

Divvy annual members vs. casual riders

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Business Task

Divvy is a bikeshare company that would like to convert casual riders that pay per-ride or per-day into annual members that pay an annual fee. Annual memberships are both more cost-effective for customers and profitable for Divvy. So, the business task is to **determine how annual members use bikes differently from casual riders, and develop data-driven insights to convert casual riders into annual members.**

Data Sources

The data have been made available by Motivate International Inc. under this license. This data source seems to be:

- reliable (accurate, complete, and unbiased)
- original (produced first-hand by Divvy)
- comprehensive (includes all bike rides from all times (times/days/months) and stations (across Chicago))
- current (updated regularly)
- cited (it is publicly available by Divvy)

Note that riders' personally identifiable information is not publicly available. This means that we will not be able to connect past purchases to credit card numbers to determine if casual riders live in the Divvy service area or if they have purchased multiple single passes.

Approach:

1. Download the last 12 months (in this case, March 2024-February 2025) of Divvy trip data. The data can be found at <https://divvy-tripdata.s3.amazonaws.com/index.html>.
2. Store in a subdirectory titled "raw-files".

Data Cleaning & Manipulation

Approach:

- Remove geographical data which are outside the continental USA.
- Calculate trip duration and ensure there are no negative duration.
- Determine if bikes are returned to the same station or different station.
- Create values for month, day, and hour.

Summary of Analysis

Question 1: How do total number of rides, bike type, and trip duration differ between casual riders and annual members?

Approach: Calculate the mean duration of bike ride and number of bike rides by member type and bike type.

Results:

- Casual riders make up 36.8% of total rides, and annual members make up 63.2% of total rides.
- Electric bikes are the most-used, while electric scooters are the least-used type of ride for both casual riders and annual members.
- Ride duration differs between member types on classic bikes. Casual members on classic bikes have over two times longer rides (29.4 minutes) compared to annual members on classic bikes (13.4 minutes). The ride duration is about the same between member types for electric bikes (14.5 vs. 13.4 minutes for casual vs. annual members) and electric scooters (11.9 vs. 8.2 minutes for casual vs. annual members).

Question 2: How do start and end locations differ between casual riders and annual members?

Approach: Determine the most popular starting stations by member type.

Results:

- The most popular start and end stations for casual riders include Streeter Dr & Grand Ave, DuSable Lake Shore Dr & Monroe St, and Michigan Ave & Oak St.
- The most popular start and end stations for annual members include Kingsbury St & Kinzie St, Clinton St & Washington Blvd, and Clark St & Elm St.
- One of the most popular start stations for annual members does not have a name (41.89000 N, -87.63000 W).
- Annual members are much more likely to return to a different station as the start station compared to casual riders.

Question 3: How do monthly rides differ between casual riders and annual members?

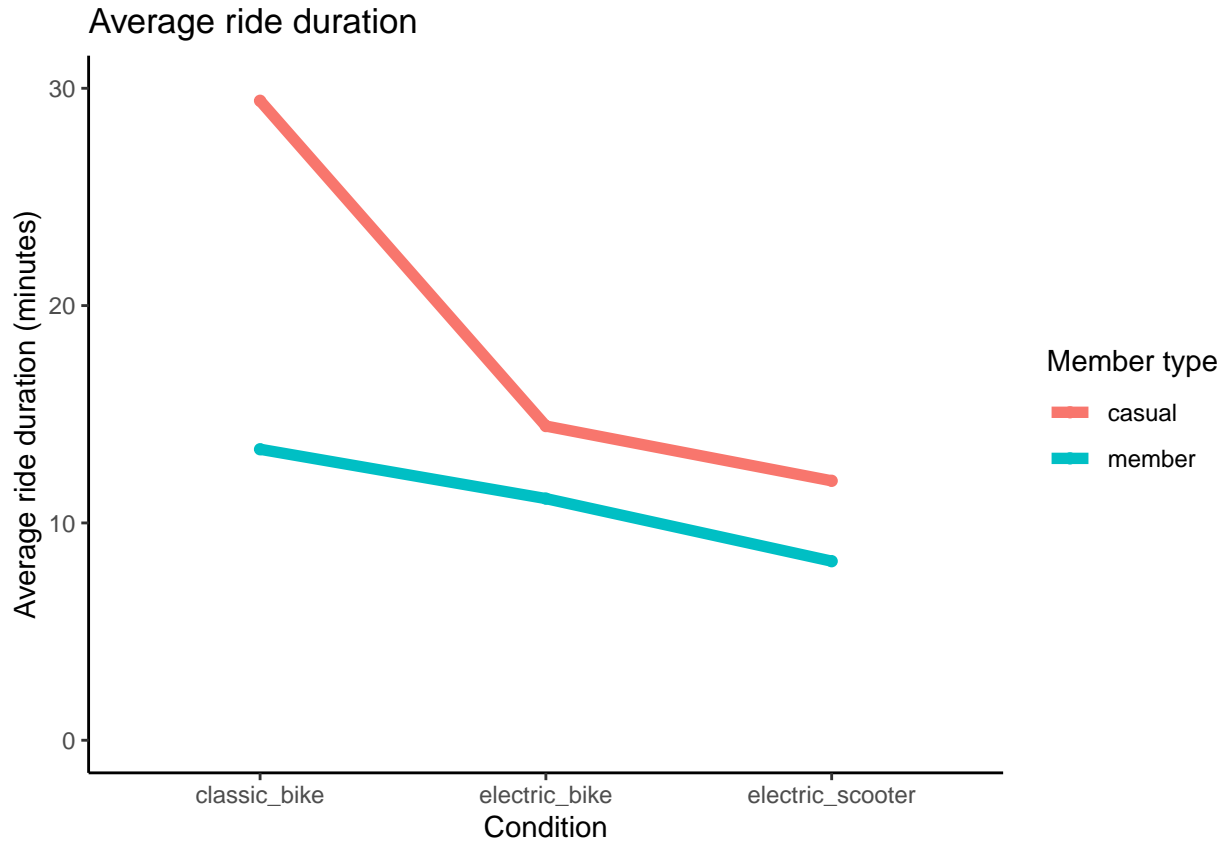
Approach: Determine the most popular month, day of week, and time of day for bike rides by member type.

Results:

- The most popular time of year to ride is May-October (with September being the most popular month) for both member types.
- Annual members ride most often during the work week, with Tuesday and Wednesday being the most popular days. However, casual members ride most often during the weekend, with Saturday and Sunday being the most popular days.
- Annual members ride most often during rush hour, at 4-6 PM and 8 AM. Casual members also ride most often during 4-6PM, but also ride often at 2-3PM.

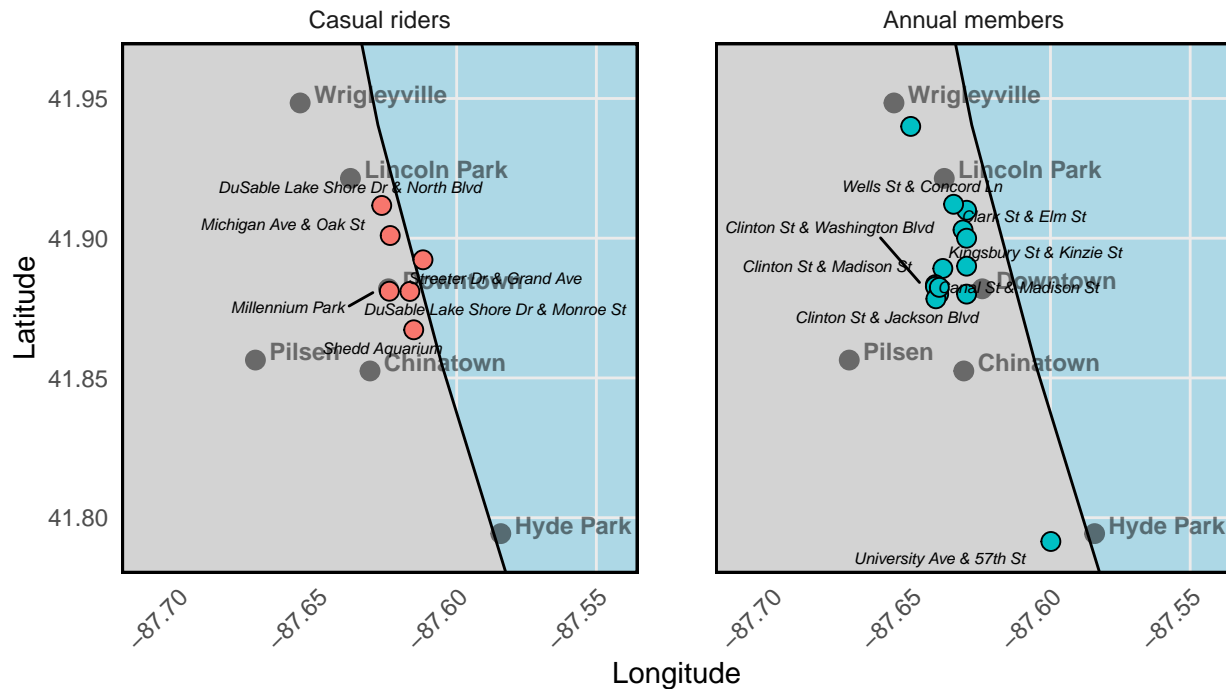
Visualizations & Key Findings

1. Casual riders take longer rides on *classic bikes* compared to annual members, but have similar ride duration to annual members using electric bikes and scooters.

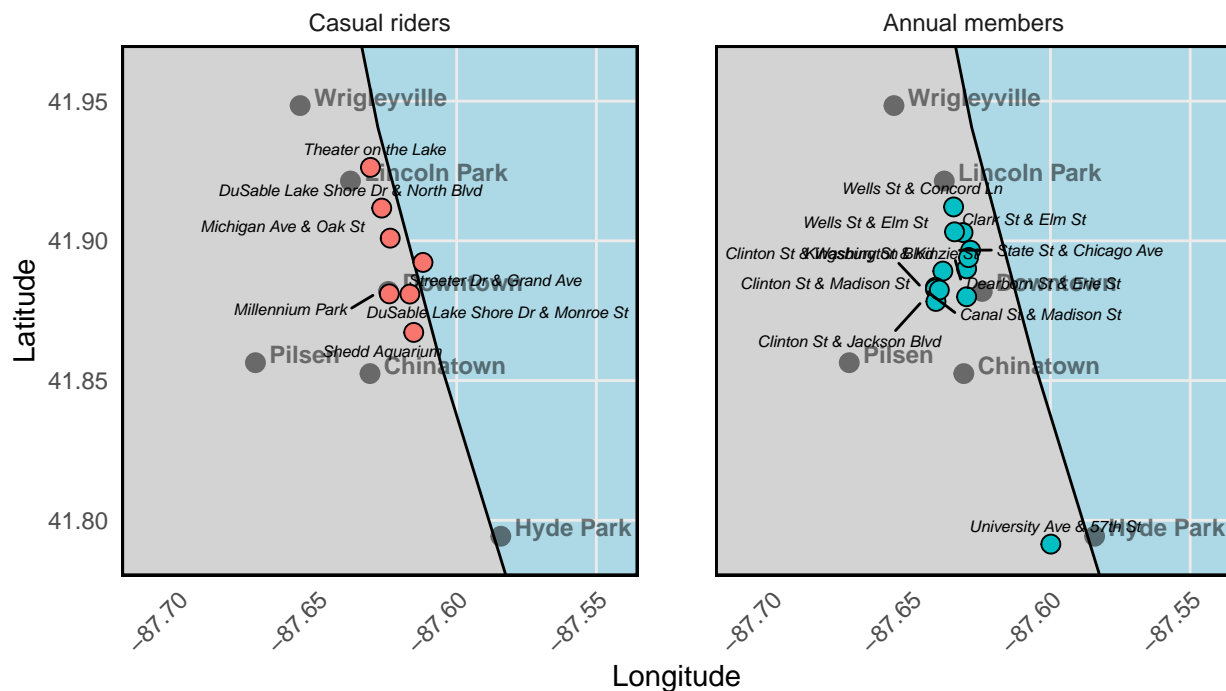


2. Casual riders tend to start their bike rides on the *Downtown waterfront*, while annual members tend to start their bike rides *inland from downtown and near Hyde Park*. Further, although a majority of riders return their bikes to a different station than they retrieved from, casual riders are more likely than annual members to return their bikes to the same station they retrieved from.

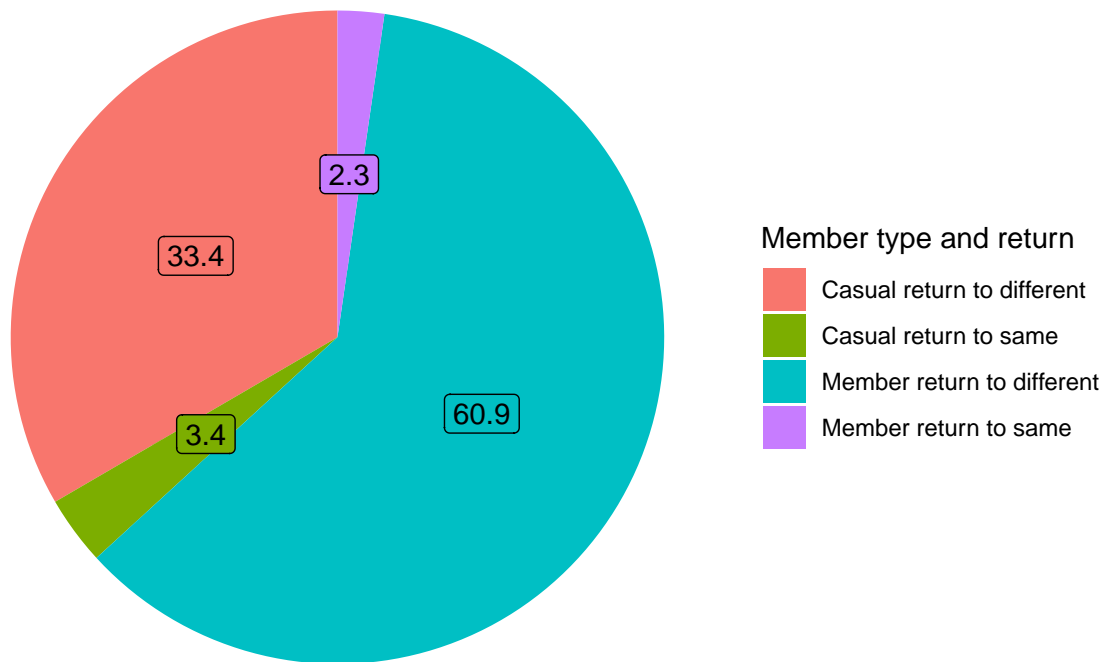
Chicago, IL: Most popular start stations



Chicago, IL: Most popular end stations

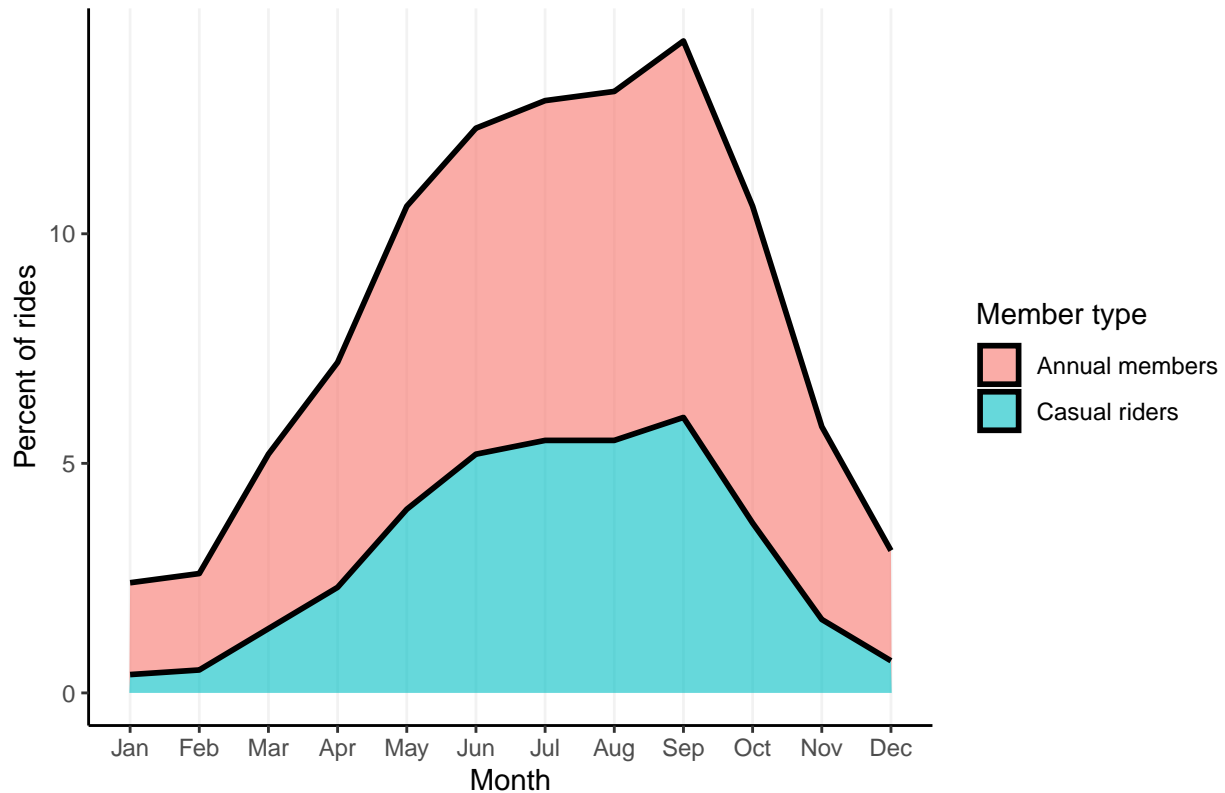


Percent of rides by member type and return station

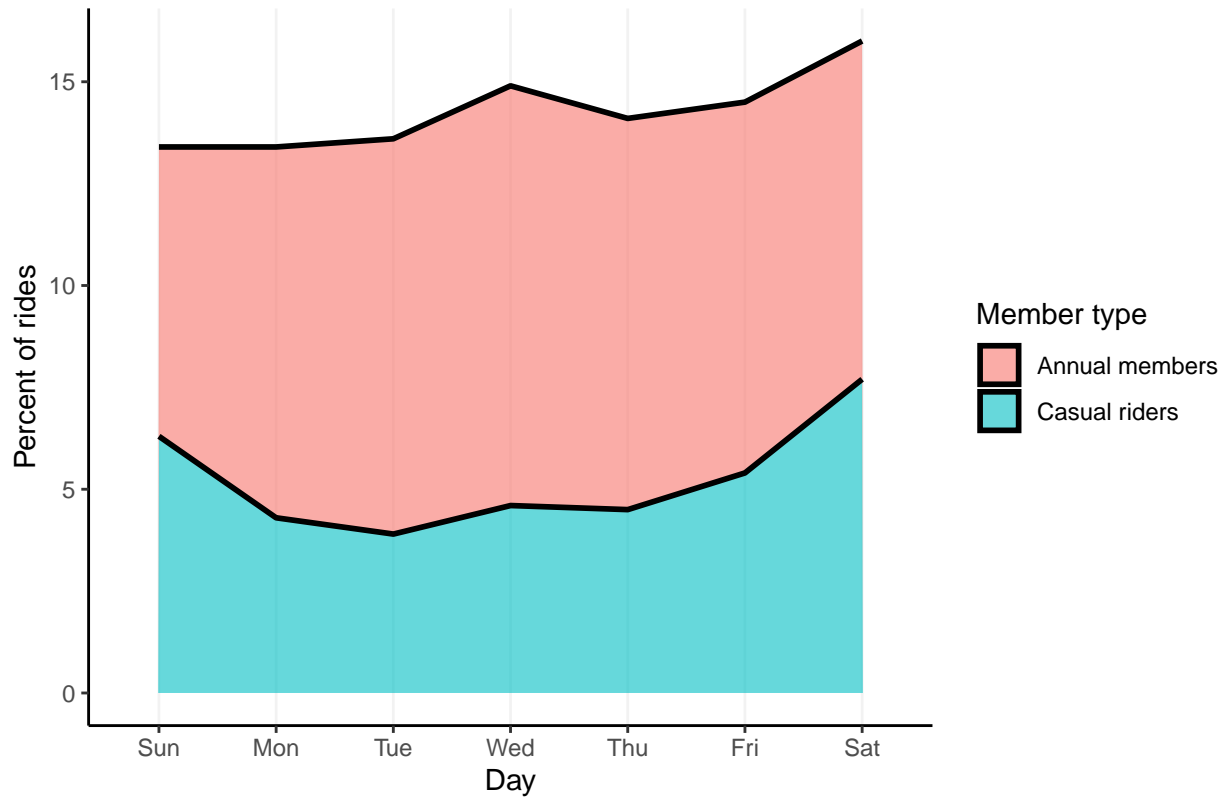


3. All riders are most active during the warm season (May thru October), and especially in September. However, while casual members tend to ride most often during afternoons and evenings on the weekend, annual members ride most often during commuting times in the work week (including morning and evening).

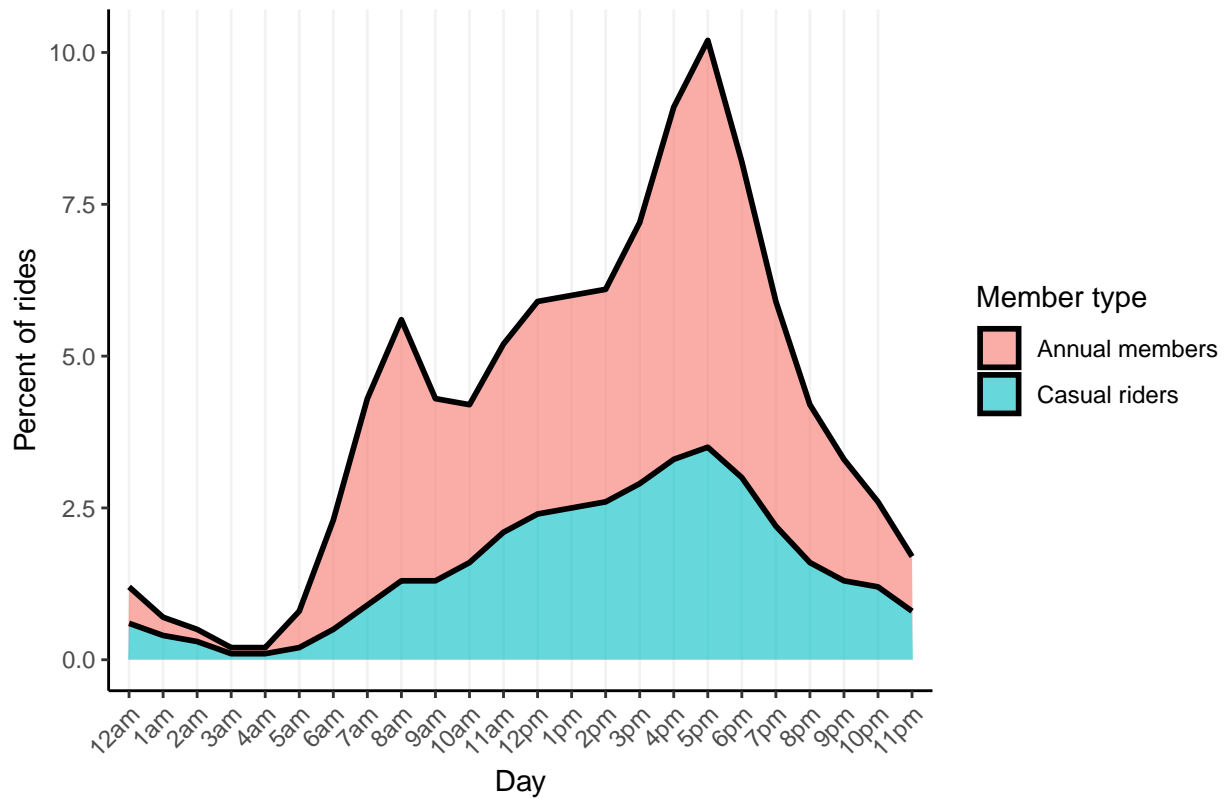
Stacked area plot of rides across months of the year



Stacked area plot of rides across days of the week



Stacked area plot of rides across times of the day



Recommendations

In order to switch casual riders to annual members:

1. Casual riders take more time on classic bikes compared to annual members, so they are likely taking leisure rides with their families or significant others. Offer “kids-bike-free” or “plus-one-bikes-free” promotions to riders who sign up for annual memberships.
2. Casual riders are most active at the Downtown waterfront, and more likely to return their bikes to the same station. Prioritize advertisements for annual memberships at bike stations near Downtown waterfront as opposed to other areas.
3. Casual riders are most active during weekends. Create an annual membership tier that is cheaper than the original annual membership, and allows bike access only during weekends (Saturday and Sunday).