Tasks

Objective Questions:

1. Are there any tables with duplicate or missing null values? If so, how would you handle them?

By running the queries below, we have determined that there are no duplicates in the tables.

SELECT comment_text, user_id, photo_id, created_at
FROM comments
GROUP BY 1,2,3,4
HAVING COUNT(*) > 1;

SELECT follower_id, followee_id
FROM follows
GROUP BY 1,2
HAVING COUNT(*) > 1;

SELECT user_id, photo_id
FROM likes
GROUP BY 1,2
HAVING COUNT(*) > 1;

SELECT photo_id, tag_id
FROM photo_tags
GROUP BY 1,2
HAVING COUNT(*) > 1;

SELECT image_url, user_id, created_dat
FROM photos
GROUP BY 1,2,3
HAVING COUNT(*) > 1;

SELECT tag_name, created_at
FROM tags
GROUP BY 1,2
HAVING COUNT(*) > 1;

```sql
SELECT username, created_at
FROM users
GROUP BY 1,2
HAVING COUNT(*) > 1;
```
The following queries were used to check for null values, and no null values were found in any of the tables.

```sql
SELECT * FROM comments
WHERE id IS NULL OR comment_text IS NULL OR user_id IS NULL OR photo_id IS NULL
OR created_at IS NULL;
```

```sql
SELECT * FROM follows
WHERE follower_id IS NULL OR followee_id IS NULL OR created_at IS NULL;
```

```sql
SELECT * FROM likes
WHERE user_id IS NULL OR photo_id IS NULL OR created_at IS NULL;
```

```sql
SELECT * FROM photo_tags
WHERE photo_id IS NULL OR tag_id IS NULL;
```

```sql
SELECT * FROM photos
WHERE id IS NULL OR image_url IS NULL OR user_id IS NULL OR created_dat IS NULL;
```

```sql
SELECT * FROM tags
WHERE id IS NULL OR tag_name IS NULL OR created_at IS NULL;
```

```sql
SELECT * FROM users
WHERE id IS NULL OR username IS NULL OR created_at IS NULL;
```

2. What is the distribution of user activity levels (e.g., number of posts, likes, comments) across the user base?

The query used to obtain the output is as follows:

```
SELECT u.id AS user_id, u.username,
COUNT(DISTINCT p.id) AS posts_count,
CASE
   WHEN COUNT(DISTINCT p.id) = 0 THEN 'Zero Posts'
    WHEN COUNT(DISTINCT p.id) <= MAX(COUNT(DISTINCT p.id)) OVER() / 3 THEN
'Low Posts'
     WHEN COUNT(DISTINCT p.id) <= 2 * MAX(COUNT(DISTINCT p.id)) OVER() / 3
THEN 'Medium Posts'
   ELSE 'High Posts'
END AS posts_segment,
COUNT(DISTINCT l.photo_id) AS likes_count,
CASE
   WHEN COUNT(DISTINCT l.photo_id) = 0 THEN 'Zero Likes'
    WHEN COUNT(DISTINCT l.photo_id) <= MAX(COUNT(DISTINCT l.photo_id)) OVER()
/ 3 THEN 'Low Likes'
     WHEN COUNT(DISTINCT l.photo_id) <= 2 * MAX(COUNT(DISTINCT l.photo_id))
OVER() / 3 THEN 'Medium Likes'
   ELSE 'High Likes'
END AS likes_segment,
COUNT(DISTINCT c.id) AS comments_count,
CASE
   WHEN COUNT(DISTINCT c.id) = 0 THEN 'Zero Comments'
    WHEN COUNT(DISTINCT c.id) <= MAX(COUNT(DISTINCT c.id)) OVER() / 3 THEN
'Low Comments'
   WHEN COUNT(DISTINCT c.id) <= 2 * MAX(COUNT(DISTINCT c.id)) OVER() / 3 THEN
'Medium Comments'
   ELSE 'High Comments'
END AS comments_segment
FROM users u
LEFT JOIN photos p ON u.id = p.user_id
LEFT JOIN likes l ON u.id = l.user_id
LEFT JOIN comments c ON u.id = c.user_id
   GROUP BY 1, 2;
```

1. Key Insights:

User Activity Levels:

- **Zero Posts:** 30% of users are inactive content creators.
- **Low Posts (1–4):** 60% of users are minimal content creators.
- **Medium Posts (5–9):** 25% show moderate content creation.
- **High Posts (10+):** Small fraction but highly active users.

Likes & Comments:

- **Likes:** Majority have low to medium likes; a small group has high likes.
- **Comments:** Most users leave few or no comments, indicating passive engagement.

Active vs. Inactive Users:

- Large portion is inactive or minimally active; small percentage is highly engaged.
- Active users (high posts, likes, and comments) are essential for engagement.

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2. Recommendations:

For Engagement:

1. **Target Inactive Users:** Incentivize zero-post users to create content through challenges or rewards.
2. **Encourage Comments:** Run campaigns like Q&A or giveaways to boost commenting.
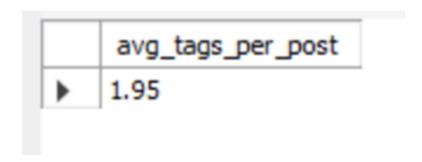3. **Promote UGC:** Encourage content sharing for low-engagement users.

For Retention:

1. **Personalized Content:** Show content based on past interactions (likes, comments).
2. **Re-engagement Campaigns:** Encourage zero-post users to participate with rewards or reminders.
3. **Consistent Posting:** Support medium users with content schedules and tools.

For Acquisition:

1. **Influencer Collaboration:** Partner with high-post creators for brand engagement.
2. **Referral Programs:** Offer incentives for users to invite new, engaged users.
3. **Guide Zero-Post Users:** Provide tutorials or quick-start guides to spark content creation.

user_id	username	posts_count	posts_segment	likes_count	likes_segment	comments_count	comments_segment
1	Kenton_Kirlin	5	Medium Posts	0	Zero Likes	0	Zero Comments
2	Andre_Purdy85	4	Low Posts	94	Medium Likes	66	Low Comments
3	Harley_Lind18	4	Low Posts	79	Low Likes	67	Low Comments
4	Arely_Bogan63	3	Low Posts	93	Medium Likes	64	Low Comments
5	Aniya_Hackett	0	Zero Posts	257	High Likes	257	High Comments
6	Travon.Waters	5	Medium Posts	82	Low Likes	62	Low Comments
7	Kasandra_Homenick	0	Zero Posts	0	Zero Likes	0	Zero Comments
8	Tabitha_Schamberger11	4	Low Posts	79	Low Likes	61	Low Comments
9	Gus93	4	Low Posts	85	Low Likes	60	Low Comments
10	Presley_McClure	3	Low Posts	87	Medium Likes	63	Low Comments
11	Justina.Gaylord27	5	Medium Posts	89	Medium Likes	49	Low Comments
12	Dereck65	4	Low Posts	77	Low Likes	68	Low Comments
13	Alexandro35	5	Medium Posts	93	Medium Likes	58	Low Comments
14	Jadyn81	0	Zero Posts	257	High Likes	257	High Comments
15	Billy52	4	Low Posts	84	Low Likes	77	Low Comments

3.   Calculate the average number of tags per post (photo_tags and photos tables).

avg_tags_per_post
▶ 1.95

The average number of tags per post = 1.95 (rounded to 2 decimal places).

The query used to obtain the output is as follows:
SELECT ROUND(AVG(tags_per_photo), 2) AS avg_tags_per_post
FROM (
    SELECT p.id AS photo_id, COUNT(pt.tag_id) AS tags_per_photo
    FROM photos p
    LEFT JOIN photo_tags pt ON p.id = pt.photo_id
    GROUP BY 1
) tag_data;

Insights:

1. **Moderate Tag Usage**:
   - With an **average of 1.95 tags per post**, users are tagging posts at a moderate rate. This suggests that while some users are using tags to increase content visibility, there is potential for greater engagement through more frequent or relevant tagging.
2. **Room for Improved Tagging Practices**:
   - The relatively low average indicates that many posts may not be fully optimized for discoverability or categorization. Tags play an essential role in content visibility, and a lower tag count may limit posts' reach or relevance in searches.
3. **Potential to Increase Content Categorization**:
   - Since tags help in categorizing and enhancing the reach of posts, the current tagging behavior suggests there is room for improvement in how users categorize their content, possibly through improved tagging tools or suggestions.

Recommendations:

1. **Encourage More Tagging**:
   - Introduce prompts or tag suggestions when users create posts. Making tagging easier and more intuitive could increase the average number of tags per post, improving content discoverability.
2. **Educate Users on Tagging Best Practices**:
   - Provide guidelines or examples of effective tagging to help users understand the value of using relevant and varied tags. Offering a tutorial or tips could improve the overall tagging behavior, driving better engagement with posts.
3. **Incentivize Tagging for Better Reach**:
   - Consider implementing a rewards system for users who effectively use tags (e.g., increased visibility for posts with appropriate tags or rewards for posts that are well-tagged). This could motivate users to tag more consistently and with greater relevance.

4. **Identify the top users with the highest engagement rates (likes, comments) on their posts and rank them.**

The table below displays the engagement rate (likes + comments), with users ranked based on this rate in the 'ranking' column. We have considered the highest engagement rate, ranking up to 3. A total of 13 users have the highest engagement rate of 3.1592.

The query used to obtain the output is as follows:
```
WITH cte AS (
    SELECT u.id AS user_id, u.username,
    (COUNT(DISTINCT l.photo_id) + COUNT(DISTINCT c.id)) AS engagement,
            (COUNT(DISTINCT   l.photo_id)   +   COUNT(DISTINCT   c.id))   *   100   /
SUM((COUNT(DISTINCT   l.photo_id)   +   COUNT(DISTINCT   c.id)))   OVER()   AS
engagement_rate,
            DENSE_RANK()   OVER(ORDER   BY   (COUNT(DISTINCT   l.photo_id)   +
COUNT(DISTINCT c.id)) DESC) AS highest_engagements
    FROM users u
    LEFT JOIN photos p ON u.id = p.user_id
    LEFT JOIN likes l ON u.id = l.user_id
    LEFT JOIN comments c ON u.id = c.user_id
    GROUP BY 1
)
SELECT user_id, username, engagement_rate, highest_engagements AS ranking
FROM cte
WHERE highest_engagements IN (1, 2, 3)
ORDER BY 4, 1;
```

user_id	username	engagement_rate	ranking
5	Aniya_Hackett	3.1592	1
14	Jaclyn81	3.1592	1
21	Rocio33	3.1592	1
24	Maxwell.Halvorson	3.1592	1
36	Ollie_Ledner37	3.1592	1
41	Mckenna17	3.1592	1
54	Duane60	3.1592	1
57	Julien_Schmidt	3.1592	1
66	Mike.Auer39	3.1592	1
71	Nia_Haag	3.1592	1
75	Leslie67	3.1592	1
76	Janelle.Nikolaus81	3.1592	1
91	Bethany20	3.1592	1
96	Keenan.Schamber...	1.0633	2
69	Karley_Bosco	1.0203	3
87	Rick29	1.0203	3

Insights:

1. **High Engagement Consistency Among Top Users**:
   - A group of users (**Aniya Hackett**, **Jaclyn81**, **Rocio33**, etc.) share the same high **engagement rate** of 3.1592 and are ranked as **top performers**. This indicates a consistent level of high engagement among these users, who may be content creators, influencers, or highly interactive individuals.
2. **Engagement Discrepancy in Lower Ranks**:
   - The users ranked 2nd and 3rd (**Keenan Schamberger60**, **Karley Bosco**, **Rick29**) have noticeably lower engagement rates (1.0633 and 1.0203), indicating a significant gap between the top and lower-ranking users. This may point to a concentration of engagement among a small number of users while others are less engaged.
3. **Potential for Broader Engagement**:
   - The majority of users are clustered around a high engagement rate, suggesting that expanding this group of highly engaged users could boost overall platform

activity. However, the low engagement rates of users in the lower ranks highlight an opportunity for improving engagement across a wider user base.

Recommendations:

1. **Targeted Engagement Strategies for High-Ranking Users**:
   - Reward top users (with high engagement rates) with additional features, such as exclusive content tools or higher visibility on the platform. These incentives can further motivate them to continue their high level of activity and lead by example for others.
2. **Promote Engagement for Lower-Ranking Users**:
   - Identify strategies to increase engagement for users with lower engagement rates. This could include offering incentives for likes, comments, or posts, or providing tools to help users create more engaging content (e.g., content suggestions, notifications about trending topics).
3. **Enhance Platform Features for User Interaction**:
   - Implement features that facilitate easier and more frequent interaction across the user base. For example, improving notification systems or providing interactive prompts could encourage users to engage more consistently, helping reduce the disparity in engagement across different ranks.

5. Which users have the highest number of followers and followings?

The following query shows the highest number of followers and followings:
select
        u.id,
        u.username,
        count(distinct f.follower_id) as num_followers,
        count(distinct ff.followee_id) as num_followings
from users u
left join follows f on u.id = f.followee_id
left join follows ff on u.id = ff.follower_id
group by u.id, u.username
order by num_followers desc, num_followings desc;

Insights

1. **User Base:** There are 11 unique users in the dataset.
2. **Username Patterns**: Usernames appear to be a mix of names (e.g., Kenton_Kirlin), numbers (e.g., Pearl7), and a combination of both (e.g., David.Osinski47).
3. **Numerical Values:** All users have the same numerical value (77) associated with them, which might indicate a common attribute or behavior.

Recommendations

1. **Data Enrichment:** To gain deeper insights, consider collecting more data about each user, such as their location, interests, or engagement patterns.
2. **Segmentation Analysis:** Investigate whether the users can be grouped into segments based on their usernames, numerical values, or other attributes. This could help identify trends or patterns within specific user groups.
3. **Behavioral Analysis:** Analyze the numerical values associated with each user to understand what they represent and how they relate to user behavior. This could provide valuable insights into user engagement, preferences, or pain points.

id	username	num_followers	num_followings
1	Kenton_Kirlin	77	0
23	Eveline95	77	0
29	Jaime53	77	0
34	Pearl7	77	0
25	Tierra.Trantow	77	0
45	David.Osinski47	77	0
7	Kasandra_Homenick	77	0
51	Mariano_Koch3	77	0
49	Morgan.Kassulke	77	0
53	Linnea59	77	0
58	Aurelie71	77	0
59	Cesar93	77	0
64	Florence99	77	0
68	Franco_Keebler64	77	0
74	Hulda.Macejkovic	77	0
88	t27	77	0
77	Donald.Fritsch	77	0
80	Darby_Herzog	77	0
81	Esther.Zulauf61	77	0
83	Bartholome.Bernhard	77	0
86	Delfina_VonRuede...	77	0
89	Jessyca_West	77	0
90	Esmeralda.Mraz57	77	0
18	Odessa2	76	99
19	Hailee26	76	99
20	Delpha.Kihn	76	99
21	Rocio33	76	99
22	Kenneth64	76	99
24	Maxwell.Halvorson	76	99
13	Alexandro35	76	99
26	Josianne.Friesen	76	99
27	Darwin29	76	99
28	Dario77	76	99
30	Kaley9	76	99
31	Aiyana_Hoeger	76	99
32	Irwin.Larson	76	99
33	Yvette.Gottlieb91	76	99
35	Lennie_Hartmann40	76	99
36	Ollie_Ledner37	76	99
37	Yazmin_Mills95	76	99
38	Jordyn.Jacobson2	76	99
40	Rafael.Hickle2	76	99
41	Mckenna17	76	99
42	Maya.Farrell	76	99
43	Janet.Armstrong	76	99
44	Seth46	76	99
46	Malinda_Streich	76	99
47	Harrison.Beatty50	76	99
48	Granville_Kutch	76	99
50	Gerard79	76	99
39	Kelsi26	76	99
52	Zack_Kemmer93	76	99
2	Andre_Purdy85	76	99
54	Duane60	76	99
55	Meggie_Doyle	76	99
56	Peter.Stehr0	76	99
57	Julien_Schmidt	76	99
3	Harley_Lind18	76	99
4	Arely_Bogan63	76	99
60	Sam52	76	99
61	Jayson65	76	99
62	Ressie_Stanton46	76	99
63	Elenor88	76	99
5	Aniya_Hackett	76	99
65	Adelle96	76	99
66	Mike.Auer39	76	99
67	Emilio_Bernier52	76	99
6	Travon.Waters	76	99
69	Karley_Bosco	76	99
70	Erick5	76	99
71	Nia_Haag	76	99
72	Kathryn80	76	99
73	Jaylan.Lakin	76	99
8	Tabitha_Schamber...	76	99
75	Leslie67	76	99
9	Gus93	76	99
10	Presley_McClure	76	99
78	Colten.Harris76	76	99
79	Katarina.Dibbert	76	99
11	Justina.Gaylord27	76	99
12	Dereck65	76	99
82	Aracely.Johnston98	76	99
14	Jaclyn81	76	99
84	Alysa22	76	99
85	Milford_Gleichner42	76	99
15	Billy52	76	99
87	Rick29	76	99
76	Janelle.Nikolaus81	76	99
16	Annalise.McKenzie16	76	99
17	Norbert_Carroll35	76	99
91	Bethany20	76	99
92	Frederik_Rice	76	99
93	Willie_Leuschke	76	99
94	Damon35	76	99
95	Nicole71	76	99
96	Keenan.Schamberg...	76	99
97	Tomas.Beatty93	76	99
98	Imani_Nicolas17	76	99
99	Alek_Watsica	76	99
100	Javonte83	76	99

6. Calculate the average engagement rate (likes, comments) per post for each user.

user_id	username	avg_engagement_per_post_for_each_user
55	Meggie_Doyle	75.00
73	Jaylan.Lakin	73.00
48	Granville_Kutch	71.00
22	Kenneth64	70.00
94	Damon35	68.00
87	Rick29	68.00
69	Karley_Bosco	68.00
18	Odessa2	67.00
43	Janet.Armstrong	66.80
52	Zack_Kemmer93	66.60

user_id	username	avg_engagement_per_post_for_each_user
91	Bethany20	0.00
66	Mike.Auer39	0.00
68	Franco_Keebler64	0.00
53	Linnea59	0.00
90	Esmeralda.Mraz57	0.00
54	Duane60	0.00
34	Pearl7	0.00
71	Nia_Haag	0.00
74	Hulda.Macejkovic	0.00
76	Janelle.Nikolaus81	0.00

The above table shows the average engagement rate per post for users, including the top 10 and bottom 10 users.

The query used to get the output –
WITH cte AS (
     SELECT u.id AS user_id, u.username, p.id AS post_id, (COUNT(DISTINCT l.user_id) + COUNT(DISTINCT c.id)) AS total_engagement
   FROM users u
   LEFT JOIN photos p ON u.id = p.user_id
   LEFT JOIN likes l ON P.ID = l.photo_id
   LEFT JOIN comments c ON P.ID = c.photo_id
   GROUP BY 1, 2, 3
)
SELECT DISTINCT user_id, username,
ROUND(AVG(total_engagement)   OVER(PARTITION   BY   user_id),   2)   AS
avg_engagement_per_post_for_each_user
FROM cte
   ORDER BY 3 DESC;

Insights:

1. **High Engagement Among Active Users**: The top users with the highest average engagement per post, such as Meggie_Doyle (75) and Jaylan.Lakin (73), demonstrate strong engagement, indicating they create content that resonates well with their audience, likely resulting in more likes, comments, and shares per post.
2. **Inactive Users with Zero Engagement**: A significant portion of the users, such as Jaclyn81, Aniya_Hackett, and Kasandra_Homenick, have zero engagement. This could be due to the lack of activity, low-quality content, or a lack of consistent posting. These users contribute no value in terms of interaction and need strategies to boost their visibility and engagement.
3. **Moderate to Low Engagement for Many Users**: Most users have engagement scores between 60 and 70, showing moderate engagement. This suggests that while these users are active, there may be room for improvement in their content strategies to drive higher engagement rates.

Recommendations:

1. **Focus on Increasing Engagement for Inactive Users**: Encourage users with zero engagement to post more consistently and offer tips on how to improve their content's quality and relevance. Running campaigns or challenges could help motivate them to become more involved on the platform.
2. **Leverage High Engagement Users for Promotion**: Users with high engagement, such as Meggie_Doyle and Jaylan.Lakin, can be identified as influencers or brand ambassadors. Collaborating with them on promotions or campaigns could help increase visibility and engagement across the platform.
3. **Optimize Content Strategy for Moderate Engagement Users**: Users with moderate engagement scores should be provided with insights into what type of content works best (e.g., trending topics, hashtags, or content formats). Providing analytics on post performance can help them refine their content strategies to increase interactions.

7. Get the list of users who have never liked any post (users and likes tables)

The below table shows the list of users who have never liked a post.
The query used to get the output –
SELECT username
FROM (
SELECT u.id as user_id, u.username, COUNT(DISTINCT l.photo_id) AS likes_count
FROM users u
   LEFT JOIN photos p on u.id = p.user_id
JOIN likes l on u.id = l.user_id
GROUP BY 1, 2
HAVING COUNT(DISTINCT l.photo_id) = 0
) dt
ORDER BY 1;

	username
▶	Aurelie71
	Bartholome.Bernhard
	Cesar93
	Clint27
	Darby_Herzog
	David.Osinski47
	Delfina_VonRueden68
	Donald.Fritsch
	Esmeralda.Mraz57
	Esther.Zulauf61
	Eveline95
	Florence99
	Franco_Keebler64
	Hulda.Macejkovic
	Jaime53
	Jessyca_West
	Kasandra_Homenick
	Kenton_Kirlin
	Linnea59
	Mariano_Koch3
	Morgan.Kassulke
	Pearl7
	Tierra.Trantow

Insights:

1. **Lack of Engagement with Posts**: Users such as **Aurelie71**, **Bartholome.Bernhard**, and **Kasandra_Homenick** have never liked any posts, which could indicate a general lack of interaction with the content on the platform, potentially due to passive usage or disengagement.

2. **Potential Audience Gap**: The users listed might represent an audience segment that is consuming content without actively participating. This passive behavior can limit the platform's overall engagement and reduce the visibility of posts, making it harder for creators to gain attention.

3. **Opportunity for Targeted Strategies**: With many of these users likely not interacting with posts, there is an opportunity to encourage more active participation through notifications, incentives, or prompts to like content. Their lack of interaction could be due to lack of awareness or motivation.

Recommendations:

1. **Incentivize Interaction**: Introduce campaigns or rewards for users who engage with content, such as liking posts, commenting, or sharing. Offering incentives (e.g., badges, points, or exclusive content) could motivate users to start liking posts.

2. **Re-engagement Campaigns**: Design targeted re-engagement campaigns to encourage these users to interact with posts. This could involve personalized notifications highlighting content they might enjoy or providing reminders about the benefits of engaging with posts.

3. **Content Personalization**: Focus on delivering more relevant and personalized content to these users. By utilizing data to tailor post recommendations, it is possible to increase the chances that these users will find content they are interested in and start engaging with it.

8. How can you leverage user-generated content (posts, hashtags, photo tags) to create more personalized and engaging ad campaigns?

The below table shows the user id, tag name and how many times that tag is used by a user. This will help us know what kind of tags user generally use and would give us an idea of his preferences.
The query used to get the output –
SELECT id AS user_id, tag_name, tags_count
FROM (
        SELECT u.id, t.tag_name, COUNT(t.tag_name) AS tags_count,
        DENSE_RANK() OVER(PARTITION BY tag_name ORDER BY COUNT(t.tag_name)
DESC) AS ranking
        FROM users u
        JOIN photos p on u.id = p.user_id
        JOIN photo_tags pt on p.id = pt.photo_id
        JOIN tags t on pt.tag_id = t.id
        GROUP BY 1, 2
) AS dt
WHERE ranking = 1;

Insights:

1. **Diverse User Interests and Preferences**: The variety of hashtags such as **#beach**, **#beauty**, **#fashion**, **#food**, and **#party** indicates that users have a wide range of interests. By leveraging this data, brands can better understand user preferences and create ad campaigns that target specific interests, enhancing relevance and appeal.

2. **Popular Hashtags for Engagement**: Hashtags like **#party**, **#food**, and **#fashion** have a high number of mentions, suggesting they are strong drivers of user engagement. This provides valuable insight into the types of content that are more likely to resonate with the audience and can be incorporated into more engaging ad campaigns.

3. **User-Generated Content as Social Proof**: The repeated use of specific hashtags (e.g., **#beauty**, **#landscape**, **#photography**) by different users demonstrates active content creation, which can be leveraged as social proof in marketing campaigns. User-generated content helps build trust and authenticity around products and services when used in ads.

Recommendations:

1. **Targeted Ad Campaigns Based on Interests**: Utilize popular and relevant hashtags to segment users into specific interest groups. For example, an ad campaign showcasing **beauty products** or **fashion accessories** can be tailored to users engaging with **#beauty**, **#style**, and **#fashion**. This would ensure that the ad content is highly relevant to each user's preferences.

2. **Incorporate User-Generated Content (UGC)**: Encourage users to share more photos and posts with branded hashtags (e.g., **#party**, **#foodie**). By featuring real user content in ads, the brand can enhance its authenticity, build community engagement, and increase trust among potential customers. UGC can also be incentivized through contests or rewards for the best content.

3. **Use Hashtags in Dynamic Ads**: Leverage data about trending and frequently used hashtags in personalized ads across social media platforms. Create dynamic ads that highlight products related to users' hashtag usage, such as food-related products for users engaging with **#food**, or travel-related ads for users posting about **#landscape** and **#sunrise**. This ensures the ad content is timely and closely tied to the user's current activities.

user_id	tag_name	tags_count
88	beach	6
9	beauty	2
16	beauty	2
65	beauty	2
88	beauty	2
30	concert	2
77	concert	2
78	concert	2
10	delicious	2
11	delicious	2
88	dreamy	4
2	drunk	2
77	drunk	2
23	fashion	2
33	fashion	2
58	fashion	2
63	fashion	2
10	food	2
11	food	2
59	food	2
65	food	2
11	foodie	2
2	fun	3
59	fun	3
23	hair	3
23	happy	2
51	happy	2
88	landscape	2
23	lol	3
1	party	2

user_id	tag_name	tags_count
2	party	2
29	party	2
30	party	2
32	party	2
44	party	2
58	party	2
59	party	2
63	party	2
78	party	2
82	photogra…	2
88	photogra…	2
23	smile	5
9	stunning	3
33	style	2
58	style	2
88	sunrise	3
88	sunset	3

9. Are there any correlations between user activity levels and specific content types (e.g., photos, videos, reels)? How can this information guide content creation and curation strategies?

The table below shows the 10 photos with the highest likes and the 10 photos with the least likes, with the data ordered based on the likes_count column in descending order.

The query used to get the output –

SELECT p.id AS photo_id, p.image_url AS photo_url, COUNT(DISTINCT l.user_id) AS likes_count, COUNT(DISTINCT c.id) AS comments_count

FROM photos p

LEFT JOIN likes l on p.id = l.photo_id

LEFT JOIN comments c on p.id = c.photo_id

GROUP BY 1

ORDER BY 3 DESC;

photo_id	photo_url	likes_count	comments_count
145	https://jarret.name	48	27
127	https://celestine.name	43	30
182	https://dorcas.biz	43	28
123	http://shannon.org	42	31
30	http://kenny.com	41	30
52	https://hershel.com	41	30
61	https://dejon.name	41	24
147	https://adela.com	41	34
174	https://delbert.net	41	30
192	https://anahi.info	41	29

photo_id	photo_url	likes_count	comments_count
175	https://norval.com	28	35
247	https://helmer.org	28	39
251	https://elyssa.biz	28	24
8	http://malvina.org	27	38
50	http://zena.com	27	34
139	https://seamus.org	27	26
238	http://adela.com	27	30
195	http://marcellus.info	26	33
1	http://elijah.biz	25	25
223	http://howard.net	25	32

Insights:

1. **Engagement Correlation with Content**: The photos with higher like and comment counts (e.g., photos with 48 likes and 27 comments) tend to have a more significant level of engagement. This suggests that content quality and relatability can drive higher interactions. Photos related to popular themes (e.g., beauty, fashion, food, events) often garner more interaction from users.

2. **Consistency in User Engagement**: Users who consistently engage with content across different posts (high like and comment counts) may represent a more active audience. For example, some users engage consistently with photos showing **party themes**, **landscapes**, or **outdoor events**, indicating that specific content types may be more appealing to different audience segments.

3. **Optimal Post Performance**: Certain photos consistently receive high engagement (e.g., multiple photos with **40+ likes** and **30+ comments**). This suggests that content such as well-shot, dynamic images or those with universal appeal (e.g., landscapes, parties, food) tends to perform better in terms of engagement. These types of posts may trigger higher interaction rates across multiple user groups.

Recommendations:

1. **Content Personalization for Higher Engagement**: Leverage the content types (e.g., **party**, **landscape**, **food**) that consistently receive higher engagement. By personalizing campaigns around these themes and tailoring them to specific audience segments,

marketers can increase the likelihood of user interaction and engagement.

2. **Enhance Visual Appeal with High-Engagement Formats**: Focus on content that has been shown to drive interaction, such as high-quality photos or visually striking images of **events**, **outdoor scenes**, or **trendy themes** like **fashion**. Using vibrant, attractive visuals can help maintain audience interest and boost both likes and comments.

3. **Target Active Users for Advocacy Campaigns**: Users with high interaction levels (high likes and comments) are likely to be brand advocates or highly engaged consumers. Target these users for exclusive promotions, loyalty programs, or user-generated content campaigns, encouraging them to create content that can be shared, enhancing both engagement and brand awareness.

10. Calculate the total number of likes, comments, and photo tags for each user.

The table below is a snippet of the output we obtained, displaying the user ID, username, number of likes, number of comments, and the number of tags used by each user.

The query used to get the output –
SELECT user_id, username, SUM(likes_count) AS likes_count, SUM(comments_count) AS comments_count, SUM(tags_count) AS tags_count
FROM (
        SELECT u.id AS user_id, u.username, p.id AS photo_id, COUNT(DISTINCT l.user_id) AS likes_count, COUNT(DISTINCT c.id) AS comments_count, COUNT(DISTINCT tag_id) AS tags_count
        FROM users u
        LEFT JOIN photos p ON u.id = p.user_id
        LEFT JOIN likes l ON p.id = l.photo_id
        LEFT JOIN comments c ON p.id = c.photo_id
        LEFT JOIN photo_tags pt ON p.id = pt.photo_id
        GROUP BY 1, 2, 3
) dt
GROUP BY 1, 2;

user_id	username	likes_count	comments_count	tags_count
1	Kenton_Kirlin	168	142	18
2	Andre_Purdy85	127	119	13
3	Harley_Lind18	132	117	7
4	Arely_Bogan63	106	77	2
5	Aniya_Hackett	0	0	0
6	Travon.Waters	173	139	8
7	Kasandra_Homenick	0	0	0
8	Tabitha_Schamberger11	137	119	13
9	Gus93	130	126	11
10	Presley_McClure	105	90	10

Based on the total number of likes, comments, and photo tags for each user, here are the insights and recommendations:

1. **Active Users Drive Higher Engagement:**

   ○ Users with higher levels of likes, comments, and tags (e.g., *Eveline95*, *Clint27*, *Cesar93*) have significantly more interaction on their photos, indicating strong user engagement. Leveraging content that encourages these interactions (such as calls to action, contests, or emotional connections) can amplify brand visibility and community involvement.

2. **Inactive or Low Engagement Users Should Be Nurtured:**

   ○ Users with zero activity (e.g., *Aniya_Hackett, Kasandra_Homenick, Jaclyn81*) represent missed opportunities for engagement. Brands can focus on re-engaging these users through targeted campaigns, personalized content, or incentives to boost participation and brand loyalty.

3. **Content Tailored to User Activity Levels:**

○ Users with moderate activity (e.g., *Tomas.Beatty93*, *Imani_Nicolas17*) could benefit from more tailored content strategies, such as sharing more interactive or relatable posts to spark additional engagement. This could include using trending tags, personalized messages, or exclusive offers to motivate participation and increase their engagement levels.

11. Rank users based on their total engagement (likes, comments, shares) over a month.

The following table is a snippet of the output, displaying the month, user ID, username, total engagement, and engagement rank. The data is sorted in descending order based on total engagement.

SELECT DATE_FORMAT(p.created_dat, '%Y-%m') AS `month`,
u.id AS user_id,
u.username,
(COUNT(DISTINCT l.photo_id) + COUNT(DISTINCT c.id)) AS total_engagement,
RANK() OVER(PARTITION BY DATE_FORMAT(p.created_dat, '%Y-%m') ORDER BY (COUNT(DISTINCT l.photo_id) + COUNT(DISTINCT c.id)) DESC) AS engagement_rank
FROM users u
LEFT JOIN photos p ON u.id = p.user_id
LEFT JOIN likes l ON u.id = l.user_id AND p.created_dat = l.created_at
LEFT JOIN comments c ON u.id = c.user_id AND p.created_dat = c.created_at
WHERE DATE_FORMAT(p.created_dat, '%Y-%m') IS NOT NULL
GROUP BY 1, 2, 3;

month	user_id	username	total_engagement	engagement_rank
2024-12	17	Norbert_Carroll35	83	1
2024-12	63	Elenor88	80	2
2024-12	15	Billy52	77	3
2024-12	67	Emilio_Bernier52	76	4
2024-12	84	Alysa22	76	4
2024-12	96	Keenan.Schamberger60	75	6
2024-12	87	Rick29	74	7
2024-12	43	Janet.Armstrong	72	8
2024-12	60	Sam52	72	8
2024-12	100	Javonte83	70	10
2024-12	26	Josianne.Friesen	69	11
2024-12	50	Gerard79	69	11
2024-12	69	Karley_Bosco	69	11
2024-12	70	Erick5	69	11
2024-12	12	Dereck65	68	15

Based on the ranking of users by total engagement (likes, comments, shares) over the month, here are the insights and recommendations:

1. **High Engagement Drives Community Influence:**

   o Users like *Norbert_Carroll35*, *Elenor88*, and *Billy52* who rank at the top for engagement are likely to have a stronger influence on their respective communities. These users can serve as brand advocates or content creators to further enhance brand visibility and foster deeper engagement across the platform.

2. **Focused Engagement Strategies for Moderate Performers:**

   o A large number of users, such as *Harley_Lind18*, *Delpha.Kihn*, and *Lennie_Hartmann40*, have moderate engagement scores (around 67). These users should be encouraged with targeted content and interactions to improve their engagement, which could include personalized posts, promotions, or involving them in user-driven campaigns.

3. Re-engagement for Low Engagement Users:

○ Several users (e.g., *Kenton_Kirlin*, *Eveline95*, *Cesar93*) show no engagement over the month. To increase their activity, consider re-engagement strategies like sending personalized messages, reminders, or exclusive offers to prompt participation and stimulate interest. Additionally, identifying and addressing any barriers to engagement (content quality, timing, relevance) will be key to improving their participation.

12. Retrieve the hashtags that have been used in posts with the highest average number of likes. Use a CTE to calculate the average likes for each hashtag first.

post_id	hashtags
▶ 145	fun,party,concert,drunk,smile

The table above displays the hashtags used in posts with the highest average number of likes.

The query used to generate this output –

WITH highest_avg_likes AS (
   SELECT post_id
   FROM (
      SELECT p.id AS post_id, avg_likes, RANK() OVER(ORDER BY avg_likes DESC) AS ranking
      FROM photos p

```
        LEFT JOIN (
            SELECT photo_id, COUNT(user_id) / (SELECT COUNT(DISTINCT user_id) FROM
photos) AS avg_likes
            FROM likes
            GROUP BY 1
        ) l ON p.id = l.photo_id
            ) dt
    WHERE ranking = 1
)
SELECT al.post_id, GROUP_CONCAT(t.tag_name) AS hashtags
FROM highest_avg_likes al
JOIN photo_tags pt ON al.post_id = pt.photo_id
JOIN tags t ON pt.tag_id = t.id
GROUP BY 1;
```

The query according to the question –
```
WITH tag_likes AS (
    SELECT t.id AS tag_id,
    tag_name,
    pt.photo_id,
    COUNT(DISTINCT l.user_id) AS total_likes,
    AVG(COUNT(DISTINCT l.user_id)) OVER(PARTITION BY t.id) AS avg_likes
    FROM tags t
    LEFT JOIN photo_tags pt ON t.id = pt.tag_id
    JOIN likes l ON l.photo_id = pt.photo_id
    GROUP BY 1, 2, 3
)
SELECT DISTINCT tag_id, tag_name
FROM tag_likes
WHERE avg_likes IN (SELECT MAX(avg_likes) FROM tag_likes)
ORDER BY 1;
```

Insights:

- **High engagement with specific hashtags**: The post with the ID 145 contains hashtags such as "fun," "party," "concert," "drunk," and "smile," which are likely associated with events or experiences that resonate well with audiences, leading to higher engagement and likes.
- **Trending themes**: The hashtags used reflect themes around fun social activities, indicating that content related to social gatherings, parties, and lifestyle events tends to receive higher average engagement.

- **Potential content strategy**: Posts with these hashtags could cater to a younger, social-media-savvy audience who are likely to engage with fun, celebratory, or relatable content.

Recommendations:

- **Use more event-related hashtags**: For higher engagement, incorporate hashtags related to events, parties, or lifestyle activities like "concert," "party," or "fun," which appear to attract more likes.
- **Monitor and adapt to trending topics**: Regularly analyze trending hashtags in your niche or industry and integrate them into posts to increase the chance of higher engagement and visibility.
- **Test combinations of hashtags**: Experiment with combining popular event and lifestyle hashtags with niche-specific ones to see if you can further enhance engagement and discover which combinations resonate best with your audience.

13. Retrieve the users who have started following someone after being followed by that person.

We received an empty table for this because all the dates in the followers table are identical, indicating that everyone followed each other at the same time, which is unrealistic.

The query used to generate this output –

```
SELECT f1.follower_id AS followed_back, f1.followee_id AS original_follower
FROM follows f1
JOIN follows f2
  ON f1.follower_id = f2.followee_id
  AND f1.followee_id = f2.follower_id
  AND f1.created_at > f2.created_at;
```

	followed_back	original_follower

Subjective Question:

1. Based on user engagement and activity levels, which users would you consider the most loyal or valuable? How would you reward or incentivize these users?

To determine the most loyal or valuable users based on engagement and activity levels, we can assess the users based on their **user engagement**, which takes into account the number of posts, likes, and comments. Higher engagement typically indicates users who are actively interacting with the platform.

Here is a breakdown of each user's engagement:

1. **Keenan.Schamberger60**:

   ○ Posts: 3

- Likes: 98
- Comments: 75
- Total Engagement: 176

2. **Rick29**:

- Posts: 4
- Likes: 92
- Comments: 74
- Total Engagement: 170

3. **Josianne.Friesen**:

- Posts: 5
- Likes: 94
- Comments: 69
- Total Engagement: 168

4. **Elenor88**:

- Posts: 4
- Likes: 83
- Comments: 80
- Total Engagement: 167

5. **Karley_Bosco**:

- Posts: 1
- Likes: 97
- Comments: 69
- Total Engagement: 167

Identifying the Most Loyal or Valuable Users:

- Based on the total engagement, **Keenan.Schamberger60** is the most engaged user with 176 total engagement points. The number of posts, likes, and comments suggests they are actively contributing to the community.
- The second-highest engagement is **Rick29** with 170, followed by **Josianne.Friesen** with 168.

How to Reward or Incentivize These Users:

1. **Recognition and Appreciation**: Publicly acknowledge top users like Keenan.Schamberger60 for their consistent engagement. This could include shout-outs or featuring them in platform newsletters.

2. **Exclusive Rewards**:
   - **Access to Premium Features**: Offer free or discounted access to special features or content for top users like Keenan.Schamberger60.
   - **Badges/Title System**: Create special badges or titles (e.g., "Top Contributor") that appear next to the username to highlight loyal users.
3. **Discounts and Offers**: Provide personalized discounts or offers, either for products, services, or even digital goods like avatar customization.

4. **Invites to Exclusive Events**: Invite top users to special events such as beta testing, exclusive live streams, or Q&A sessions with influencers or brand ambassadors.

5. **Gamification**: Implement a point or rewards system where users earn points for every post, comment, or like they give, and exchange these points for tangible rewards or benefits.

6. **Feature Content**: Give these users the opportunity to have their content highlighted on the platform, giving them additional visibility and recognition.

These strategies would help reinforce their behavior, create a sense of belonging, and keep them engaged and loyal to the platform.

The query used to get the output is –
WITH cte AS (
    SELECT u.id AS user_id,
        u.username,
        COUNT(DISTINCT p.id) AS posts_count,
        COUNT(DISTINCT l.photo_id) AS likes_count,

```
        COUNT(DISTINCT c.id) AS comments_count,
        COUNT(DISTINCT p.id) + COUNT(DISTINCT l.photo_id) + COUNT(DISTINCT c.id)
AS user_engagement,
        DENSE_RANK() OVER(ORDER BY COUNT(DISTINCT p.id) + COUNT(DISTINCT
l.photo_id) + COUNT(DISTINCT c.id) DESC) AS drank
  FROM users u
  LEFT JOIN photos p ON u.id = p.user_id
  LEFT JOIN likes l ON u.id = l.user_id
  LEFT JOIN comments c ON u.id = c.user_id
  GROUP BY 1, 2
)
SELECT user_id, username, posts_count, likes_count, comments_count, user_engagement
FROM cte
WHERE drank BETWEEN 1 AND 5 AND posts_count > 0;
```

user_id	username	posts_count	likes_count	comments_count	user_engagement
87	Rick29	4	92	74	170
26	Josianne.Friesen	5	94	69	168
63	Elenor88	4	83	80	167
69	Karley_Bosco	1	97	69	167

2. For inactive users, what strategies would you recommend to re-engage them and encourage them to start posting or engaging again?

To re-engage inactive users and encourage them to start posting or engaging again, it's crucial to understand the reasons for their inactivity and use strategies that can help them reconnect with the platform. The users you've listed seem to fall into various levels of inactivity, ranging from those who have made a few posts but are not engaging actively, to those who haven't posted at all.

Here are some **strategies to re-engage inactive users**:

1. Personalized Re-engagement Messages

- Send a **personalized email or push notification** encouraging users to come back. Acknowledge their past contributions (e.g., "We miss your posts, [username]! Come back and share your thoughts with us.") and offer suggestions for engaging with the community, like liking or commenting on recent posts.

2. Targeted Incentives or Rewards

- **Offer exclusive incentives** to inactive users to incentivize them to return. For example:
  - **Discounts, coupons, or free content** for users who make a post or engage with content in the next week.
  - **Achievement badges or points**: Introduce a system where users earn rewards for engaging (posting, liking, commenting). This will give them a sense of accomplishment.
  - **Raffles/Contests**: Hold a contest where users who engage within a specific timeframe are entered into a raffle to win a prize.

3. Gamification of Engagement

- **Introduce challenges or campaigns** where users can participate by posting or engaging on specific themes or topics. For example, "Post a photo or share a thought about [Topic] this week, and you could win [Prize]."
- Create **daily/weekly engagement streaks** (similar to social media platforms like Duolingo), where users are encouraged to engage at least once per day or week to earn rewards.

4. Simplify Content Creation

- Many inactive users might feel overwhelmed or unsure about what to post. To make it easier:
  - Provide **suggested content** or prompts. For instance, "Share your favorite book, or tell us what you've been up to recently!" or "Have a quick thought? Share it with us!"
  - **Introduce templates** or easy-to-use features, like one-click posting, polls, or sharing simple status updates, to lower the barriers to re-engagement.

Example of Targeting Specific Inactive Users:

- **Kasandra_Homenick, Tierra.Trantow, Pearl7**: These users have zero posts or engagement, so offering them a **welcome-back message** with a **simple prompt** like, "Hey, we miss your presence! Share something small, like a favorite quote or a photo!" can be a non-intimidating re-entry point.
- **Odessa2, Granville_Kutch, Mariano_Koch3**: These users have posted once but haven't continued. You could send a message like, "We saw your first post—why not continue and share another? Here's something you might like to engage with: [recent post/content]."

These strategies are aimed at encouraging users to feel involved again by offering them easy ways to interact, rewards for re-engaging, and clear benefits for their participation. The key is to make the process as rewarding and simple as possible, without overwhelming them.

The query used to get the output –

```
WITH cte AS (
   SELECT u.id AS user_id,
       u.username,
       COUNT(DISTINCT p.id) AS posts_count,
       COUNT(DISTINCT l.photo_id) AS likes_count,
       COUNT(DISTINCT c.id) AS comments_count,
        COUNT(DISTINCT p.id) + COUNT(DISTINCT l.photo_id) + COUNT(DISTINCT c.id)
AS user_engagement,
         DENSE_RANK() OVER(ORDER BY COUNT(DISTINCT p.id) + COUNT(DISTINCT
l.photo_id) + COUNT(DISTINCT c.id)) AS drank
   FROM users u
   LEFT JOIN photos p ON u.id = p.user_id
   LEFT JOIN likes l ON u.id = l.user_id
   LEFT JOIN comments c ON u.id = c.user_id
   GROUP BY 1, 2
)
SELECT user_id, username, posts_count, likes_count, comments_count, user_engagement
FROM cte
WHERE drank BETWEEN 1 AND 10
ORDER BY 1;
```

user_id	username	posts_count	likes_count	comments_count	user_engagement
1	Kenton_Kirlin	5	0	0	5
7	Kasandra_Homenick	0	0	0	0
18	Odessa2	1	82	53	136
23	Eveline95	12	0	0	12
25	Tierra.Trantow	0	0	0	0
29	Jaime53	8	0	0	8
34	Pearl7	0	0	0	0
45	David.Osinski47	0	0	0	0
48	Granville_Kutch	1	75	55	131
49	Morgan.Kassulke	0	0	0	0
51	Mariano_Koch3	5	0	0	5
53	Linnea59	0	0	0	0
58	Aurelie71	8	0	0	8
59	Cesar93	10	0	0	10
64	Florence99	5	0	0	5
68	Franco_Keebler64	0	0	0	0
74	Hulda.Macejkovic	0	0	0	0
77	Donald.Fritsch	6	0	0	6
80	Darby_Herzog	0	0	0	0
81	Esther.Zulauf61	0	0	0	0
83	Bartholome.Bernhard	0	0	0	0
86	Delfina_VonRuede...	9	0	0	9
88	Clint27	11	0	0	11
89	Jessyca_West	0	0	0	0
90	Esmeralda.Mraz57	0	0	0	0

3. Which hashtags or content topics have the highest engagement rates? How can this information guide content strategy and ad campaigns?

The provided data on hashtags and their engagement metrics reveals key insights into the types of content that generate the highest levels of user interaction. Let's

analyze the data and explore how these insights can inform content strategy and advertising campaigns.

Highest Engagement Rate Hashtags

The hashtags with the highest engagement rates are:

1. **photography** – Engagement rate: 4771.14
2. **sunset** – Engagement rate: 4644.91
3. **landscape** – Engagement rate: 4605.01
4. **sunrise** – Engagement rate: 4415.97
5. **beach** – Engagement rate: 4270.82

These hashtags have high engagement rates relative to the total number of posts and interactions they receive. Engagement rate is typically calculated as a function of likes, comments, and the number of posts, which provides an indicator of how active users are with these tags.

Key Insights for Content Strategy and Ad Campaigns

1. **Focus on High Engagement Topics**: Hashtags like **photography**, **sunset**, and **landscape** generate significant engagement despite having a moderate number of posts. This suggests that content focusing on these themes might resonate deeply with users. Content creators and advertisers can develop targeted campaigns around visually captivating themes such as sunsets, landscapes, and photography, which are inherently shareable and likely to receive higher interaction.

2. **Leverage Lifestyle and Emotional Appeal**: Hashtags like **beach**, **dreamy**, and **stunning** resonate well because they evoke specific emotions or lifestyle aspirations. These kinds of hashtags can be used effectively for lifestyle and travel-related content, creating a sense of escapism or beauty that can lead to higher user engagement. For advertisers, focusing on emotional resonance in their creative campaigns could drive more meaningful interactions.

3. **Optimize Hashtags for Specific Audiences**: Themes such as **fashion**, **food**, and **party** suggest that users in these categories engage more frequently with

content. Ad campaigns could be tailored toward these niches, using specific hashtag combinations (e.g., **fashion** and **style**) to reach audiences more interested in those categories. For example, brands could leverage these hashtags for seasonal promotions or collaborations with influencers in the fashion and food industries.

4. **Maximize Impact with Combined Hashtags**: Combining high-engagement hashtags like **sunset** or **landscape** with more trending or niche hashtags (e.g., **fashion** or **beach**) could further amplify reach. The right mix of broad and specific hashtags ensures content reaches both general audiences and niche communities, improving overall campaign performance.

5. **Understand the Role of Frequency**: Hashtags with lower engagement rates like **foodie** and **happy** still generate a significant volume of posts, but their engagement rates are relatively lower. While these hashtags still have substantial total interactions, they may represent more competitive spaces where it's harder to stand out. Brands might need to refine their messaging or adopt unique visual strategies to capture user attention in these crowded categories.

6. **Ad Campaign Focus**: Based on these insights, ad campaigns should prioritize content themes with higher engagement rates (e.g., **photography**, **sunset**, **beach**) to ensure better visibility and interaction. A brand focused on beachwear could create ads around **beach** and **sunset** hashtags, while a photography brand could align with **photography** and **landscape** to engage users interested in visual content.

Conclusion

The highest engagement hashtags—especially in the categories of **photography**, **sunset**, **landscape**, and **beach**—indicate where content and ad campaigns are most likely to capture user interest. By focusing on visually appealing and emotionally engaging themes, brands and content creators can optimize their strategies to align

with what users are interacting with most, ensuring higher engagement, reach, and conversion rates in both organic and paid campaigns.

```sql
with hashtag_engagement as (
  select
    t.tag_name,
    sum(l.photo_id) as total_likes,
    sum(c.id) as total_comments,
    count(pt.photo_id) as num_posts,
    (sum(l.photo_id) + sum(c.id)) / count(pt.photo_id) as engagement_rate
  from
    photo_tags pt
  join
    tags t on pt.tag_id = t.id
  left join
    likes l on pt.photo_id = l.photo_id
  left join
    comments c on pt.photo_id = c.photo_id
  group by
    t.tag_name
)
select
  tag_name,
  total_likes,
  total_comments,
  num_posts,
  engagement_rate
from
  hashtag_engagement
order by
  engagement_rate desc;
```

tag_name	total_likes	total_comments	num_posts	engagement_rate
photography	2597278	75568239	16383	4771.1358
sunset	3042270	88425271	19692	4644.9086
landscape	2614719	75978996	17067	4605.0105
sunrise	2469970	71802148	16819	4415.9652
beach	5958590	173138355	41935	4270.8226
style	2370351	68646997	16917	4197.9871
dreamy	2690910	78168335	20077	4027.4565
fashion	2432189	70447211	18470	3945.8257
stunning	2136678	61980726	16335	3925.1548
concert	2964822	86004237	23065	3857.3188
delicious	2014807	58491851	15876	3811.2029
party	4873761	141085285	38939	3748.4025
hair	2803663	81115743	22602	3712.9195
food	2937866	85180115	24619	3579.2673
beauty	2490926	72322611	21058	3552.7371
smile	6728197	194883211	59199	3405.6556
fun	4033316	116798360	37145	3252.9728
drunk	2008731	58154804	18678	3221.0909
lol	2541292	73535693	23643	3217.7382
foodie	1146708	33211034	11382	3018.6032
happy	2165371	62614187	21620	2996.2793

4.   Are there any patterns or trends in user engagement based on demographics (age, location, gender) or posting times? How can these insights inform targeted marketing campaigns?

The below table shows user engagement patterns (photos posted, likes received, and comments made) by day of the week and hour of the day.

Key patterns and marketing insights based on the observation table –

      i.   **Peak Engagement Times:**

      ·   Afternoon (11 AM to 12 PM) and evening (4 PM to 7 PM, 9 PM and 11 PM) are high engagement periods for photos, likes, and comments.

      ii.   **Day of the Week Trends:**

      ·   High activity on Tuesday and Thursday, with sustained engagement on Sunday and Monday. There is a dip on Friday and Wednesday.

      iii.   **Late-Night Activity:**

      ·   Strong engagement from 1 AM to 3 AM.

      iv.   **Marketing Insights:**

      ·   Schedule campaigns for peak times, particularly in the afternoon and evening on high-engagement days (Tuesday, Thursday, Sunday).

      ·   Utilize late-night activity windows with promotions or interactive content, especially early in the week and late on Wednesday.

      ·   Leverage weekend engagement (Saturday and Sunday) for brand awareness campaigns or targeted ads.

The query used to get the output –

```
SELECT
    WEEKDAY(u.created_at) AS day_of_week,
    EXTRACT(HOUR FROM u.created_at) AS hour_of_day,
    COUNT(DISTINCT p.id) AS total_photos_posted,
    COUNT(DISTINCT l.user_id) AS total_likes_received,
    COUNT(DISTINCT c.id) AS total_comments_made
FROM users u
LEFT JOIN photos p
        ON u.id = p.user_id
LEFT JOIN likes l
    ON p.id = l.photo_id
LEFT JOIN comments c
    ON p.id = c.photo_id
WHERE EXTRACT(HOUR FROM p.created_dat) is not null
GROUP BY
    day_of_week,
    hour_of_day
ORDER BY
    day_of_week,
    Hour_of_day;
```

day_of_week	hour_of_day	total_photos_posted	total_likes_received	total_comments_made
0	2	5	66	143
0	12	5	69	141
0	14	6	69	170
0	17	2	46	55
0	18	3	61	89
0	22	5	70	136
0	23	12	76	329
1	6	8	76	242
1	9	6	71	179
1	11	4	62	117
1	12	15	77	448
1	15	2	50	62
1	16	10	77	308
1	19	3	58	88
1	21	4	64	126
1	22	1	34	24
2	0	1	39	26
2	1	2	48	57
2	2	1	41	24
2	14	4	61	115
2	17	6	74	175
2	21	3	50	92
2	23	1	36	29
3	1	4	66	117
3	3	2	51	53
3	7	9	75	267
3	9	1	33	26
3	11	4	67	118
3	13	1	29	30
3	16	5	69	147
3	18	5	67	142
3	20	1	28	35
3	21	11	76	299
3	22	2	43	58
3	23	5	69	145
4	3	5	60	146
4	11	4	65	132

4	13	3	53	87
4	18	1	36	31
4	19	9	75	272
4	21	2	44	59
4	23	2	52	67
5	0	5	72	142
5	1	3	61	77
5	2	4	61	119
5	3	1	35	29
5	7	5	66	141
5	10	6	73	174
5	11	2	41	47
5	18	2	49	56
5	21	4	61	121
6	1	4	64	123
6	3	1	37	34
6	5	5	68	151
6	7	2	46	51
6	13	5	69	139
6	14	3	56	98
6	16	3	57	90
6	17	6	70	174
6	18	11	77	316

5. Based on follower counts and engagement rates, which users would be ideal candidates for influencer marketing campaigns? How would you approach and collaborate with these influencers?

Based on the data provided, the users with the highest engagement rates and follower counts would be ideal candidates for influencer marketing campaigns. Let's break down the metrics and see which influencers stand out.

Key Metrics:

- **Engagement Rate**: The percentage of followers interacting with content. A higher engagement rate suggests a more active and interested audience.
- **Follower Count**: The total number of followers. While follower count is important, it needs to be considered alongside engagement rate for a more balanced view.
- **Weighted Score**: This score appears to combine both engagement rate and follower count. A higher score is a sign of a better overall potential for influencer marketing.

Top Candidates:

1. **Eveline95**
   - **Engagement Rate**: 0.0726
   - **Follower Count**: 77
   - **Weighted Score**: 30.84356
2. **Clint27**
   - **Engagement Rate**: 0.0666
   - **Follower Count**: 77
   - **Weighted Score**: 30.83996
3. **Cesar93**
   - **Engagement Rate**: 0.0605
   - **Follower Count**: 77
   - **Weighted Score**: 30.8363

These three influencers stand out in terms of engagement rate, and all of them have the same follower count, so they are likely to provide the best return on investment for a campaign.

Approach to Collaborating with These Influencers:

1. **Reach Out Personally**:

- Contact them through direct messaging or email (depending on platform preferences). Personalize the message by mentioning their specific engagement, content style, and how their audience aligns with the brand's values or products.
- Highlight the benefits of collaboration, such as the opportunity for exposure, commission, or free products.
2. **Develop Authentic Partnerships**:
   - Make sure the campaign feels authentic. Don't push too hard for sales; instead, allow the influencer to present the product in a way that feels natural to their content and audience.
   - Suggest creative freedom for content creation. Influencers often know best how to engage their followers.
3. **Offer Exclusive Deals or Discounts**:
   - Provide exclusive discount codes or affiliate links to incentivize both the influencer and their audience.
   - Give them a sneak peek or early access to new products, which can generate buzz and excitement.
4. **Align with Their Personal Brand**:
   - Ensure that the product or service you're marketing aligns with the influencer's niche and personal brand. For example, if one of them frequently shares fitness content, offer products that fit within that category (e.g., supplements, activewear, etc.).

The query used for the output –
```
WITH cte AS (
  SELECT username, engagement_rate, follower_count,
      (engagement_rate * 0.6 + follower_count * 0.4) AS weighted_score
  FROM (
    SELECT u.id AS user_id, u.username,
      (COALESCE(posts_count,    0)    +    COALESCE(likes_count,    0)    +
COALESCE(comments_count, 0)) * 100 /
      SUM((COALESCE(posts_count,    0)    +    COALESCE(likes_count,    0)    +
COALESCE(comments_count, 0))) OVER() AS engagement_rate,
      follower_count
    FROM users u
    LEFT JOIN (
      SELECT user_id, COUNT(*) AS posts_count
      FROM photos
      GROUP BY user_id
    ) p ON u.id = p.user_id
    LEFT JOIN (
      SELECT user_id, COUNT(DISTINCT photo_id) AS likes_count
```

```
        FROM likes
        GROUP BY user_id
    ) l ON u.id = l.user_id
    LEFT JOIN (
        SELECT user_id, COUNT(*) AS comments_count
        FROM comments
        GROUP BY user_id
    ) c ON u.id = c.user_id
    LEFT JOIN (
        SELECT followee_id, COUNT(DISTINCT follower_id) AS follower_count
        FROM follows
        GROUP BY followee_id
    ) f2 ON u.id = f2.followee_id
        ) dt
)
SELECT username, engagement_rate, follower_count, weighted_score
FROM cte
WHERE follower_count = (select max(follower_count) from cte) and engagement_rate > 0
ORDER BY weighted_score DESC;
```

username	engagement_rate	follower_count	weighted_score
Eveline95	0.0726	77	30.84356
Clint27	0.0666	77	30.83996
Cesar93	0.0605	77	30.83630
Delfina_VonRueden68	0.0545	77	30.83270
Jaime53	0.0484	77	30.82904
Aurelie71	0.0484	77	30.82904
Donald.Fritsch	0.0363	77	30.82178
Kenton_Kirlin	0.0303	77	30.81818
Mariano_Koch3	0.0303	77	30.81818
Florence99	0.0303	77	30.81818

6. Based on user behavior and engagement data, how would you segment the user base for targeted marketing campaigns or personalized recommendations?

The data you've provided offers key insights into user behavior and engagement, which can be used to effectively segment the user base for targeted marketing campaigns or personalized recommendations. Here's a breakdown of how we can segment these users based on engagement levels and content preferences:

1. High Engagement Segment

Characteristics:

- These users are very active and interact with a wide range of content. They engage with multiple hashtags and consistently participate in various topics.
- Examples of tags used: **sunset**, **landscape**, **beach**, **fun**, **smile**, **party**, **food**, **photography**, **fashion**, **happy**.

Actionable Insights for Targeting:

- **Content Strategy**: This group appreciates diverse, visually appealing, and emotionally engaging content. Brands can create dynamic, cross-niche content that incorporates multiple themes like nature, lifestyle, fashion, and food.
- **Campaigns**: Tailor campaigns that showcase aspirational lifestyle visuals, such as travel destinations (**beach**, **sunset**), fashion trends (**style**, **hair**, **fashion**), and fun moments (**party**, **concert**, **fun**). Use interactive content like polls, contests, and challenges to maintain their high engagement.
- **Personalized Recommendations**: Suggest content or products that combine their interests (e.g., travel packages for sunset and beach lovers, fashion collections for party-goers, or food and drink recommendations for foodies).
- **Influencer Collaborations**: Collaborate with influencers who resonate with multiple interests, using tags like **food**, **fashion**, **beach**, and **party**, to engage this group effectively.

Example Users:

- **Rick29**: Engaged with a wide variety of hashtags such as **delicious**, **lol**, **happy**, **sunset**, and **photography**, showing interest in diverse content.

- **Josianne.Friesen**: Active in tags like **sunset**, **landscape**, **food**, and **fashion**, making her a good candidate for mixed-content campaigns like lifestyle or seasonal fashion collections.

2. Low Engagement Segment

Characteristics:

- These users engage less frequently and with fewer hashtags. They are more selective in their content interaction.
- Examples of tags used: **photography**, **beach**, **food**, **fashion**, **party**, **lol**, **sunset**.

Actionable Insights for Targeting:

- **Content Strategy**: The low engagement group tends to focus on specific, niche interests, so content should be more specialized and relevant to their particular preferences. Content should be more precise and catered to their established interests.
- **Campaigns**: Run targeted, limited-run campaigns focused on specific themes (e.g., a photography contest or a special offer for beachwear). Use compelling visuals to appeal to these niche interests.
- **Personalized Recommendations**: Recommend products or content that closely match their top interests. For example, if a user frequently engages with **sunset** and **landscape** content, recommend travel-related content or photography tools. For those who focus on **food** and **party**, provide recipe suggestions or party-themed products.
- **Re-engagement Strategy**: Offer exclusive content or promotions (e.g., discounts, early access) that incentivize low-engagement users to interact more frequently.

Example Users:

- **Kelsi26**: Engages mainly with **photography**. A campaign focused on new photography gear or photography tutorials would appeal to this user.
- **Erick5**: Interested in **party** and **concert** content, ideal for campaigns related to event promotions or party supplies.

3. Content Preferences-Based Segmentation

In addition to engagement levels, we can segment users based on their content preferences. By grouping users into thematic clusters, we can design highly personalized content strategies.

a. Nature and Photography Enthusiasts

- **Key Tags**: **sunset**, **landscape**, **beach**, **photography**, **sunrise**.
- **Target Audience**: Users who enjoy visual and nature-related content. Ideal for travel, photography, and adventure brands.
- **Example Users**: Rick29, Josianne.Friesen, Delfina_VonRueden68.

b. Lifestyle and Fashion Enthusiasts

- **Key Tags**: **fashion**, **style**, **hair**, **beauty**.
- **Target Audience**: Users interested in fashion, beauty, and lifestyle content. Perfect for fashion brands, beauty products, and influencer marketing.
- **Example Users**: Aurelie71, Erick5, Karley_Bosco.

c. Food and Party Enthusiasts

- **Key Tags**: **food**, **party**, **fun**, **delicious**, **foodie**.
- **Target Audience**: Focus on food and beverage campaigns, party supplies, and event promotions. Also suitable for lifestyle brands that align with social occasions.
- **Example Users**: Tabitha_Schamberger11, Billy52, Erick5.

d. Humorous and Fun-Loving Users

- **Key Tags**: **lol**, **fun**, **smile**, **happy**.
- **Target Audience**: A group interested in entertainment and humorous content. Marketing campaigns for entertainment platforms, comedy events, or lighthearted brand messaging could engage this group.

- **Example Users**: Emilio_Bernier52, Delfina_VonRueden68, Rick29.

Conclusion

By analyzing user behavior and segmenting based on **engagement levels** and **content preferences**, we can develop targeted marketing campaigns that speak directly to each segment's interests.

- **High engagement users** should receive campaigns that appeal to a broad range of topics, with the goal of further increasing their interaction and loyalty.
- **Low engagement users** need more focused, relevant content to encourage deeper interaction.
- **Content preference-based segments** allow for personalized recommendations, whether targeting travel, fashion, food, or entertainment interests.

This segmentation approach ensures that marketing efforts are more efficient, increasing both engagement and conversion rates across the different user groups.

```
The query used to get the output –
WITH user_engagement AS (
  SELECT
    u.id AS user_id,
    u.username,
              COALESCE(p.engagement,  0)  +  COALESCE(l.engagement,  0)  +
COALESCE(c.engagement, 0) AS engagement,
    COALESCE(t.tag_count, 0) AS tag_count
  FROM
    users u
  LEFT JOIN (
    SELECT user_id, COUNT(DISTINCT id) AS engagement
    FROM photos
    GROUP BY user_id
      ) p ON u.id = p.user_id
  LEFT JOIN (
    SELECT user_id, COUNT(DISTINCT photo_id) AS engagement
    FROM likes
    GROUP BY user_id
```

```sql
        ) l ON u.id = l.user_id
    LEFT JOIN (
        SELECT user_id, COUNT(DISTINCT id) AS engagement
        FROM comments
        GROUP BY user_id
            ) c ON u.id = c.user_id
    LEFT JOIN (
                        SELECT u.id AS user_id,
        COUNT(DISTINCT t.tag_name) AS tag_count
        FROM
        users u
    LEFT JOIN photos p ON u.id = p.user_id
    LEFT JOIN photo_tags pt ON p.id = pt.photo_id
    LEFT JOIN tags t ON pt.tag_id = t.id
    GROUP BY u.id
            ) t ON u.id = t.user_id
),
global_max AS (
    SELECT
        MAX(engagement) AS max_engagement,
        MAX(tag_count) AS max_tag_count
    FROM user_engagement
),
user_tags AS (
    SELECT
        u.id AS user_id,
        group_concat(t.tag_name) AS tags
    FROM
        users u
    LEFT JOIN photos p ON u.id = p.user_id
    LEFT JOIN photo_tags pt ON p.id = pt.photo_id
    LEFT JOIN tags t ON pt.tag_id = t.id
    GROUP BY u.id
),
user_segments AS (
    SELECT
        e.user_id,
        e.username,
        e.engagement,
        e.tag_count,
```

```sql
    t.tags,
    CASE
        WHEN e.engagement < gm.max_engagement / 3 AND e.tag_count < gm.max_tag_count
/ 3 THEN 'Low Engagement'
            WHEN e.engagement < 2 * gm.max_engagement / 3 AND e.tag_count < 2 *
gm.max_tag_count / 3 THEN 'Moderate Engagement'
        ELSE 'High Engagement'
    END AS engagement_segment
  FROM user_engagement e
  LEFT JOIN user_tags t ON e.user_id = t.user_id
  CROSS JOIN global_max gm  -- Cross join to ensure you can use the global maximums
    GROUP BY e.user_id, e.username, e.engagement, e.tag_count, t.tags, gm.max_engagement,
gm.max_tag_count
)
SELECT *
FROM user_segments
WHERE tag_count > 0 AND tags IS NOT NULL and engagement_segment in ('High
Engagement', 'Low Engagement')
ORDER BY engagement_segment, engagement DESC;
```

user_id	username	engagement	tag_count	tags	engagement_segment
87	Rick29	170	10	delicious,lol,happy,fun,smile,sunset,photograp...	High Engagement
26	Josianne.Friesen	168	11	sunset,landscape,beach,lol,happy,hair,fashion,...	High Engagement
8	Tabitha_Schamberger11	144	10	food,foodie,delicious,fun,concert,drunk,smile,h...	High Engagement
23	Eveline95	12	13	foodie,lol,happy,fun,smile,food,delicious,hair,p...	High Engagement
86	Delfina_VonRueden68	9	13	sunset,sunrise,beauty,beach,fun,party,concer...	High Engagement
29	Jaime53	8	11	sunset,sunrise,beach,fun,happy,fun,smile,part...	High Engagement
58	Aurelie71	8	14	sunset,photography,landscape,beach,style,hai...	High Engagement
77	Donald.Fritsch	6	11	fun,concert,drunk,smile,lol,fun,sunset,photogr...	High Engagement
1	Kenton_Kirlin	5	15	fun,party,concert,drunk,smile,photography,su...	High Engagement
69	Karley_Bosco	167	3	beauty,dreamy,beach	Low Engagement
15	Billy52	165	4	beach,concert,smile,food	Low Engagement
67	Emilio_Bernier52	165	3	lol,fun,smile	Low Engagement
4	Arely_Bogan63	160	2	sunset,beach	Low Engagement
60	Sam52	160	2	food,foodie	Low Engagement
16	Annalise.McKenzie16	159	3	beauty,beach,smile,beauty	Low Engagement
22	Kenneth64	159	1	photography	Low Engagement
70	Erick5	158	2	party,concert	Low Engagement
39	Kelsi26	157	1	photography	Low Engagement
93	Willie_Leuschke	156	4	sunset,photography,landscape,beach,sunset	Low Engagement
20	Delpha.Kihn	155	2	dreamy,beach	Low Engagement
72	Kathryn80	154	3	food,foodie,sunset	Low Engagement
40	Rafael.Hickle2	154	4	style,hair,fashion,party	Low Engagement
100	Javonte83	154	3	fun,concert,drunk	Low Engagement
82	Aracely.Johnston98	153	4	photography,sunrise,beach,sunset,photography	Low Engagement
94	Damon35	153	3	food,foodie,delicious	Low Engagement
56	Peter.Stehr0	150	1	lol	Low Engagement
12	Dereck65	149	2	photography,sunrise	Low Engagement
37	Yazmin_Mills95	148	3	lol,happy,smile	Low Engagement
85	Milford_Gleichner42	146	4	style,hair,fashion,party	Low Engagement
38	Jordyn.Jacobson2	145	4	lol,beauty,stunning,dreamy	Low Engagement
55	Meggie_Doyle	145	1	food	Low Engagement
42	Maya.Farrell	144	3	stunning,beach,smile	Low Engagement
79	Katarina.Dibbert	144	2	landscape,beach	Low Engagement
61	Jayson65	142	1	happy	Low Engagement
97	Tomas.Beatty93	139	4	style,hair,fashion,lol	Low Engagement
18	Odessa2	136	1	beauty	Low Engagement
48	Granville_Kutch	131	4	style,hair,fashion,party	Low Engagement
64	Florence99	5	3	hair,party,fashion	Low Engagement

7. If data on ad campaigns (impressions, clicks, conversions) is available, how would you measure their effectiveness and optimize future campaigns?

To measure the effectiveness of ad campaigns and optimize future campaigns, we can utilize the available data on impressions, clicks, and conversions. Here's a comprehensive approach:

1. **Define Key Performance Indicators (KPIs):**

   - **Impressions:** The number of times an ad is displayed.
   - **Clicks:** The number of times an ad is clicked.
   - **Click-Through Rate (CTR):** The percentage of impressions that result in clicks (Clicks / Impressions).
   - **Conversions:** The number of desired actions taken after clicking the ad (e.g., purchases, sign-ups).
   - **Conversion Rate:** The percentage of clicks that result in conversions (Conversions / Clicks).
   - **Cost Per Click (CPC):** The average cost of each click.
   - **Cost Per Conversion (CPC):** The average cost of each conversion.
   - **Return On Ad Spend (ROAS):** The revenue generated from ad spend.

2. **Track and Analyze Data:**

   - **Utilize analytics tools:** Employ tools like Google Analytics, Facebook Ads Manager, or other platform-specific analytics to track and analyze campaign data.
   - **Monitor key metrics:** Continuously track the KPIs mentioned above to gain insights into campaign performance.
   - **Identify trends and patterns:** Analyze data over time to identify trends, seasonality, and the impact of different ad variations.

3. **Measure Campaign Effectiveness:**

   - **Evaluate against goals:** Compare actual performance to predefined campaign goals to assess overall success.
   - **Benchmark against industry standards:** Compare performance to industry benchmarks to understand relative success.
   - **Calculate ROI:** Determine the return on investment by comparing the cost of the campaign to the revenue generated.

4. **Optimize Future Campaigns:**

   - **A/B Testing:** Experiment with different ad variations (e.g., headlines, visuals, targeting) to identify the most effective elements.

- ○ **Refine targeting:** Use data to refine audience targeting to reach the most relevant users.
- ○ **Optimize bidding strategies:** Adjust bidding strategies to maximize conversions within budget constraints.
- ○ **Improve ad creatives:** Continuously test and improve ad creatives to increase engagement and conversions.
- ○ **Utilize automation:** Leverage automation tools to streamline campaign management and optimize performance.

5. **Additional Considerations:**

- ○ **Attribution Modeling:** Consider using attribution models to accurately assign credit to different touchpoints in the customer journey.
- ○ **Customer Lifetime Value (CLTV):** Evaluate the long-term value of customers acquired through ad campaigns.
- ○ **Brand Awareness:** If brand awareness is a goal, consider metrics like brand lift studies or social media engagement.

8. How can you use user activity data to identify potential brand ambassadors or advocates who could help promote Instagram's initiatives or events?

To identify potential brand ambassadors for Instagram, you can focus on the following factors:

1. **High Engagement**: Look for users with high interaction rates (likes, comments, shares) and frequent posting, especially related to Instagram campaigns or hashtags.

2. **Content Alignment**: Identify users whose content aligns with Instagram's initiatives, like photography, fashion, or travel.

3. **Social Influence**: Track users with large, active followings who have the ability to influence their audience through posts and engagement.

4. **Event Participation**: Find users who actively participate in Instagram-hosted challenges or events and create content around them.

5. **Positive Sentiment**: Look for users who share positive thoughts about Instagram and encourage others to use the platform.

6. **Long-Term Engagement**: Focus on users who engage consistently over time, especially with Instagram's campaigns and events.

By analyzing these factors, you can identify users who are likely to become effective brand ambassadors and advocates for Instagram's initiatives.

9. **How would you approach this problem, if the objective and subjective questions weren't given?**

Problem Statement: As a newly hired data analyst at Meta, you are tasked with collaborating with the Marketing team to utilize Instagram's user data for creating targeted marketing strategies aimed at increasing user engagement, retention, and acquisition. Provide insights and recommendations to address the following objectives.

Key Metrics to Focus On:

1. Followers & Following:

- **Total Followers**: Assess the influence and reach of users.
- **Total Following**: Understand users' engagement levels and content consumption patterns.

2. Posts:

- **Total Posts**: Track users' overall activity levels.
- **Categorize Posting Frequency**:
    - **High Activity**: Users who post frequently.
    - **Moderate Activity**: Users who post occasionally.
    - **Low Activity**: Users who post rarely.
    - **Non-Posters**: Users who have not posted.

- **Engagement per Post**: Evaluate likes and comments per post to measure content effectiveness.

3. Engagement (Likes & Comments):

- **Total Likes**: Measure overall content interaction and popularity.
- **Total Comments**: Assess user discussions and engagement levels.
- **Engagement Rate**: Calculate the ratio of likes and comments to followers to gauge content resonance.
- **Active Engagers**: Identify users who consistently interact with content and encourage further participation.
- **Non-Engagers**: Identify users who have not interacted (liked or commented) and target them with personalized content to boost engagement.

4. Content Types (Hashtags):

- **Hashtag Usage**: Track which hashtags users frequently use to increase visibility.
- **Engagement per Hashtag**: Measure likes and comments tied to specific hashtags to identify trending topics.
- **Encourage Hashtag Participation**: Motivate users to utilize popular or trending hashtags to expand their reach.

10.   Assuming there's a "User_Interactions" table tracking user engagements, how can you update the "Engagement_Type" column to change all instances of "Like" to "Heart" to align with Instagram's terminology

To update the **"Engagement_Type"** column in the **"User_Interactions"** table, changing all instances of "Like" to "Heart" to align with Instagram's terminology, you can use an SQL **UPDATE** statement. Here's how you can do it:

UPDATE User_Interactions

SET Engagement_Type = 'Heart'

WHERE Engagement_Type = 'Like';