Cyclist Bike Trip Analysis

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Cyclist__Full__Year__Analysis

This analysis is based on cyclist case study.The purpose of this script is to consolidate downloaded Cyclist data into a single data frame and then conduct simple analysis to help answer the key question: “In what ways do annual members and casual riders use Cyclist bikes differently?

Install Required packages

Install and load packages like tidyverse,lubridate and ggplot2

```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.1 --
```

```
## v ggplot2 3.3.5     v purrr   0.3.4
## v tibble  3.1.6     v dplyr   1.0.7
## v tidyr   1.1.4     v stringr 1.4.0
## v readr   2.1.1     v forcats 0.5.1
```

```
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(lubridate)
```

```
##
## Attaching package: 'lubridate'
```

```
## The following objects are masked from 'package:base':
##
##     date, intersect, setdiff, union
```

```
library(ggplot2)
```

STEP 1: Upload data

Upload cyclist csv files:

```
q2_2019 <- read_csv("D:/Coursera/Google_Analyze_data/Capstone_Project/Cyclist_Bike_Sharing/Cyclist_bike
q3_2019 <- read_csv("D:/Coursera/Google_Analyze_data/Capstone_Project/Cyclist_Bike_Sharing/Cyclist_bike
q4_2019 <- read_csv("D:/Coursera/Google_Analyze_data/Capstone_Project/Cyclist_Bike_Sharing/Cyclist_bike
q1_2020 <- read_csv("D:/Coursera/Google_Analyze_data/Capstone_Project/Cyclist_Bike_Sharing/Cyclist_bike
```

STEP 2: WRANGLE DATA AND COMBINE INTO A SINGLE FILE

Compare column names of each file

While the names don't have to be in the same order, they DO need to match perfectly before we can use a command to join them into one file

```
colnames(q2_2019)
```

```
##  [1] "01 - Rental Details Rental ID"
##  [2] "01 - Rental Details Local Start Time"
##  [3] "01 - Rental Details Local End Time"
##  [4] "01 - Rental Details Bike ID"
##  [5] "01 - Rental Details Duration In Seconds Uncapped"
##  [6] "03 - Rental Start Station ID"
##  [7] "03 - Rental Start Station Name"
##  [8] "02 - Rental End Station ID"
##  [9] "02 - Rental End Station Name"
## [10] "User Type"
## [11] "Member Gender"
## [12] "05 - Member Details Member Birthday Year"
```

```
colnames(q3_2019)
```

```
##  [1] "trip_id"           "start_time"        "end_time"
##  [4] "bikeid"            "tripduration"      "from_station_id"
##  [7] "from_station_name" "to_station_id"     "to_station_name"
## [10] "usertype"          "gender"            "birthyear"
```

```
colnames(q4_2019)
```

```
##  [1] "trip_id"           "start_time"        "end_time"
##  [4] "bikeid"            "tripduration"      "from_station_id"
##  [7] "from_station_name" "to_station_id"     "to_station_name"
## [10] "usertype"          "gender"            "birthyear"
```

```
colnames(q4_2019)
```

```
##  [1] "trip_id"           "start_time"        "end_time"
##  [4] "bikeid"            "tripduration"      "from_station_id"
##  [7] "from_station_name" "to_station_id"     "to_station_name"
## [10] "usertype"          "gender"            "birthyear"
```

Rename column

Rename columns to make them consisent with q1_2020

```
(q4_2019 <- rename(q4_2019
                   ,ride_id = trip_id
                   ,rideable_type = bikeid
                   ,started_at = start_time
                   ,ended_at = end_time
                   ,start_station_name = from_station_name
                   ,start_station_id = from_station_id
                   ,end_station_name = to_station_name
                   ,end_station_id = to_station_id
                   ,member_casual = usertype))
(q3_2019 <- rename(q3_2019
                   ,ride_id = trip_id
                   ,rideable_type = bikeid
                   ,started_at = start_time
                   ,ended_at = end_time
                   ,start_station_name = from_station_name
                   ,start_station_id = from_station_id
                   ,end_station_name = to_station_name
                   ,end_station_id = to_station_id
                   ,member_casual = usertype))
(q2_2019 <- rename(q2_2019
                   ,ride_id = "01 - Rental Details Rental ID"
                   ,rideable_type = "01 - Rental Details Bike ID"
                   ,started_at = "01 - Rental Details Local Start Time"
                   ,ended_at = "01 - Rental Details Local End Time"
                   ,start_station_name = "03 - Rental Start Station Name"
                   ,start_station_id = "03 - Rental Start Station ID"
                   ,end_station_name = "02 - Rental End Station Name"
                   ,end_station_id = "02 - Rental End Station ID"
                   ,member_casual = "User Type"))
```

Inspect Dataframe

Inspect the dataframes and look for incongruencies

```
str(q1_2020)
```

```
## spec_tbl_df [426,887 x 13] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ ride_id           : chr [1:426887] "EACB19130B0CDA4A" "8FED874C809DC021" "789F3C21E472CA96" "C9A38
##  $ rideable_type     : chr [1:426887] "docked_bike" "docked_bike" "docked_bike" "docked_bike" ...
##  $ started_at        : POSIXct[1:426887], format: "2020-01-21 20:06:59" "2020-01-30 14:22:39" ...
##  $ ended_at          : POSIXct[1:426887], format: "2020-01-21 20:14:30" "2020-01-30 14:26:22" ...
##  $ start_station_name: chr [1:426887] "Western Ave & Leland Ave" "Clark St & Montrose Ave" "Broadway
##  $ start_station_id  : num [1:426887] 239 234 296 51 66 212 96 96 212 38 ...
##  $ end_station_name  : chr [1:426887] "Clark St & Leland Ave" "Southport Ave & Irving Park Rd" "Wilte
##  $ end_station_id    : num [1:426887] 326 318 117 24 212 96 212 212 96 100 ...
##  $ start_lat         : num [1:426887] 42 42 41.9 41.9 41.9 ...
##  $ start_lng         : num [1:426887] -87.7 -87.7 -87.6 -87.6 -87.6 ...
##  $ end_lat           : num [1:426887] 42 42 41.9 41.9 41.9 ...
##  $ end_lng           : num [1:426887] -87.7 -87.7 -87.7 -87.6 -87.6 ...
##  $ member_casual     : chr [1:426887] "member" "member" "member" "member" ...
##  - attr(*, "spec")=
##   .. cols(
##   ..   ride_id = col_character(),
##   ..   rideable_type = col_character(),
##   ..   started_at = col_datetime(format = ""),
##   ..   ended_at = col_datetime(format = ""),
##   ..   start_station_name = col_character(),
##   ..   start_station_id = col_double(),
##   ..   end_station_name = col_character(),
##   ..   end_station_id = col_double(),
##   ..   start_lat = col_double(),
##   ..   start_lng = col_double(),
##   ..   end_lat = col_double(),
##   ..   end_lng = col_double(),
##   ..   member_casual = col_character()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

```
str(q4_2019)
```

```
## spec_tbl_df [704,054 x 12] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ ride_id          : num [1:704054] 25223640 25223641 25223642 25223643 25223644 ...
##  $ started_at       : POSIXct[1:704054], format: "2019-10-01 00:01:39" "2019-10-01 00:02:16" ...
##  $ ended_at         : POSIXct[1:704054], format: "2019-10-01 00:17:20" "2019-10-01 00:06:34" ...
##  $ rideable_type    : num [1:704054] 2215 6328 3003 3275 5294 ...
##  $ tripduration     : num [1:704054] 940 258 850 2350 1867 ...
##  $ start_station_id  : num [1:704054] 20 19 84 313 210 156 84 156 156 336 ...
##  $ start_station_name: chr [1:704054] "Sheffield Ave & Kingsbury St" "Throop (Loomis) St & Taylor St
##  $ end_station_id    : num [1:704054] 309 241 199 290 382 226 142 463 463 336 ...
##  $ end_station_name  : chr [1:704054] "Leavitt St & Armitage Ave" "Morgan St & Polk St" "Wabash Ave &
##  $ member_casual     : chr [1:704054] "Subscriber" "Subscriber" "Subscriber" "Subscriber" ...
##  $ gender            : chr [1:704054] "Male" "Male" "Female" "Male" ...
##  $ birthyear         : num [1:704054] 1987 1998 1991 1990 1987 ...
##  - attr(*, "spec")=
##   .. cols(
##   ..   trip_id = col_double(),
##   ..   start_time = col_datetime(format = ""),
##   ..   end_time = col_datetime(format = ""),
##   ..   bikeid = col_double(),
##   ..   tripduration = col_number(),
##   ..   from_station_id = col_double(),
##   ..   from_station_name = col_character(),
##   ..   to_station_id = col_double(),
##   ..   to_station_name = col_character(),
##   ..   usertype = col_character(),
##   ..   gender = col_character(),
##   ..   birthyear = col_double()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

```
str(q3_2019)
```

```
## spec_tbl_df [1,640,718 x 12] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ ride_id          : num [1:1640718] 23479388 23479389 23479390 23479391 23479392 ...
##  $ started_at       : POSIXct[1:1640718], format: "2019-07-01 00:00:27" "2019-07-01 00:01:16" ...
##  $ ended_at         : POSIXct[1:1640718], format: "2019-07-01 00:20:41" "2019-07-01 00:18:44" ...
##  $ rideable_type    : num [1:1640718] 3591 5353 6180 5540 6014 ...
##  $ tripduration     : num [1:1640718] 1214 1048 1554 1503 1213 ...
##  $ start_station_id  : num [1:1640718] 117 381 313 313 168 300 168 313 43 43 ...
##  $ start_station_name: chr [1:1640718] "Wilton Ave & Belmont Ave" "Western Ave & Monroe St" "Lakeview
##  $ end_station_id    : num [1:1640718] 497 203 144 144 62 232 62 144 195 195 ...
##  $ end_station_name  : chr [1:1640718] "Kimball Ave & Belmont Ave" "Western Ave & 21st St" "Larrabee
##  $ member_casual     : chr [1:1640718] "Subscriber" "Customer" "Customer" "Customer" ...
##  $ gender            : chr [1:1640718] "Male" NA NA NA ...
##  $ birthyear         : num [1:1640718] 1992 NA NA NA NA ...
##  - attr(*, "spec")=
##   .. cols(
##   ..   trip_id = col_double(),
##   ..   start_time = col_datetime(format = ""),
##   ..   end_time = col_datetime(format = ""),
##   ..   bikeid = col_double(),
##   ..   tripduration = col_number(),
##   ..   from_station_id = col_double(),
##   ..   from_station_name = col_character(),
##   ..   to_station_id = col_double(),
##   ..   to_station_name = col_character(),
##   ..   usertype = col_character(),
##   ..   gender = col_character(),
##   ..   birthyear = col_double()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

```
str(q2_2019)
```

```
## spec_tbl_df [1,108,163 x 12] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ ride_id                                       : num [1:1108163] 22178529 22178530 22178531 2217
##  $ started_at                                    : POSIXct[1:1108163], format: "2019-04-01 00:02:2
##  $ ended_at                                      : POSIXct[1:1108163], format: "2019-04-01 00:09:4
##  $ rideable_type                                 : num [1:1108163] 6251 6226 5649 4151 3270 ...
##  $ 01 - Rental Details Duration In Seconds Uncapped: num [1:1108163] 446 1048 252 357 1007 ...
##  $ start_station_id                              : num [1:1108163] 81 317 283 26 202 420 503 260 2
##  $ start_station_name                            : chr [1:1108163] "Daley Center Plaza" "Wood St &
##  $ end_station_id                                : num [1:1108163] 56 59 174 133 129 426 500 499 2
##  $ end_station_name                              : chr [1:1108163] "Desplaines St & Kinzie St" "Wa
##  $ member_casual                                 : chr [1:1108163] "Subscriber" "Subscriber" "Subs
##  $ Member Gender                                 : chr [1:1108163] "Male" "Female" "Male" "Male" .
##  $ 05 - Member Details Member Birthday Year      : num [1:1108163] 1975 1984 1990 1993 1992 ...
##  - attr(*, "spec")=
##   .. cols(
##   ..   `01 - Rental Details Rental ID` = col_double(),
##   ..   `01 - Rental Details Local Start Time` = col_datetime(format = ""),
##   ..   `01 - Rental Details Local End Time` = col_datetime(format = ""),
##   ..   `01 - Rental Details Bike ID` = col_double(),
##   ..   `01 - Rental Details Duration In Seconds Uncapped` = col_number(),
##   ..   `03 - Rental Start Station ID` = col_double(),
##   ..   `03 - Rental Start Station Name` = col_character(),
##   ..   `02 - Rental End Station ID` = col_double(),
##   ..   `02 - Rental End Station Name` = col_character(),
##   ..   `User Type` = col_character(),
##   ..   `Member Gender` = col_character(),
##   ..   `05 - Member Details Member Birthday Year` = col_double()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

Convert Column format

Convert ride_id and rideable_type to character so that they can stack correctly

```
q4_2019 <- mutate(q4_2019, ride_id = as.character(ride_id), rideable_type = as.character(rideable_type)
q3_2019 <- mutate(q3_2019, ride_id = as.character(ride_id), rideable_type = as.character(rideable_type)
q2_2019 <- mutate(q2_2019, ride_id = as.character(ride_id), rideable_type = as.character(rideable_type)
```

Join Dataframes

Join all the quarter data into one big data frame

```
all_trips <- bind_rows(q2_2019,q3_2019,q4_2019,q1_2020)
```

Remove Columns

Remove lat, long, birthyear, and gender fields as this data was dropped beginning in 2020

```
all_trips <- all_trips %>%
  select(-c(start_lat,start_lng,end_lat,end_lng,birthyear,gender,"01 - Rental Details Duration In Secon
```

STEP 3: CLEAN UP AND ADD DATA TO PREPARE FOR ANALYSIS

Inspect new table

Inspect the new table that has been created

list of column names

```
colnames(all_trips)
```

```
## [1] "ride_id"            "started_at"         "ended_at"
## [4] "rideable_type"      "start_station_id"   "start_station_name"
## [7] "end_station_id"     "end_station_name"   "member_casual"
```

Number of rows in data frame

```
nrow(all_trips)
```

```
## [1] 3879822
```

Dimension of the data frame

```
dim(all_trips)
```

```
## [1] 3879822       9
```

First six rows of data frame

```
head(all_trips)
```

```
## # A tibble: 6 x 9
##   ride_id started_at          ended_at            rideable_type start_station_id
##   <chr>   <dttm>              <dttm>              <chr>                    <dbl>
## 1 221785~ 2019-04-01 00:02:22 2019-04-01 00:09:48 6251                        81
## 2 221785~ 2019-04-01 00:03:02 2019-04-01 00:20:30 6226                       317
## 3 221785~ 2019-04-01 00:11:07 2019-04-01 00:15:19 5649                       283
## 4 221785~ 2019-04-01 00:13:01 2019-04-01 00:18:58 4151                        26
## 5 221785~ 2019-04-01 00:19:26 2019-04-01 00:36:13 3270                       202
## 6 221785~ 2019-04-01 00:19:39 2019-04-01 00:23:56 3123                       420
## # ... with 4 more variables: start_station_name <chr>, end_station_id <dbl>,
## #   end_station_name <chr>, member_casual <chr>
```

List of columns and data types

```
str(all_trips)
```

```
## tibble [3,879,822 x 9] (S3: tbl_df/tbl/data.frame)
##  $ ride_id           : chr [1:3879822] "22178529" "22178530" "22178531" "22178532" ...
##  $ started_at        : POSIXct[1:3879822], format: "2019-04-01 00:02:22" "2019-04-01 00:03:02" ...
##  $ ended_at          : POSIXct[1:3879822], format: "2019-04-01 00:09:48" "2019-04-01 00:20:30" ...
##  $ rideable_type     : chr [1:3879822] "6251" "6226" "5649" "4151" ...
##  $ start_station_id  : num [1:3879822] 81 317 283 26 202 420 503 260 211 211 ...
##  $ start_station_name: chr [1:3879822] "Daley Center Plaza" "Wood St & Taylor St" "LaSalle St & Jacks
##  $ end_station_id    : num [1:3879822] 56 59 174 133 129 426 500 499 211 211 ...
##  $ end_station_name  : chr [1:3879822] "Desplaines St & Kinzie St" "Wabash Ave & Roosevelt Rd" "Canal
##  $ member_casual     : chr [1:3879822] "Subscriber" "Subscriber" "Subscriber" "Subscriber" ...
```

Statistical summary of data frame

```
summary(all_trips)
```

```
##    ride_id            started_at                        ended_at
##  Length:3879822     Min.   :2019-04-01 00:02:22   Min.   :2019-04-01 00:09:48
##  Class :character   1st Qu.:2019-06-23 07:49:09   1st Qu.:2019-06-23 08:20:27
##  Mode  :character   Median :2019-08-14 17:43:38   Median :2019-08-14 18:02:04
##                     Mean   :2019-08-26 00:49:59   Mean   :2019-08-26 01:14:37
##                     3rd Qu.:2019-10-12 12:10:21   3rd Qu.:2019-10-12 12:36:16
##                     Max.   :2020-03-31 23:51:34   Max.   :2020-05-19 20:10:34
##
##  rideable_type      start_station_id start_station_name end_station_id
##  Length:3879822     Min.   :  1.0    Length:3879822     Min.   :  1.0
##  Class :character   1st Qu.: 77.0    Class :character   1st Qu.: 77.0
##  Mode  :character   Median :174.0    Mode  :character   Median :174.0
##                     Mean   :202.9                       Mean   :203.8
##                     3rd Qu.:291.0                       3rd Qu.:291.0
##                     Max.   :675.0                       Max.   :675.0
##                                                         NA's   :1
##  end_station_name   member_casual
##  Length:3879822     Length:3879822
##  Class :character   Class :character
##  Mode  :character   Mode  :character
##
##
##
##
```

Number of observation fall under each usertype

```
table(all_trips$member_casual)
```

```
##
##     casual   Customer     member Subscriber
##      48480     857474     378407    2595461
```

Cleaning data

In the "member_casual" column, replace "Subscriber" with "member" and "Customer" with "casual" Before 2020, Cyclist used different labels for these two types of riders … we will want to make our dataframe consistent with their current nomenclature

```
all_trips <- all_trips %>%
  mutate(member_casual = recode(member_casual, "Subscriber" = "member", "Customer" = "casual"))
```

Reassign to the desired values (we will go with the current 2020 labels)

Adding columns Add columns that list the date, month, day, and year of each ride

```
all_trips$date <- as.Date(all_trips$started_at)
all_trips$month <- format(as.Date(all_trips$date), "%m")
all_trips$day <- format(as.Date(all_trips$date), "%d")
all_trips$year <- format(as.Date(all_trips$date), "%Y")
all_trips$day_of_week <- format(as.Date(all_trips$date), "%A")
```

Adding ride length column

```
all_trips$ride_length <- difftime(all_trips$ended_at,all_trips$started_at)
```

Inspect the structure of the column

```
str(all_trips)
```

```
## tibble [3,879,822 x 15] (S3: tbl_df/tbl/data.frame)
##  $ ride_id           : chr [1:3879822] "22178529" "22178530" "22178531" "22178532" ...
##  $ started_at        : POSIXct[1:3879822], format: "2019-04-01 00:02:22" "2019-04-01 00:03:02" ...
##  $ ended_at          : POSIXct[1:3879822], format: "2019-04-01 00:09:48" "2019-04-01 00:20:30" ...
##  $ rideable_type     : chr [1:3879822] "6251" "6226" "5649" "4151" ...
##  $ start_station_id  : num [1:3879822] 81 317 283 26 202 420 503 260 211 211 ...
##  $ start_station_name: chr [1:3879822] "Daley Center Plaza" "Wood St & Taylor St" "LaSalle St & Jacks
##  $ end_station_id    : num [1:3879822] 56 59 174 133 129 426 500 499 211 211 ...
##  $ end_station_name  : chr [1:3879822] "Desplaines St & Kinzie St" "Wabash Ave & Roosevelt Rd" "Canal
##  $ member_casual     : chr [1:3879822] "member" "member" "member" "member" ...
##  $ date              : Date[1:3879822], format: "2019-04-01" "2019-04-01" ...
##  $ month             : chr [1:3879822] "04" "04" "04" "04" ...
##  $ day               : chr [1:3879822] "01" "01" "01" "01" ...
##  $ year              : chr [1:3879822] "2019" "2019" "2019" "2019" ...
##  $ day_of_week       : chr [1:3879822] "Monday" "Monday" "Monday" "Monday" ...
##  $ ride_length       : 'difftime' num [1:3879822] 446 1048 252 357 ...
##   ..- attr(*, "units")= chr "secs"
```

Convert data format Convert "ride_length" from Factor to numeric so we can run calculations on the data

```
is.factor(all_trips$ride_length)
```

```
## [1] FALSE
```

```
all_trips$ride_length <- as.numeric(as.character(all_trips$ride_length))
is.numeric(all_trips$ride_length)
```

```
## [1] TRUE
```

Removing data

The dataframe includes a few hundred entries when bikes were taken out of docks and checked for quality by cyclist or ride_length was negative We will create a new version of the dataframe (v2) since data is being removed

```
all_trips_v2 <- all_trips[!(all_trips$start_station_name == "HQ QR"|all_trips$ride_length<0),]
```

STEP 4: CONDUCT DESCRIPTIVE ANALYSIS

Descriptive analysis on ride_length (all figures in seconds)

Summary of ride length

```
summary(all_trips_v2$ride_length)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max. 
##       1     412     712    1479    1289 9387024
```

Compare members and casual riders

comparing mean, median, max, min in ride length between members and casual riders

```
aggregate(all_trips_v2$ride_length~all_trips_v2$member_casual, FUN = mean)
```

```
##   all_trips_v2$member_casual all_trips_v2$ride_length
## 1                     casual                3552.7502
## 2                     member                 850.0662
```

```
aggregate(all_trips_v2$ride_length~all_trips_v2$member_casual, FUN = median)
```

```
##   all_trips_v2$member_casual all_trips_v2$ride_length
## 1                     casual                     1546
## 2                     member                      589
```

```
aggregate(all_trips_v2$ride_length~all_trips_v2$member_casual, FUN = max)
```

```
##   all_trips_v2$member_casual all_trips_v2$ride_length
## 1                     casual                  9387024
## 2                     member                  9056634
```

```
aggregate(all_trips_v2$ride_length~all_trips_v2$member_casual, FUN = min)
```

```
##   all_trips_v2$member_casual all_trips_v2$ride_length
## 1                     casual                        2
## 2                     member                        1
```

See the average ride time by each day for members vs casual user

```
aggregate(all_trips_v2$ride_length~all_trips_v2$member_casual+all_trips_v2$day_of_week, FUN = mean)
```

```
##    all_trips_v2$member_casual all_trips_v2$day_of_week all_trips_v2$ride_length
## 1                      casual                   Friday                3773.8351
## 2                      member                   Friday                 824.5305
## 3                      casual                   Monday                3372.2869
## 4                      member                   Monday                 842.5726
## 5                      casual                 Saturday                3331.9138
## 6                      member                 Saturday                 968.9337
## 7                      casual                   Sunday                3581.4054
## 8                      member                   Sunday                 919.9746
## 9                      casual                 Thursday                3682.9847
## 10                     member                 Thursday                 823.9278
## 11                     casual                  Tuesday                3596.3599
## 12                     member                  Tuesday                 826.1427
## 13                     casual                Wednesday                3718.6619
## 14                     member                Wednesday                 823.9996
```

Days of week are not in order.Let's fix that

```
all_trips_v2$day_of_week <- ordered(all_trips_v2$day_of_week, levels = c("Sunday","Monday","Tuesday","We
```

Now, let's run the average ride time by each day for members vs casual users

```
aggregate(all_trips_v2$ride_length~all_trips_v2$member_casual+all_trips_v2$day_of_week, FUN = mean)
```

```
##    all_trips_v2$member_casual all_trips_v2$day_of_week all_trips_v2$ride_length
## 1                      casual                   Sunday                 3581.4054
## 2                      member                   Sunday                  919.9746
## 3                      casual                   Monday                 3372.2869
## 4                      member                   Monday                  842.5726
## 5                      casual                  Tuesday                 3596.3599
## 6                      member                  Tuesday                  826.1427
## 7                      casual                Wednesday                 3718.6619
## 8                      member                Wednesday                  823.9996
## 9                      casual                 Thursday                 3682.9847
## 10                     member                 Thursday                  823.9278
## 11                     casual                   Friday                 3773.8351
## 12                     member                   Friday                  824.5305
## 13                     casual                 Saturday                 3331.9138
## 14                     member                 Saturday                  968.9337
```

Analyze ridership data by type and weekday

```
all_trips_v2 %>%
  mutate(weekday = wday(started_at, label = TRUE))%>%
  group_by(member_casual,weekday)%>%
  summarise(number_of_rides = n(),average_duration = mean(ride_length))%>%
  arrange(member_casual,weekday)
```

```
## `summarise()` has grouped output by 'member_casual'. You can override using the `.groups` argument.
```

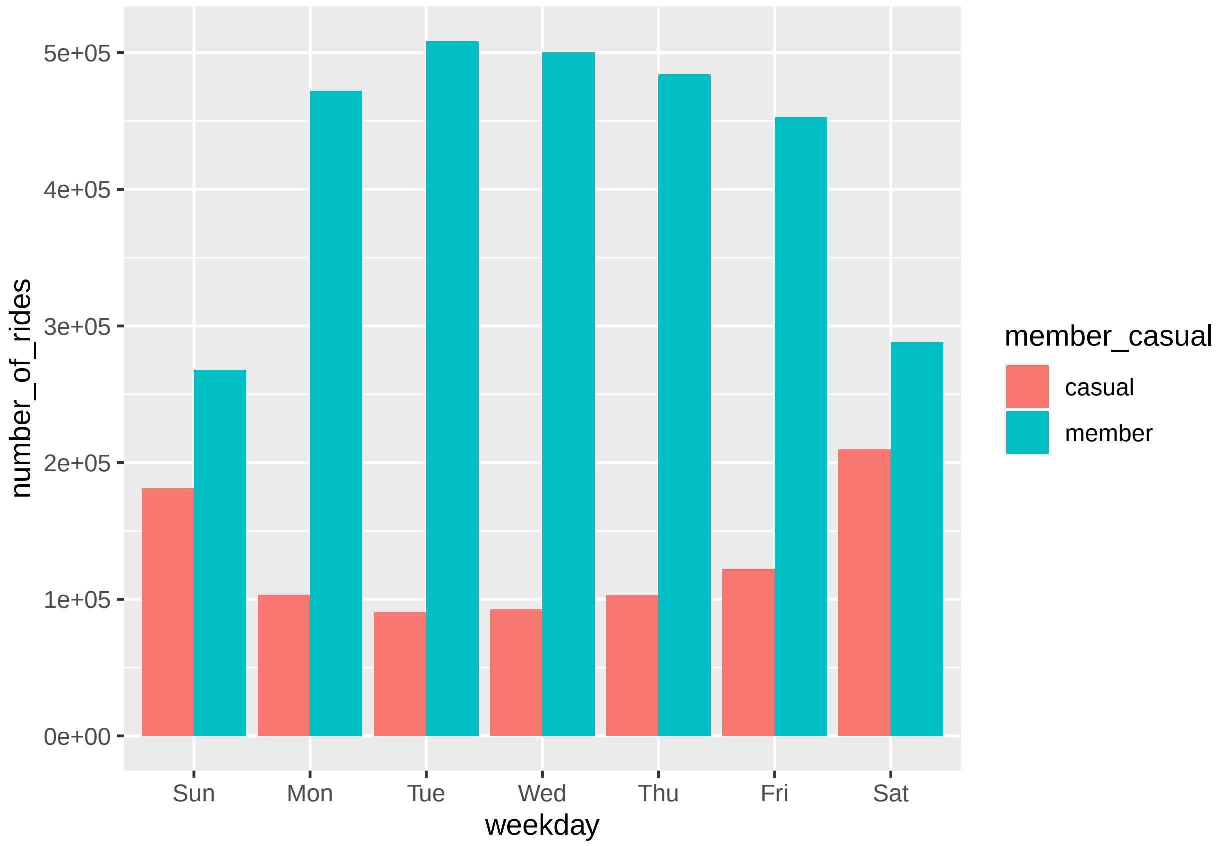
```
## # A tibble: 14 x 4
## # Groups:   member_casual [2]
##    member_casual weekday number_of_rides average_duration
##    <chr>         <ord>             <int>            <dbl>
##  1 casual        Sun              181293            3581.
##  2 casual        Mon              103296            3372.
##  3 casual        Tue               90510            3596.
##  4 casual        Wed               92457            3719.
##  5 casual        Thu              102679            3683.
##  6 casual        Fri              122404            3774.
##  7 casual        Sat              209543            3332.
##  8 member        Sun              267965             920.
##  9 member        Mon              472196             843.
## 10 member        Tue              508445             826.
## 11 member        Wed              500329             824.
## 12 member        Thu              484177             824.
## 13 member        Fri              452790             825.
## 14 member        Sat              287958             969.
```

Visualization

Visualize the number of rides by the rider type

```
all_trips_v2 %>%
  mutate(weekday = wday(started_at,label = TRUE)) %>%
  group_by(member_casual,weekday) %>%
  summarise(number_of_rides = n(),average_duration = mean(ride_length)) %>%
  arrange(member_casual,weekday) %>%
  ggplot(aes(x = weekday, y = number_of_rides, fill = member_casual))+
  geom_col(position = "dodge")
```

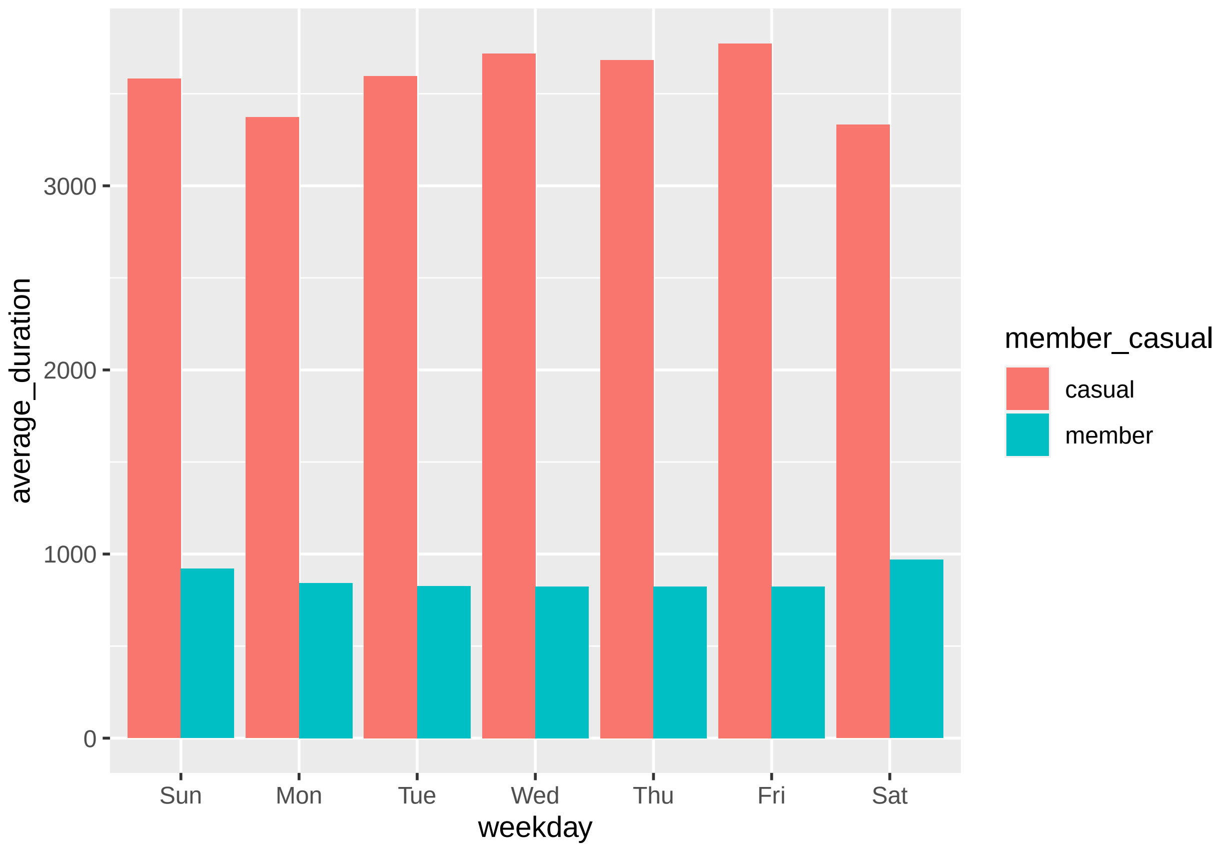
```
## `summarise()` has grouped output by 'member_casual'. You can override using the `.groups` argument.
```



Visualization for average duration

```
all_trips_v2 %>%
   mutate(weekday = wday(started_at, label = TRUE))%>%
  group_by(member_casual,weekday)%>%
  summarise(number_of_rides = n(),average_duration = mean(ride_length))%>%
  arrange(member_casual,weekday) %>%
   ggplot(aes(x = weekday, y = average_duration, fill = member_casual))+
  geom_col(position = "dodge")
```

```
## `summarise()` has grouped output by 'member_casual'. You can override using the `.groups` argument.
```


average_duration
3000
2000
1000
0
Sun
Mon
Tue
Wed
Thu
Fri
Sat
weekday
member_casual
casual
member