**Data Analyst Technical Interview**

**Round 1 – Analytics Proposal**

**1. Group Activity Score**

* **Description**: Calculates an engagement score based on the **number of messages sent**, **number of active members**, and **group type** (public/private). Helps in identifying highly engaged groups.

**2. Average Messages per User**

* **Description**: Computes the **average number of messages sent per user** in a group. Helps in detecting **silent** vs. **active users**.

**3. Member Growth Rate**

* **Description**: Tracks the **rate of new members joining a group** over time. Helps in understanding **community expansion trends**.

**4. Admin-to-Member Ratio**

* **Description**: Measures the **proportion of admins to total members**. Useful for determining **moderation effectiveness**.

**5. Message Sentiment Analysis**

* **Description**: Analyzes the **sentiment (positive/negative/neutral)** of messages using NLP techniques. Helps in understanding **group mood**.

**6. Peak Activity Hours**

* **Description**: Identifies **time slots with the highest message volume**. Helps in scheduling **announcements** or events.

**7. Bots-to-Human Ratio**

* **Description**: Calculates the **percentage of bots** in a group. Helps in spotting **spam-heavy groups**.

**8. Most Active Users**

* **Description**: Identifies **users with the highest message count**. Useful for recognizing **top contributors**.

**9. Inactive Members Count**

* **Description**: Counts **members who haven’t sent any messages** in a given period. Helps in **group cleanup strategies**.

**10. Top Shared URLs**

* **Description**: Extracts and lists **the most frequently shared URLs**. Useful for **content tracking**.

**11. Most Used Hashtags**

* **Description**: Finds the **most common hashtags** in messages. Helps in **trending topic analysis**.

**12. Forwarded Messages Ratio**

* **Description**: Measures **how many messages were forwarded** vs. original messages. Helps in detecting **spam or viral content**.

**13. Most Pinned Topics**

* **Description**: Analyzes **the most frequently pinned messages** to understand **what’s important** in the group.

**14. Daily Messages Sent**

* **Description**: Tracks the **number of messages sent daily**. Helps in identifying **engagement trends**.

**15. Message Response Rate**

* **Description**: Measures the **average number of replies per message**. Helps in assessing **engagement levels**.

**16. Visibility Impact on Engagement**

* **Description**: Compares engagement metrics between **public and restricted groups**. Helps in optimizing **group settings**.

**17. Admin Engagement Level**

* **Description**: Tracks **how often admins send messages**. Helps in evaluating **moderation activity**.

**18. Most Viewed Messages**

* **Description**: Identifies **messages with the highest views**. Useful for detecting **important or viral content**.

**19. Media-to-Text Message Ratio**

* **Description**: Computes the **ratio of media messages (images, videos) to text messages**. Helps in understanding **content preferences**.

**20. Group Lifespan Analysis**

* **Description**: Tracks **how long a group remains active before engagement drops**. Useful for **lifecycle management**.

Round\_2

**Admin Dashboard Analytics Proposal**

1. **Daily Active Users**  
   Measures the number of unique users sending messages daily. Helps gauge engagement trends.
2. **Weekly New Members**  
   Tracks the count of users joining groups per week, indicating group growth.
3. **Monthly Member Retention Rate**  
   Calculates the percentage of users who remain in the group after one month.
4. **Average Messages Per User**  
   Computes the average messages sent by each user to understand engagement levels.
5. **Most Active Members**  
   Identifies top contributors based on the number of messages sent.
6. **Group Engagement Score**  
   A weighted score based on messages, replies, and reactions to assess group activity.
7. **Bot Activity Report**  
   Analyzes the activity of bots, including message frequency and types.
8. **Most Shared URLs**  
   Lists the most frequently shared links across groups.
9. **Top Hashtags Used**  
   Displays commonly used hashtags to identify discussion trends.
10. **Most Popular Message Types**  
    Breaks down the percentage of text, media, and other message types.
11. **Peak Activity Hours**  
    Identifies the hours of the day with the highest message frequency.
12. **Message Sentiment Analysis**  
    Analyzes message sentiment (positive, neutral, or negative) using NLP techniques.
13. **Group Growth Rate**  
    Tracks how quickly groups are gaining new members over time.
14. **User Churn Rate**  
    Measures how many users leave the group over a given period.
15. **Admin Actions Log**  
    Records admin actions like bans, removals, and pinned messages.
16. **Message Forwarding Trends**  
    Shows the most forwarded messages and their impact.
17. **Member Join and Leave Patterns**  
    Analyzes when users tend to join or leave groups.
18. **Inactive Members Count**  
    Identifies users who haven't sent messages within a specific timeframe.
19. **Media Content Analysis**  
    Breaks down the types of media shared (images, videos, files, etc.).
20. **Group Comparison Metrics**  
    Allows admins to compare engagement metrics between different groups.
21. **Number of New Groups Created**  
    Tracks the number of new groups formed in a given period.
22. **Pinned Message Interactions**  
    Measures views and replies on pinned messages.
23. **Response Time Analysis**  
    Calculates the average time for users to respond to messages.
24. **Admin-to-Member Ratio**  
    Shows the proportion of admins to members in a group.
25. **Trending Topics**  
    Identifies popular discussion topics using NLP keyword extraction.
26. **Spam Message Detection**  
    Flags messages that contain spam-like content.
27. **Most Mentioned Users**  
    Lists users most frequently mentioned in conversations.
28. **Hashtag Co-occurrence Network**  
    Maps relationships between commonly used hashtags.
29. **Group Sentiment Trends Over Time**  
    Visualizes sentiment changes over weeks or months.
30. **Message Length Distribution**  
    Analyzes the distribution of message lengths to understand conversation style.