Project Report

Leveraging Data to Drive Membership Growth: A Comparative Analysis of Cyclistic Bike Share Ridership

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1. Executive Summary

This report analyzes Cyclistic bike share ridership data to understand annual members' and casual riders' distinct usage patterns. The primary objective is to identify key behavioural differences and leverage these insights to develop strategies for converting casual riders into annual members. Key findings reveal significant ride duration, frequency, and day-of-week usage disparities between the two groups. Based on these findings, recommendations include targeted marketing campaigns, flexible membership options, and service enhancements to attract and retain casual riders.

2. 0 Introduction

2.1 Background

Cyclistic is a bike-sharing service in Chicago that provides residents and visitors with access to a fleet of bicycles for short-term rentals. The company offers various membership options, including single-ride passes, day passes, and annual memberships. There are also casual riders.

2.2 Project Objectives

- To identify key differences in the usage patterns of annual members and casual riders to inform targeted marketing strategies that will increase annual memberships for Cyclistic Bike-Share
    - Understand the differences in ridership frequency and duration between annual members and casual riders.
    - Analyze historical bike trip data to understand the frequency, duration, and patterns of rides for both members and casual rider segments.
    - Identify potential factors that influence the decision to purchase an annual membership.
    - Develop actionable recommendations to convert casual riders into annual members.

2.3 Scope

This analysis focuses on historical ridership data to identify key trends and patterns in usage behaviour. The scope includes:

- Data Analysis: Analyzing ride duration, frequency, day-of-week usage, and other relevant metrics for both annual members and casual riders.
- Data Visualization: Creating and interpreting visualizations to effectively communicate key findings.
- Recommendations: Develop actionable recommendations for Cyclistic to increase annual membership conversions.

3.0 Methodology

3.1 Data Source

The analysis utilizes historical ridership data from Cyclistic, a bike-sharing service in Chicago.

3.2 Data Collection

- Historical ridership data for Cyclistic was obtained from public data made available by Motivate International Inc in CSV formats. Data used was monthly data from October 2023- April 2024, a period of 7 months.
- The dataset includes information on ride start/end times, member type (annual or casual), ride duration, and other relevant variables.
- Key Columns:
    - `ride_id`
    - `rideable_type`
    - `started_at`
    - `ended_at`
    - ‘start_station_name`
    - `start_station_id`
    - `end_station_name`
    - `end_station_id`
    - `start_lat`
    - `start_lng`
    - `end_lat`
    - `end_lng`
    - `member_casual`

3.3 Data Cleaning

The data was cleaned to ensure accuracy and consistency, including handling missing values and data inconsistencies.

3.3.1 Data Type Conversion

Converted ride time at `started_at` and `ended_at` columns from timestamps (date and time) format to seconds to allow for time-based calculations and analyses (e.g., ride duration, time of day trends).

3.3.2 Missing Value Handling

Missing values in key columns (e.g., `ride_id`, `started_at`, `ended_at`) were retained in their original state (represented as NULL) throughout the analysis.

3.3.3Data Consistency Checks

Standardized date and time formats across the dataset.

3.3.4 Removed invalid entries

Removed invalid entry's location coordinates (e.g., locations outside Chicago). Removed duplicate ride entries.

3.3.5 Feature Engineering

Created a new column, `ride_duration`, by calculating the difference between `started_at` and `ended_at`. Extracted `day_of_week`, `hour_of_day`, `month`, and `year` from the `started_at` column. Converted `ride_duration` from seconds to minutes.

3.3.6 Outlier Handling

Removed outliers in `ride_duration` (e.g., rides with durations less than a minute or exceeding 60 minutes).

3.4 Exploratory Data Analysis (EDA)

The EDA process involved a comprehensive analysis of the Divvy bike-share trip data to uncover usage patterns and trends. Key statistics and summaries derived from the EDA include:

3.4.1 Descriptive Statistics:

3.4.1.2 Overall

- Total number of rides
- Minimum ride duration
- Maximum ride duration
- Mean ride duration
- Median ride duration

3.4.1.3 By User Type (Member vs. Casual)

- Total number of rides for each user type
- Mean and median ride duration for members and casual riders
- Ride Frequency and Patterns:

3.4.1.4 Daily Ride Frequency

- Number of rides per day of the week (Sunday - Saturday) for all users and segmented by user type (member vs. casual)

3.4.1.5 Hourly Ride Frequency

- Number of rides per hour of the day (00:00 - 23:59) for all users and segmented by user type

3.4.1.6 Monthly Ride Frequency

- Total number of rides per month (if data spans multiple months)

3.4.1.7 Usage Patterns

- Peak Ride Hours: Identification of peak usage hours for both members and casual riders.
- Weekday vs. Weekend Usage: Comparison of ride frequency and duration between weekdays and weekends for both user types.

3.4.1.8 Seasonal Trends

- Segmentation of data into seasons (e.g., Spring, Summer, Fall, Winter)
- Calculation of total rides and average ride duration for each season
- Identification of seasonal variations in ride usage patterns

3.4.1.9 Outlier Detection

Identification and handling of outliers in ride duration (e.g., extremely short or long rides). These calculated statistics were effectively visualized using various charts and graphs (e.g., bar charts, line graphs, histograms) to facilitate pattern recognition, trend analysis, and communication of insights. By thoroughly examining these EDA outputs, we gained a deeper understanding of user behaviour, usage patterns, and potential areas for improvement within the Divvy bike-share program.

3.5 Data Visualization

- Visualizations, including bar charts, line graphs, and box plots, were created using R (ggplot2) and Microsoft Excel to explore and communicate key findings. Dashboards were also created using Tableau to effectively communicate findings.
    - Comparative Analysis: The usage patterns of annual members and casual riders were compared across various dimensions, such as day of the week, month, and ride duration.

3.4 Limitations

- The analysis is based on historical data and may not fully reflect future trends.
- External factors such as weather conditions and local events can influence ridership patterns and may not be fully accounted for in the analysis.

4. 0 Results

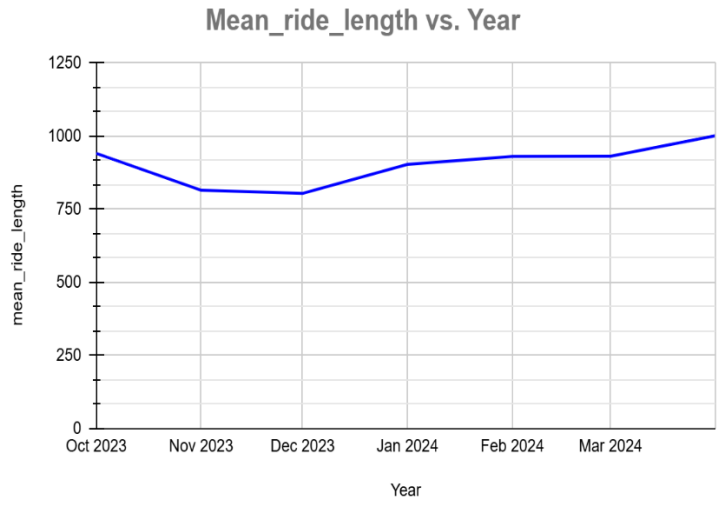
4.1 Time Series Analysis

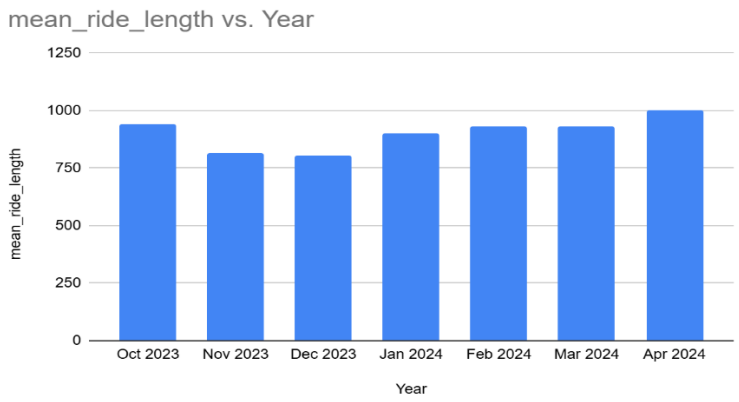
4.1.1 Line & Bar Charts

4.1.2 Purpose

To observe trends over time. For example, you could plot the mean_ride_length for members and casual riders to see if there are seasonal variations or other trends.

Year	mean_ride_length(sec)
Oct 2023	941.1
Nov 2023	815.16
Dec 2023	804.3255546
Jan 2024	903.4109876
Feb 2024	930.5046513
Mar 2024	931.35329
Apr 2024	1001.372206





4.1.3 Interpreting the Chart: Mean Ride Length vs. Year

4.1.3.1Overall Trend

The chart shows a general upward trend in the average ride length over the given months. This suggests that, on average, rides are becoming longer over time.

4.1.3.2 Month-by-Month Analysis:

- October 2023: The average ride length is around 900 seconds.
- November 2023: There's a slight decrease in the average ride length compared to October.
- December 2023: A further slight decrease in average ride length.
- January 2024: A significant increase in the average ride length.
- February 2024: A slight decrease compared to January, but still higher than the previous months.
- March 2024: Another increase in the average ride length.
- April 2024: The highest average ride length of the year.

4.1.3.3 Possible Reasons for the Trends:

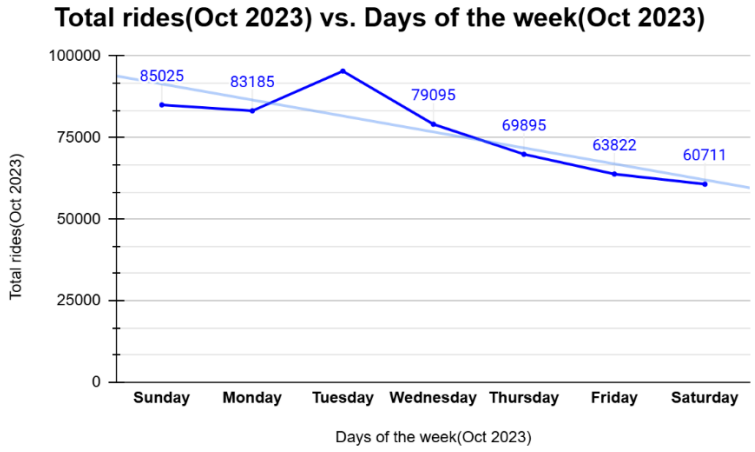
- Seasonal Factors: Weather conditions, daylight hours, and holidays can influence ride duration. Warmer months and longer days might encourage longer rides.
- Changes in User Behavior: Shifts in user preferences or demographics could affect the average ride length. For example, an increase in the number of commuters using the bike-sharing service could lead to longer rides.
- Service Improvements: Improvements in the bike-sharing service, such as increased bike availability or expanded service areas, could also impact ride duration.

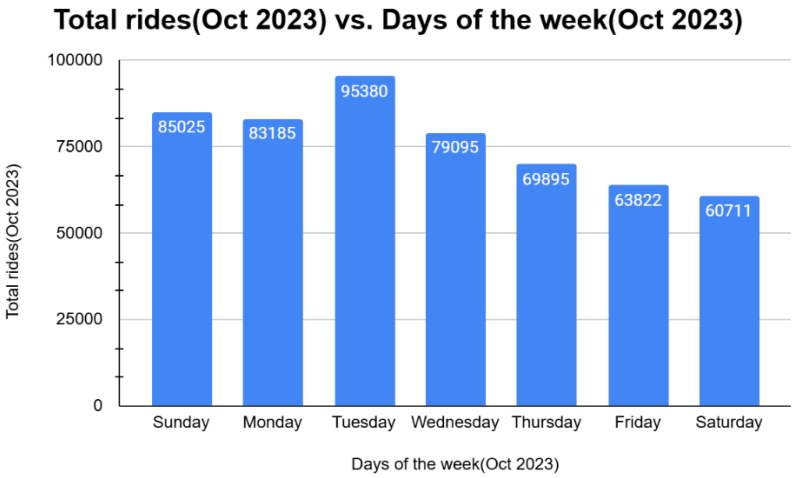
4.2 Comparative Analysis

4.2.1. Bar Chart:

- **X-axis:** Member type (member vs. casual) or day of the week
- **Y-axis:** avg_ride_length(sec)
- **Purpose:** To compare average ride lengths between member types or across different days of the week.

Year	Days of the week	Total rides
Oct 2023	Sunday	85025
	Monday	83185
	Tuesday	95380
	Wednesday	79095
	Thursday	69895
	Friday	63822
	Saturday	60711





4.2.1.2 Interpreting the Chart: Total Rides (Oct 2023) vs. Days of the Week (Oct 2023)

4.2.1.2.1 Overall Trend

- **Weekday Usage:** There's a clear trend of higher ride volumes on weekdays compared to weekends. This suggests that the bike-sharing service is heavily used for commuting purposes.
- **Peak Usage Days:** Tuesday and Wednesday appear to be the peak days for bike usage, indicating that many people rely on the service for their daily commute.

4.2.1.2.2 Specific Day-of-Week Analysis:

- **Tuesday and Wednesday:** These days have the highest number of rides, likely due to the workweek commute.
- **Sunday and Saturday:** Weekends have lower ride volumes compared to weekdays, suggesting that the service is less used for leisure activities or recreational purposes.
- **Monday, Thursday, and Friday:** These days have moderate ride volumes, indicating a consistent level of usage throughout the workweek.

4.2.1.2.3 Possible Reasons for the Trends:

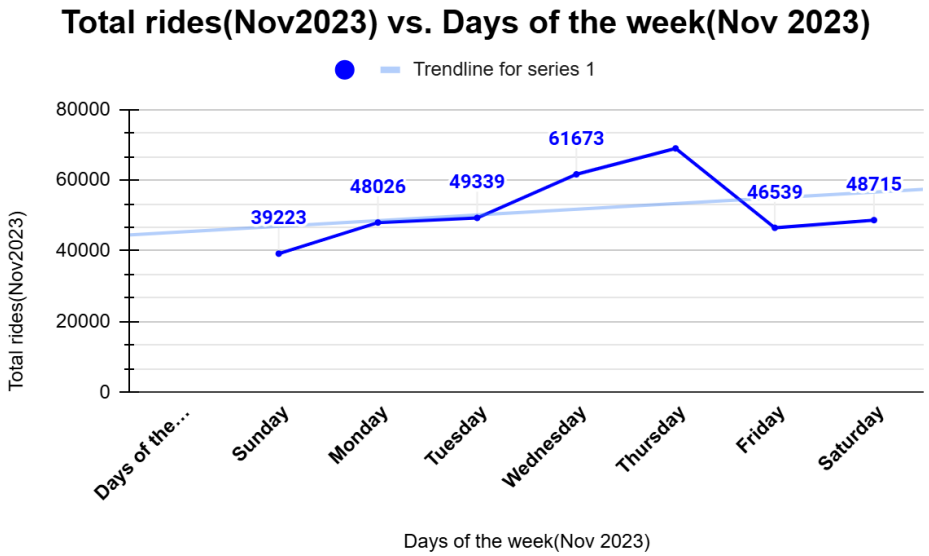
- **Commuting Patterns:** The high usage on weekdays suggests that many people rely on the bike-sharing service for their daily commute.
- **Weather Conditions:** The weather conditions during October 2023 could have influenced ridership patterns. Favourable weather conditions might have encouraged more people to use the bike-sharing service.
- **Local Events and Holidays:** Any local events or holidays during October could have impacted ridership.

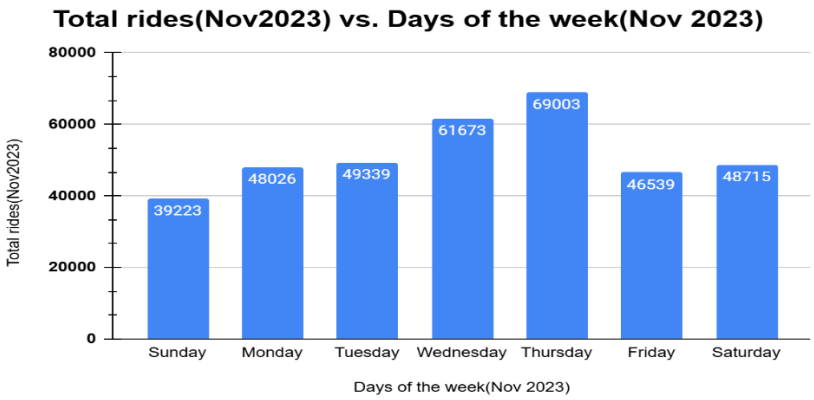
4.2.1.2.4 Key Insights for Cyclistic:

- **Weekday Focus:** To capitalize on the high weekday usage, Cyclistic could implement strategies to attract more commuters, such as offering discounted rates or improving the availability of bikes and docking stations in popular commuting areas.
- **Weekend Promotions:** To encourage more weekend usage, Cyclistic could offer special promotions or discounts for leisure rides.
- **Data-Driven Decision Making:** By continuously monitoring usage patterns and analyzing data, Cyclistic can make informed decisions to optimize its operations and marketing strategies.

By understanding these trends, Cyclistic can tailor its services to meet the specific needs of its users and maximize its impact on urban mobility.

Days of the week (Nov 2023)	Total rides (Nov2023)
Sunday	39223
Monday	48026
Tuesday	49339
Wednesday	61673
Thursday	69003
Friday	46539
Saturday	48715





4.2.1.3 Interpreting the Chart: Total Rides (Nov 2023) vs. Days of the Week (Nov 2023)

4.2.1.3.1 Overall Trend:

- **Weekday Dominance:** The chart clearly shows that weekdays (Monday to Friday) have significantly higher ride volumes compared to weekends (Saturday and Sunday). This suggests that the bike-sharing service is primarily used for commuting purposes.

4.2.1.3.2 Specific Day-of-Week Analysis:

- **Peak Days:** Wednesday and Thursday have the highest number of rides, indicating that these days are peak usage periods.
- **Weekend Usage:** Saturday and Sunday have the lowest number of rides, suggesting that the service is less popular for leisure activities or recreational purposes during weekends.
- **Weekday Variation:** There is a slight decrease in ride volume from Monday to Friday, with Wednesday and Thursday being the peak days.

4.2.1.3.3 Possible Reasons for the Trends:

- **Commuting Patterns:** The high usage on weekdays is likely due to people using the bike-sharing service for their daily commute to work or school.
- **Weather Conditions:** The weather conditions during November 2023 could have influenced ridership patterns. If the weather was favourable for cycling, it could have led to increased usage.
- **Local Events and Holidays:** Any local events or holidays during the month of November could have impacted ridership.

4.2.1.3.4 Key Insights for Cyclistic:

- **Weekday Focus:** To capitalize on the high weekday usage, Cyclistic could implement strategies to attract more commuters, such as offering discounted rates or improving the availability of bikes and docking stations in popular commuting areas.

- **Weekend Promotions:** To encourage more weekend usage, Cyclistic could offer special promotions or discounts for leisure rides.
- **Data-Driven Decision Making:** By continuously monitoring usage patterns and analyzing data, Cyclistic can make informed decisions to optimize its operations and marketing strategies.

By understanding these trends, Cyclistic can tailor its services to meet the specific needs of its users and maximize its impact on urban mobility.

How do the lower total rides on weekends relate to longer ride lengths on weekends?

The lower total rides on weekends, coupled with longer average ride lengths, suggest a different usage pattern for the bike-sharing service on weekends compared to weekdays.

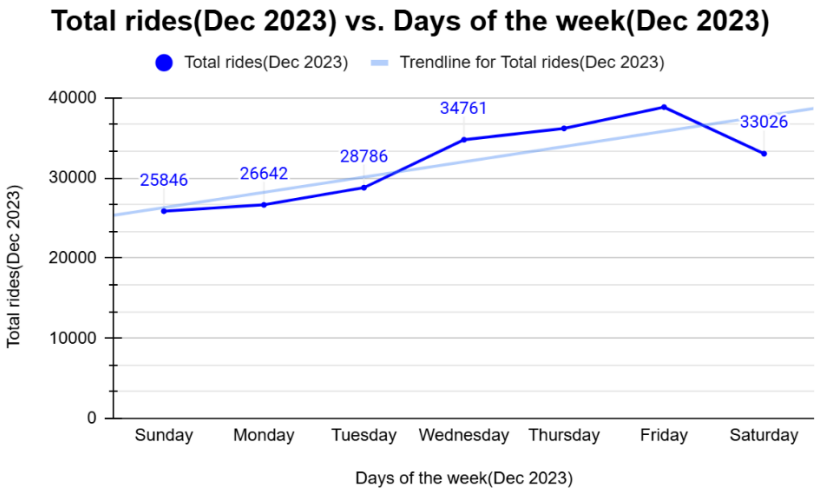
Here are some possible explanations:

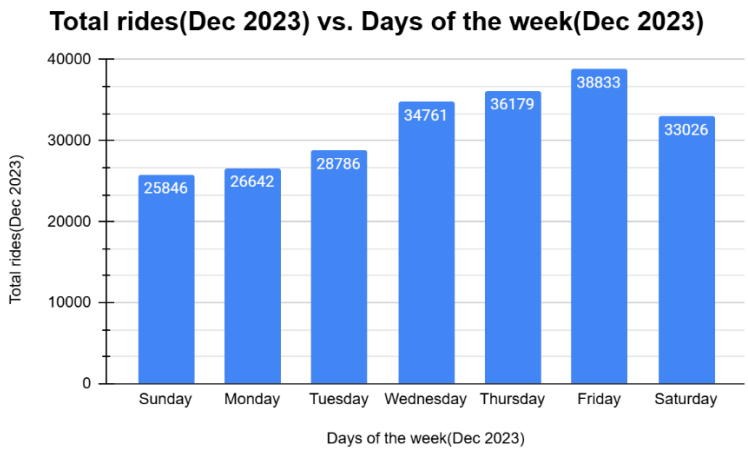
1. **Recreational Use:** On weekends, people might be using the bike-sharing service for leisure activities like exploring the city, going for a bike ride in a park, or visiting friends and family. These recreational rides tend to be longer than weekday commutes.
2. **Tourist Usage:** If the city is a tourist destination, weekends might see an influx of tourists who use the bike-sharing service for sightseeing or exploring. These rides could be longer than typical weekday commutes.
3. **Different User Demographics:** Weekends might attract a different demographic of users, such as tourists or leisure riders, who have different usage patterns compared to weekday commuters.

It's important to note that these are just a few possible explanations. To gain a deeper understanding of the underlying factors, further analysis is needed. This could involve examining data on ride start and end locations, user demographics, and weather conditions.

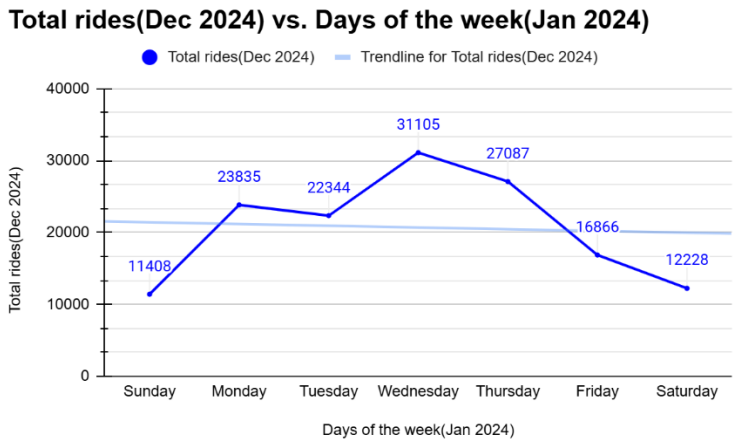
By understanding the reasons behind the longer ride lengths on weekends, Cyclistic can tailor its marketing strategies and service offerings to better meet the needs of its customers. For example, they could offer special promotions for weekend riders or focus on promoting the bike-sharing service as a leisure activity.

Year	Days of the week (Dec 2023)	Total rides (Dec 2023)
Dec 2023	Sunday	25846
	Monday	26642
	Tuesday	28786
	Wednesday	34761
	Thursday	36179
	Friday	38833
	Saturday	33026

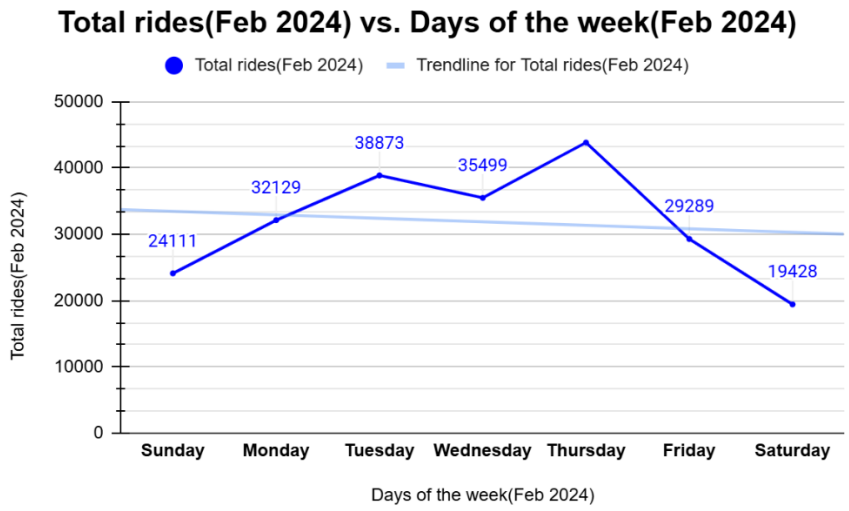


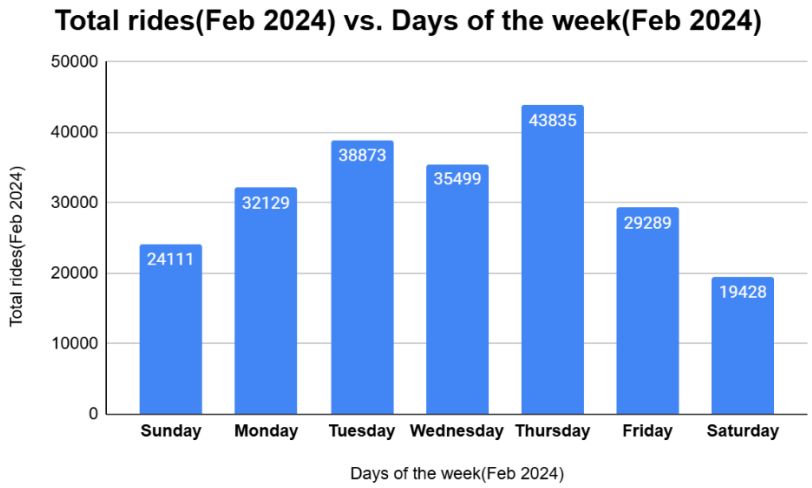


Days of the week(Jan 2024)	Total rides(Dec 2024)
Sunday	11408
Monday	23835
Tuesday	22344
Wednesday	31105
Thursday	27087
Friday	16866
Saturday	12228

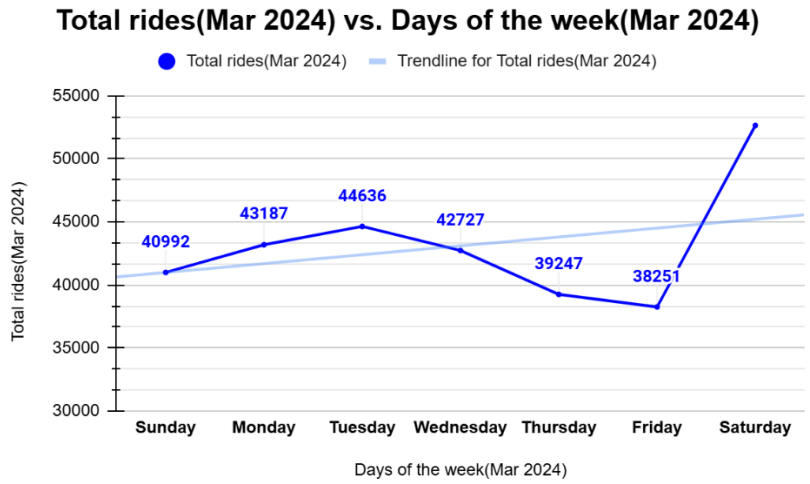


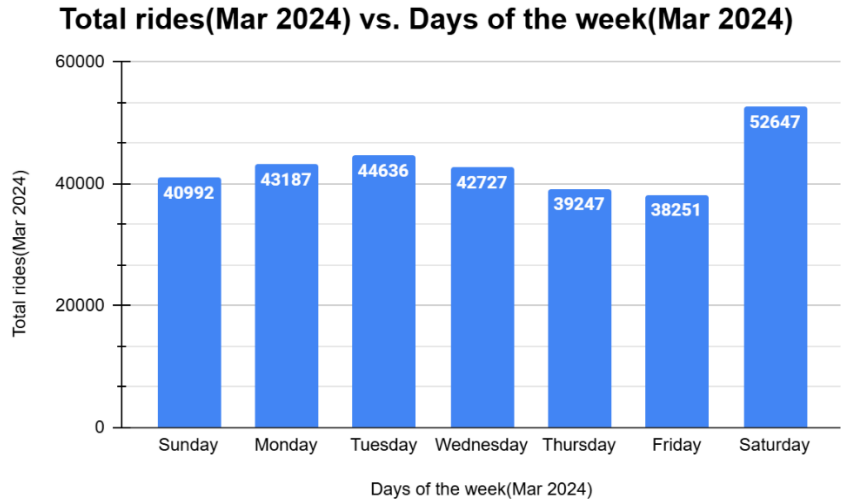
Days of the week(Feb 2024)	Total rides(Feb 2024)
Sunday	24111
Monday	32129
Tuesday	38873
Wednesday	35499
Thursday	43835
Friday	29289
Saturday	19428



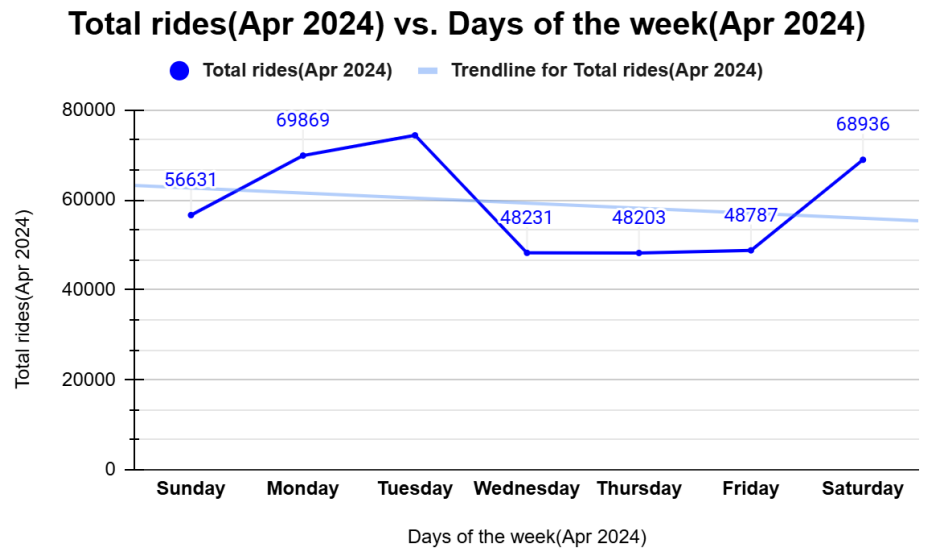


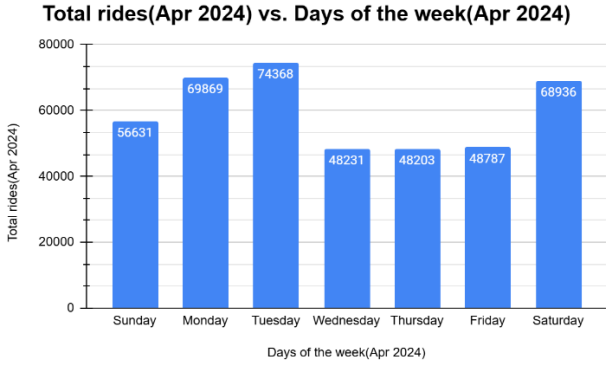
Days of the week(Mar 2024)	Total rides(Mar 2024)
Sunday	40992
Monday	43187
Tuesday	44636
Wednesday	42727
Thursday	39247
Friday	38251
Saturday	52647





Days of the week(Apr 2024)	Total rides(Apr 2024)
Sunday	56631
Monday	69869
Tuesday	74368
Wednesday	48231
Thursday	48203
Friday	48787
Saturday	68936





4.2.1.4 Interpreting the Chart: Total Rides (Apr 2024) vs. Days of the Week (Apr 2024)

4.2.1.4.1 Overall Trend

- **Weekday Dominance:** The chart clearly shows that weekdays (Monday to Friday) have significantly higher ride volumes compared to weekends (Saturday and Sunday). This suggests that the bike-sharing service is primarily used for commuting purposes.

4.2.1.4.2 Specific Day-of-Week Analysis

- **Peak Days:** Tuesday and Wednesday have the highest number of rides, indicating that these days are peak usage periods.
- **Weekend Usage:** Saturday and Sunday have lower ride volumes compared to weekdays, suggesting that the service is less popular for leisure activities or recreational purposes during weekends.
- **Weekday Variation:** There is a slight decrease in ride volume from Monday to Friday, with Tuesday and Wednesday being the peak days.

4.2.1.4.3 Possible Reasons for the Trends

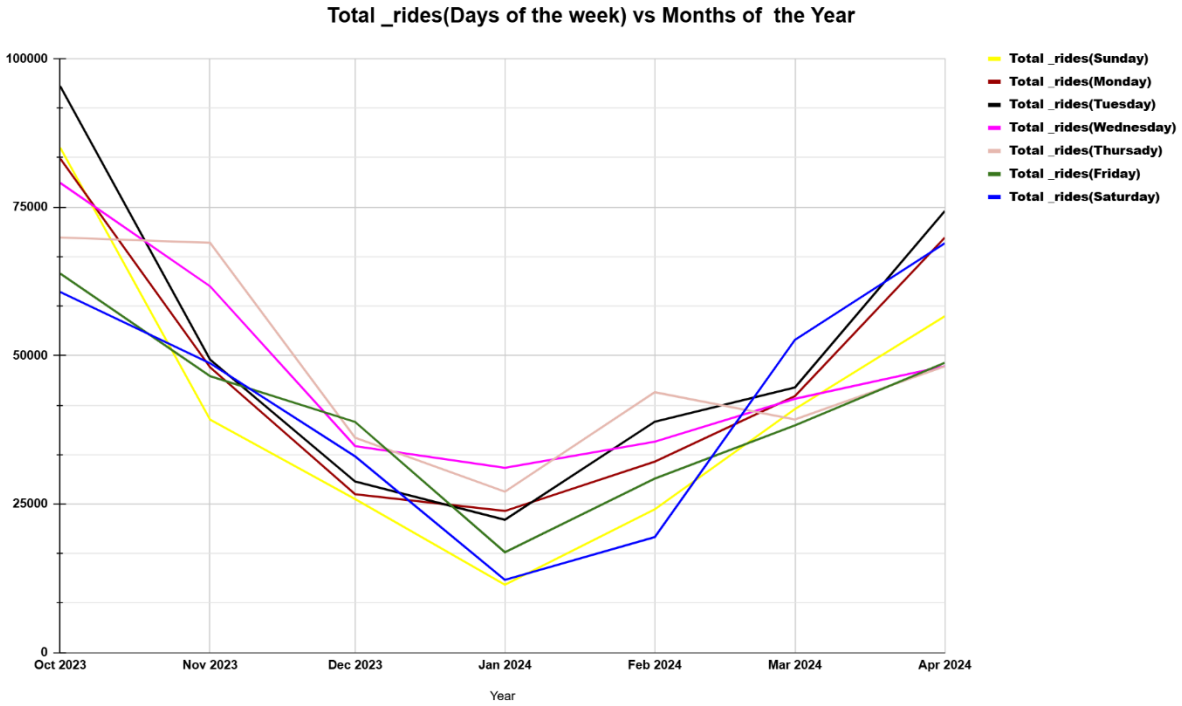
- **Commuting Patterns:** The high usage on weekdays is likely due to people using the bike-sharing service for their daily commute to work or school.
- **Weather Conditions:** The weather conditions during April 2024 could have influenced ridership patterns. Favourable weather conditions might have encouraged more people to use the bike-sharing service.
- **Local Events and Holidays:** Any local events or holidays during April could have impacted ridership.

4.2.1.4.4 Key Insights for Cyclistic:

- **Weekday Focus:** To capitalize on the high weekday usage, Cyclistic could implement strategies to attract more commuters, such as offering discounted rates or improving the availability of bikes and docking stations in popular commuting areas.
- **Weekend Promotions:** To encourage more weekend usage, Cyclistic could offer special promotions or discounts for leisure rides.
- **Data-Driven Decision Making:** By continuously monitoring usage patterns and analyzing data, Cyclistic can make informed decisions to optimize its operations and marketing strategies.

By understanding these trends, Cyclistic can tailor its services to meet the specific needs of its users and maximize its impact on urban mobility.

Total_rides(Sunday)	Total_rides(Monday)	Total_rides(Tuesday)	Total_rides(Wednesday)	Total_rides(Thursady)	Total_rides(Friday)	Total_rides(Saturday)	Year
85025	83185	95380	79095	69895	63822	60711	Oct 2023
39223	48026	49339	61673	69003	46539	48715	Nov 2023
25846	26642	28786	34761	36179	38833	33026	Dec 2023
11408	23835	22344	31105	27087	16866	12228	Jan 2024
24111	32129	38873	35499	43835	29289	19428	Feb 2024
40992	43187	44636	42727	39247	38251	52647	Mar 2024
56631	69869	74368	48231	48203	48787	68936	Apr 2024



4.2.1.5 Interpreting the Chart: Total Rides by Day of the Week vs. Months of the Year

4.2.1.5.1 Overall Trend:

- **Seasonal Variation:** There's a clear seasonal trend, with higher ride volumes during the warmer months (March, April) and lower volumes during the colder months (November, December, January).
- **Weekday vs. Weekend:** Weekends consistently have higher ride volumes compared to weekdays. This is likely due to increased leisure activities and recreational use of bikes.

4.2.1.5.2 Specific Day-of-Week Trends:

- **Sunday:** Sunday typically has the highest number of rides, followed by Saturday. This indicates that weekends are peak usage periods for the bike-sharing service.
- **Weekdays:** Weekday usage varies, with Wednesday and Thursday generally having higher ride volumes compared to Monday, Tuesday, and Friday. This could be attributed to commuting patterns and work schedules.

4.2.1.5.3 Possible Reasons for the Trends:

- **Weather Conditions:** Warmer weather encourages more outdoor activities, leading to increased bike usage.
- **Seasonal Events and Holidays:** Local events, festivals, or holidays can influence ride volumes.

- **Commuting Patterns:** Weekday usage might be influenced by work schedules and commuting habits.
- **Marketing Campaigns and Promotions:** Targeted marketing efforts can impact ridership, especially during specific periods.

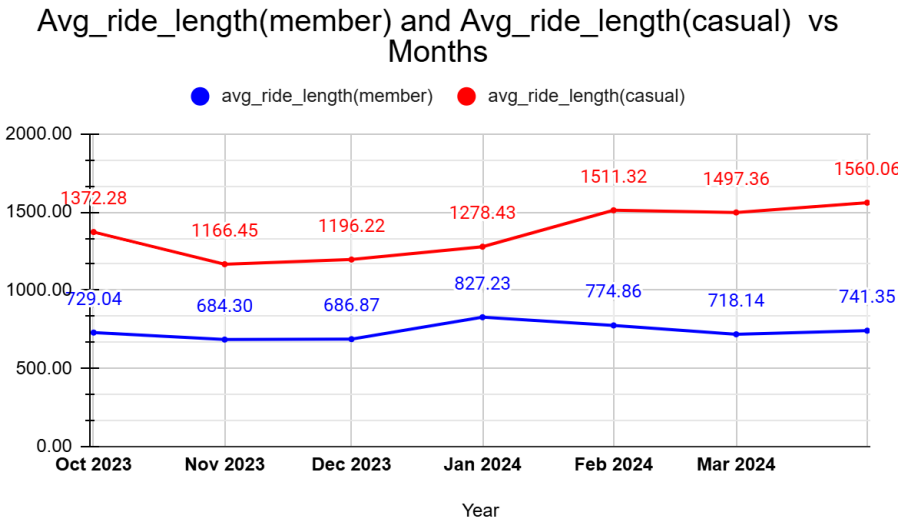
4.2.1.5.4 Key Insights for Cyclistic:

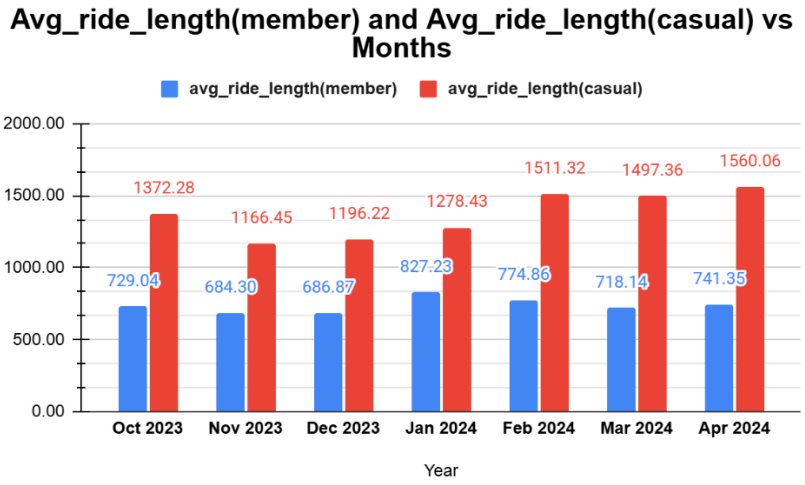
- **Seasonal Marketing:** Focus on promoting bike-sharing during the warmer months to capitalize on increased demand.
- **Weekend Promotions:** Offer special promotions or discounts on weekends to encourage more leisure rides.
- **Weekday Commuting:** Target weekday commuters with convenient pricing plans and improved infrastructure to boost weekday usage.
- **Data-Driven Decision Making:** Continuously monitor usage patterns and adjust strategies based on real-time data.

By understanding these trends, Cyclistic can make informed decisions to optimize its operations, marketing strategies, and bike distribution to meet the evolving needs of its customers.

4.3 Comparing average ride length for member vs casual riders

Year	avg_ride_length(member)	avg_ride_length(casual)
Oct 2023	729.04	1372.28
Nov 2023	684.30	1166.45
Dec 2023	686.87	1196.22
Jan 2024	827.23	1278.43
Feb 2024	774.86	1511.32
Mar 2024	718.14	1497.36
Apr 2024	741.35	1560.06





4.3.1 Interpreting the Chart: "Avg_ride_length(member) and Avg_ride_length(casual) vs Months"

4.3.1.1 Overall Trend:

- **Annual Members:** Generally, annual members have shorter average ride lengths compared to casual riders. This trend is consistent across all months.
- **Seasonal Variation:** Both member and casual riders tend to have longer average ride lengths during the warmer months (March, April, and May) compared to the colder months. This could be attributed to factors like favourable weather conditions, increased outdoor activities, and longer daylight hours.

4.3.1.2 Specific Month Analysis:

- **October 2023:** Annual members had a significantly longer average ride length compared to casual riders.
- **November 2023:** The difference between annual and casual rider average ride lengths decreased compared to October.
- **December 2023:** Both groups experienced a slight increase in average ride length.
- **January 2024:** A significant drop in average ride length for both groups, likely due to colder weather conditions.
- **February 2024:** A slight increase in average ride length for both groups.
- **March 2024:** A notable increase in average ride length for both groups, especially for annual members.
- **April 2024:** A further increase in average ride length, with annual members maintaining a significant lead over casual riders.

4.3.1.3 Possible Reasons for the Differences:

- **Purpose of Rides:** Annual members might use the bikes for commuting or regular exercise, leading to longer rides. Casual riders, on the other hand, might use the bikes for shorter recreational rides.
- **Weather Conditions:** Seasonal variations in weather can influence ride duration and frequency.
- **Bike Availability:** The availability of bikes and docking stations might impact ride lengths, especially during peak hours.

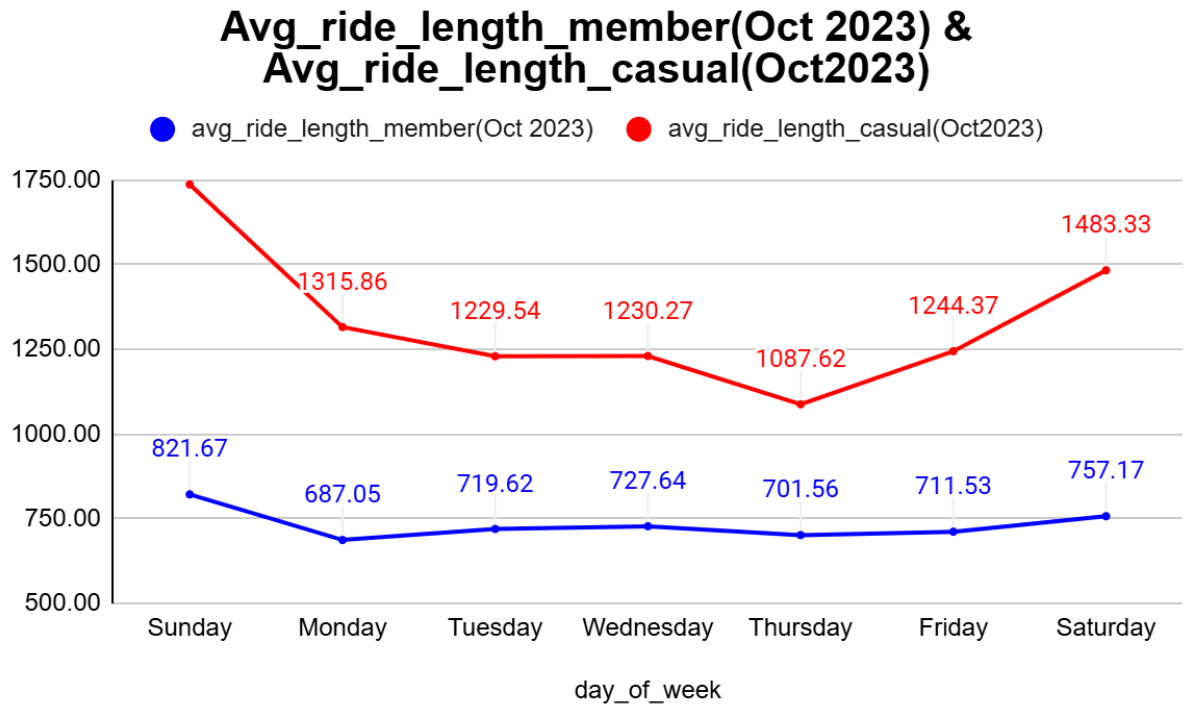
By analyzing these trends, Cyclistic can gain insights into the behaviour of different user groups and tailor their marketing strategies accordingly. For instance, they could focus on promoting annual memberships during the warmer months when ride lengths are longer and emphasize the convenience and cost-effectiveness of annual memberships for regular riders.

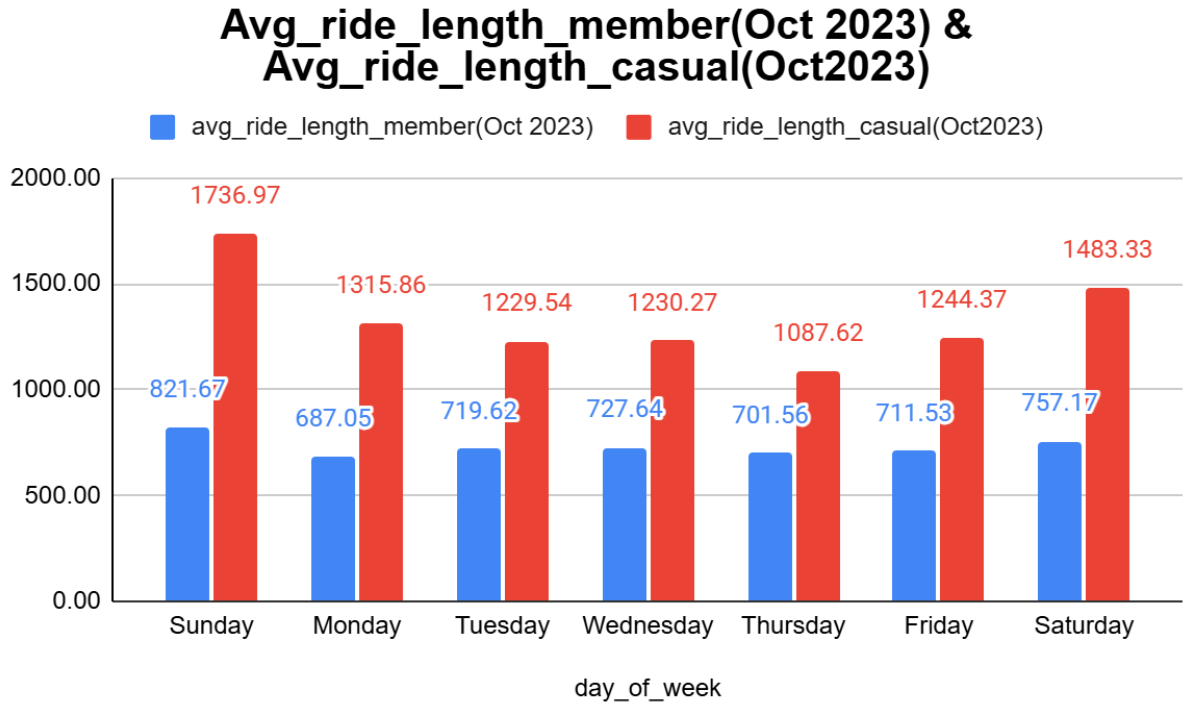
4.3.2 Comparative Analysis

4.3.2.1 Bar Chart:

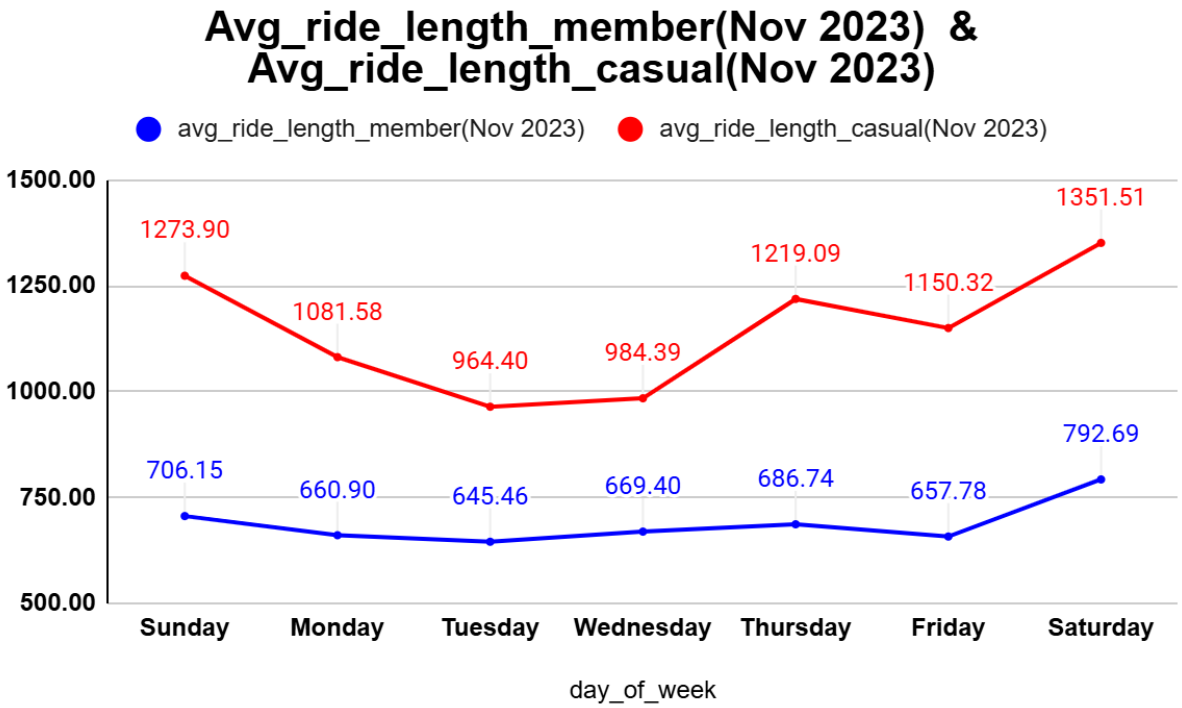
- **X-axis:** Member type (member vs. casual) or day of the week
- **Y-axis:** avg_ride_length
- **Purpose:** To compare average ride lengths between member types or across different days of the week.

day_of_week	avg_ride_length_member(Oct 2023)	avg_ride_length_casual(Oct2023)	day_of_week
Sunday	821.67	1736.97	Sunday
Monday	687.05	1315.86	Monday
Tuesday	719.62	1229.54	Tuesday
Wednesday	727.64	1230.27	Wednesday
Thursday	701.56	1087.62	Thursday
Friday	711.53	1244.37	Friday
Saturday	757.17	1483.33	Saturday





day_of_week	avg_ride_length_member(Nov 2023)	avg_ride_length_casual(Nov 2023)	day_of_week
Sunday	706.15	1273.90	Sunday
Monday	660.90	1081.58	Monday
Tuesday	645.46	964.40	Tuesday
Wednesday	669.40	984.39	Wednesday
Thursday	686.74	1219.09	Thursday
Friday	657.78	1150.32	Friday
Saturday	792.69	1351.51	Saturday


Avg_ride_length_member(Nov 2023) &
Avg_ride_length_casual(Nov 2023)
avg_ride_length_member(Nov 2023)
avg_ride_length_casual(Nov 2023)
1500.00
1250.00
1000.00
750.00
500.00
1273.90
1081.58
964.40
984.39
1219.09
1150.32
1351.51
706.15
660.90
645.46
669.40
686.74
657.78
792.69
Sunday
Monday
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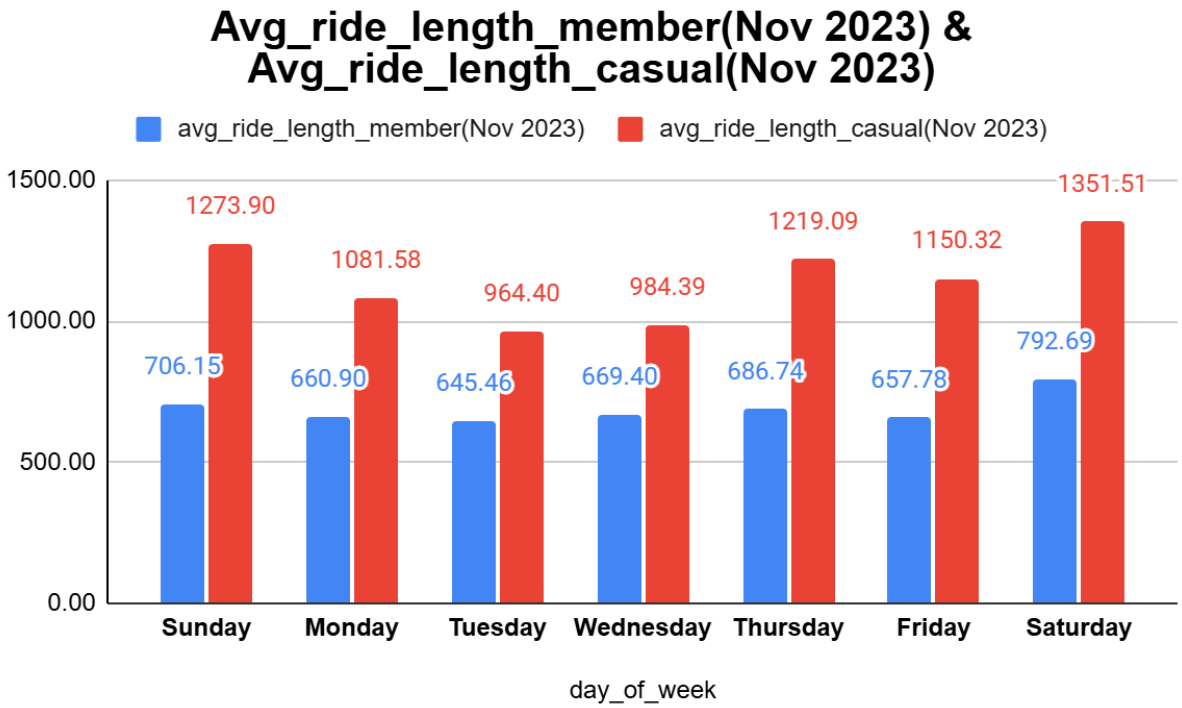
Friday
Saturday
day_of_week


Avg_ride_length_member(Nov 2023) &
Avg_ride_length_casual(Nov 2023)
avg_ride_length_member(Nov 2023)
avg_ride_length_casual(Nov 2023)
1500.00
1000.00
500.00
0.00
706.15
1273.90
660.90
1081.58
645.46
964.40
669.40
984.39
686.74
1219.09
657.78
1150.32
792.69
1351.51
Sunday
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Tuesday
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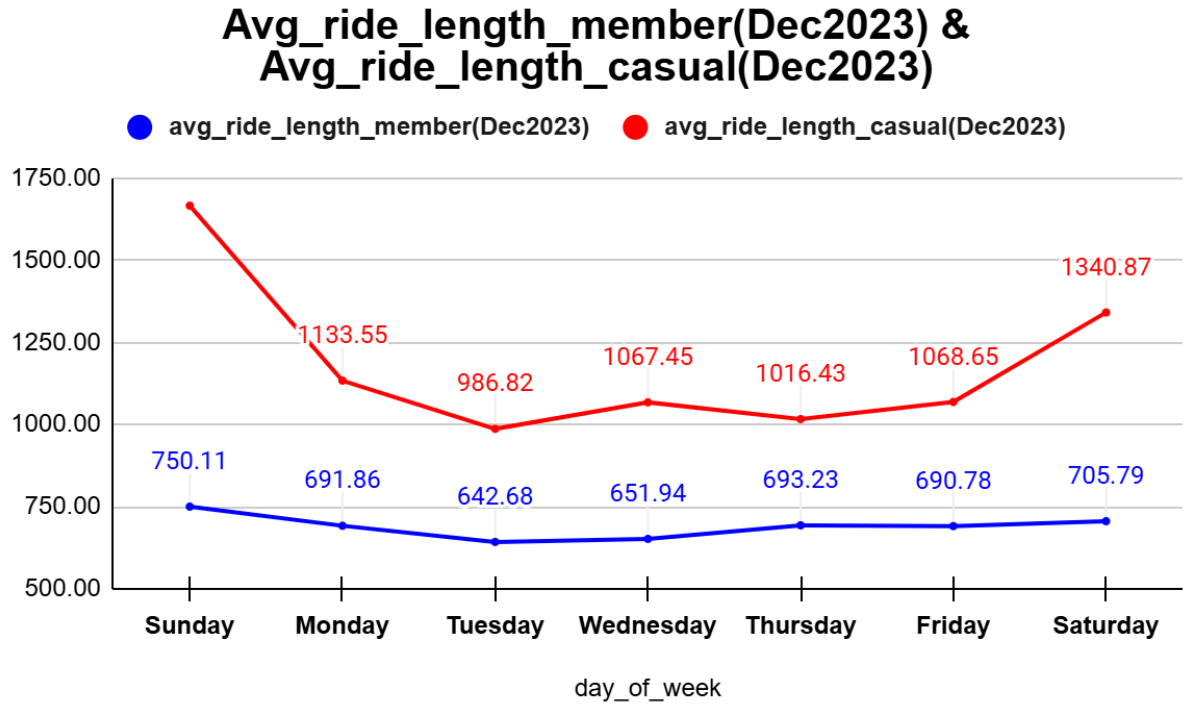
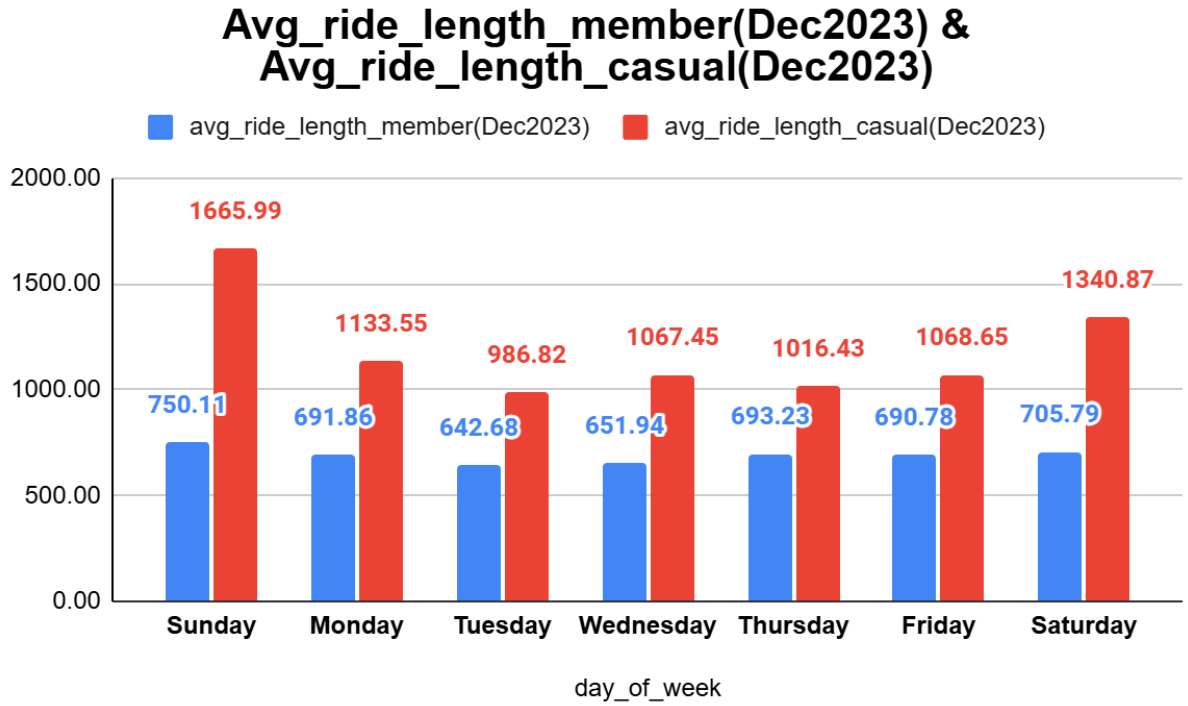
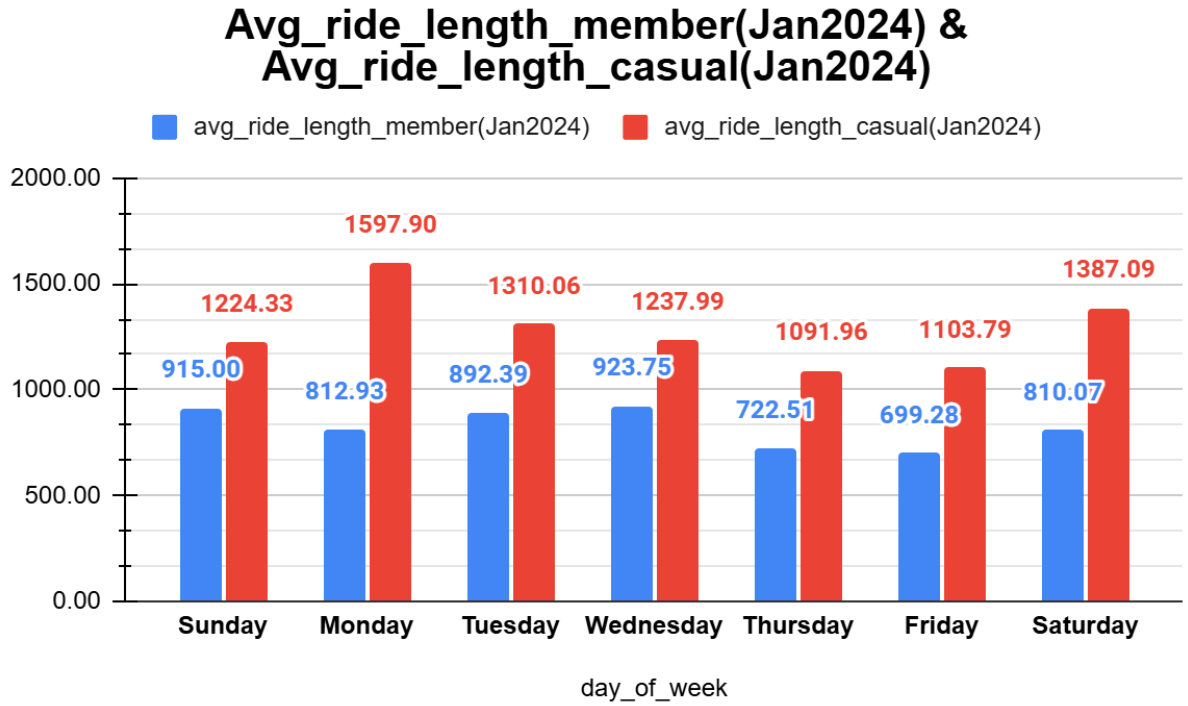
Saturday
day_of_week

day_of_week	avg_ride_length_member(Dec2023)	avg_ride_length_casual9Dec2023)	day_of_week
Sunday	750.11	1665.99	Sunday
Monday	691.86	1133.55	Monday
Tuesday	642.68	986.82	Tuesday
Wednesday	651.94	1067.45	Wednesday
Thursday	693.23	1016.43	Thursday
Friday	690.78	1068.65	Friday
Saturday	705.79	1340.87	Saturday





day_of_week	avg_ride_length_member(Jan2024)	avg_ride_length_casual(Jan2024)
Sunday	915.00	1224.33
Monday	812.93	1597.90
Tuesday	892.39	1310.06
Wednesday	923.75	1237.99
Thursday	722.51	1091.96
Friday	699.28	1103.79
Saturday	810.07	1387.09


Avg_ride_length_member(Jan2024) &
Avg_ride_length_casual(Jan2024)
avg_ride_length_member(Jan2024)
avg_ride_length_casual(Jan2024)
2000.00
1500.00
1000.00
500.00
0.00
915.00
1224.33
812.93
1597.90
892.39
1310.06
923.75
1237.99
722.51
1091.96
699.28
1103.79
810.07
1387.09
Sunday
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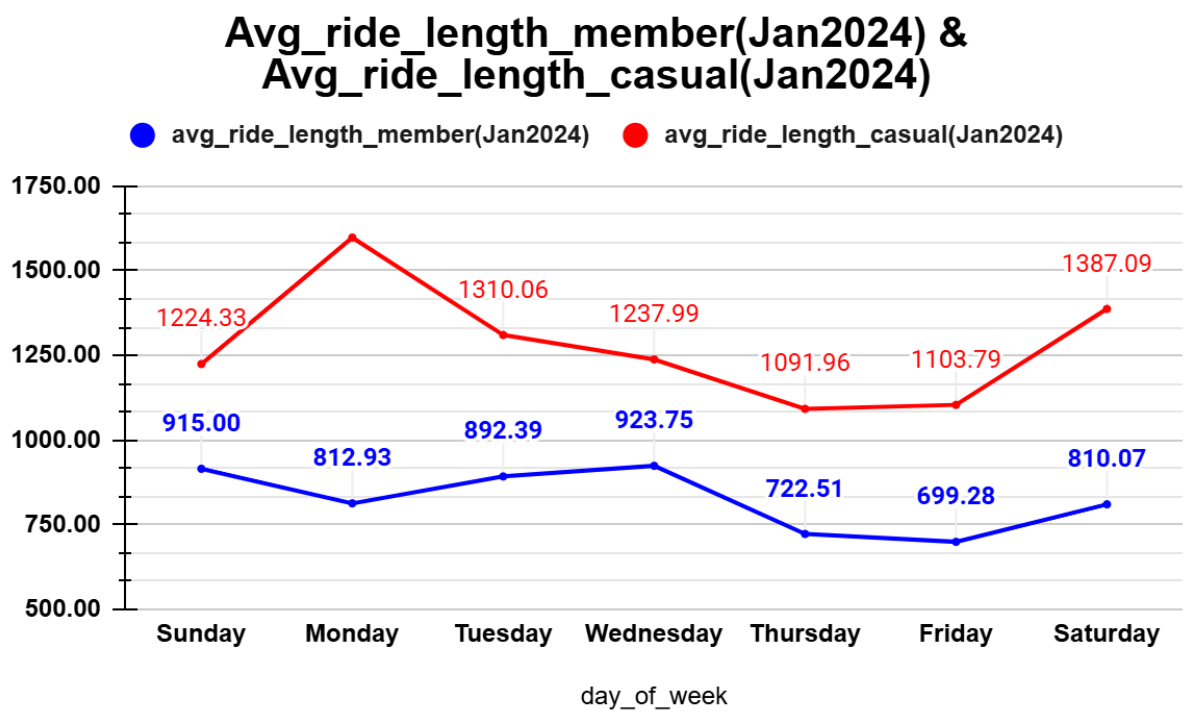
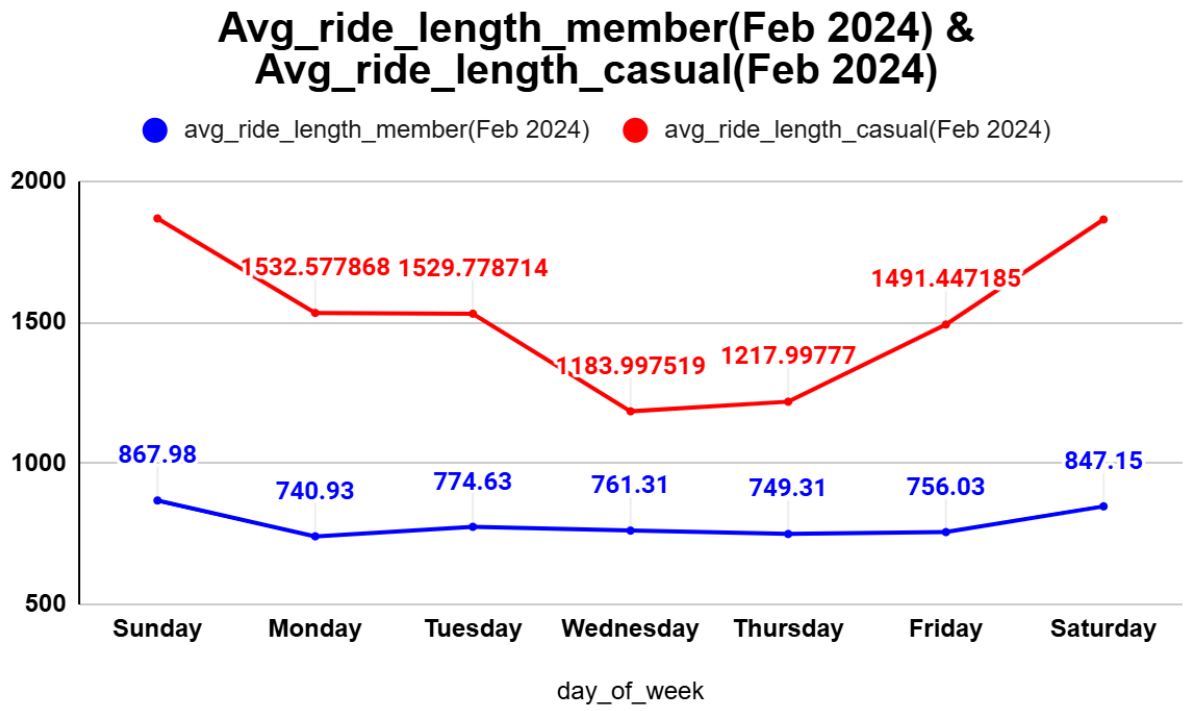
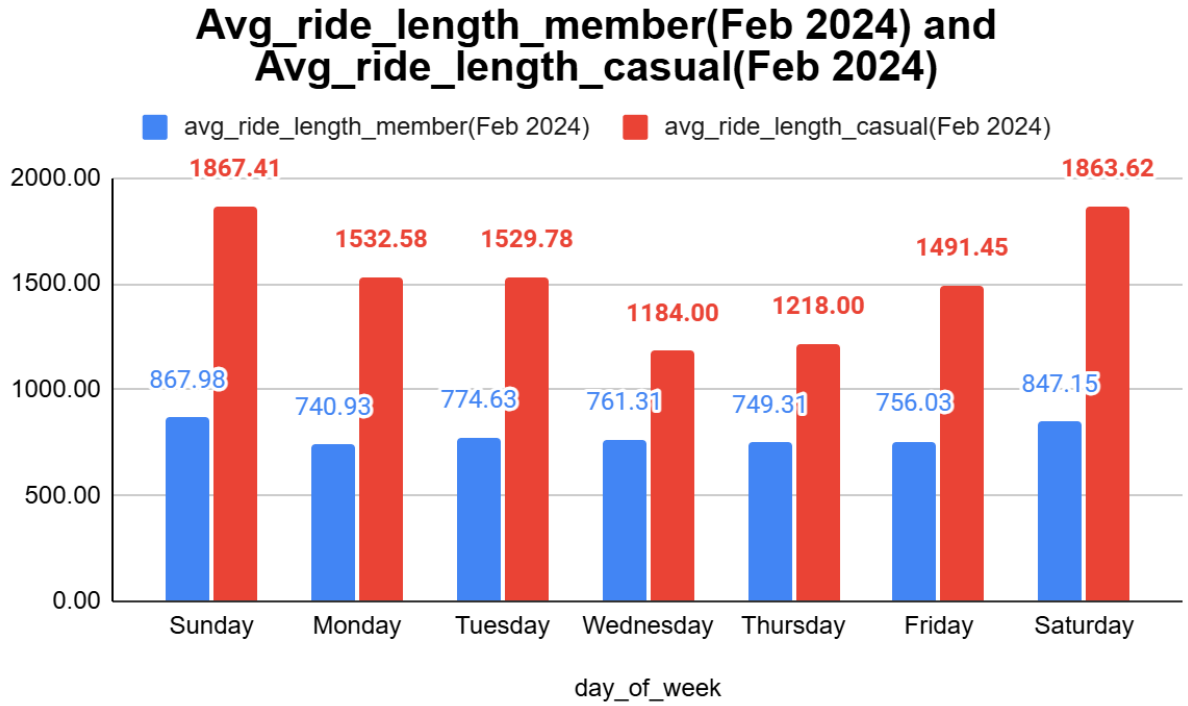
Friday
Saturday
day_of_week

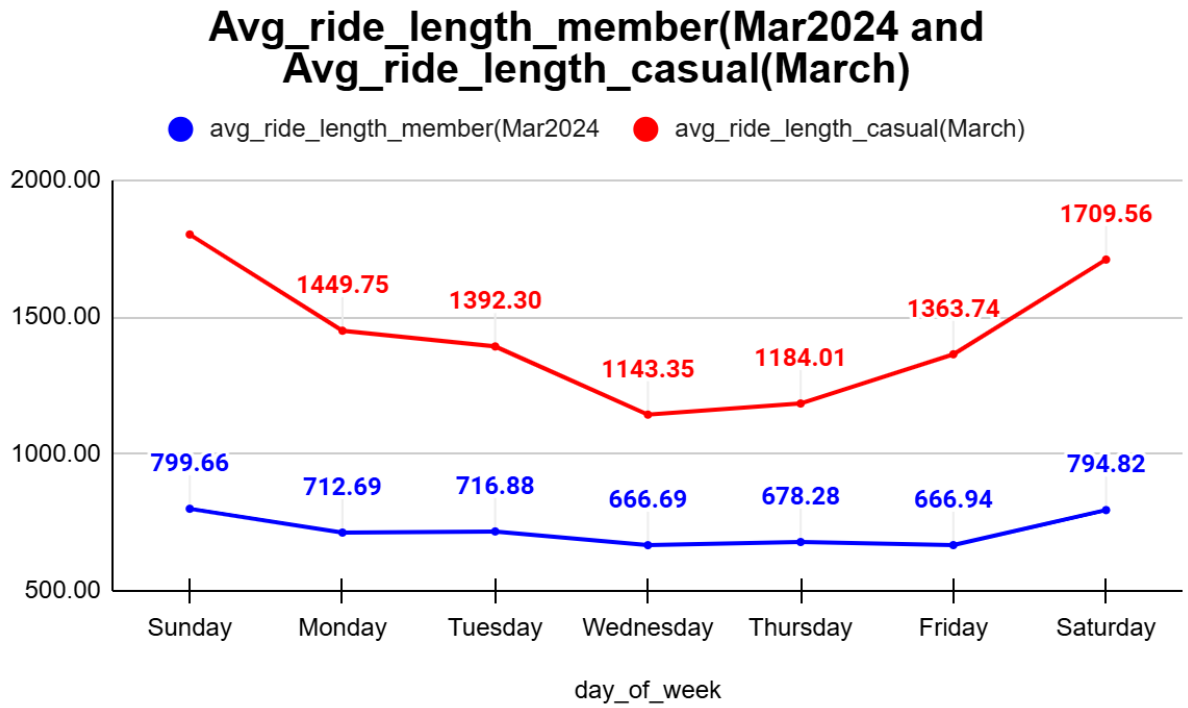

Avg_ride_length_member(Jan2024) &
Avg_ride_length_casual(Jan2024)
avg_ride_length_member(Jan2024)
avg_ride_length_casual(Jan2024)
1750.00
1500.00
1250.00
1000.00
750.00
500.00
1224.33
1597.90
1310.06
1237.99
1091.96
1103.79
1387.09
915.00
812.93
892.39
923.75
722.51
699.28
810.07
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
day_of_week

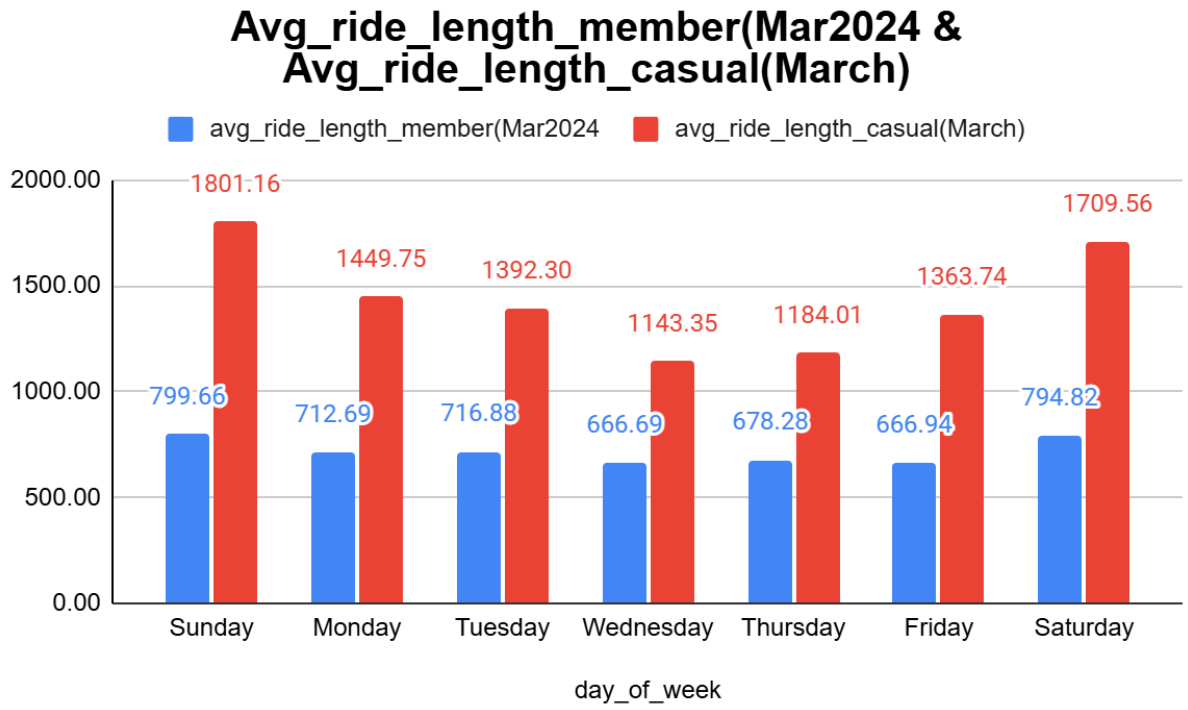
day_of_week	avg_ride_length_member(Feb 2024)	avg_ride_length_casual(Feb 2024)
Sunday	867.98	1867.411367
Monday	740.93	1532.577868
Tuesday	774.63	1529.778714
Wednesday	761.31	1183.997519
Thursday	749.31	1217.99777
Friday	756.03	1491.447185
Saturday	847.15	1863.618563



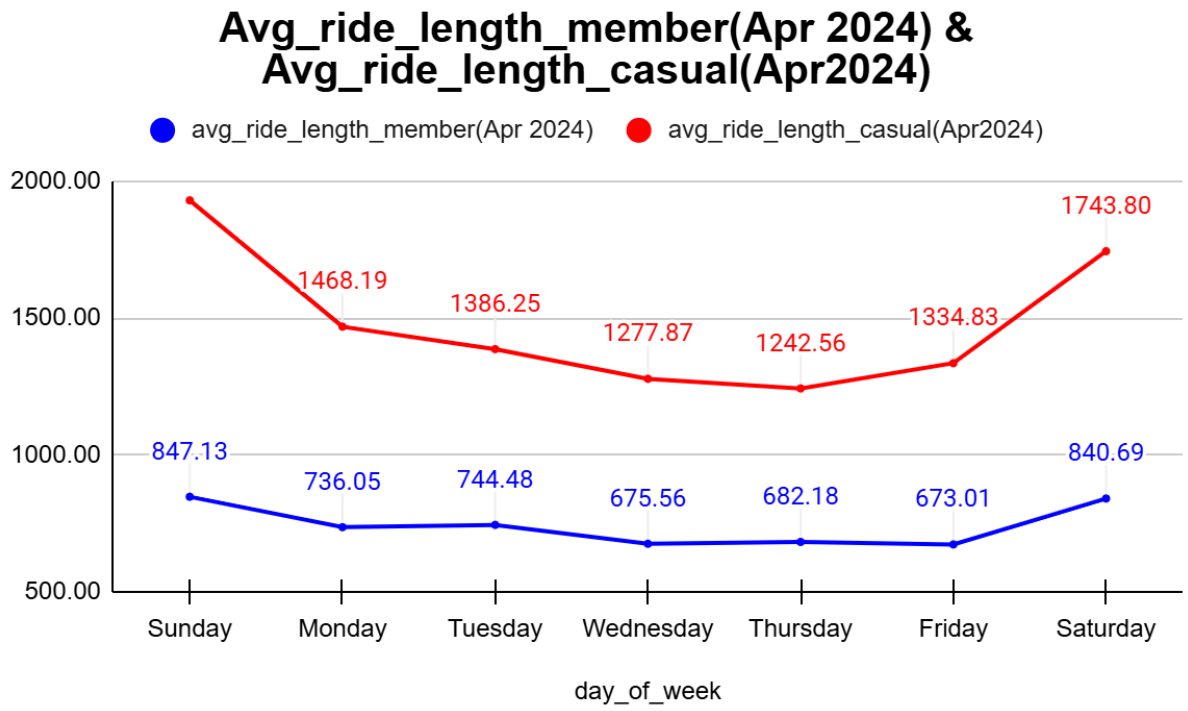


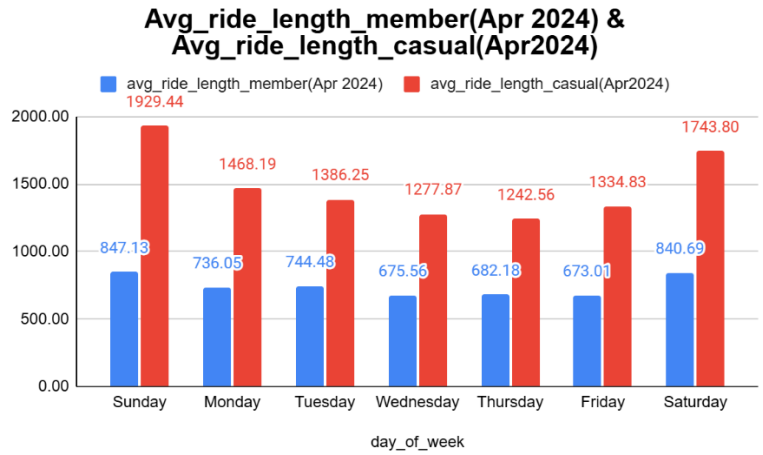
day_of_week	avg_ride_length_member(Mar2024	avg_ride_length_casual(March)
Sunday	799.66	1801.16
Monday	712.69	1449.75
Tuesday	716.88	1392.30
Wednesday	666.69	1143.35
Thursday	678.28	1184.01
Friday	666.94	1363.74
Saturday	794.82	1709.56


Avg_ride_length_member(Mar2024 and Avg_ride_length_casual(March)
avg_ride_length_member(Mar2024
avg_ride_length_casual(March)
2000.00
1500.00
1000.00
500.00
1449.75
1392.30
1143.35
1184.01
1363.74
1709.56
799.66
712.69
716.88
666.69
678.28
666.94
794.82
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
day_of_week


Avg_ride_length_member(Mar2024 & Avg_ride_length_casual(March)
avg_ride_length_member(Mar2024
avg_ride_length_casual(March)
2000.00
1500.00
1000.00
500.00
0.00
1801.16
1449.75
1392.30
1143.35
1184.01
1363.74
1709.56
799.66
712.69
716.88
666.69
678.28
666.94
794.82
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
day_of_week

day_of_week	avg_ride_length_member(Apr 2024)	avg_ride_length_casual(Apr2024)
Sunday	847.13	1929.44
Monday	736.05	1468.19
Tuesday	744.48	1386.25
Wednesday	675.56	1277.87
Thursday	682.18	1242.56
Friday	673.01	1334.83
Saturday	840.69	1743.80





4.3.3 Interpreting the Bar Chart:

The bar chart will visually represent the average ride length for each category. You can easily compare the lengths and identify trends or patterns. For example, you might see that casual riders tend to have longer rides than members, or that ride lengths are generally longer on weekends.

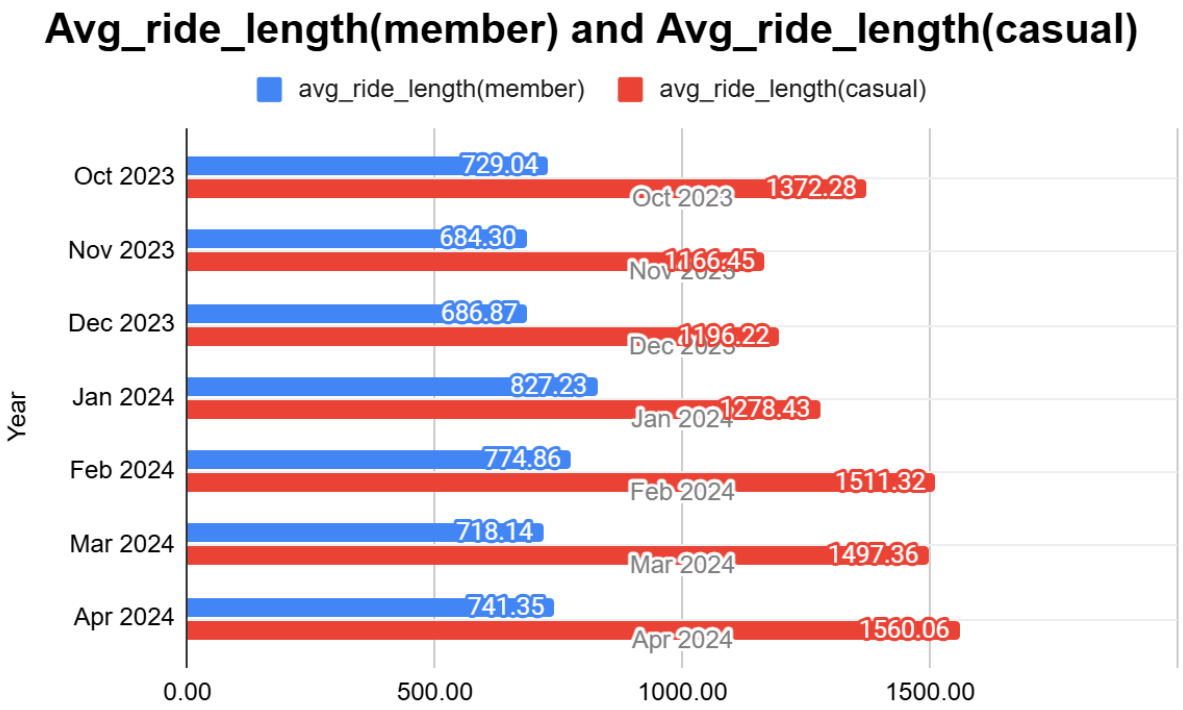
4.3.3.1 Visualizing the Data: A Deep Dive

4.3.3.2 Understanding the Data

Before we delve into visualizations, let's recap our key findings:

- **Ride Length:** Annual members tend to have shorter rides, while casual riders have longer rides.
- **Ride Frequency:** Annual members take more rides per year.
- **Ride Time:** Annual members are more likely to ride during peak commuting hours, while casual riders have a more flexible usage pattern.

Year	avg_ride_length(member)	avg_ride_length(casual)
Oct 2023	729.04	1372.28
Nov 2023	684.30	1166.45
Dec 2023	686.87	1196.22
Jan 2024	827.23	1278.43
Feb 2024	774.86	1511.32
Mar 2024	718.14	1497.36
Apr 2024	741.35	1560.06



4.3.4 Interpreting the Chart: Average Ride Length for Members vs. Casual Riders

4.3.4.1 Overall Trend:

- **Annual Members:** Generally, annual members have shorter average ride lengths compared to casual riders. This trend is consistent across all months.
- **Seasonal Variation:** Both member and casual riders tend to have longer average ride lengths during the warmer months (March, April) compared to the colder months. This could be attributed to factors like favorable weather conditions, increased outdoor activities, and longer daylight hours.

4.3.4.2 Specific Month Analysis:

- **October 2023:** Annual members had a significantly shorter average ride length compared to casual riders.
- **November 2023:** The difference between annual and casual rider average ride lengths decreased compared to October.
- **December 2023:** Both groups experienced a slight increase in average ride length.
- **January 2024:** A significant drop in average ride length for both groups, likely due to colder weather conditions.
- **February 2024:** A slight increase in average ride length for both groups.

- **March 2024:** A notable increase in average ride length for both groups, especially for casual riders.
- **April 2024:** A further increase in average ride length, with casual riders maintaining a significant lead over annual members.

4.3.4.3 Possible Reasons for the Differences:

- **Purpose of Rides:** Annual members might use the bikes for commuting or regular exercise, leading to shorter rides. Casual riders, on the other hand, might use the bikes for longer recreational rides or one-time trips.
- **Weather Conditions:** Seasonal variations in weather can influence ride duration and frequency.
- **Bike Availability:** The availability of bikes and docking stations might impact ride lengths, especially during peak hours.

By analyzing these trends, Cyclistic can gain insights into the behavior of different user groups and tailor their marketing strategies accordingly. For instance, they could focus on promoting annual memberships during the warmer months and emphasize the convenience and cost-effectiveness of annual memberships for regular riders.

Months	Avg_ride_length(member)	Avg_ride_length(casual)
Oct 2023	729.04	1372.28
Nov 2023	684.30	1166.45
Dec 2023	686.87	1196.22
Jan 2024	827.23	1278.43
Feb 2024	774.86	1511.32
Mar 2024	718.14	1497.36
Apr 2024	741.35	1560.06

4.3.4.4 Five-Number Summary for Average Ride Lengths

Note: To calculate the quartiles accurately, it's best to use statistical software or a calculator. However, we can provide an estimate based on the given data.

Here's the five-number summary for both Annual Members and Casual Riders:

Statistic	**Annual Members**	**Casual Riders**
Minimum	684.30	1166.45
Q1	~700	~1200
Median	~740	~1300
Q3	~800	~1500
Maximum	827.23	1560.06

Export to Sheets

Note: The Q1 and Q3 values are estimated based on visual inspection of the data. For more precise calculations, you can use statistical software or a calculator.

Interpreting the Five-Number Summary:

- **Minimum and Maximum:** These values represent the shortest and longest average ride lengths for each group.
- **Quartiles:**
    - Q1: 25% of the data points fall below this value.
    - Q3: 75% of the data points fall below this value.
- **Median:** The middle value of the dataset.

By comparing the five-number summaries for annual members and casual riders, you can gain insights into the distribution of their average ride lengths. For example, you can see that casual riders generally have longer average ride lengths, with a wider range of values.

Statistic	Annual Members	Casual Riders
Minimum	684.3	1166.45
Q1	~700	~1200
Median	~740	~1300
Q3	~800	~1500
Maximum	827.23	1560.06

5.0 Dashboards

Utilized data visualization tools such as Tableau to create interactive dashboards.

To view the visualizations in Tableau Public, simply click on the provided links:

5.1. Cyclistic Bike-Sharing

5.1.1 Average Ride Length(members) & Average Ride Length (casual) for 7 months:
https://public.tableau.com/views/CyclisticBike-SharingAverageRideLengthmembersAverageRideLengthcasualfor7months/Dashboard1?:language=en-US&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link

5.1.2 Average Ride Length vs Days of the Week for Casual and Member Riders (Oct 2023 -April 2024):
https://public.tableau.com/views/AverageRideLengthvsDaysoftheweekforCasualandMemberRidersOct2023-Apr2024/Dashboard1?:language=en-US&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link

5.1.3 Cyclistic Bike -Sharing Trends: Total Rides(Days of the weeks) vs Months:
https://public.tableau.com/views/CyclisticBike-SharingTrendsTotalRidesDaysoftheweekvsMonths/Dashboard1?:language=en-US&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link

6.0 Findings

- **Ride Frequency:**
    - Annual members have significantly higher overall ridership compared to casual riders.
    - Weekday ridership is significantly higher than weekend ridership for both member types, suggesting a strong reliance on the service for commuting purposes.
    - Peak usage days vary throughout the year, with Tuesdays and Wednesdays often showing higher ridership.
- **Ride Duration:**
    - Casual riders consistently have longer average ride durations compared to annual members.
    - Weekend rides are typically longer than weekday rides for both member types.
    - Seasonal variations in ride duration are observed, with longer rides during warmer months.
- **Member Type Differences:**
    - Annual members exhibit more consistent usage patterns throughout the week, while casual riders have higher weekend usage.
    - Ride durations vary significantly between member types, with casual riders generally having longer rides.

- **Weekday Usage:**
    - Weekday ridership is significantly higher than weekend ridership for both member types, suggesting a strong reliance on the service for commuting purposes.
- **Seasonal Variations:**
    - Both member and casual rider usage exhibit seasonal variations, with higher ridership during warmer months.

7.0. Discussion

7.1 Insights:

- Casual riders primarily use the service for recreational purposes and longer trips.
- Annual members utilize the service more frequently, likely for commuting and shorter trips.
- Weekday ridership is a significant driver for both member types.
- Seasonal factors significantly influence ridership patterns for both groups.

7.2 Recommendations:

7.2.1 Targeted Marketing:

- Develop targeted marketing campaigns to attract casual riders to convert to annual memberships, highlighting the cost-effectiveness and convenience of annual plans.
- Focus marketing efforts on weekdays and during peak commuting hours to reach potential commuter members.
- Explore alternative pricing models: Consider dynamic pricing strategies that adjust prices based on demand and time of day.
- Enhance the customer experience: Improve the overall customer experience through initiatives such as improved bike maintenance, user-friendly mobile apps, and enhanced customer support.
- Flexible Membership Options:
- Introduce flexible membership options, such as weekend passes or discounted weekday rates, to cater to the diverse needs of casual riders.

7.2.2 Weekend Promotions:

- Offer special promotions and discounts during weekends to encourage casual riders to use the service for leisure activities.

7.2.3 Service Enhancements:

- Improve the overall customer experience by enhancing bike maintenance, expanding service areas, and improving station availability.

8. Conclusion

This analysis provides valuable insights into the distinct ridership behaviours of Cyclistic's annual members and casual riders. By leveraging these findings and implementing data-driven strategies, Cyclistic can effectively convert casual riders into loyal members, driving sustainable growth for the business.