RMarkdown Cyclistic Capstone

Tate-Madison Bell

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Setting up my environment

```
library(lubridate)
```

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

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

```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.2 --

## v ggplot2 3.3.6      v purrr   0.3.4
## v tibble  3.1.7      v dplyr   1.0.10
## v tidyr   1.2.0      v stringr 1.4.1
## v readr   2.1.2      v forcats 0.5.1
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x lubridate::as.difftime() masks base::as.difftime()
## x lubridate::date()        masks base::date()
## x dplyr::filter()          masks stats::filter()
## x lubridate::intersect()   masks base::intersect()
## x dplyr::lag()             masks stats::lag()
## x lubridate::setdiff()     masks base::setdiff()
## x lubridate::union()       masks base::union()
```

```
library(dplyr)
library(scales)
```

```
##
## Attaching package: 'scales'
##
## The following object is masked from 'package:purrr':
##
##     discard
##
```

```
## The following object is masked from 'package:readr':
##
##     col_factor
```

```
library(hms)
```

```
##
## Attaching package: 'hms'
##
## The following object is masked from 'package:lubridate':
##
##     hms
```

```
library(ggplot2)
```

```
getwd()
```

```
## [1] "/Users/tatemadisonbell/Documents/R"
```

Collect data

```
Aug21 <- read_csv("202108-divvy-tripdata.csv")
```

```
## Rows: 804352 Columns: 13
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (7): ride_id, rideable_type, start_station_name, start_station_id, end_...
## dbl  (4): start_lat, start_lng, end_lat, end_lng
## dttm (2): started_at, ended_at
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
Sep21 <- read_csv("202109-divvy-tripdata.csv")
```

```
## Rows: 756147 Columns: 13
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (7): ride_id, rideable_type, start_station_name, start_station_id, end_...
## dbl  (4): start_lat, start_lng, end_lat, end_lng
## dttm (2): started_at, ended_at
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
Oct21 <- read_csv("202110-divvy-tripdata.csv")
```

```
## Rows: 631226 Columns: 13
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (7): ride_id, rideable_type, start_station_name, start_station_id, end_...
## dbl  (4): start_lat, start_lng, end_lat, end_lng
## dttm (2): started_at, ended_at
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
Nov21 <- read_csv("202111-divvy-tripdata.csv")
```

```
## Rows: 359978 Columns: 13
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (7): ride_id, rideable_type, start_station_name, start_station_id, end_...
## dbl  (4): start_lat, start_lng, end_lat, end_lng
## dttm (2): started_at, ended_at
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
Dec21 <- read_csv("202112-divvy-tripdata.csv")
```

```
## Rows: 247540 Columns: 13
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (7): ride_id, rideable_type, start_station_name, start_station_id, end_...
## dbl  (4): start_lat, start_lng, end_lat, end_lng
## dttm (2): started_at, ended_at
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
Jan22 <- read_csv("202201-divvy-tripdata.csv")
```

```
## Rows: 103770 Columns: 13
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (7): ride_id, rideable_type, start_station_name, start_station_id, end_...
## dbl  (4): start_lat, start_lng, end_lat, end_lng
## dttm (2): started_at, ended_at
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
Feb22 <- read_csv("202202-divvy-tripdata.csv")
```

```
## Rows: 115609 Columns: 13
## -- Column specification --------------------------------------------------------
## Delimiter: ","
```

```
## chr  (7): ride_id, rideable_type, start_station_name, start_station_id, end_...
## dbl  (4): start_lat, start_lng, end_lat, end_lng
## dttm (2): started_at, ended_at
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
Mar22 <- read_csv("202203-divvy-tripdata.csv")
```

```
## Rows: 284042 Columns: 13
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (7): ride_id, rideable_type, start_station_name, start_station_id, end_...
## dbl  (4): start_lat, start_lng, end_lat, end_lng
## dttm (2): started_at, ended_at
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
Apr22 <- read_csv("202204-divvy-tripdata.csv")
```

```
## Rows: 371249 Columns: 13
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (7): ride_id, rideable_type, start_station_name, start_station_id, end_...
## dbl  (4): start_lat, start_lng, end_lat, end_lng
## dttm (2): started_at, ended_at
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
May22 <- read_csv("202205-divvy-tripdata.csv")
```

```
## Rows: 634858 Columns: 13
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (7): ride_id, rideable_type, start_station_name, start_station_id, end_...
## dbl  (4): start_lat, start_lng, end_lat, end_lng
## dttm (2): started_at, ended_at
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
Jun22 <- read_csv("202206-divvy-tripdata.csv")
```

```
## Rows: 769204 Columns: 13
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (7): ride_id, rideable_type, start_station_name, start_station_id, end_...
## dbl  (4): start_lat, start_lng, end_lat, end_lng
## dttm (2): started_at, ended_at
```

```
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
Jul22 <- read_csv("202207-divvy-tripdata.csv")
```

```
## Rows: 823488 Columns: 13
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (7): ride_id, rideable_type, start_station_name, start_station_id, end_...
## dbl  (4): start_lat, start_lng, end_lat, end_lng
## dttm (2): started_at, ended_at
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

Wrangle and combine data

Compare column names

```
colnames(Aug21)
```

```
##  [1] "ride_id"            "rideable_type"      "started_at"
##  [4] "ended_at"           "start_station_name" "start_station_id"
##  [7] "end_station_name"   "end_station_id"     "start_lat"
## [10] "start_lng"          "end_lat"            "end_lng"
## [13] "member_casual"
```

```
colnames(Sep21)
```

```
##  [1] "ride_id"            "rideable_type"      "started_at"
##  [4] "ended_at"           "start_station_name" "start_station_id"
##  [7] "end_station_name"   "end_station_id"     "start_lat"
## [10] "start_lng"          "end_lat"            "end_lng"
## [13] "member_casual"
```

```
colnames(Oct21)
```

```
##  [1] "ride_id"            "rideable_type"      "started_at"
##  [4] "ended_at"           "start_station_name" "start_station_id"
##  [7] "end_station_name"   "end_station_id"     "start_lat"
## [10] "start_lng"          "end_lat"            "end_lng"
## [13] "member_casual"
```

```
colnames(Nov21)
```

```
##  [1] "ride_id"            "rideable_type"      "started_at"
##  [4] "ended_at"           "start_station_name" "start_station_id"
##  [7] "end_station_name"   "end_station_id"     "start_lat"
## [10] "start_lng"          "end_lat"            "end_lng"
## [13] "member_casual"
```

```
colnames(Dec21)
```

```
##  [1] "ride_id"            "rideable_type"      "started_at"
##  [4] "ended_at"           "start_station_name" "start_station_id"
##  [7] "end_station_name"   "end_station_id"     "start_lat"
## [10] "start_lng"          "end_lat"            "end_lng"
## [13] "member_casual"
```

```
colnames(Jan22)
```

```
##  [1] "ride_id"            "rideable_type"      "started_at"
##  [4] "ended_at"           "start_station_name" "start_station_id"
##  [7] "end_station_name"   "end_station_id"     "start_lat"
## [10] "start_lng"          "end_lat"            "end_lng"
## [13] "member_casual"
```

```
colnames(Feb22)
```

```
##  [1] "ride_id"            "rideable_type"      "started_at"
##  [4] "ended_at"           "start_station_name" "start_station_id"
##  [7] "end_station_name"   "end_station_id"     "start_lat"
## [10] "start_lng"          "end_lat"            "end_lng"
## [13] "member_casual"
```

```
colnames(Mar22)
```

```
##  [1] "ride_id"            "rideable_type"      "started_at"
##  [4] "ended_at"           "start_station_name" "start_station_id"
##  [7] "end_station_name"   "end_station_id"     "start_lat"
## [10] "start_lng"          "end_lat"            "end_lng"
## [13] "member_casual"
```

```
colnames(Apr22)
```

```
##  [1] "ride_id"            "rideable_type"      "started_at"
##  [4] "ended_at"           "start_station_name" "start_station_id"
##  [7] "end_station_name"   "end_station_id"     "start_lat"
## [10] "start_lng"          "end_lat"            "end_lng"
## [13] "member_casual"
```

```
colnames(May22)
```

```
##  [1] "ride_id"            "rideable_type"      "started_at"
##  [4] "ended_at"           "start_station_name" "start_station_id"
##  [7] "end_station_name"   "end_station_id"     "start_lat"
## [10] "start_lng"          "end_lat"            "end_lng"
## [13] "member_casual"
```

```
colnames(Jun22)
```

```
##  [1] "ride_id"            "rideable_type"      "started_at"
##  [4] "ended_at"           "start_station_name" "start_station_id"
##  [7] "end_station_name"   "end_station_id"     "start_lat"
## [10] "start_lng"          "end_lat"            "end_lng"
## [13] "member_casual"
```

```
colnames(Jul22)
```

```
##  [1] "ride_id"            "rideable_type"      "started_at"
##  [4] "ended_at"           "start_station_name" "start_station_id"
##  [7] "end_station_name"   "end_station_id"     "start_lat"
## [10] "start_lng"          "end_lat"            "end_lng"
## [13] "member_casual"
```

Inspect the dataframes to look for incongruencies

```
str(Aug21)
```

```
## spec_tbl_df [804,352 x 13] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ ride_id           : chr [1:804352] "99103BB87CC6C1BB" "EAFCCCFB0A3FC5A1" "9EF4F46C57AD234D" "5834
##  $ rideable_type     : chr [1:804352] "electric_bike" "electric_bike" "electric_bike" "electric_bike
##  $ started_at        : POSIXct[1:804352], format: "2021-08-10 17:15:49" "2021-08-10 17:23:14" ...
##  $ ended_at          : POSIXct[1:804352], format: "2021-08-10 17:22:44" "2021-08-10 17:39:24" ...
##  $ start_station_name: chr [1:804352] NA NA NA NA ...
##  $ start_station_id  : chr [1:804352] NA NA NA NA ...
##  $ end_station_name  : chr [1:804352] NA NA NA NA ...
##  $ end_station_id    : chr [1:804352] NA NA NA NA ...
##  $ start_lat         : num [1:804352] 41.8 41.8 42 42 41.8 ...
##  $ start_lng         : num [1:804352] -87.7 -87.7 -87.7 -87.7 -87.6 ...
##  $ end_lat           : num [1:804352] 41.8 41.8 42 42 41.8 ...
##  $ end_lng           : num [1:804352] -87.7 -87.6 -87.7 -87.7 -87.6 ...
##  $ member_casual     : chr [1:804352] "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_character(),
##   ..   end_station_name = col_character(),
##   ..   end_station_id = col_character(),
##   ..   start_lat = col_double(),
##   ..   start_lng = col_double(),
##   ..   end_lat = col_double(),
##   ..   end_lng = col_double(),
##   ..   member_casual = col_character()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

```
str(Sep21)
```

```
## spec_tbl_df [756,147 x 13] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ ride_id           : chr [1:756147] "9DC7B962304CBFD8" "F930E2C6872D6B32" "6EF72137900BB910" "78D1
##  $ rideable_type     : chr [1:756147] "electric_bike" "electric_bike" "electric_bike" "electric_bike
##  $ started_at        : POSIXct[1:756147], format: "2021-09-28 16:07:10" "2021-09-28 14:24:51" ...
##  $ ended_at          : POSIXct[1:756147], format: "2021-09-28 16:09:54" "2021-09-28 14:40:05" ...
##  $ start_station_name: chr [1:756147] NA NA NA NA ...
##  $ start_station_id  : chr [1:756147] NA NA NA NA ...
##  $ end_station_name  : chr [1:756147] NA NA NA NA ...
##  $ end_station_id    : chr [1:756147] NA NA NA NA ...
##  $ start_lat         : num [1:756147] 41.9 41.9 41.8 41.8 41.9 ...
##  $ start_lng         : num [1:756147] -87.7 -87.6 -87.7 -87.7 -87.7 ...
##  $ end_lat           : num [1:756147] 41.9 42 41.8 41.8 41.9 ...
##  $ end_lng           : num [1:756147] -87.7 -87.7 -87.7 -87.7 -87.7 ...
##  $ member_casual     : chr [1:756147] "casual" "casual" "casual" "casual" ...
##  - 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_character(),
##   ..   end_station_name = col_character(),
##   ..   end_station_id = col_character(),
##   ..   start_lat = col_double(),
##   ..   start_lng = col_double(),
##   ..   end_lat = col_double(),
##   ..   end_lng = col_double(),
##   ..   member_casual = col_character()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

```
str(Oct21)
```

```
## spec_tbl_df [631,226 x 13] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ ride_id           : chr [1:631226] "620BC6107255BF4C" "4471C70731AB2E45" "26CA69D43D15EE14" "3629
##  $ rideable_type     : chr [1:631226] "electric_bike" "electric_bike" "electric_bike" "electric_bike
##  $ started_at        : POSIXct[1:631226], format: "2021-10-22 12:46:42" "2021-10-21 09:12:37" ...
##  $ ended_at          : POSIXct[1:631226], format: "2021-10-22 12:49:50" "2021-10-21 09:14:14" ...
##  $ start_station_name: chr [1:631226] "Kingsbury St & Kinzie St" NA NA NA ...
##  $ start_station_id  : chr [1:631226] "KA1503000043" NA NA NA ...
##  $ end_station_name  : chr [1:631226] NA NA NA NA ...
##  $ end_station_id    : chr [1:631226] NA NA NA NA ...
##  $ start_lat         : num [1:631226] 41.9 41.9 41.9 41.9 41.9 ...
##  $ start_lng         : num [1:631226] -87.6 -87.7 -87.7 -87.7 -87.7 ...
##  $ end_lat           : num [1:631226] 41.9 41.9 41.9 41.9 41.9 ...
##  $ end_lng           : num [1:631226] -87.6 -87.7 -87.7 -87.7 -87.7 ...
##  $ member_casual     : chr [1:631226] "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_character(),
##   ..   end_station_name = col_character(),
##   ..   end_station_id = col_character(),
##   ..   start_lat = col_double(),
##   ..   start_lng = col_double(),
##   ..   end_lat = col_double(),
##   ..   end_lng = col_double(),
##   ..   member_casual = col_character()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

```
str(Nov21)
```

```
## spec_tbl_df [359,978 x 13] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ ride_id           : chr [1:359978] "7C00A93E10556E47" "90854840DFD508BA" "0A7D10CDD144061C" "2F3B
##  $ rideable_type     : chr [1:359978] "electric_bike" "electric_bike" "electric_bike" "electric_bike
##  $ started_at        : POSIXct[1:359978], format: "2021-11-27 13:27:38" "2021-11-27 13:38:25" ...
##  $ ended_at          : POSIXct[1:359978], format: "2021-11-27 13:46:38" "2021-11-27 13:56:10" ...
##  $ start_station_name: chr [1:359978] NA NA NA NA ...
##  $ start_station_id  : chr [1:359978] NA NA NA NA ...
##  $ end_station_name  : chr [1:359978] NA NA NA NA ...
##  $ end_station_id    : chr [1:359978] NA NA NA NA ...
##  $ start_lat         : num [1:359978] 41.9 42 42 41.9 41.9 ...
##  $ start_lng         : num [1:359978] -87.7 -87.7 -87.7 -87.8 -87.6 ...
##  $ end_lat           : num [1:359978] 42 41.9 42 41.9 41.9 ...
##  $ end_lng           : num [1:359978] -87.7 -87.7 -87.7 -87.8 -87.6 ...
##  $ member_casual     : chr [1:359978] "casual" "casual" "casual" "casual" ...
##  - 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_character(),
##   ..   end_station_name = col_character(),
##   ..   end_station_id = col_character(),
##   ..   start_lat = col_double(),
##   ..   start_lng = col_double(),
##   ..   end_lat = col_double(),
##   ..   end_lng = col_double(),
##   ..   member_casual = col_character()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

```
str(Dec21)
```

```
## spec_tbl_df [247,540 x 13] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ ride_id           : chr [1:247540] "46F8167220E4431F" "73A77762838B32FD" "4CF42452054F59C5" "3278
```

```
##  $ rideable_type     : chr [1:247540] "electric_bike" "electric_bike" "electric_bike" "classic_bike"
##  $ started_at        : POSIXct[1:247540], format: "2021-12-07 15:06:07" "2021-12-11 03:43:29" ...
##  $ ended_at          : POSIXct[1:247540], format: "2021-12-07 15:13:42" "2021-12-11 04:10:23" ...
##  $ start_station_name: chr [1:247540] "Laflin St & Cullerton St" "LaSalle Dr & Huron St" "Halsted St
##  $ start_station_id  : chr [1:247540] "13307" "KP1705001026" "KA1504000117" "KA1504000117" ...
##  $ end_station_name  : chr [1:247540] "Morgan St & Polk St" "Clarendon Ave & Leland Ave" "Broadway &
##  $ end_station_id    : chr [1:247540] "TA1307000130" "TA1307000119" "13137" "KP1705001026" ...
##  $ start_lat         : num [1:247540] 41.9 41.9 41.9 41.9 41.9 ...
##  $ start_lng         : num [1:247540] -87.7 -87.6 -87.6 -87.6 -87.7 ...
##  $ end_lat           : num [1:247540] 41.9 42 41.9 41.9 41.9 ...
##  $ end_lng           : num [1:247540] -87.7 -87.7 -87.6 -87.6 -87.6 ...
##  $ member_casual     : chr [1:247540] "member" "casual" "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_character(),
##   ..   end_station_name = col_character(),
##   ..   end_station_id = col_character(),
##   ..   start_lat = col_double(),
##   ..   start_lng = col_double(),
##   ..   end_lat = col_double(),
##   ..   end_lng = col_double(),
##   ..   member_casual = col_character()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

```
str(Jan22)
```

```
## spec_tbl_df [103,770 x 13] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ ride_id           : chr [1:103770] "C2F7DD78E82EC875" "A6CF8980A652D272" "BD0F91DFF741C66D" "CBB8
##  $ rideable_type     : chr [1:103770] "electric_bike" "electric_bike" "classic_bike" "classic_bike"
##  $ started_at        : POSIXct[1:103770], format: "2022-01-13 11:59:47" "2022-01-10 08:41:56" ...
##  $ ended_at          : POSIXct[1:103770], format: "2022-01-13 12:02:44" "2022-01-10 08:46:17" ...
##  $ start_station_name: chr [1:103770] "Glenwood Ave & Touhy Ave" "Glenwood Ave & Touhy Ave" "Sheffiel
##  $ start_station_id  : chr [1:103770] "525" "525" "TA1306000016" "KA1504000151" ...
##  $ end_station_name  : chr [1:103770] "Clark St & Touhy Ave" "Clark St & Touhy Ave" "Greenview Ave &
##  $ end_station_id    : chr [1:103770] "RP-007" "RP-007" "TA1307000001" "TA1309000021" ...
##  $ start_lat         : num [1:103770] 42 42 41.9 42 41.9 ...
##  $ start_lng         : num [1:103770] -87.7 -87.7 -87.7 -87.7 -87.6 ...
##  $ end_lat           : num [1:103770] 42 42 41.9 42 41.9 ...
##  $ end_lng           : num [1:103770] -87.7 -87.7 -87.7 -87.7 -87.6 ...
##  $ member_casual     : chr [1:103770] "casual" "casual" "member" "casual" ...
##  - 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_character(),
```

```
##   ..   end_station_name = col_character(),
##   ..   end_station_id = col_character(),
##   ..   start_lat = col_double(),
##   ..   start_lng = col_double(),
##   ..   end_lat = col_double(),
##   ..   end_lng = col_double(),
##   ..   member_casual = col_character()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

```
str(Feb22)
```

```
## spec_tbl_df [115,609 x 13] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ ride_id           : chr [1:115609] "E1E065E7ED285C02" "1602DCDC5B30FFE3" "BE7DD2AF4B55C4AF" "A178
##  $ rideable_type     : chr [1:115609] "classic_bike" "classic_bike" "classic_bike" "classic_bike" ..
##  $ started_at        : POSIXct[1:115609], format: "2022-02-19 18:08:41" "2022-02-20 17:41:30" ...
##  $ ended_at          : POSIXct[1:115609], format: "2022-02-19 18:23:56" "2022-02-20 17:45:56" ...
##  $ start_station_name: chr [1:115609] "State St & Randolph St" "Halsted St & Wrightwood Ave" "State S
##  $ start_station_id  : chr [1:115609] "TA1305000029" "TA1309000061" "TA1305000029" "13235" ...
##  $ end_station_name  : chr [1:115609] "Clark St & Lincoln Ave" "Southport Ave & Wrightwood Ave" "Cana
##  $ end_station_id    : chr [1:115609] "13179" "TA1307000113" "13011" "13323" ...
##  $ start_lat         : num [1:115609] 41.9 41.9 41.9 41.9 41.9 ...
##  $ start_lng         : num [1:115609] -87.6 -87.6 -87.6 -87.7 -87.6 ...
##  $ end_lat           : num [1:115609] 41.9 41.9 41.9 42 41.9 ...
##  $ end_lng           : num [1:115609] -87.6 -87.7 -87.6 -87.6 -87.6 ...
##  $ member_casual     : chr [1:115609] "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_character(),
##   ..   end_station_name = col_character(),
##   ..   end_station_id = col_character(),
##   ..   start_lat = col_double(),
##   ..   start_lng = col_double(),
##   ..   end_lat = col_double(),
##   ..   end_lng = col_double(),
##   ..   member_casual = col_character()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

```
str(Mar22)
```

```
## spec_tbl_df [284,042 x 13] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ ride_id           : chr [1:284042] "47EC0A7F82E65D52" "8494861979B0F477" "EFE527AF80B66109" "9F44
##  $ rideable_type     : chr [1:284042] "classic_bike" "electric_bike" "classic_bike" "classic_bike" .
##  $ started_at        : POSIXct[1:284042], format: "2022-03-21 13:45:01" "2022-03-16 09:37:16" ...
##  $ ended_at          : POSIXct[1:284042], format: "2022-03-21 13:51:18" "2022-03-16 09:43:34" ...
##  $ start_station_name: chr [1:284042] "Wabash Ave & Wacker Pl" "Michigan Ave & Oak St" "Broadway & Be
##  $ start_station_id  : chr [1:284042] "TA1307000131" "13042" "13109" "TA1307000131" ...
```

```
##  $ end_station_name  : chr [1:284042] "Kingsbury St & Kinzie St" "Orleans St & Chestnut St (NEXT Apts
##  $ end_station_id    : chr [1:284042] "KA1503000043" "620" "15578" "TA1305000025" ...
##  $ start_lat         : num [1:284042] 41.9 41.9 42 41.9 41.9 ...
##  $ start_lng         : num [1:284042] -87.6 -87.6 -87.7 -87.6 -87.6 ...
##  $ end_lat           : num [1:284042] 41.9 41.9 42 41.9 41.9 ...
##  $ end_lng           : num [1:284042] -87.6 -87.6 -87.7 -87.6 -87.7 ...
##  $ member_casual     : chr [1:284042] "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_character(),
##   ..   end_station_name = col_character(),
##   ..   end_station_id = col_character(),
##   ..   start_lat = col_double(),
##   ..   start_lng = col_double(),
##   ..   end_lat = col_double(),
##   ..   end_lng = col_double(),
##   ..   member_casual = col_character()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

```
str(Apr22)
```

```
## spec_tbl_df [371,249 x 13] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ ride_id           : chr [1:371249] "3564070EEFD12711" "0B820C7FCF22F489" "89EEEE32293F07FF" "84D4
##  $ rideable_type     : chr [1:371249] "electric_bike" "classic_bike" "classic_bike" "classic_bike" .
##  $ started_at        : POSIXct[1:371249], format: "2022-04-06 17:42:48" "2022-04-24 19:23:07" ...
##  $ ended_at          : POSIXct[1:371249], format: "2022-04-06 17:54:36" "2022-04-24 19:43:17" ...
##  $ start_station_name: chr [1:371249] "Paulina St & Howard St" "Wentworth Ave & Cermak Rd" "Halsted S
##  $ start_station_id  : chr [1:371249] "515" "13075" "TA1307000121" "13075" ...
##  $ end_station_name  : chr [1:371249] "University Library (NU)" "Green St & Madison St" "Green St & M
##  $ end_station_id    : chr [1:371249] "605" "TA1307000120" "TA1307000120" "KA1706005007" ...
##  $ start_lat         : num [1:371249] 42 41.9 41.9 41.9 41.9 ...
##  $ start_lng         : num [1:371249] -87.7 -87.6 -87.6 -87.6 -87.6 ...
##  $ end_lat           : num [1:371249] 42.1 41.9 41.9 41.9 41.9 ...
##  $ end_lng           : num [1:371249] -87.7 -87.6 -87.6 -87.6 -87.6 ...
##  $ member_casual     : chr [1:371249] "member" "member" "member" "casual" ...
##  - 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_character(),
##   ..   end_station_name = col_character(),
##   ..   end_station_id = col_character(),
##   ..   start_lat = col_double(),
##   ..   start_lng = col_double(),
##   ..   end_lat = col_double(),
```

```
##   ..   end_lng = col_double(),
##   ..   member_casual = col_character()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

```
str(May22)
```

```
## spec_tbl_df [634,858 x 13] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ ride_id           : chr [1:634858] "EC2DE40644C6B0F4" "1C31AD03897EE385" "1542FBEC830415CF" "6FF5
##  $ rideable_type     : chr [1:634858] "classic_bike" "classic_bike" "classic_bike" "classic_bike" ..
##  $ started_at        : POSIXct[1:634858], format: "2022-05-23 23:06:58" "2022-05-11 08:53:28" ...
##  $ ended_at          : POSIXct[1:634858], format: "2022-05-23 23:40:19" "2022-05-11 09:31:22" ...
##  $ start_station_name: chr [1:634858] "Wabash Ave & Grand Ave" "DuSable Lake Shore Dr & Monroe St" "
##  $ start_station_id  : chr [1:634858] "TA1307000117" "13300" "TA1305000032" "TA1305000032" ...
##  $ end_station_name  : chr [1:634858] "Halsted St & Roscoe St" "Field Blvd & South Water St" "Wood S
##  $ end_station_id    : chr [1:634858] "TA1309000025" "15534" "13221" "TA1305000030" ...
##  $ start_lat         : num [1:634858] 41.9 41.9 41.9 41.9 41.9 ...
##  $ start_lng         : num [1:634858] -87.6 -87.6 -87.6 -87.6 -87.6 ...
##  $ end_lat           : num [1:634858] 41.9 41.9 41.9 41.9 41.9 ...
##  $ end_lng           : num [1:634858] -87.6 -87.6 -87.7 -87.6 -87.7 ...
##  $ member_casual     : chr [1:634858] "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_character(),
##   ..   end_station_name = col_character(),
##   ..   end_station_id = col_character(),
##   ..   start_lat = col_double(),
##   ..   start_lng = col_double(),
##   ..   end_lat = col_double(),
##   ..   end_lng = col_double(),
##   ..   member_casual = col_character()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

```
str(Jun22)
```

```
## spec_tbl_df [769,204 x 13] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ ride_id           : chr [1:769204] "600CFD130D0FD2A4" "F5E6B5C1682C6464" "B6EB6D27BAD771D2" "C9C3
##  $ rideable_type     : chr [1:769204] "electric_bike" "electric_bike" "electric_bike" "electric_bike
##  $ started_at        : POSIXct[1:769204], format: "2022-06-30 17:27:53" "2022-06-30 18:39:52" ...
##  $ ended_at          : POSIXct[1:769204], format: "2022-06-30 17:35:15" "2022-06-30 18:47:28" ...
##  $ start_station_name: chr [1:769204] NA NA NA NA ...
##  $ start_station_id  : chr [1:769204] NA NA NA NA ...
##  $ end_station_name  : chr [1:769204] NA NA NA NA ...
##  $ end_station_id    : chr [1:769204] NA NA NA NA ...
##  $ start_lat         : num [1:769204] 41.9 41.9 41.9 41.8 41.9 ...
##  $ start_lng         : num [1:769204] -87.6 -87.6 -87.7 -87.7 -87.6 ...
##  $ end_lat           : num [1:769204] 41.9 41.9 41.9 41.8 41.9 ...
```

```
##  $ end_lng           : num [1:769204] -87.6 -87.6 -87.6 -87.7 -87.6 ...
##  $ member_casual     : chr [1:769204] "casual" "casual" "casual" "casual" ...
##  - 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_character(),
##   ..   end_station_name = col_character(),
##   ..   end_station_id = col_character(),
##   ..   start_lat = col_double(),
##   ..   start_lng = col_double(),
##   ..   end_lat = col_double(),
##   ..   end_lng = col_double(),
##   ..   member_casual = col_character()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

```
str(Jul22)
```

```
## spec_tbl_df [823,488 x 13] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ ride_id           : chr [1:823488] "954144C2F67B1932" "292E027607D218B6" "57765852588AD6E0" "B5B6
##  $ rideable_type     : chr [1:823488] "classic_bike" "classic_bike" "classic_bike" "classic_bike" ..
##  $ started_at        : POSIXct[1:823488], format: "2022-07-05 08:12:47" "2022-07-26 12:53:38" ...
##  $ ended_at          : POSIXct[1:823488], format: "2022-07-05 08:24:32" "2022-07-26 12:55:31" ...
##  $ start_station_name: chr [1:823488] "Ashland Ave & Blackhawk St" "Buckingham Fountain (Temp)" "Buc
##  $ start_station_id  : chr [1:823488] "13224" "15541" "15541" "15541" ...
##  $ end_station_name  : chr [1:823488] "Kingsbury St & Kinzie St" "Michigan Ave & 8th St" "Michigan A
##  $ end_station_id    : chr [1:823488] "KA1503000043" "623" "623" "TA1307000164" ...
##  $ start_lat         : num [1:823488] 41.9 41.9 41.9 41.9 41.9 ...
##  $ start_lng         : num [1:823488] -87.7 -87.6 -87.6 -87.6 -87.6 ...
##  $ end_lat           : num [1:823488] 41.9 41.9 41.9 41.8 41.9 ...
##  $ end_lng           : num [1:823488] -87.6 -87.6 -87.6 -87.6 -87.7 ...
##  $ member_casual     : chr [1:823488] "member" "casual" "casual" "casual" ...
##  - 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_character(),
##   ..   end_station_name = col_character(),
##   ..   end_station_id = col_character(),
##   ..   start_lat = col_double(),
##   ..   start_lng = col_double(),
##   ..   end_lat = col_double(),
##   ..   end_lng = col_double(),
##   ..   member_casual = col_character()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

Merge 12 dataframes into one big dataframe

```
all_trips <- bind_rows(Sep21, Oct21, Nov21, Dec21, Jan22, Feb22, Mar22, Apr22, May22, Jun22, Jul22)
```

Remove lat/lng because this data was dropped in 2020

```
all_trips <- all_trips %>%
  select(-c(start_lat, start_lng, end_lat, end_lng))
```

Clean up and add data to prepare for analysis

Inspect the new table

```
colnames(all_trips)  #List of column names
```

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

```
nrow(all_trips)  #How many rows are in data frame?
```

```
## [1] 5097111
```

```
dim(all_trips)  #Dimensions of the data frame?
```

```
## [1] 5097111       9
```

```
head(all_trips)  #See the first 6 rows of data frame.  Also tail(all_trips)
```

```
## # A tibble: 6 x 9
##   ride_id        ridea~1 started_at          ended_at            start~2 start~3
##   <chr>          <chr>   <dttm>              <dttm>              <chr>   <chr>
## 1 9DC7B962304CB~ electr~ 2021-09-28 16:07:10 2021-09-28 16:09:54 <NA>    <NA>
## 2 F930E2C6872D6~ electr~ 2021-09-28 14:24:51 2021-09-28 14:40:05 <NA>    <NA>
## 3 6EF72137900BB~ electr~ 2021-09-28 00:20:16 2021-09-28 00:23:57 <NA>    <NA>
## 4 78D1DE133B3DB~ electr~ 2021-09-28 14:51:17 2021-09-28 15:00:06 <NA>    <NA>
## 5 E03D4ACDCAEF6~ electr~ 2021-09-28 09:53:12 2021-09-28 10:03:44 <NA>    <NA>
## 6 346DE323A2677~ electr~ 2021-09-28 01:53:18 2021-09-28 02:00:02 <NA>    <NA>
## # ... with 3 more variables: end_station_name <chr>, end_station_id <chr>,
## #   member_casual <chr>, and abbreviated variable names 1: rideable_type,
## #   2: start_station_name, 3: start_station_id
## # i Use `colnames()` to see all variable names
```

```
str(all_trips)  #See list of columns and data types (numeric, character, etc)
```

```
## tibble [5,097,111 x 9] (S3: tbl_df/tbl/data.frame)
##  $ ride_id           : chr [1:5097111] "9DC7B962304CBFD8" "F930E2C6872D6B32" "6EF72137900BB910" "78D
##  $ rideable_type     : chr [1:5097111] "electric_bike" "electric_bike" "electric_bike" "electric_bik
##  $ started_at        : POSIXct[1:5097111], format: "2021-09-28 16:07:10" "2021-09-28 14:24:51" ...
##  $ ended_at          : POSIXct[1:5097111], format: "2021-09-28 16:09:54" "2021-09-28 14:40:05" ...
##  $ start_station_name: chr [1:5097111] NA NA NA NA ...
##  $ start_station_id  : chr [1:5097111] NA NA NA NA ...
##  $ end_station_name  : chr [1:5097111] NA NA NA NA ...
##  $ end_station_id    : chr [1:5097111] NA NA NA NA ...
##  $ member_casual     : chr [1:5097111] "casual" "casual" "casual" "casual" ...
```

```
summary(all_trips)  #Statistical summary of data. Mainly for numerics
```

```
##    ride_id          rideable_type        started_at
##  Length:5097111     Length:5097111     Min.   :2021-09-01 00:00:06.00
##  Class :character   Class :character   1st Qu.:2021-10-23 20:36:13.50
##  Mode  :character   Mode  :character   Median :2022-04-06 09:26:50.00
##                                        Mean   :2022-02-27 11:52:07.07
##                                        3rd Qu.:2022-06-14 16:54:27.50
##                                        Max.   :2022-07-31 23:59:58.00
##     ended_at                      start_station_name start_station_id
##  Min.   :2021-09-01 00:00:41.00   Length:5097111     Length:5097111
##  1st Qu.:2021-10-23 20:58:47.00   Class :character   Class :character
##  Median :2022-04-06 09:38:24.00   Mode  :character   Mode  :character
##  Mean   :2022-02-27 12:11:43.93
##  3rd Qu.:2022-06-14 17:11:15.50
##  Max.   :2022-08-04 13:53:01.00
##  end_station_name   end_station_id     member_casual
##  Length:5097111     Length:5097111     Length:5097111
##  Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character
##
##
##
```

See if there are any duplicate ride ids (they should all be unique)

```
length(unique(all_trips$ride_id)) == nrow(all_trips)
```

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

See how many bike options there are

```
unique(all_trips$rideable_type)
```

```
## [1] "electric_bike" "classic_bike"  "docked_bike"
```

Make sure there are only two options for member_casual

```
unique(all_trips$member_casual)
```

```
## [1] "casual" "member"
```

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

```
all_trips$date <- as.Date(all_trips$started_at) #The default format is yyyy-mm-dd
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")
```

Calculate ride length and make a column for it in seconds

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

Inspect the structure of the columns

```
str(all_trips)
```

```
## tibble [5,097,111 x 15] (S3: tbl_df/tbl/data.frame)
##  $ ride_id           : chr [1:5097111] "9DC7B962304CBFD8" "F930E2C6872D6B32" "6EF72137900BB910" "78D
##  $ rideable_type     : chr [1:5097111] "electric_bike" "electric_bike" "electric_bike" "electric_bik
##  $ started_at        : POSIXct[1:5097111], format: "2021-09-28 16:07:10" "2021-09-28 14:24:51" ...
##  $ ended_at          : POSIXct[1:5097111], format: "2021-09-28 16:09:54" "2021-09-28 14:40:05" ...
##  $ start_station_name: chr [1:5097111] NA NA NA NA ...
##  $ start_station_id  : chr [1:5097111] NA NA NA NA ...
##  $ end_station_name  : chr [1:5097111] NA NA NA NA ...
##  $ end_station_id    : chr [1:5097111] NA NA NA NA ...
##  $ member_casual     : chr [1:5097111] "casual" "casual" "casual" "casual" ...
##  $ date              : Date[1:5097111], format: "2021-09-28" "2021-09-28" ...
##  $ month             : chr [1:5097111] "09" "09" "09" "09" ...
##  $ day               : chr [1:5097111] "28" "28" "28" "28" ...
##  $ year              : chr [1:5097111] "2021" "2021" "2021" "2021" ...
##  $ day_of_week       : chr [1:5097111] "Tuesday" "Tuesday" "Tuesday" "Tuesday" ...
##  $ ride_length       : 'difftime' num [1:5097111] 164 914 221 529 ...
##   ..- attr(*, "units")= chr "secs"
```

Convert ride length to numeric

```
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
```

Remove data that lists ride length as less than 60 seconds because these were false starts or taken out by employees for maintenence checks

```
all_trips_v2 <- all_trips[!(all_trips$start_station_name == "HQ QR" | all_trips$ride_length<60),]
```

Remove NAs

```
all_trips_v2 <- na.omit(all_trips_v2)
```

Conduct descriptive analysis

```
mean(all_trips_v2$ride_length) #straight average (total ride length / rides)
```

```
## [1] 1099.724
```

```
median(all_trips_v2$ride_length)
```

```
## [1] 668
```

```
max(all_trips_v2$ride_length)
```

```
## [1] 2442301
```

```
min(all_trips_v2$ride_length)
```

```
## [1] 60
```

Compare 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                 1592.774
## 2                     member                  760.505
```

```
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                      903
## 2                     member                      552
```

```
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                  2442301
## 2                     member                    89575
```

```
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                       60
## 2                     member                       60
```

See the average ride length by each day for members vs casual riders

```
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                1464.6194
## 2                      member                   Friday                 739.7179
## 3                      casual                   Monday                1672.0765
## 4                      member                   Monday                 739.1193
## 5                      casual                 Saturday                1750.9713
## 6                      member                 Saturday                 858.5124
## 7                      casual                   Sunday                1834.7249
## 8                      member                   Sunday                 863.6020
## 9                      casual                 Thursday                1395.8788
## 10                     member                 Thursday                 729.0393
## 11                     casual                  Tuesday                1374.4835
## 12                     member                  Tuesday                 709.8739
## 13                     casual                Wednesday                1360.1478
## 14                     member                Wednesday                 718.6280
```

Order the days of the week

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

Find the average ride length by day of the week for members vs casual riders

```
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                1834.7249
## 2                      member                   Sunday                 863.6020
## 3                      casual                   Monday                1672.0765
## 4                      member                   Monday                 739.1193
## 5                      casual                  Tuesday                1374.4835
## 6                      member                  Tuesday                 709.8739
## 7                      casual                Wednesday                1360.1478
## 8                      member                Wednesday                 718.6280
## 9                      casual                 Thursday                1395.8788
## 10                     member                 Thursday                 729.0393
## 11                     casual                   Friday                1464.6194
## 12                     member                   Friday                 739.7179
## 13                     casual                 Saturday                1750.9713
## 14                     member                 Saturday                 858.5124
```

Turn off scientific notation

```
options(scipen=999)
```

Analyze ridership data by type and weekday

Number of rides by type and weekday

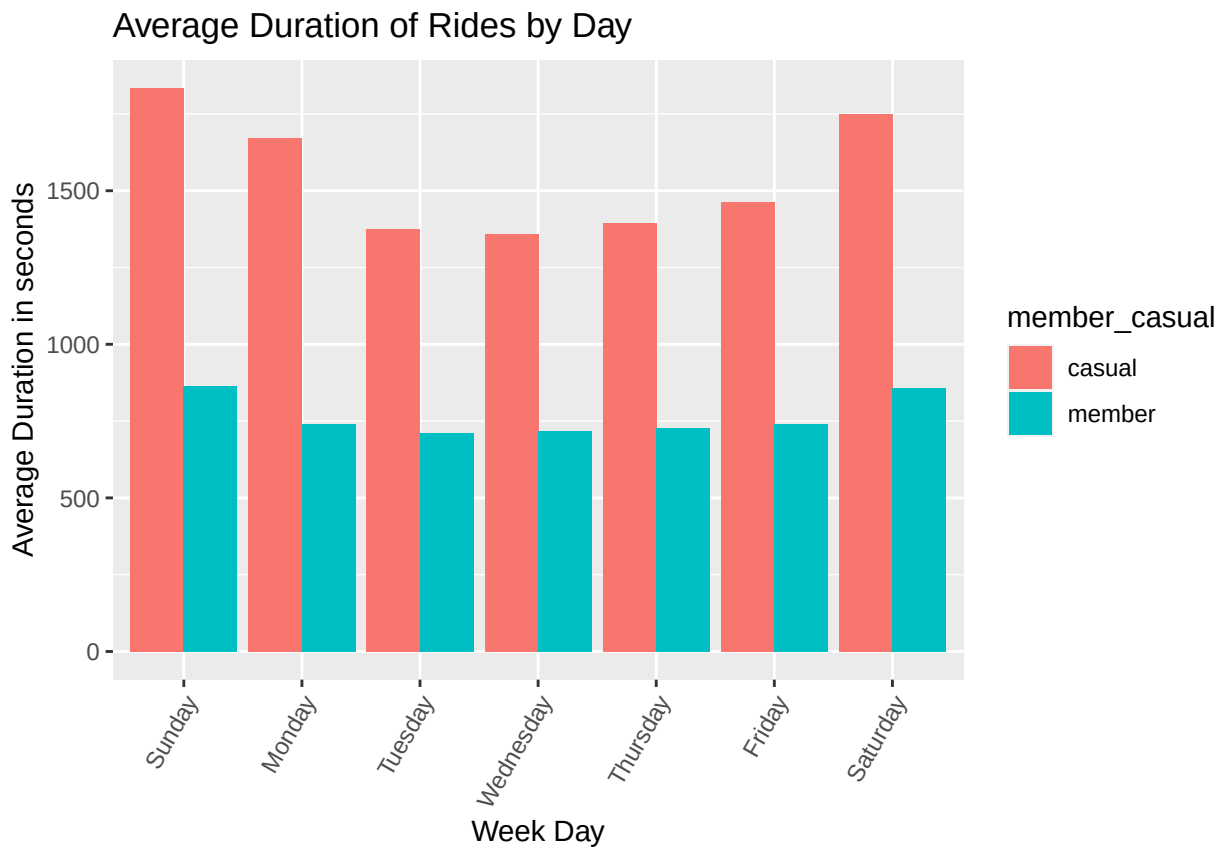
```
all_trips_v2 %>%
  group_by(member_casual, day_of_week) %>%
  summarise(number_of_rides = n(), average_duration = mean(ride_length)) %>%
  arrange(member_casual, day_of_week)%>%
  ggplot(aes(x = day_of_week, y = number_of_rides, fill = member_casual)) +
  geom_col(position = "dodge") + labs(title="Total Number of Rides by Day", x = "Week Day", y = "Number
```

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

Average duration by type and weekday

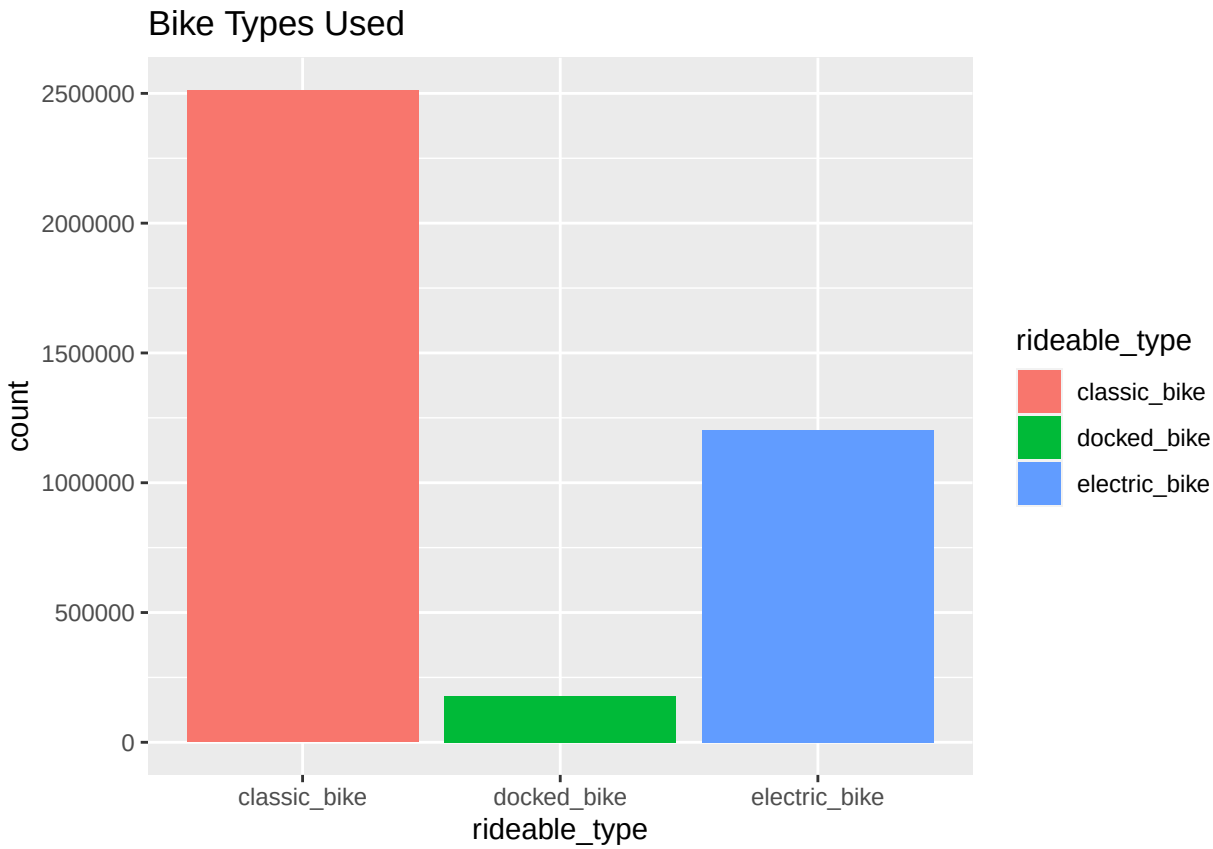
```
all_trips_v2 %>%
  group_by(member_casual, day_of_week) %>%
  summarise(number_of_rides = n(), average_duration = mean(ride_length)) %>%
  arrange(member_casual, day_of_week)%>%
  ggplot(aes(x = day_of_week, y = average_duration, fill = member_casual)) +
  geom_col(position = "dodge") + labs(title="Average Duration of Rides by Day", x = "Week Day", y = "Av
```

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



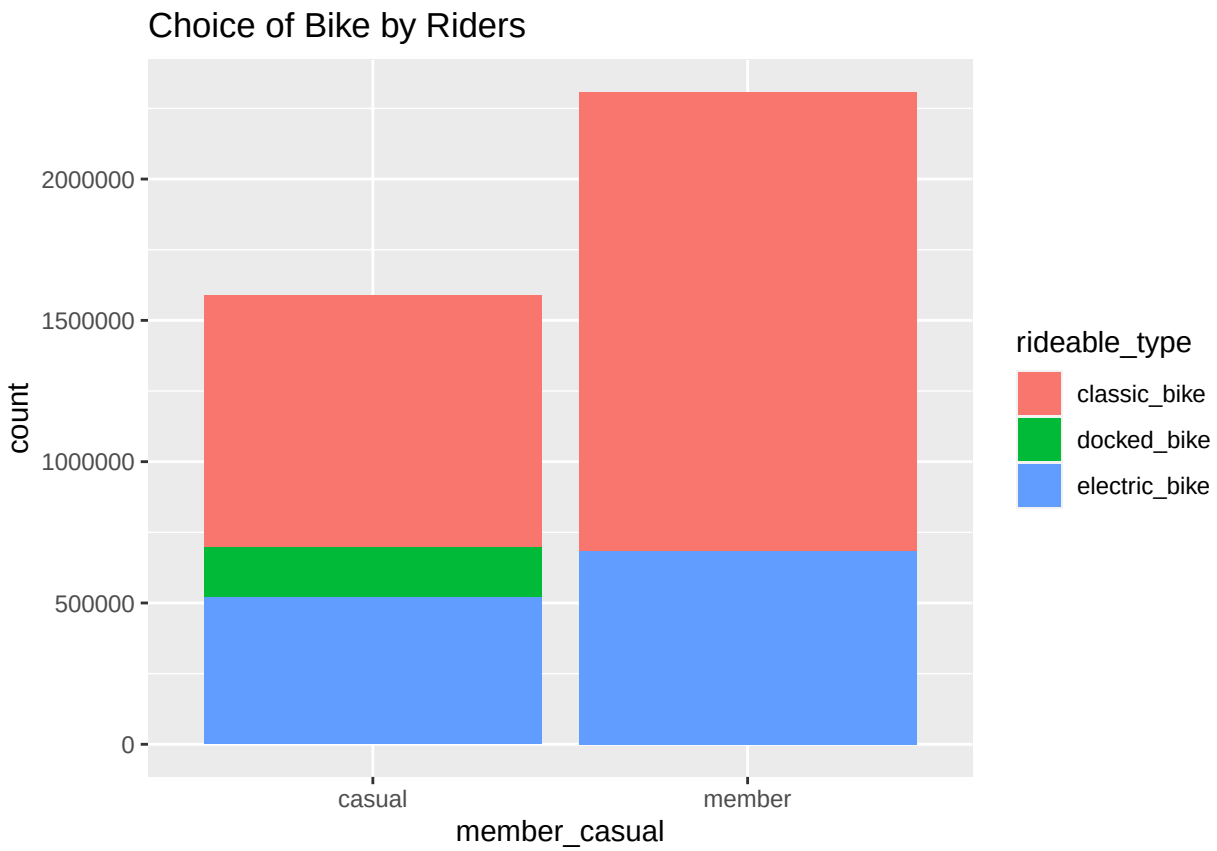
Bike types used

```
ggplot(data = all_trips_v2,mapping= aes(x= rideable_type,fill=rideable_type)) +geom_bar() + labs(title=
```



Choice of bike by rider type

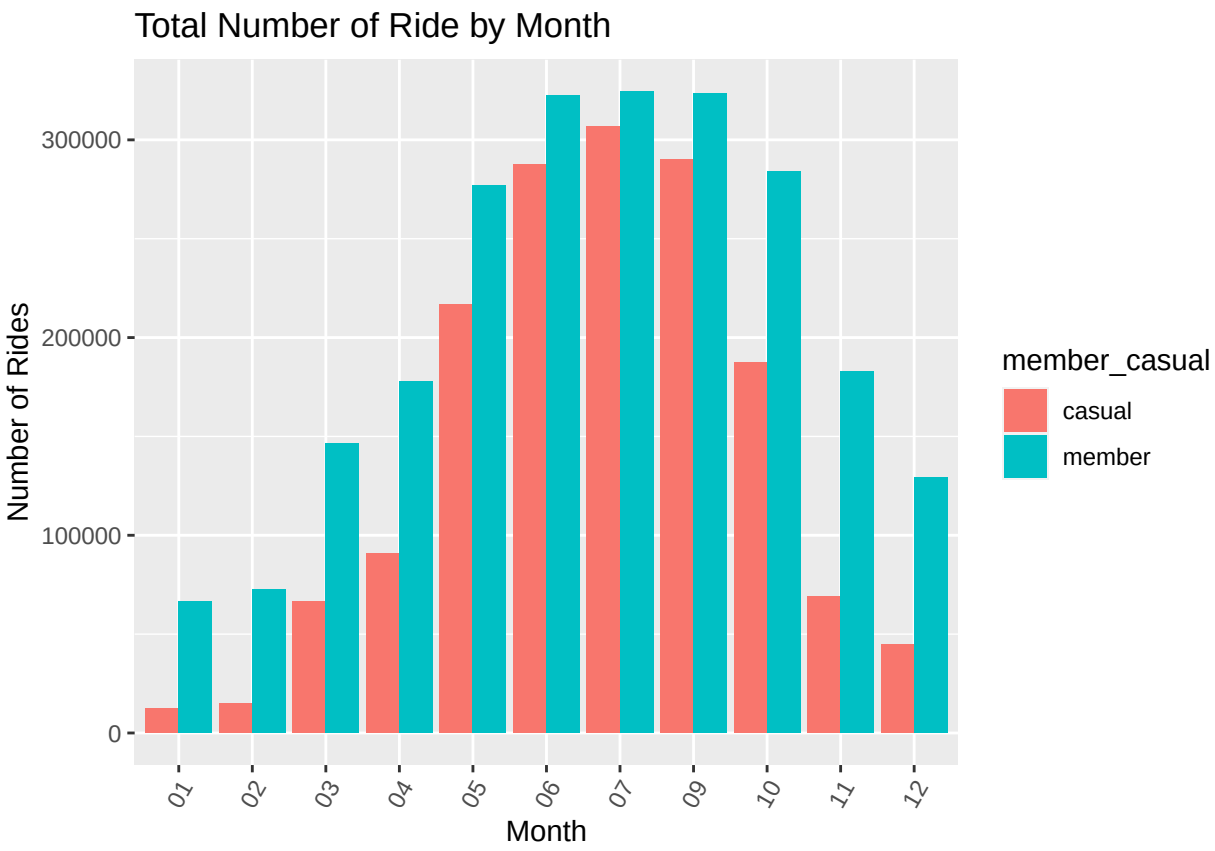
```
ggplot(data = all_trips_v2,mapping= aes(x= member_casual, fill=rideable_type)) +geom_bar() + labs(title=
```



Number of rides by riders and month

```
all_trips_v2 %>%
  group_by(member_casual, month) %>%
  summarise(number_of_rides = n(), average_duration = mean(ride_length)) %>%
  arrange(member_casual, month) %>%
  ggplot(aes(x = month, y = number_of_rides, fill = member_casual)) +
  geom_col(position = "dodge") + labs(title="Total Number of Ride by Month", x = "Month", y = "Number o
```

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


Total Number of Ride by Month
Number of Rides
300000
200000
100000
0
01
02
03
04
05
06
07
09
10
11
12
Month
member_casual
casual
member