Cyclistic Bike-Share Case Study:

Objectives:

- The primary objective is to understand how annual members and casual riders use Cyclistic bikes differently.
- The insights derived will help design a marketing strategy to convert casual riders into annual members, as annual members are more profitable for Cyclistic.

Data Sources:

- **Cyclistic Historical Bike Trip Data**: This dataset contains information about the trips made using Cyclistic bikes over the past 12 months. The data includes details such as trip duration, start and end time, day of the week, user type (annual member or casual rider), and more.
- **Data Availability**: The data can be accessed and downloaded from Divvy Trip Data.

Data Preparation and Cleaning:

- **Data Cleaning Steps**:
    1. **Import Data**: All 12 months of data files were downloaded, unzipped, and stored appropriately.
    2. **Consistent Column Names**: Ensure column names across all datasets are consistent.
    3. **Date Formatting**: Convert the date columns into datetime format for easy manipulation.
    4. **Create New Columns**:
        - **ride_length**: Calculate the length of each ride by subtracting started_at from ended_at.
        - **day_of_week**: Extract the day of the week for each ride to analyze patterns based on weekdays.
    5. **Handle Missing Values**: Identify and handle any missing values that could affect the analysis.
    6. **Data Aggregation**: Combine all individual monthly datasets into a single comprehensive dataset for analysis.

Data Analysis:

- **Average Ride Duration**:
    - Casual riders tend to have longer average ride durations compared to annual members.
- **Ride Frequency by Day of Week**:

    - Casual riders are more likely to ride on weekends, while annual members have a more consistent usage pattern throughout the week, indicating possible commuting habits.

- **Ride Frequency by Time of Day**:
    - Annual members show higher activity during morning and evening rush hours, consistent with work commutes. Casual riders show higher activity during mid-day and evening, possibly indicating leisure trips.
- **Trends in Bike Usage**:
    - Casual riders show seasonal variation, with peaks during warmer months. Annual members maintain a steadier usage rate across seasons.

Visualizations:

- **Ride Duration Comparison**: A bar chart showing the average ride duration for casual riders vs. annual members.
- **Day of the Week Usage Patterns**: A heatmap showing the intensity of bike usage by day of the week and time of day for both user types.
- **Monthly Ride Trends**: A line graph depicting the monthly trends in bike usage for casual riders and annual members.

Key Findings:

- **Longer Rides by Casual Riders**: Casual riders have significantly longer ride durations, suggesting they may use bikes for leisure rather than commuting.
- **Weekend Peaks for Casual Riders**: Casual riders predominantly use bikes on weekends, which aligns with leisure activities.
- **Consistent Commuting Patterns for Annual Members**: Annual members show consistent bike usage during weekdays, particularly during commuting hours.
- **Seasonal Variation**: Casual rider activity is highly seasonal, with more rides during warmer months, while annual members show steadier usage across the year.

Recommendations:

- **Targeted Marketing for Commuters**: Develop campaigns that highlight the benefits of an annual membership for daily commuting, focusing on convenience and cost savings.
- **Weekend and Leisure Promotions**: Offer promotions that encourage casual riders to try out an annual membership by highlighting weekend and leisure benefits.
- **Seasonal Membership Offers**: Introduce seasonal promotions that convert casual riders to annual memberships during peak riding seasons.