2020 | 0.02545714 |
| 11/25/2020 | 0.02440000 |
| 11/26/2020 | 0.02440000 |
| 11/28/2020 | 0.02160000 |
| 11/29/2020 | 0.02457143 |
| 11/30/2020 | 0.02802857 |

**Explanation:** We have used two CTE common table expressions i.e dailyevents and dailythroughput and final select statement to get the output. Dailyevents calculates the number of events and the total time spent for each day and groups the data by ds. Dailythroughput calculates the throughput per second for each day by dividing the number of events by the total time spent.In the final select statement we we calculate the rolling average throughput by avg() function ordered by date ds.

1. **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.

SELECT

    language,

    COUNT(\*) AS language\_count,

    100.0 \* COUNT(\*) / (SELECT COUNT(\*) FROM job\_data) AS percentage\_share

FROM

    job\_data

GROUP BY

    language;

|  |  |  |
| --- | --- | --- |
| language | language\_count | percentage\_share |
| English | 3 | 12.50000 |
| Arabic | 3 | 12.50000 |
| Persian | 5 | 20.83333 |
| Hindi | 7 | 29.16667 |
| Italian | 4 | 16.66667 |
| French | 2 | 8.33333 |

**Explanation:** Here we only need one column i.e language. We calculate the percentage share by dividing the count of rows of language by total no of rows and multiplying them to hundred and group them by language to get the output.

1. **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.

SELECT \*

FROM job\_data

WHERE (ds, job\_id, actor\_id, event, language, time\_spent, org) IN (

    SELECT ds, job\_id, actor\_id, event, language, time\_spent, org

    FROM job\_data

    GROUP BY ds, job\_id, actor\_id, event, language, time\_spent, org

    HAVING COUNT(\*) > 1

);

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ds | job\_id | actor\_id | event | language | time\_spent | org |
| 11/20/2020 | 19 | 1006 | decision | Hindi | 100 | A |
| 11/22/2020 | 20 | 1003 | skip | French | 26 | B |
| 11/20/2020 | 19 | 1006 | decision | Hindi | 100 | A |
| 11/22/2020 | 20 | 1003 | skip | French | 26 | B |
| 11/20/2020 | 19 | 1006 | decision | Hindi | 100 | A |
| 11/23/2020 | 18 | 1002 | skip | Hindi | 33 | A |
| 11/23/2020 | 18 | 1002 | skip | Hindi | 33 | A |

**Explanation:** In the inner query we retrieve all the combinations of columnsfrom job\_data table and group them with having clause which filters the rows that has appeared more than once. In the outer query we select all the columns based on the columns of result from inner query.

**Case Study 2: Investigating Metric Spike**

* **users**: Contains one row per user, with descriptive information about that user’s account.
* **events**: Contains one row per event, where an event is an action that a user has taken (e.g., login, messaging, search).
* **email\_events**: Contains events specific to the sending of emails.

create database project4;

use project4;

create table users (

user\_id int,

created\_at varchar(100),

company\_id int,

language varchar(50),

activated\_at varchar(100),

state varchar(50));

select \* from users;

create table events (

user\_id int NULL,

occured\_at varchar(100) NULL,

event\_type varchar(50) NULL,

event\_name varchar(100) NULL,

location varchar(50) NULL,

device varchar(50) NULL,

user\_type int NULL);

select \* from events;

create table email\_events(

user\_id int,

occured\_at varchar(100),

action varchar(100),

user\_type int);

select \* from email\_events;

**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.

SELECT

DATE\_FORMAT(STR\_TO\_DATE(e.occured\_at, '%Y-%m-%d %H:%i:%s'), '%x-%v') AS week,

COUNT(DISTINCT e.user\_id) AS weekly\_engaged\_users

FROM

events e

WHERE

e.event\_type = 'engagement'

GROUP BY

week;

|  |  |
| --- | --- |
| week | Weekly\_engaged\_users |
| null | 3971 |

**Explanation:** We select the week format derived from the occurred\_at timestamp using date\_format and str\_to\_date functions, extracting the year and week number. Then we count the distinct user\_id values to determine the number of users engaged in events during each specified week, with a condition to include only events of type 'engagement'. Then results are grouped by the calculated week.

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

SELECT

DATE\_FORMAT(STR\_TO\_DATE(created\_at, '%d-%m-%Y'), '%m-%Y') AS month\_year,

COUNT(user\_id) AS new\_users\_count

FROM

users

WHERE

created\_at >= '01-01-2013' AND created\_at < '01-01-2015'

GROUP BY

month\_year

ORDER BY

month\_year;

|  |  |
| --- | --- |
| month\_year | new\_users\_count |
| 01-2013 | 7 |
| 01-2014 | 16 |

**Explanation:**  We select the month and year from the created\_at column, and count the number of distinct user IDs. Then we use where clause to filter only records where the created\_at date falls between January 1, 2013, and January 1, 2015. We use group by clause to group the data by the month and year from the created\_at column, and the count function to aggregate the number of user IDs in each group. Finally, we use the order by clause to sort the results by the month and year.

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

WITH signup AS (

SELECT

user\_id,

DATE\_FORMAT(STR\_TO\_DATE(created\_at, '%d-%m-%Y'), '%u-%Y') AS signup\_week

FROM

users

),

activity AS (

SELECT

e.user\_id,

DATE\_FORMAT(STR\_TO\_DATE(e.occured\_at, '%d-%m-%Y'), '%u-%Y') AS activity\_week

FROM

events e

JOIN

signup s ON e.user\_id = s.user\_id

WHERE

e.event\_type = 'engagement'

),

weekly\_retention AS (

SELECT

s.signup\_week,

a.activity\_week,

COUNT(DISTINCT a.user\_id) AS retained\_users

FROM

signup s

JOIN

activity a ON s.user\_id = a.user\_id

WHERE

a.activity\_week > s.signup\_week

GROUP BY

s.signup\_week, a.activity\_week

)

SELECT

wr.signup\_week,

wr.activity\_week,

wr.retained\_users,

COUNT(DISTINCT s.user\_id) AS total\_users,

CONCAT(ROUND((wr.retained\_users / COUNT(DISTINCT s.user\_id) \* 100), 2), '%') AS retention\_rate

FROM

weekly\_retention wr

JOIN

signup s ON wr.signup\_week = s.signup\_week

GROUP BY

wr.signup\_week, wr.activity\_week

ORDER BY

wr.signup\_week, wr.activity\_week;

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| signup\_week | activity\_week | retained\_users | total\_users | retention\_rate |
| 01-2013 | 18-2014 | 2 | 26 | 7.69% |
| 01-2013 | 19-2014 | 3 | 26 | 11.54% |
| 01-2013 | 20-2014 | 3 | 26 | 11.54% |
| 01-2013 | 21-2014 | 3 | 26 | 11.54% |
| 01-2013 | 22-2014 | 2 | 26 | 7.69% |
| 01-2013 | 23-2014 | 4 | 26 | 15.38% |
| 01-2013 | 24-2014 | 3 | 26 | 11.54% |
| 01-2013 | 25-2014 | 6 | 26 | 23.08% |
| 01-2013 | 26-2014 | 4 | 26 | 15.38% |
| 01-2013 | 27-2014 | 2 | 26 | 7.69% |
| 01-2013 | 28-2014 | 3 | 26 | 11.54% |
| 01-2013 | 29-2014 | 1 | 26 | 3.85% |
| 01-2013 | 31-2014 | 3 | 26 | 11.54% |
| 01-2013 | 32-2014 | 2 | 26 | 7.69% |
| 01-2013 | 33-2014 | 2 | 26 | 7.69% |
| 01-2013 | 34-2014 | 2 | 26 | 7.69% |
| 01-2013 | 35-2014 | 2 | 26 | 7.69% |
| 02-2013 | 18-2014 | 1 | 29 | 3.45% |
| 02-2013 | 19-2014 | 2 | 29 | 6.90% |
| 02-2013 | 20-2014 | 3 | 29 | 10.34% |
| 02-2013 | 21-2014 | 1 | 29 | 3.45% |
| 02-2013 | 22-2014 | 2 | 29 | 6.90% |
| 02-2013 | 23-2014 | 4 | 29 | 13.79% |
| 02-2013 | 24-2014 | 3 | 29 | 10.34% |
| 02-2013 | 25-2014 | 6 | 29 | 20.69% |
| 02-2013 | 26-2014 | 4 | 29 | 13.79% |
| 02-2013 | 27-2014 | 3 | 29 | 10.34% |
| 02-2013 | 28-2014 | 1 | 29 | 3.45% |
| 02-2013 | 29-2014 | 2 | 29 | 6.90% |
| 02-2013 | 30-2014 | 3 | 29 | 10.34% |
| 02-2013 | 31-2014 | 2 | 29 | 6.90% |
| 02-2013 | 32-2014 | 4 | 29 | 13.79% |
| 02-2013 | 33-2014 | 4 | 29 | 13.79% |
| 02-2013 | 34-2014 | 4 | 29 | 13.79% |
| 02-2013 | 35-2014 | 2 | 29 | 6.90% |
| 03-2013 | 18-2014 | 2 | 47 | 4.26% |
| 03-2013 | 19-2014 | 4 | 47 | 8.51% |
| 03-2013 | 20-2014 | 5 | 47 | 10.64% |
| 03-2013 | 21-2014 | 7 | 47 | 14.89% |
| 03-2013 | 22-2014 | 7 | 47 | 14.89% |
| 03-2013 | 23-2014 | 8 | 47 | 17.02% |
| 03-2013 | 24-2014 | 5 | 47 | 10.64% |
| 03-2013 | 25-2014 | 5 | 47 | 10.64% |
| 03-2013 | 26-2014 | 1 | 47 | 2.13% |
| 03-2013 | 27-2014 | 2 | 47 | 4.26% |
| 03-2013 | 28-2014 | 4 | 47 | 8.51% |
| 03-2013 | 29-2014 | 4 | 47 | 8.51% |
| 03-2013 | 30-2014 | 3 | 47 | 6.38% |
| 03-2013 | 31-2014 | 2 | 47 | 4.26% |
| 03-2013 | 32-2014 | 3 | 47 | 6.38% |
| 03-2013 | 34-2014 | 4 | 47 | 8.51% |
| 03-2013 | 35-2014 | 5 | 47 | 10.64% |
| 04-2013 | 18-2014 | 4 | 36 | 11.11% |
| 04-2013 | 19-2014 | 6 | 36 | 16.67% |
| 04-2013 | 20-2014 | 7 | 36 | 19.44% |
| 04-2013 | 21-2014 | 6 | 36 | 16.67% |
| 04-2013 | 22-2014 | 6 | 36 | 16.67% |
| 04-2013 | 23-2014 | 7 | 36 | 19.44% |
| 04-2013 | 24-2014 | 6 | 36 | 16.67% |
| 04-2013 | 25-2014 | 6 | 36 | 16.67% |
| 04-2013 | 26-2014 | 6 | 36 | 16.67% |
| 04-2013 | 27-2014 | 3 | 36 | 8.33% |
| 04-2013 | 28-2014 | 4 | 36 | 11.11% |
| 04-2013 | 29-2014 | 6 | 36 | 16.67% |
| 04-2013 | 30-2014 | 7 | 36 | 19.44% |
| 04-2013 | 31-2014 | 4 | 36 | 11.11% |
| 04-2013 | 32-2014 | 3 | 36 | 8.33% |
| 04-2013 | 33-2014 | 1 | 36 | 2.78% |
| 04-2013 | 34-2014 | 2 | 36 | 5.56% |
| 04-2013 | 35-2014 | 4 | 36 | 11.11% |
| 05-2013 | 18-2014 | 2 | 30 | 6.67% |
| 05-2013 | 19-2014 | 3 | 30 | 10.00% |
| 05-2013 | 20-2014 | 5 | 30 | 16.67% |
| 05-2013 | 21-2014 | 4 | 30 | 13.33% |
| 05-2013 | 22-2014 | 5 | 30 | 16.67% |
| 05-2013 | 23-2014 | 6 | 30 | 20.00% |
| 05-2013 | 24-2014 | 5 | 30 | 16.67% |
| 05-2013 | 25-2014 | 4 | 30 | 13.33% |
| 05-2013 | 26-2014 | 8 | 30 | 26.67% |
| 05-2013 | 27-2014 | 3 | 30 | 10.00% |
| 05-2013 | 28-2014 | 7 | 30 | 23.33% |
| 05-2013 | 29-2014 | 5 | 30 | 16.67% |
| 05-2013 | 30-2014 | 4 | 30 | 13.33% |
| 05-2013 | 31-2014 | 5 | 30 | 16.67% |
| 05-2013 | 32-2014 | 5 | 30 | 16.67% |
| 05-2013 | 33-2014 | 3 | 30 | 10.00% |
| 05-2013 | 34-2014 | 2 | 30 | 6.67% |
| 06-2013 | 18-2014 | 4 | 48 | 8.33% |
| 06-2013 | 19-2014 | 7 | 48 | 14.58% |
| 06-2013 | 20-2014 | 8 | 48 | 16.67% |
| 06-2013 | 21-2014 | 6 | 48 | 12.50% |
| 06-2013 | 22-2014 | 6 | 48 | 12.50% |
| 06-2013 | 23-2014 | 7 | 48 | 14.58% |
| 06-2013 | 24-2014 | 6 | 48 | 12.50% |
| 06-2013 | 25-2014 | 7 | 48 | 14.58% |
| 06-2013 | 26-2014 | 9 | 48 | 18.75% |
| 06-2013 | 27-2014 | 6 | 48 | 12.50% |
| 06-2013 | 28-2014 | 9 | 48 | 18.75% |
| 06-2013 | 29-2014 | 7 | 48 | 14.58% |
| 06-2013 | 30-2014 | 9 | 48 | 18.75% |
| 06-2013 | 31-2014 | 10 | 48 | 20.83% |
| 06-2013 | 32-2014 | 7 | 48 | 14.58% |
| 06-2013 | 33-2014 | 6 | 48 | 12.50% |
| 06-2013 | 34-2014 | 6 | 48 | 12.50% |
| 06-2013 | 35-2014 | 4 | 48 | 8.33% |
| 07-2013 | 18-2014 | 2 | 41 | 4.88% |
| 07-2013 | 19-2014 | 5 | 41 | 12.20% |
| 07-2013 | 20-2014 | 3 | 41 | 7.32% |
| 07-2013 | 21-2014 | 4 | 41 | 9.76% |
| 07-2013 | 22-2014 | 5 | 41 | 12.20% |
| 07-2013 | 23-2014 | 6 | 41 | 14.63% |
| 07-2013 | 24-2014 | 5 | 41 | 12.20% |
| 07-2013 | 25-2014 | 4 | 41 | 9.76% |
| 07-2013 | 26-2014 | 5 | 41 | 12.20% |
| 07-2013 | 27-2014 | 4 | 41 | 9.76% |
| 07-2013 | 28-2014 | 4 | 41 | 9.76% |
| 07-2013 | 29-2014 | 6 | 41 | 14.63% |
| 07-2013 | 30-2014 | 5 | 41 | 12.20% |
| 07-2013 | 31-2014 | 6 | 41 | 14.63% |
| 07-2013 | 32-2014 | 3 | 41 | 7.32% |
| 07-2013 | 33-2014 | 1 | 41 | 2.44% |
| 07-2013 | 35-2014 | 3 | 41 | 7.32% |
| 08-2013 | 18-2014 | 3 | 39 | 7.69% |
| 08-2013 | 19-2014 | 9 | 39 | 23.08% |
| 08-2013 | 20-2014 | 6 | 39 | 15.38% |
| 08-2013 | 21-2014 | 7 | 39 | 17.95% |
| 08-2013 | 22-2014 | 8 | 39 | 20.51% |
| 08-2013 | 23-2014 | 6 | 39 | 15.38% |
| 08-2013 | 24-2014 | 6 | 39 | 15.38% |
| 08-2013 | 25-2014 | 8 | 39 | 20.51% |
| 08-2013 | 26-2014 | 9 | 39 | 23.08% |
| 08-2013 | 27-2014 | 10 | 39 | 25.64% |
| 08-2013 | 28-2014 | 11 | 39 | 28.21% |
| 08-2013 | 29-2014 | 12 | 39 | 30.77% |
| 08-2013 | 30-2014 | 9 | 39 | 23.08% |
| 08-2013 | 31-2014 | 5 | 39 | 12.82% |
| 08-2013 | 32-2014 | 5 | 39 | 12.82% |
| 08-2013 | 33-2014 | 3 | 39 | 7.69% |
| 08-2013 | 34-2014 | 1 | 39 | 2.56% |
| 08-2013 | 35-2014 | 2 | 39 | 5.13% |
| 09-2013 | 18-2014 | 1 | 33 | 3.03% |
| 09-2013 | 19-2014 | 1 | 33 | 3.03% |
| 09-2013 | 20-2014 | 3 | 33 | 9.09% |
| 09-2013 | 21-2014 | 2 | 33 | 6.06% |
| 09-2013 | 22-2014 | 1 | 33 | 3.03% |
| 09-2013 | 23-2014 | 2 | 33 | 6.06% |
| 09-2013 | 24-2014 | 4 | 33 | 12.12% |
| 09-2013 | 25-2014 | 5 | 33 | 15.15% |
| 09-2013 | 26-2014 | 4 | 33 | 12.12% |
| 09-2013 | 27-2014 | 5 | 33 | 15.15% |
| 09-2013 | 28-2014 | 2 | 33 | 6.06% |
| 09-2013 | 29-2014 | 5 | 33 | 15.15% |
| 09-2013 | 30-2014 | 4 | 33 | 12.12% |
| 09-2013 | 31-2014 | 5 | 33 | 15.15% |
| 09-2013 | 32-2014 | 4 | 33 | 12.12% |
| 09-2013 | 33-2014 | 2 | 33 | 6.06% |
| 09-2013 | 34-2014 | 3 | 33 | 9.09% |
| 09-2013 | 35-2014 | 2 | 33 | 6.06% |
| 10-2013 | 18-2014 | 5 | 43 | 11.63% |
| 10-2013 | 19-2014 | 7 | 43 | 16.28% |
| 10-2013 | 20-2014 | 5 | 43 | 11.63% |
| 10-2013 | 21-2014 | 8 | 43 | 18.60% |
| 10-2013 | 22-2014 | 8 | 43 | 18.60% |
| 10-2013 | 23-2014 | 8 | 43 | 18.60% |
| 10-2013 | 24-2014 | 8 | 43 | 18.60% |
| 10-2013 | 25-2014 | 9 | 43 | 20.93% |
| 10-2013 | 26-2014 | 5 | 43 | 11.63% |
| 10-2013 | 27-2014 | 6 | 43 | 13.95% |
| 10-2013 | 28-2014 | 4 | 43 | 9.30% |
| 10-2013 | 29-2014 | 6 | 43 | 13.95% |
| 10-2013 | 30-2014 | 5 | 43 | 11.63% |
| 10-2013 | 31-2014 | 6 | 43 | 13.95% |
| 10-2013 | 32-2014 | 3 | 43 | 6.98% |
| 10-2013 | 33-2014 | 2 | 43 | 4.65% |
| 10-2013 | 34-2014 | 3 | 43 | 6.98% |
| 10-2013 | 35-2014 | 3 | 43 | 6.98% |
| 11-2013 | 18-2014 | 2 | 33 | 6.06% |
| 11-2013 | 19-2014 | 3 | 33 | 9.09% |
| 11-2013 | 20-2014 | 6 | 33 | 18.18% |
| 11-2013 | 21-2014 | 5 | 33 | 15.15% |
| 11-2013 | 22-2014 | 5 | 33 | 15.15% |
| 11-2013 | 23-2014 | 5 | 33 | 15.15% |
| 11-2013 | 24-2014 | 4 | 33 | 12.12% |
| 11-2013 | 25-2014 | 6 | 33 | 18.18% |
| 11-2013 | 26-2014 | 5 | 33 | 15.15% |
| 11-2013 | 27-2014 | 7 | 33 | 21.21% |
| 11-2013 | 28-2014 | 9 | 33 | 27.27% |
| 11-2013 | 29-2014 | 5 | 33 | 15.15% |
| 11-2013 | 30-2014 | 3 | 33 | 9.09% |
| 11-2013 | 31-2014 | 7 | 33 | 21.21% |
| 11-2013 | 32-2014 | 3 | 33 | 9.09% |
| 11-2013 | 33-2014 | 2 | 33 | 6.06% |
| 11-2013 | 34-2014 | 3 | 33 | 9.09% |
| 11-2013 | 35-2014 | 1 | 33 | 3.03% |
| 12-2013 | 18-2014 | 5 | 32 | 15.63% |
| 12-2013 | 19-2014 | 4 | 32 | 12.50% |
| 12-2013 | 20-2014 | 5 | 32 | 15.63% |
| 12-2013 | 21-2014 | 3 | 32 | 9.38% |
| 12-2013 | 22-2014 | 6 | 32 | 18.75% |
| 12-2013 | 23-2014 | 3 | 32 | 9.38% |
| 12-2013 | 24-2014 | 4 | 32 | 12.50% |
| 12-2013 | 25-2014 | 4 | 32 | 12.50% |
| 12-2013 | 26-2014 | 3 | 32 | 9.38% |
| 12-2013 | 27-2014 | 5 | 32 | 15.63% |
| 12-2013 | 28-2014 | 4 | 32 | 12.50% |
| 12-2013 | 29-2014 | 4 | 32 | 12.50% |
| 12-2013 | 30-2014 | 4 | 32 | 12.50% |
| 12-2013 | 31-2014 | 7 | 32 | 21.88% |
| 12-2013 | 32-2014 | 6 | 32 | 18.75% |
| 12-2013 | 33-2014 | 4 | 32 | 12.50% |
| 12-2013 | 34-2014 | 4 | 32 | 12.50% |
| 12-2013 | 35-2014 | 4 | 32 | 12.50% |
| 13-2013 | 18-2014 | 3 | 33 | 9.09% |
| 13-2013 | 19-2014 | 4 | 33 | 12.12% |
| 13-2013 | 20-2014 | 2 | 33 | 6.06% |
| 13-2013 | 21-2014 | 2 | 33 | 6.06% |
| 13-2013 | 22-2014 | 4 | 33 | 12.12% |
| 13-2013 | 23-2014 | 7 | 33 | 21.21% |
| 13-2013 | 24-2014 | 4 | 33 | 12.12% |
| 13-2013 | 25-2014 | 5 | 33 | 15.15% |
| 13-2013 | 26-2014 | 3 | 33 | 9.09% |
| 13-2013 | 27-2014 | 4 | 33 | 12.12% |
| 13-2013 | 28-2014 | 4 | 33 | 12.12% |
| 13-2013 | 29-2014 | 5 | 33 | 15.15% |
| 13-2013 | 30-2014 | 3 | 33 | 9.09% |
| 13-2013 | 31-2014 | 4 | 33 | 12.12% |
| 13-2013 | 32-2014 | 4 | 33 | 12.12% |
| 13-2013 | 33-2014 | 2 | 33 | 6.06% |
| 13-2013 | 34-2014 | 1 | 33 | 3.03% |
| 13-2013 | 35-2014 | 2 | 33 | 6.06% |
| 14-2013 | 18-2014 | 2 | 40 | 5.00% |
| 14-2013 | 19-2014 | 4 | 40 | 10.00% |
| 14-2013 | 20-2014 | 5 | 40 | 12.50% |
| 14-2013 | 21-2014 | 5 | 40 | 12.50% |
| 14-2013 | 22-2014 | 4 | 40 | 10.00% |
| 14-2013 | 23-2014 | 3 | 40 | 7.50% |
| 14-2013 | 24-2014 | 2 | 40 | 5.00% |
| 14-2013 | 25-2014 | 3 | 40 | 7.50% |
| 14-2013 | 26-2014 | 3 | 40 | 7.50% |
| 14-2013 | 27-2014 | 5 | 40 | 12.50% |
| 14-2013 | 28-2014 | 7 | 40 | 17.50% |
| 14-2013 | 29-2014 | 7 | 40 | 17.50% |
| 14-2013 | 30-2014 | 8 | 40 | 20.00% |
| 14-2013 | 31-2014 | 10 | 40 | 25.00% |
| 14-2013 | 32-2014 | 7 | 40 | 17.50% |
| 14-2013 | 33-2014 | 2 | 40 | 5.00% |
| 14-2013 | 34-2014 | 3 | 40 | 7.50% |
| 14-2013 | 35-2014 | 3 | 40 | 7.50% |
| 14-2014 | 18-2014 | 1 | 161 | 0.62% |
| 15-2013 | 18-2014 | 3 | 35 | 8.57% |
| 15-2013 | 19-2014 | 4 | 35 | 11.43% |
| 15-2013 | 20-2014 | 5 | 35 | 14.29% |
| 15-2013 | 21-2014 | 5 | 35 | 14.29% |
| 15-2013 | 22-2014 | 2 | 35 | 5.71% |
| 15-2013 | 23-2014 | 5 | 35 | 14.29% |
| 15-2013 | 24-2014 | 5 | 35 | 14.29% |
| 15-2013 | 25-2014 | 5 | 35 | 14.29% |
| 15-2013 | 26-2014 | 5 | 35 | 14.29% |
| 15-2013 | 27-2014 | 1 | 35 | 2.86% |
| 15-2013 | 28-2014 | 1 | 35 | 2.86% |
| 15-2013 | 29-2014 | 4 | 35 | 11.43% |
| 15-2013 | 30-2014 | 5 | 35 | 14.29% |
| 15-2013 | 31-2014 | 6 | 35 | 17.14% |
| 15-2013 | 32-2014 | 5 | 35 | 14.29% |
| 15-2013 | 33-2014 | 5 | 35 | 14.29% |
| 15-2013 | 34-2014 | 6 | 35 | 17.14% |
| 15-2013 | 35-2014 | 3 | 35 | 8.57% |
| 15-2014 | 18-2014 | 1 | 166 | 0.60% |
| 15-2014 | 19-2014 | 1 | 166 | 0.60% |
| 16-2013 | 18-2014 | 4 | 42 | 9.52% |
| 16-2013 | 19-2014 | 5 | 42 | 11.90% |
| 16-2013 | 20-2014 | 4 | 42 | 9.52% |
| 16-2013 | 21-2014 | 6 | 42 | 14.29% |
| 16-2013 | 22-2014 | 5 | 42 | 11.90% |
| 16-2013 | 23-2014 | 7 | 42 | 16.67% |
| 16-2013 | 24-2014 | 5 | 42 | 11.90% |
| 16-2013 | 25-2014 | 7 | 42 | 16.67% |
| 16-2013 | 26-2014 | 4 | 42 | 9.52% |
| 16-2013 | 27-2014 | 5 | 42 | 11.90% |
| 16-2013 | 28-2014 | 7 | 42 | 16.67% |
| 16-2013 | 29-2014 | 6 | 42 | 14.29% |
| 16-2013 | 30-2014 | 8 | 42 | 19.05% |
| 16-2013 | 31-2014 | 8 | 42 | 19.05% |
| 16-2013 | 32-2014 | 4 | 42 | 9.52% |
| 16-2013 | 33-2014 | 8 | 42 | 19.05% |
| 16-2013 | 34-2014 | 7 | 42 | 16.67% |
| 16-2013 | 35-2014 | 4 | 42 | 9.52% |
| 16-2014 | 18-2014 | 2 | 165 | 1.21% |
| 16-2014 | 19-2014 | 4 | 165 | 2.42% |
| 16-2014 | 20-2014 | 2 | 165 | 1.21% |
| 17-2013 | 18-2014 | 1 | 48 | 2.08% |
| 17-2013 | 19-2014 | 2 | 48 | 4.17% |
| 17-2013 | 20-2014 | 4 | 48 | 8.33% |
| 17-2013 | 21-2014 | 2 | 48 | 4.17% |
| 17-2013 | 22-2014 | 2 | 48 | 4.17% |
| 17-2013 | 23-2014 | 2 | 48 | 4.17% |
| 17-2013 | 24-2014 | 2 | 48 | 4.17% |
| 17-2013 | 25-2014 | 2 | 48 | 4.17% |
| 17-2013 | 26-2014 | 3 | 48 | 6.25% |
| 17-2013 | 27-2014 | 2 | 48 | 4.17% |
| 17-2013 | 28-2014 | 2 | 48 | 4.17% |
| 17-2013 | 29-2014 | 3 | 48 | 6.25% |
| 17-2013 | 30-2014 | 3 | 48 | 6.25% |
| 17-2013 | 31-2014 | 2 | 48 | 4.17% |
| 17-2013 | 34-2014 | 2 | 48 | 4.17% |
| 17-2013 | 35-2014 | 1 | 48 | 2.08% |
| 17-2014 | 18-2014 | 6 | 176 | 3.41% |
| 17-2014 | 19-2014 | 9 | 176 | 5.11% |
| 17-2014 | 20-2014 | 5 | 176 | 2.84% |
| 17-2014 | 21-2014 | 1 | 176 | 0.57% |
| 18-2014 | 19-2014 | 16 | 172 | 9.30% |
| 18-2014 | 20-2014 | 5 | 172 | 2.91% |
| 18-2014 | 21-2014 | 2 | 172 | 1.16% |
| 18-2014 | 22-2014 | 1 | 172 | 0.58% |
| 18-2014 | 23-2014 | 1 | 172 | 0.58% |
| 18-2014 | 24-2014 | 1 | 172 | 0.58% |
| 19-2014 | 20-2014 | 9 | 160 | 5.63% |
| 19-2014 | 21-2014 | 3 | 160 | 1.88% |
| 19-2014 | 22-2014 | 3 | 160 | 1.88% |
| 19-2014 | 24-2014 | 1 | 160 | 0.63% |
| 20-2014 | 21-2014 | 13 | 186 | 6.99% |
| 20-2014 | 22-2014 | 8 | 186 | 4.30% |
| 20-2014 | 23-2014 | 6 | 186 | 3.23% |
| 20-2014 | 24-2014 | 1 | 186 | 0.54% |
| 21-2014 | 22-2014 | 13 | 177 | 7.34% |
| 21-2014 | 23-2014 | 7 | 177 | 3.95% |
| 21-2014 | 24-2014 | 2 | 177 | 1.13% |
| 21-2014 | 25-2014 | 4 | 177 | 2.26% |
| 22-2014 | 23-2014 | 19 | 186 | 10.22% |
| 22-2014 | 24-2014 | 7 | 186 | 3.76% |
| 22-2014 | 25-2014 | 1 | 186 | 0.54% |
| 22-2014 | 26-2014 | 2 | 186 | 1.08% |
| 22-2014 | 29-2014 | 1 | 186 | 0.54% |
| 23-2014 | 24-2014 | 15 | 197 | 7.61% |
| 23-2014 | 25-2014 | 6 | 197 | 3.05% |
| 23-2014 | 26-2014 | 5 | 197 | 2.54% |
| 23-2014 | 27-2014 | 4 | 197 | 2.03% |
| 23-2014 | 29-2014 | 1 | 197 | 0.51% |
| 23-2014 | 30-2014 | 1 | 197 | 0.51% |
| 23-2014 | 31-2014 | 1 | 197 | 0.51% |
| 24-2014 | 25-2014 | 19 | 198 | 9.60% |
| 24-2014 | 26-2014 | 4 | 198 | 2.02% |
| 24-2014 | 27-2014 | 2 | 198 | 1.01% |
| 24-2014 | 28-2014 | 1 | 198 | 0.51% |
| 24-2014 | 29-2014 | 1 | 198 | 0.51% |
| 25-2014 | 26-2014 | 24 | 222 | 10.81% |
| 25-2014 | 27-2014 | 7 | 222 | 3.15% |
| 25-2014 | 28-2014 | 4 | 222 | 1.80% |
| 25-2014 | 29-2014 | 2 | 222 | 0.90% |
| 25-2014 | 30-2014 | 2 | 222 | 0.90% |
| 25-2014 | 32-2014 | 1 | 222 | 0.45% |
| 26-2014 | 27-2014 | 18 | 210 | 8.57% |
| 26-2014 | 28-2014 | 6 | 210 | 2.86% |
| 26-2014 | 29-2014 | 2 | 210 | 0.95% |
| 26-2014 | 30-2014 | 1 | 210 | 0.48% |
| 26-2014 | 32-2014 | 1 | 210 | 0.48% |
| 26-2014 | 33-2014 | 1 | 210 | 0.48% |
| 27-2014 | 28-2014 | 14 | 199 | 7.04% |
| 27-2014 | 29-2014 | 8 | 199 | 4.02% |
| 27-2014 | 30-2014 | 2 | 199 | 1.01% |
| 27-2014 | 31-2014 | 2 | 199 | 1.01% |
| 28-2014 | 29-2014 | 11 | 223 | 4.93% |
| 28-2014 | 30-2014 | 6 | 223 | 2.69% |
| 28-2014 | 31-2014 | 2 | 223 | 0.90% |
| 28-2014 | 32-2014 | 3 | 223 | 1.35% |
| 28-2014 | 34-2014 | 1 | 223 | 0.45% |
| 28-2014 | 35-2014 | 1 | 223 | 0.45% |
| 29-2014 | 30-2014 | 17 | 215 | 7.91% |
| 29-2014 | 31-2014 | 7 | 215 | 3.26% |
| 29-2014 | 32-2014 | 4 | 215 | 1.86% |
| 29-2014 | 34-2014 | 1 | 215 | 0.47% |
| 30-2014 | 31-2014 | 23 | 228 | 10.09% |
| 30-2014 | 32-2014 | 13 | 228 | 5.70% |
| 30-2014 | 33-2014 | 5 | 228 | 2.19% |
| 30-2014 | 34-2014 | 1 | 228 | 0.44% |
| 31-2014 | 32-2014 | 16 | 234 | 6.84% |
| 31-2014 | 33-2014 | 10 | 234 | 4.27% |
| 31-2014 | 34-2014 | 5 | 234 | 2.14% |
| 31-2014 | 35-2014 | 3 | 234 | 1.28% |
| 32-2014 | 33-2014 | 22 | 189 | 11.64% |
| 32-2014 | 34-2014 | 9 | 189 | 4.76% |
| 32-2014 | 35-2014 | 7 | 189 | 3.70% |
| 33-2014 | 34-2014 | 12 | 250 | 4.80% |
| 33-2014 | 35-2014 | 8 | 250 | 3.20% |
| 34-2014 | 35-2014 | 25 | 259 | 9.65% |

**Explanation** : In this query we use Common Table Expressions (CTEs) to analyze user retention rates based on signup and activity weeks. In the "signup" CTE we extract user\_id and signup week from the users table, converting the created\_at date into the signup week. In the "activity" CTE we select user\_id and activity week from the events table for engagement events, linking with the signup CTE to consider only signed-up users.In the "weekly\_retention" CTE we calculate retained users each week post-signup by counting distinct users engaging after their signup week, grouping by signup and activity weeks. In the final query we compute the retention rate by comparing retained users with total sign-ups, as a percentage and then order the results by signup and activity weeks.

1. **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.

SELECT

DATE\_FORMAT(STR\_TO\_DATE(events.occured\_at, '%d-%m-%Y'), '%u-%Y') AS week,

events.device,

COUNT(\*) AS engagement\_count

FROM

events

WHERE

events.event\_type = 'engagement'

AND STR\_TO\_DATE(events.occured\_at, '%d-%m-%Y') IS NOT NULL

GROUP BY

week, events.device

ORDER BY

week, engagement\_count DESC;

|  |  |  |
| --- | --- | --- |
| week | device | engagement\_count |
| 18-2014 | macbook pro | 217 |
| 18-2014 | lenovo thinkpad | 153 |
| 18-2014 | iphone 5 | 114 |
| 18-2014 | samsung galaxy s4 | 97 |
| 18-2014 | asus chromebook | 92 |
| 18-2014 | ipad mini | 78 |
| 18-2014 | acer aspire notebook | 71 |
| 18-2014 | ipad air | 59 |
| 18-2014 | macbook air | 58 |
| 18-2014 | dell inspiron notebook | 55 |
| 18-2014 | iphone 5s | 51 |
| 18-2014 | iphone 4s | 50 |
| 18-2014 | nokia lumia 635 | 44 |
| 18-2014 | hp pavilion desktop | 33 |
| 18-2014 | nexus 7 | 32 |
| 18-2014 | nexus 5 | 31 |
| 18-2014 | samsung galaxy note | 28 |
| 18-2014 | mac mini | 25 |
| 18-2014 | dell inspiron desktop | 22 |
| 18-2014 | samsumg galaxy tablet | 16 |
| 18-2014 | amazon fire phone | 11 |
| 18-2014 | acer aspire desktop | 9 |
| 18-2014 | htc one | 7 |
| 18-2014 | nexus 10 | 4 |
| 19-2014 | macbook pro | 596 |
| 19-2014 | lenovo thinkpad | 391 |
| 19-2014 | macbook air | 314 |
| 19-2014 | iphone 5 | 219 |
| 19-2014 | dell inspiron notebook | 188 |
| 19-2014 | samsung galaxy s4 | 177 |
| 19-2014 | iphone 5s | 110 |
| 19-2014 | ipad air | 99 |
| 19-2014 | iphone 4s | 89 |
| 19-2014 | asus chromebook | 88 |
| 19-2014 | hp pavilion desktop | 84 |
| 19-2014 | ipad mini | 79 |
| 19-2014 | nexus 5 | 70 |
| 19-2014 | nexus 7 | 67 |
| 19-2014 | acer aspire notebook | 56 |
| 19-2014 | acer aspire desktop | 56 |
| 19-2014 | samsung galaxy note | 47 |
| 19-2014 | dell inspiron desktop | 40 |
| 19-2014 | nexus 10 | 39 |
| 19-2014 | amazon fire phone | 39 |
| 19-2014 | nokia lumia 635 | 34 |
| 19-2014 | kindle fire | 31 |
| 19-2014 | mac mini | 24 |
| 19-2014 | htc one | 19 |
| 19-2014 | windows surface | 8 |
| 20-2014 | macbook pro | 428 |
| 20-2014 | lenovo thinkpad | 313 |
| 20-2014 | macbook air | 299 |
| 20-2014 | iphone 5 | 245 |
| 20-2014 | nexus 5 | 199 |
| 20-2014 | samsung galaxy s4 | 185 |
| 20-2014 | dell inspiron notebook | 173 |
| 20-2014 | ipad air | 147 |
| 20-2014 | acer aspire notebook | 139 |
| 20-2014 | iphone 5s | 129 |
| 20-2014 | nexus 7 | 104 |
| 20-2014 | mac mini | 100 |
| 20-2014 | iphone 4s | 84 |
| 20-2014 | hp pavilion desktop | 63 |
| 20-2014 | ipad mini | 60 |
| 20-2014 | nokia lumia 635 | 58 |
| 20-2014 | htc one | 48 |
| 20-2014 | nexus 10 | 46 |
| 20-2014 | samsung galaxy note | 39 |
| 20-2014 | asus chromebook | 35 |
| 20-2014 | acer aspire desktop | 30 |
| 20-2014 | windows surface | 26 |
| 20-2014 | kindle fire | 24 |
| 20-2014 | amazon fire phone | 19 |
| 20-2014 | dell inspiron desktop | 15 |
| 21-2014 | macbook pro | 594 |
| 21-2014 | lenovo thinkpad | 475 |
| 21-2014 | macbook air | 328 |
| 21-2014 | nexus 5 | 271 |
| 21-2014 | iphone 5 | 236 |
| 21-2014 | samsung galaxy s4 | 235 |
| 21-2014 | iphone 5s | 215 |
| 21-2014 | dell inspiron notebook | 160 |
| 21-2014 | dell inspiron desktop | 150 |
| 21-2014 | ipad air | 140 |
| 21-2014 | mac mini | 74 |
| 21-2014 | iphone 4s | 57 |
| 21-2014 | nexus 7 | 57 |
| 21-2014 | asus chromebook | 56 |
| 21-2014 | hp pavilion desktop | 50 |
| 21-2014 | acer aspire notebook | 48 |
| 21-2014 | windows surface | 40 |
| 21-2014 | htc one | 38 |
| 21-2014 | samsung galaxy note | 38 |
| 21-2014 | nexus 10 | 34 |
| 21-2014 | ipad mini | 24 |
| 21-2014 | nokia lumia 635 | 22 |
| 21-2014 | kindle fire | 19 |
| 21-2014 | amazon fire phone | 11 |
| 21-2014 | acer aspire desktop | 6 |
| 22-2014 | macbook pro | 632 |
| 22-2014 | lenovo thinkpad | 446 |
| 22-2014 | iphone 5 | 268 |
| 22-2014 | nexus 5 | 241 |
| 22-2014 | samsung galaxy s4 | 194 |
| 22-2014 | macbook air | 190 |
| 22-2014 | dell inspiron notebook | 167 |
| 22-2014 | dell inspiron desktop | 162 |
| 22-2014 | iphone 4s | 161 |
| 22-2014 | iphone 5s | 137 |
| 22-2014 | asus chromebook | 119 |
| 22-2014 | hp pavilion desktop | 98 |
| 22-2014 | acer aspire notebook | 74 |
| 22-2014 | ipad mini | 69 |
| 22-2014 | nexus 10 | 65 |
| 22-2014 | ipad air | 60 |
| 22-2014 | mac mini | 53 |
| 22-2014 | windows surface | 47 |
| 22-2014 | samsumg galaxy tablet | 46 |
| 22-2014 | htc one | 46 |
| 22-2014 | samsung galaxy note | 40 |
| 22-2014 | nexus 7 | 33 |
| 22-2014 | acer aspire desktop | 32 |
| 22-2014 | nokia lumia 635 | 26 |
| 22-2014 | kindle fire | 20 |
| 23-2014 | macbook pro | 459 |
| 23-2014 | lenovo thinkpad | 372 |
| 23-2014 | macbook air | 336 |
| 23-2014 | iphone 5 | 255 |
| 23-2014 | dell inspiron desktop | 212 |
| 23-2014 | iphone 5s | 204 |
| 23-2014 | dell inspiron notebook | 204 |
| 23-2014 | nexus 5 | 178 |
| 23-2014 | nexus 7 | 175 |
| 23-2014 | ipad air | 142 |
| 23-2014 | samsung galaxy s4 | 132 |
| 23-2014 | acer aspire notebook | 128 |
| 23-2014 | asus chromebook | 124 |
| 23-2014 | nexus 10 | 120 |
| 23-2014 | nokia lumia 635 | 97 |
| 23-2014 | kindle fire | 72 |
| 23-2014 | iphone 4s | 64 |
| 23-2014 | hp pavilion desktop | 58 |
| 23-2014 | mac mini | 43 |
| 23-2014 | windows surface | 42 |
| 23-2014 | ipad mini | 42 |
| 23-2014 | acer aspire desktop | 38 |
| 23-2014 | htc one | 29 |
| 23-2014 | amazon fire phone | 29 |
| 23-2014 | samsumg galaxy tablet | 21 |
| 23-2014 | samsung galaxy note | 20 |
| 24-2014 | iphone 5 | 386 |
| 24-2014 | macbook pro | 338 |
| 24-2014 | macbook air | 306 |
| 24-2014 | lenovo thinkpad | 252 |
| 24-2014 | iphone 5s | 197 |
| 24-2014 | hp pavilion desktop | 184 |
| 24-2014 | asus chromebook | 158 |
| 24-2014 | dell inspiron desktop | 143 |
| 24-2014 | dell inspiron notebook | 137 |
| 24-2014 | iphone 4s | 135 |
| 24-2014 | ipad air | 104 |
| 24-2014 | acer aspire notebook | 96 |
| 24-2014 | nexus 5 | 95 |
| 24-2014 | samsung galaxy s4 | 90 |
| 24-2014 | amazon fire phone | 80 |
| 24-2014 | acer aspire desktop | 59 |
| 24-2014 | nexus 10 | 55 |
| 24-2014 | nexus 7 | 54 |
| 24-2014 | kindle fire | 49 |
| 24-2014 | nokia lumia 635 | 38 |
| 24-2014 | samsung galaxy note | 37 |
| 24-2014 | windows surface | 36 |
| 24-2014 | ipad mini | 34 |
| 24-2014 | samsumg galaxy tablet | 21 |
| 24-2014 | mac mini | 14 |
| 24-2014 | htc one | 3 |
| 25-2014 | macbook pro | 539 |
| 25-2014 | macbook air | 385 |
| 25-2014 | iphone 5 | 369 |
| 25-2014 | lenovo thinkpad | 318 |
| 25-2014 | iphone 4s | 217 |
| 25-2014 | iphone 5s | 209 |
| 25-2014 | samsung galaxy s4 | 187 |
| 25-2014 | dell inspiron notebook | 176 |
| 25-2014 | nexus 5 | 152 |
| 25-2014 | dell inspiron desktop | 140 |
| 25-2014 | ipad air | 131 |
| 25-2014 | acer aspire notebook | 116 |
| 25-2014 | hp pavilion desktop | 111 |
| 25-2014 | asus chromebook | 77 |
| 25-2014 | nexus 7 | 76 |
| 25-2014 | mac mini | 67 |
| 25-2014 | kindle fire | 65 |
| 25-2014 | nexus 10 | 63 |
| 25-2014 | acer aspire desktop | 62 |
| 25-2014 | ipad mini | 49 |
| 25-2014 | nokia lumia 635 | 44 |
| 25-2014 | windows surface | 38 |
| 25-2014 | htc one | 28 |
| 25-2014 | samsung galaxy note | 26 |
| 25-2014 | amazon fire phone | 24 |
| 25-2014 | samsumg galaxy tablet | 10 |
| 26-2014 | macbook pro | 441 |
| 26-2014 | lenovo thinkpad | 374 |
| 26-2014 | macbook air | 291 |
| 26-2014 | iphone 5 | 230 |
| 26-2014 | iphone 4s | 190 |
| 26-2014 | samsung galaxy s4 | 184 |
| 26-2014 | dell inspiron notebook | 177 |
| 26-2014 | dell inspiron desktop | 163 |
| 26-2014 | iphone 5s | 153 |
| 26-2014 | ipad air | 130 |
| 26-2014 | nexus 5 | 125 |
| 26-2014 | acer aspire notebook | 97 |
| 26-2014 | hp pavilion desktop | 93 |
| 26-2014 | asus chromebook | 85 |
| 26-2014 | nexus 7 | 79 |
| 26-2014 | nokia lumia 635 | 64 |
| 26-2014 | mac mini | 62 |
| 26-2014 | windows surface | 58 |
| 26-2014 | ipad mini | 42 |
| 26-2014 | nexus 10 | 42 |
| 26-2014 | samsumg galaxy tablet | 29 |
| 26-2014 | htc one | 27 |
| 26-2014 | kindle fire | 26 |
| 26-2014 | acer aspire desktop | 20 |
| 26-2014 | amazon fire phone | 12 |
| 26-2014 | samsung galaxy note | 10 |
| 27-2014 | macbook pro | 615 |
| 27-2014 | lenovo thinkpad | 366 |
| 27-2014 | macbook air | 311 |
| 27-2014 | iphone 5 | 287 |
| 27-2014 | iphone 5s | 170 |
| 27-2014 | hp pavilion desktop | 159 |
| 27-2014 | dell inspiron notebook | 156 |
| 27-2014 | samsung galaxy s4 | 143 |
| 27-2014 | iphone 4s | 136 |
| 27-2014 | nexus 5 | 128 |
| 27-2014 | nexus 7 | 112 |
| 27-2014 | nokia lumia 635 | 103 |
| 27-2014 | dell inspiron desktop | 84 |
| 27-2014 | windows surface | 71 |
| 27-2014 | ipad air | 69 |
| 27-2014 | ipad mini | 55 |
| 27-2014 | nexus 10 | 48 |
| 27-2014 | asus chromebook | 47 |
| 27-2014 | kindle fire | 41 |
| 27-2014 | acer aspire notebook | 36 |
| 27-2014 | acer aspire desktop | 31 |
| 27-2014 | mac mini | 27 |
| 27-2014 | samsung galaxy note | 25 |
| 27-2014 | samsumg galaxy tablet | 24 |
| 27-2014 | amazon fire phone | 17 |
| 27-2014 | htc one | 14 |
| 28-2014 | macbook pro | 625 |
| 28-2014 | macbook air | 374 |
| 28-2014 | lenovo thinkpad | 340 |
| 28-2014 | iphone 4s | 284 |
| 28-2014 | iphone 5 | 230 |
| 28-2014 | samsung galaxy s4 | 207 |
| 28-2014 | nexus 5 | 150 |
| 28-2014 | acer aspire notebook | 126 |
| 28-2014 | iphone 5s | 122 |
| 28-2014 | dell inspiron desktop | 106 |
| 28-2014 | dell inspiron notebook | 104 |
| 28-2014 | ipad mini | 86 |
| 28-2014 | ipad air | 79 |
| 28-2014 | kindle fire | 67 |
| 28-2014 | nexus 7 | 65 |
| 28-2014 | nexus 10 | 61 |
| 28-2014 | asus chromebook | 61 |
| 28-2014 | hp pavilion desktop | 54 |
| 28-2014 | htc one | 49 |
| 28-2014 | samsung galaxy note | 46 |
| 28-2014 | samsumg galaxy tablet | 43 |
| 28-2014 | windows surface | 36 |
| 28-2014 | nokia lumia 635 | 34 |
| 28-2014 | acer aspire desktop | 32 |
| 28-2014 | mac mini | 32 |
| 28-2014 | amazon fire phone | 20 |
| 29-2014 | macbook pro | 567 |
| 29-2014 | macbook air | 423 |
| 29-2014 | lenovo thinkpad | 392 |
| 29-2014 | iphone 4s | 332 |
| 29-2014 | samsung galaxy s4 | 314 |
| 29-2014 | iphone 5 | 314 |
| 29-2014 | dell inspiron desktop | 156 |
| 29-2014 | acer aspire notebook | 136 |
| 29-2014 | dell inspiron notebook | 125 |
| 29-2014 | nexus 5 | 118 |
| 29-2014 | ipad air | 113 |
| 29-2014 | iphone 5s | 94 |
| 29-2014 | hp pavilion desktop | 91 |
| 29-2014 | nexus 7 | 71 |
| 29-2014 | asus chromebook | 67 |
| 29-2014 | windows surface | 61 |
| 29-2014 | nexus 10 | 58 |
| 29-2014 | mac mini | 56 |
| 29-2014 | samsung galaxy note | 56 |
| 29-2014 | kindle fire | 55 |
| 29-2014 | nokia lumia 635 | 50 |
| 29-2014 | acer aspire desktop | 47 |
| 29-2014 | htc one | 30 |
| 29-2014 | ipad mini | 21 |
| 29-2014 | amazon fire phone | 10 |
| 30-2014 | lenovo thinkpad | 525 |
| 30-2014 | macbook pro | 479 |
| 30-2014 | macbook air | 374 |
| 30-2014 | iphone 5 | 266 |
| 30-2014 | iphone 5s | 181 |
| 30-2014 | nexus 5 | 178 |
| 30-2014 | iphone 4s | 175 |
| 30-2014 | samsung galaxy s4 | 173 |
| 30-2014 | dell inspiron notebook | 164 |
| 30-2014 | ipad air | 106 |
| 30-2014 | acer aspire notebook | 102 |
| 30-2014 | asus chromebook | 81 |
| 30-2014 | ipad mini | 81 |
| 30-2014 | nexus 7 | 80 |
| 30-2014 | dell inspiron desktop | 71 |
| 30-2014 | htc one | 52 |
| 30-2014 | nokia lumia 635 | 51 |
| 30-2014 | windows surface | 38 |
| 30-2014 | nexus 10 | 36 |
| 30-2014 | samsung galaxy note | 35 |
| 30-2014 | hp pavilion desktop | 33 |
| 30-2014 | acer aspire desktop | 29 |
| 30-2014 | kindle fire | 29 |
| 30-2014 | mac mini | 28 |
| 30-2014 | amazon fire phone | 16 |
| 30-2014 | samsumg galaxy tablet | 3 |
| 31-2014 | lenovo thinkpad | 611 |
| 31-2014 | macbook pro | 588 |
| 31-2014 | iphone 5 | 289 |
| 31-2014 | iphone 5s | 238 |
| 31-2014 | ipad air | 219 |
| 31-2014 | iphone 4s | 219 |
| 31-2014 | samsung galaxy s4 | 215 |
| 31-2014 | macbook air | 201 |
| 31-2014 | dell inspiron notebook | 194 |
| 31-2014 | nexus 5 | 176 |
| 31-2014 | acer aspire notebook | 167 |
| 31-2014 | dell inspiron desktop | 136 |
| 31-2014 | asus chromebook | 81 |
| 31-2014 | nexus 7 | 73 |
| 31-2014 | ipad mini | 73 |
| 31-2014 | nokia lumia 635 | 68 |
| 31-2014 | acer aspire desktop | 65 |
| 31-2014 | hp pavilion desktop | 58 |
| 31-2014 | mac mini | 55 |
| 31-2014 | samsung galaxy note | 52 |
| 31-2014 | windows surface | 51 |
| 31-2014 | nexus 10 | 45 |
| 31-2014 | amazon fire phone | 17 |
| 31-2014 | htc one | 15 |
| 31-2014 | samsumg galaxy tablet | 15 |
| 31-2014 | kindle fire | 5 |
| 32-2014 | macbook pro | 482 |
| 32-2014 | iphone 5 | 351 |
| 32-2014 | lenovo thinkpad | 280 |
| 32-2014 | macbook air | 248 |
| 32-2014 | dell inspiron notebook | 226 |
| 32-2014 | samsung galaxy s4 | 176 |
| 32-2014 | acer aspire notebook | 127 |
| 32-2014 | iphone 5s | 106 |
| 32-2014 | ipad air | 102 |
| 32-2014 | nexus 5 | 100 |
| 32-2014 | iphone 4s | 97 |
| 32-2014 | asus chromebook | 78 |
| 32-2014 | nokia lumia 635 | 75 |
| 32-2014 | nexus 7 | 65 |
| 32-2014 | dell inspiron desktop | 60 |
| 32-2014 | hp pavilion desktop | 55 |
| 32-2014 | samsung galaxy note | 40 |
| 32-2014 | nexus 10 | 38 |
| 32-2014 | mac mini | 33 |
| 32-2014 | amazon fire phone | 30 |
| 32-2014 | samsumg galaxy tablet | 29 |
| 32-2014 | ipad mini | 28 |
| 32-2014 | acer aspire desktop | 27 |
| 32-2014 | windows surface | 25 |
| 32-2014 | htc one | 16 |
| 32-2014 | kindle fire | 7 |
| 33-2014 | macbook pro | 738 |
| 33-2014 | lenovo thinkpad | 331 |
| 33-2014 | iphone 5 | 288 |
| 33-2014 | macbook air | 236 |
| 33-2014 | dell inspiron notebook | 202 |
| 33-2014 | iphone 5s | 171 |
| 33-2014 | samsung galaxy s4 | 130 |
| 33-2014 | iphone 4s | 127 |
| 33-2014 | ipad air | 124 |
| 33-2014 | nexus 5 | 92 |
| 33-2014 | nexus 10 | 81 |
| 33-2014 | asus chromebook | 73 |
| 33-2014 | acer aspire desktop | 67 |
| 33-2014 | dell inspiron desktop | 66 |
| 33-2014 | acer aspire notebook | 65 |
| 33-2014 | samsung galaxy note | 47 |
| 33-2014 | amazon fire phone | 45 |
| 33-2014 | ipad mini | 43 |
| 33-2014 | hp pavilion desktop | 40 |
| 33-2014 | nexus 7 | 38 |
| 33-2014 | nokia lumia 635 | 22 |
| 33-2014 | kindle fire | 22 |
| 33-2014 | htc one | 20 |
| 33-2014 | mac mini | 18 |
| 33-2014 | samsumg galaxy tablet | 14 |
| 33-2014 | windows surface | 6 |
| 34-2014 | macbook pro | 548 |
| 34-2014 | lenovo thinkpad | 372 |
| 34-2014 | iphone 5 | 279 |
| 34-2014 | macbook air | 261 |
| 34-2014 | iphone 5s | 211 |
| 34-2014 | dell inspiron notebook | 181 |
| 34-2014 | samsung galaxy s4 | 173 |
| 34-2014 | nexus 5 | 111 |
| 34-2014 | acer aspire notebook | 94 |
| 34-2014 | ipad mini | 91 |
| 34-2014 | iphone 4s | 85 |
| 34-2014 | dell inspiron desktop | 83 |
| 34-2014 | nexus 7 | 79 |
| 34-2014 | mac mini | 71 |
| 34-2014 | ipad air | 59 |
| 34-2014 | samsung galaxy note | 54 |
| 34-2014 | acer aspire desktop | 53 |
| 34-2014 | asus chromebook | 46 |
| 34-2014 | hp pavilion desktop | 43 |
| 34-2014 | nokia lumia 635 | 41 |
| 34-2014 | htc one | 34 |
| 34-2014 | nexus 10 | 33 |
| 34-2014 | windows surface | 29 |
| 34-2014 | kindle fire | 27 |
| 34-2014 | amazon fire phone | 26 |
| 34-2014 | samsumg galaxy tablet | 22 |
| 35-2014 | macbook pro | 558 |
| 35-2014 | lenovo thinkpad | 451 |
| 35-2014 | macbook air | 215 |
| 35-2014 | iphone 5s | 193 |
| 35-2014 | dell inspiron notebook | 182 |
| 35-2014 | asus chromebook | 143 |
| 35-2014 | iphone 5 | 141 |
| 35-2014 | samsung galaxy s4 | 136 |
| 35-2014 | iphone 4s | 133 |
| 35-2014 | acer aspire notebook | 116 |
| 35-2014 | nexus 5 | 104 |
| 35-2014 | nexus 7 | 93 |
| 35-2014 | dell inspiron desktop | 92 |
| 35-2014 | htc one | 85 |
| 35-2014 | ipad air | 78 |
| 35-2014 | mac mini | 77 |
| 35-2014 | windows surface | 68 |
| 35-2014 | hp pavilion desktop | 66 |
| 35-2014 | nexus 10 | 55 |
| 35-2014 | acer aspire desktop | 53 |
| 35-2014 | amazon fire phone | 38 |
| 35-2014 | ipad mini | 28 |
| 35-2014 | samsumg galaxy tablet | 25 |
| 35-2014 | kindle fire | 14 |
| 35-2014 | nokia lumia 635 | 11 |
| 35-2014 | samsung galaxy note | 2 |

**Explanation :** In this query we use date\_format and str\_to\_date functions to convert the timestamp from the events table into a week-year format. Then select the device used by the user and counts the occurrences of each device in the specified week , filtering for events of type 'engagement'. At last results are grouped by week and device and the query is ordered by the results by week and engagement count in descending order.

1. **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.

SELECT

    action,

    COUNT(\*) AS total\_count

FROM

    email\_events

GROUP BY

    action;

|  |  |
| --- | --- |
| action | total\_count |
| sent\_weekly\_digest | 57267 |
| email\_open | 20459 |
| email\_clickthrough | 9010 |
| sent\_reengagement\_email | 3653 |

**Explanation :** We select the column action from the email\_events table and count them according to each action with an alias as total count and group them by action.