Q4 - Marketing Analytics

What Are We Asked to Do and What Do We Currently Have?

- We have two datasets: **marketing_events** and **marketing_users**.
  - The **marketing_users** dataset contains data for 100 users. From this dataset, we can identify the platforms and the timestamps of when users first came to our app.
  - It also shows that some users came to the app at different times through different platforms.
  - The **marketing_events** dataset holds event records for these 100 users. It tracks every event triggered within the app, including subscription actions.
  - Using the shared **user_id** in both datasets, we can determine both the platforms users first arrived through and their subscription actions.

1. **Task 1:** We are required to calculate the total revenue generated by three different platforms: Facebook, Apple Search Ads, and Organic.
2. **Task 2:** Using the given CPI data for Apple Search Ads ($3.1) and Facebook ($1.3), we need to compare these two platforms and extract actionable insights.

Data Model

- We know that some users came to our app through multiple platforms. At this point, I believe it's appropriate to attribute user events to the platform that brought them to the app for the first time. Therefore, I choose the **First Attribution** model because users initially discover the app through that platform.
- Using the First Attribution model, I take the users' earliest **logging_time**, also known as their **first_touch**.

```
WITH first_touch AS (
  SELECT
    user_id,
    FIRST_VALUE(
      CASE
        WHEN tracker_name LIKE '%Apple Search%' THEN 'Apple Search'
        WHEN tracker_name LIKE '%Facebook%' THEN 'Facebook'
        WHEN tracker_name = 'Organic' THEN 'Organic'
```

```
      END
    ) OVER (PARTITION BY user_id ORDER BY logging_time ASC) as first_platform
  FROM `data-sciene-for-business-imp.app_analytics.marketing_users`,
  UNNEST(tracker_names) t
  WHERE tracker_name LIKE '%Apple Search%'
    OR tracker_name LIKE '%Facebook%'
    OR tracker_name = 'Organic'
),
user_platforms AS (
  SELECT DISTINCT user_id, first_platform as platform
  FROM first_touch
  WHERE first_platform IS NOT NULL
),
```

- With the query above, I determine each user's **first_platform**.
- Next, I need to identify the users' subscription actions so that I can join these datasets later and measure the efficiency of each platform.

```
subscription_events AS (
  SELECT
    e.user_id,
    COUNT(*) as subscription_count,
    SUM(prop.value.float_value) as total_revenue
  FROM `data-sciene-for-business-imp.app_analytics.marketing_events` e,
  UNNEST(properties) prop
  WHERE event_name = 'subscribe'
  AND prop.key = 'revenue'
  GROUP BY e.user_id
)
```

- With the query above, we can see the number of subscriptions made by users and the total revenue generated.

Using these two tables, we will be able to find the answers we are looking for.

```
SELECT
  p.platform,
  COUNT(DISTINCT p.user_id) as total_users,
  COUNT(DISTINCT CASE WHEN s.subscription_count > 0 THEN p.user_id END) as subscribers,
  ROUND(100.0 * COUNT(DISTINCT CASE WHEN s.subscription_count > 0 THEN p.user_id END) / COUNT
(DISTINCT p.user_id), 2) as conversion_rate,
  SUM(s.subscription_count) as total_subscriptions,
  ROUND(SUM(COALESCE(s.total_revenue, 0)), 2) as total_revenue,
  ROUND(SUM(COALESCE(s.total_revenue, 0)) / COUNT(DISTINCT p.user_id), 2) as arpu,
  ROUND(SUM(COALESCE(s.total_revenue, 0)) / NULLIF(COUNT(DISTINCT CASE WHEN s.subscription_cou
nt > 0 THEN p.user_id END), 0), 2) as arppu,
  CASE
    WHEN p.platform = 'Apple Search' THEN 3.1
    WHEN p.platform = 'Facebook' THEN 1.3
    ELSE 0
  END as cpi,
  ROUND(CASE
    WHEN p.platform = 'Apple Search' THEN COUNT(DISTINCT p.user_id) * 3.1
    WHEN p.platform = 'Facebook' THEN COUNT(DISTINCT p.user_id) * 1.3
    ELSE 0
```

```
  END, 2) as total_cost,
  ROUND(CASE
    WHEN p.platform IN ('Apple Search', 'Facebook') THEN
      (SUM(COALESCE(s.total_revenue, 0)) - (
        CASE
          WHEN p.platform = 'Apple Search' THEN COUNT(DISTINCT p.user_id) * 3.1
          WHEN p.platform = 'Facebook' THEN COUNT(DISTINCT p.user_id) * 1.3
          ELSE 0
        END
      )) / NULLIF((
        CASE
          WHEN p.platform = 'Apple Search' THEN COUNT(DISTINCT p.user_id) * 3.1
          WHEN p.platform = 'Facebook' THEN COUNT(DISTINCT p.user_id) * 1.3
          ELSE 1
        END
      ), 0)
    ELSE NULL
  END, 2) as roi
FROM user_platforms p
LEFT JOIN subscription_events s ON p.user_id = s.user_id
GROUP BY p.platform
ORDER BY p.platform;
```

With the query above, I calculate the following metrics for each platform:

- Total Users
- Total Subscribers
- Total Subscriptions
- Conversion Rate
- Total Revenue
- ARPU (Average Revenue Per User)
- ARPPU (Average Revenue Per Paying User)
- CPI (Cost Per Install)
- Total Cost
- ROI (Return on Investment)

And with this, I arrive at the table below:

platform	total_users	subscribers	conversion_rate	total_subscriptions	total_revenue	arpu	arppu
Apple Search	25	5	%20	5	75.55	3.02	15.11
Facebook	47	4	%8.51	5	71.35	1.52	17.84
Organic	28	6	%21.43	6	79.04	2.82	13.17

Performance Analysis by Platform

Apple Search

- **Users and Subscribers:** 25 users, 5 subscribers with a **conversion rate of 20%**.
- **Revenue and Costs:** Generated $75.55 in revenue (ARPU: $3.02, ARPPU: $15.11). However, with a CPI of $3.1 and a total cost of $77.5, the channel is operating at a **negative ROI (-3%)**.

- **Key Insight:** Costs outweigh revenue, making this channel unprofitable.

Facebook

- **Users and Subscribers:** 47 users, 4 subscribers with a **low conversion rate (8.51%)**.
- **Revenue and Costs:** Revenue of $71.35 (ARPU: $1.52, ARPPU: $17.84). CPI is $1.3, and the total cost is $61.1, leading to a **positive ROI of 17%**.
- **Key Insight:** Profitable channel but with room for improvement in conversion rates.

Organic Traffic

- **Users and Subscribers:** 28 users, 6 subscribers with the **highest conversion rate (21.43%)**.
- **Revenue and Costs:** Revenue of $79.04 (ARPU: $2.82, ARPPU: $13.17). No costs (CPI: $0
- **Key Insight:** Most efficient and profitable channel with no acquisition costs.

Strategic Recommendations

1. **Apple Search:** Reduce CPI or improve user quality to make the channel profitable.
2. **Facebook:** Focus on increasing the conversion rate to further boost profitability.
3. **Organic Traffic:** Invest more in SEO and content marketing to maximize this cost-effective channel.

In summary, **Organic Traffic** is the best performer due to zero costs, while **Apple Search** requires immediate cost optimization to avoid losses.