Cyclistic Bike-Share Data Analysis Report
Google Data Analytics Capstone Case Study

Executive Summary

This report presents a comprehensive analysis of Cyclistic's historical bike-share trip data, conducted as part of the Google Data Analytics Capstone Case Study. The primary business task was to identify key differences in bike usage patterns between casual riders and annual members, with the objective of informing marketing strategies aimed at increasing annual membership subscriptions.

Using data from Q1 2019 and Q1 2020, this analysis involved cleaning and transforming the datasets in Google Sheets, merging and analyzing the data in RStudio, and visualizing key trends in Tableau. The findings revealed that casual riders take significantly longer rides but use the service less frequently, while annual members ride more often and predominantly on weekdays, suggesting commute-related behavior.

Based on these insights, the report recommends (1) increasing bike availability in March to accommodate seasonal demand, (2) reallocating bike inventory to support high afternoon usage by casual riders, and (3) modifying the annual membership structure to better suit long-ride and early-morning users, especially casual riders with commuting patterns.

These data-driven strategies aim to convert casual riders into loyal annual members, ultimately improving Cyclistic's profitability and long-term growth.

Introduction

This report presents the findings from a capstone case study for the Google Data Analytics Professional Certificate. The case is based on a fictional scenario involving Cyclistic, a bike-share company headquartered in Chicago. As a junior data analyst on the marketing analytics team, my objective was to help the company identify patterns in user behavior to support a strategic marketing initiative aimed at increasing annual memberships.

Cyclistic operates a fleet of 5,824 GPS-tracked bicycles distributed across 692 docking stations throughout the city. Users can check out a bike from one station and return it to any other within the system. Although most Cyclistic riders use the service for recreational purposes, approximately 30% use the bikes to commute to work. In addition to standard bikes, Cyclistic provides adaptive bikes, including hand tricycles and cargo bikes, making the service accessible to a wider demographic, though traditional two-wheeled bikes remain the most commonly used.

The company currently offers three pricing options:

- **Single-ride passes**
- **Full-day passes**
- **Annual memberships**

Customers who purchase single or full-day passes are classified as **casual riders**, while those who hold annual subscriptions are known as **members**. The company's finance team has concluded that annual members are substantially more profitable than casual riders. Therefore, Marketing Director Lily Moreno initiated this project with a clear objective: to design marketing strategies that convert casual riders into annual members.

In this report, I address the first of three guiding questions posed by Cyclistic's leadership:

How do annual members and casual riders use Cyclistic bikes differently?

The findings and recommendations presented here are based on an in-depth analysis of historical bike trip data.

Business Task

Goal:
Analyze Cyclistic's historical bike-share trip data to uncover usage patterns that distinguish casual riders from annual members. These insights will serve as a foundation for marketing strategies designed to increase the number of annual memberships.

Data Description

The data used in this case study is publicly available and was originally provided by Motivate International Inc., the parent company of Divvy. The datasets used are:

1. Divvy 2019 Q1 Data
2. Divvy 2020 Q1 Data

Data License: Divvy License Agreement

Data Privacy: Personally identifiable information (PII) has been excluded to ensure user privacy. Therefore, individual-level tracking (e.g., user location or purchase history) was not possible.

Tools Used

- **Google Sheets** – For initial data inspection and transformation
- **RStudio (R)** – For data cleaning, analysis, and visualization
- **Tableau** – For professional data visualizations and dashboards

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Data Preparation

In Google Sheets:

For each dataset (2019 Q1 and 2020 Q1):

- Created a column by subtracting from , formatted as HH:MM:SS.
- Created a column using where 1 = Sunday and 7 = Saturday.
- Standardized rider categories:
    - “Customer” → “casual”
    - “Subscriber” → “member”
- Renamed the column to to match across datasets.
- Calculated:
    -
    -
    -

Pivot Tables:

Three pivot tables were created in separate sheets for each dataset:

1. **Average ride duration per rider type**
2. **Average ride duration by day of the week for each rider type**
3. **Ride counts by rider type and day of the week**

Data Processing in RStudio

- Imported the datasets using from the package
- Stored them as tibbles: ,
- Merged datasets using to create
- Conducted cleaning:
    - Renamed inconsistent columns
    - Converted formats
- Final cleaned dataset saved as
- Filtered out entries with:
    - Negative ride durations
    - Administrative or maintenance trips (e.g., quality checks)
- Final working dataset:

Exploratory Analysis and Key Insights

Overall Trends:

- **Casual riders take longer rides on average** (based on mean and median).
- **Members take significantly more trips** across all days.

Weekly Patterns:

- **Casual Riders:**
    - Longest rides on **Thursdays** (mean)
    - Longest median rides on **Sundays**
- **Members:**
    - Most frequent rides on **Tuesdays**, followed by **Thursdays**

Daily and Hourly Trends:

- **Sunday:** Longest rides (mean, median, total duration) for both groups
- **Tuesday:** Highest ride count overall
- **March:** Peak ride volume for both user types
- **February:** Longest average rides for casual riders
- **March:** Longest average rides for members
- **1 PM–5 PM:** Most active hours for casual riders
- **4 AM:** Casual riders have longest average ride durations

Mode Analysis (via Google Sheets):

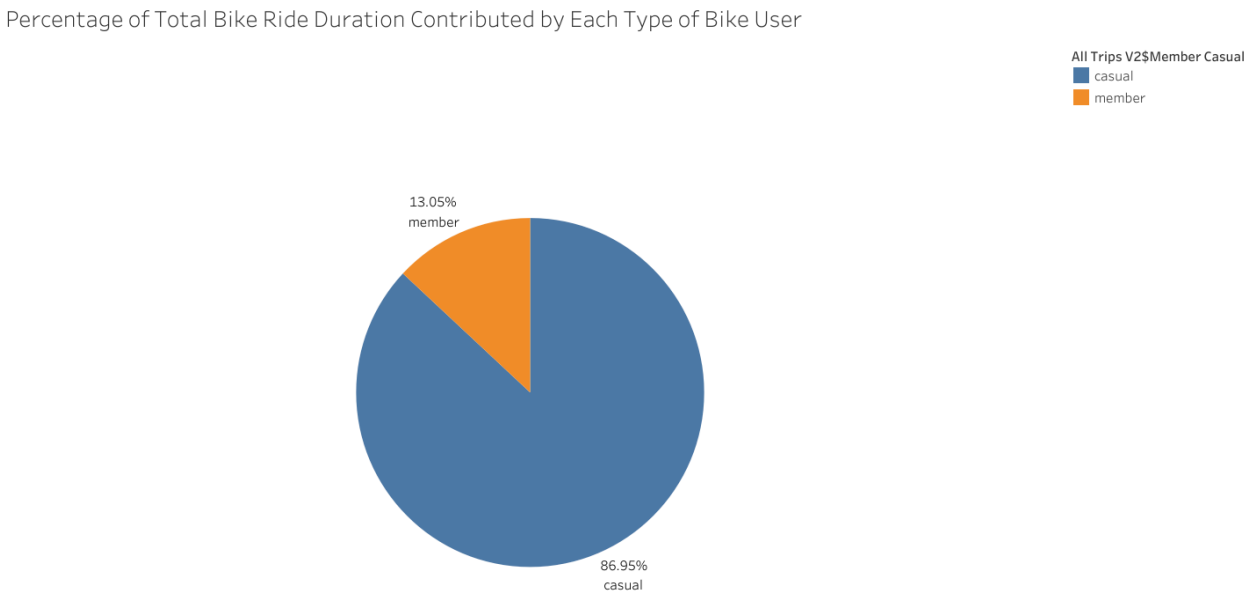
- Mode of for 2019 = 5 (**Thursday**)
- Mode of for 2020 = 3 (**Tuesday**)

Tableau Visualizations

Six professional visualizations were created, highlighting:

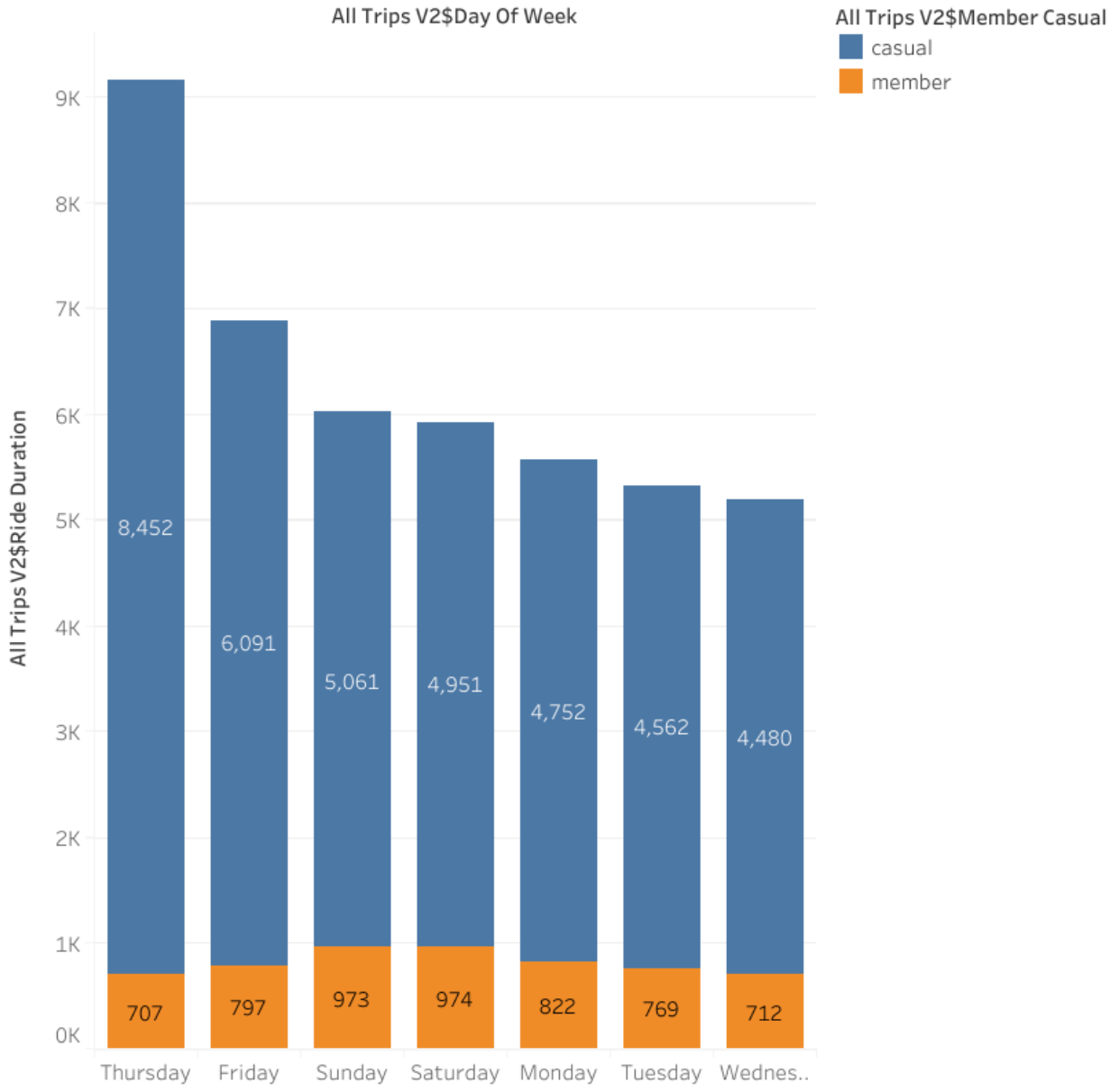
- Average ride length by rider type and weekday
- Total rides by rider type per weekday
- Monthly ride patterns
- Hourly usage trends
- Peak usage heatmaps
- Duration distribution by time of day

View pie chart on Tableau Public:
https://public.tableau.com/views/CyclisticDataVisualizations_17524091152510/Sheet1?:language=en-US&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link

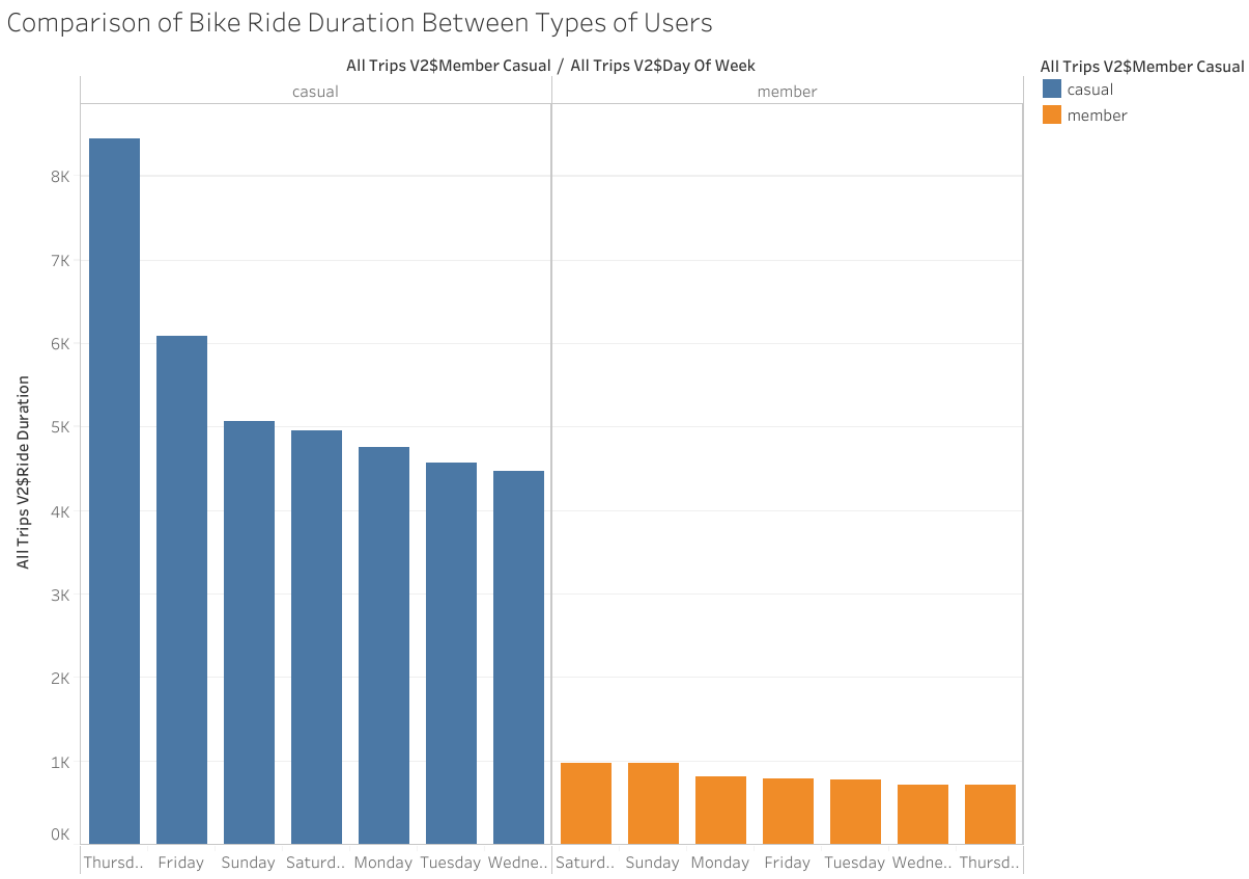


View vertical bar chart that has labels in each bar on Tableau Public:
https://public.tableau.com/views/CyclisticDataVisualizations_17524091152510/Sheet2?:language=en-US&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link

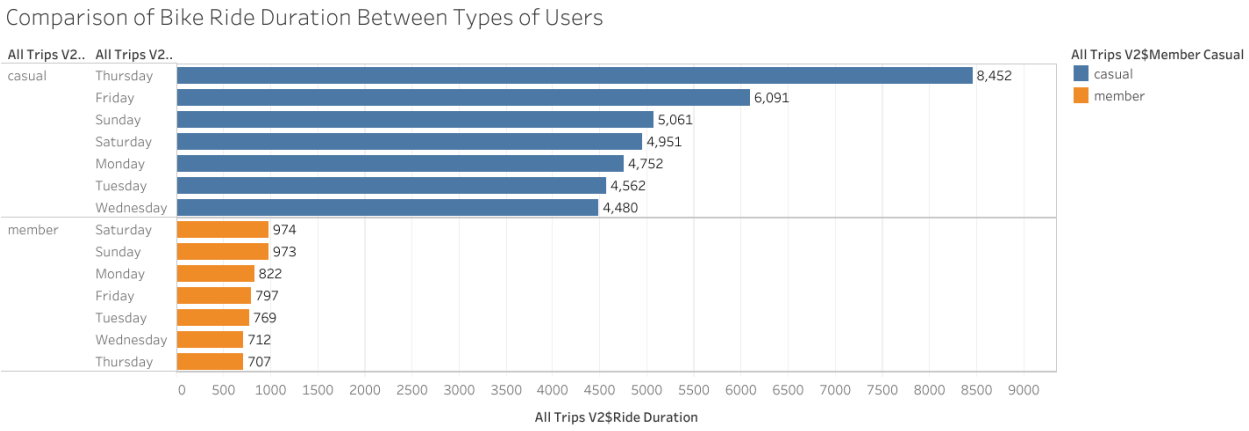
Durations of Bike Rides by User Type Across Each Day



View vertical bar chart in which the bars for casual riders and members are separated on Tableau Public: https://public.tableau.com/views/CyclisticDataVisualizations_17524091152510/Sheet3?:language=en-US&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link

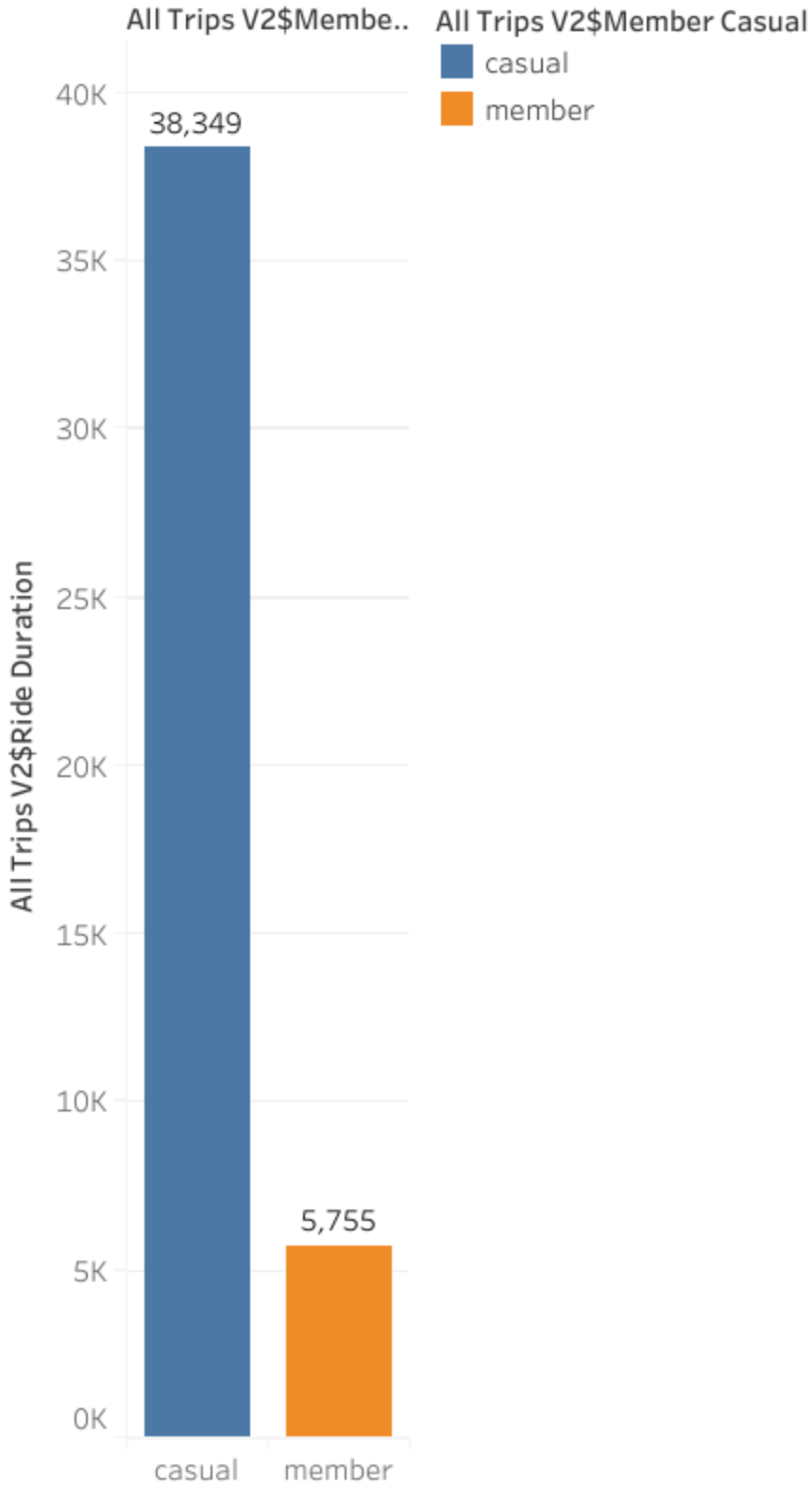


View horizontal bar chart on Tableau Public:
https://public.tableau.com/views/CyclisticDataVisualizations_17524091152510/Sheet4?:language=en-US&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link

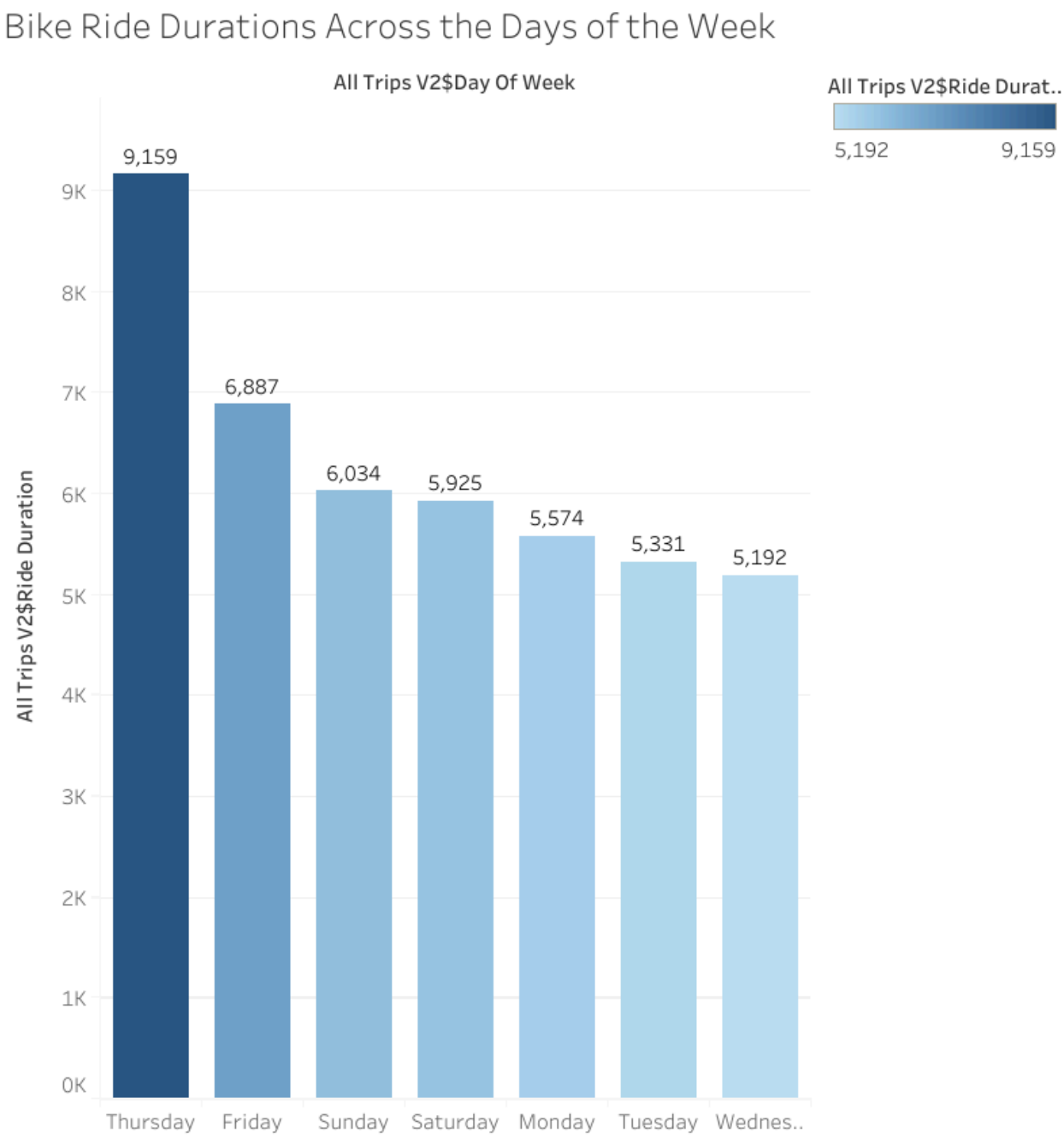


View vertical bar chart comparing the total ride durations by casual riders and members each without grouping by day of week:
https://public.tableau.com/views/CyclisticDataVisualizations_17524091152510/Sheet5?:language=en-US&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link

Bike Ride Durations for Each User Type



View vertical bar chart comparing the total ride durations for each day of the week without grouping by user type:
https://public.tableau.com/views/CyclisticDataVisualizations_17524091152510/Sheet6?:language=en-US&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link



Recommendations

1. Scale Bike Availability in March

March has the highest ride demand from both casual and member users. Cyclistic should:

- Ensure full operational readiness
- Launch Spring-themed promotions in late February

2. Allocate More Bikes During Peak Afternoon Hours

Casual riders most frequently use bikes between 1 PM and 5 PM. Cyclistic can:

- Increase bike supply at stations during this window
- Offer limited-time afternoon promos for casual riders

3. Adjust Membership Plan to Attract Casual Commuters

Data shows casual riders often take long, early-morning rides—especially around **4 AM**. This suggests commuting behavior.

Proposal:

- Allow up to **2,000 minutes of riding per day** under a revised annual membership (based on observed max duration of 2,953 minutes)
- Introduce commuter-specific pricing tiers
- Market memberships as long-term cost-saving alternatives to daily passes

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Final Thoughts and Next Steps

This analysis has uncovered distinct behavioral differences between casual riders and members. Casual riders tend to take fewer, longer trips—often during off-peak or early-morning hours—while members ride more frequently, often on weekdays and for shorter durations. These patterns suggest casual riders could be converted into members through strategic messaging, tailored plans, and operational enhancements.

Next Steps:

- Conduct a follow-up survey of casual riders to validate commuting motivations
- Analyze geospatial patterns of ride start/end stations
- A/B test promotions targeted at casual riders using social and email marketing

By using these insights to inform digital campaigns and membership redesigns, Cyclistic can foster user retention, improve customer satisfaction, and drive long-term profitability.

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