R Seminar Week 1 – Loading Data

John Kearns

2023-10-05

RMarkdown basics

A chunk is where R code is written. You can add a new chunk with ctrl+alt+i

adding include=FALSE or echo=FALSE will affect how the code is shown in the final output

knitting refers to running all of the code and saving it as a certain output (html,pdf,latex)

Headers can be made with #s Largest header is one # and lowest is six #s

You can write equations and do fancy things pretty easily in RMarkdown Some more resources here

Let's look at a dataset

Loading data in

Tip: make strings to refer to file structures so that other people can change it easily and run your code

There are different ways to load data into R You can use point-and-click method by going File -> Import Dataset -> select the type of data you are inserting

I recommend using the readr version when using csv files If reading in a txt files or some other dataset that isn't comma-separated, use read.table() or read.delim()

```
## Rows: 4212 Columns: 15
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (5): starttime, stoptime, start station name, end station name, usertype
## dbl (10): tripduration, start station id, start station latitude, start stat...
##
## 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.
```

Enter the code here to import the excel version in our files. What about downloading staright from the web from this link?

```
head(citibike,30)
```

What is in this dataset?

```
##    tripduration      starttime       stoptime start.station.id
## 1          3117  8/1/2015 1:19  8/1/2015 2:11              301
## 2           690  8/1/2015 1:27  8/1/2015 1:39              301
## 3           727  8/1/2015 1:38  8/1/2015 1:50              301
## 4           698  8/1/2015 6:06  8/1/2015 6:18              301
## 5           351  8/1/2015 6:24  8/1/2015 6:30              301
## 6           597  8/1/2015 7:46  8/1/2015 7:56              301
## 7          1248  8/1/2015 8:02  8/1/2015 8:23              301
## 8           417  8/1/2015 8:12  8/1/2015 8:19              301
## 9           454  8/1/2015 8:25  8/1/2015 8:33              301
## 10          409  8/1/2015 8:38  8/1/2015 8:45              301
## 11          384  8/1/2015 8:55  8/1/2015 9:01              301
## 12          310  8/1/2015 8:57  8/1/2015 9:02              301
## 13          272  8/1/2015 9:00  8/1/2015 9:05              301
## 14          640  8/1/2015 9:09  8/1/2015 9:19              301
## 15          631  8/1/2015 9:18  8/1/2015 9:29              301
## 16         1158  8/1/2015 9:28  8/1/2015 9:47              301
## 17         1153  8/1/2015 9:28  8/1/2015 9:47              301
## 18           93  8/1/2015 9:38  8/1/2015 9:40              301
## 19         1168  8/1/2015 9:39  8/1/2015 9:59              301
## 20         1222  8/1/2015 9:40 8/1/2015 10:00              301
## 21         1217  8/1/2015 9:40 8/1/2015 10:01              301
## 22         2071  8/1/2015 9:43 8/1/2015 10:18              301
## 23          412  8/1/2015 9:45  8/1/2015 9:52              301
## 24          274  8/1/2015 9:46  8/1/2015 9:50              301
## 25          485  8/1/2015 9:48  8/1/2015 9:56              301
## 26          952  8/1/2015 9:48 8/1/2015 10:04              301
## 27          895  8/1/2015 9:52 8/1/2015 10:07              301
## 28         1217 8/1/2015 10:06 8/1/2015 10:26              301
## 29         1224 8/1/2015 10:06 8/1/2015 10:27              301
## 30          590 8/1/2015 10:10 8/1/2015 10:20              301
##    start.station.name start.station.latitude start.station.longitude
## 1   E 2 St & Avenue B                40.72217                -73.98369
## 2   E 2 St & Avenue B                40.72217                -73.98369
## 3   E 2 St & Avenue B                40.72217                -73.98369
## 4   E 2 St & Avenue B                40.72217                -73.98369
## 5   E 2 St & Avenue B                40.72217                -73.98369
## 6   E 2 St & Avenue B                40.72217                -73.98369
## 7   E 2 St & Avenue B                40.72217                -73.98369
## 8   E 2 St & Avenue B                40.72217                -73.98369
## 9   E 2 St & Avenue B                40.72217                -73.98369
## 10  E 2 St & Avenue B                40.72217                -73.98369
## 11  E 2 St & Avenue B                40.72217                -73.98369
## 12  E 2 St & Avenue B                40.72217                -73.98369
## 13  E 2 St & Avenue B                40.72217                -73.98369
## 14  E 2 St & Avenue B                40.72217                -73.98369
## 15  E 2 St & Avenue B                40.72217                -73.98369
## 16  E 2 St & Avenue B                40.72217                -73.98369
## 17  E 2 St & Avenue B                40.72217                -73.98369
## 18  E 2 St & Avenue B                40.72217                -73.98369
## 19  E 2 St & Avenue B                40.72217                -73.98369
## 20  E 2 St & Avenue B                40.72217                -73.98369
## 21  E 2 St & Avenue B                40.72217                -73.98369
## 22  E 2 St & Avenue B                40.72217                -73.98369
```

```
## 23  E 2 St & Avenue B              40.72217              -73.98369
## 24  E 2 St & Avenue B              40.72217              -73.98369
## 25  E 2 St & Avenue B              40.72217              -73.98369
## 26  E 2 St & Avenue B              40.72217              -73.98369
## 27  E 2 St & Avenue B              40.72217              -73.98369
## 28  E 2 St & Avenue B              40.72217              -73.98369
## 29  E 2 St & Avenue B              40.72217              -73.98369
## 30  E 2 St & Avenue B              40.72217              -73.98369
##    end.station.id         end.station.name end.station.latitude
## 1             301        E 2 St & Avenue B             40.72217
## 2             349  Rivington St & Ridge St             40.71850
## 3            2010     Grand St & Greene St             40.72165
## 4             527          E 33 St & 2 Ave             40.74402
## 5             250 Lafayette St & Jersey St             40.72456
## 6             497       E 17 St & Broadway             40.73705
## 7             505          6 Ave & W 33 St             40.74901
## 8             268    Howard St & Centre St             40.71911
## 9             128 MacDougal St & Prince St             40.72710
## 10            439           E 4 St & 2 Ave             40.72628
## 11            439           E 4 St & 2 Ave             40.72628
## 12            403           E 2 St & 2 Ave             40.72503
## 13            312  Allen St & E Houston St             40.72205
## 14            151 Cleveland Pl & Spring St             40.72182
## 15            380         W 4 St & 7 Ave S             40.73401
## 16            254          W 11 St & 6 Ave             40.73532
## 17            254          W 11 St & 6 Ave             40.73532
## 18            317        E 6 St & Avenue B             40.72454
## 19            491     E 24 St & Park Ave S             40.74096
## 20            379          W 31 St & 7 Ave             40.74916
## 21            379          W 31 St & 7 Ave             40.74916
## 22            533       Broadway & W 39 St             40.75300
## 23            428           E 3 St & 1 Ave             40.72468
## 24            428           E 3 St & 1 Ave             40.72468
## 25            251      Mott St & Prince St             40.72318
## 26            491     E 24 St & Park Ave S             40.74096
## 27            474          5 Ave & E 29 St             40.74517
## 28            546     E 30 St & Park Ave S             40.74445
## 29            546     E 30 St & Park Ave S             40.74445
## 30            297          E 15 St & 3 Ave             40.73423
##    end.station.longitude bikeid   usertype birth.year gender
## 1              -73.98369  18070 Subscriber       1986      1
## 2              -73.98330  19699 Subscriber       1985      1
## 3              -74.00235  20953 Subscriber       1982      1
## 4              -73.97606  23566 Subscriber       1976      1
## 5              -73.99565  17545 Subscriber       1959      1
## 6              -73.99009  17435 Subscriber       1979      1
## 7              -73.98848  18236 Subscriber       1987      1
## 8              -73.99973  22454 Subscriber       1991      1
## 9              -74.00297  17910 Subscriber       1990      1
## 10             -73.98978  17127 Subscriber       1981      2
## 11             -73.98978  21215 Subscriber       1988      2
## 12             -73.99070  23524 Subscriber       1990      1
## 13             -73.98911  18174 Subscriber       1984      1
## 14             -73.99720  17968 Subscriber       1971      1
```

```
## 15             -74.00294  23247 Subscriber       1989      1
## 16             -73.99800  14767 Subscriber       1986      2
## 17             -73.99800  17457 Subscriber       1989      1
## 18             -73.98185  23302 Subscriber       1957      1
## 19             -73.98602  16899   Customer         NA      0
## 20             -73.99160  14722 Subscriber       1978      1
## 21             -73.99160  18070 Subscriber       1983      2
## 22             -73.98722  16102 Subscriber       1963      1
## 23             -73.98783  16107   Customer         NA      0
## 24             -73.98783  16406   Customer         NA      0
## 25             -73.99480  19568 Subscriber       1969      1
## 26             -73.98602  18803 Subscriber       1967      2
## 27             -73.98683  17537 Subscriber       1983      1
## 28             -73.98304  17883   Customer         NA      0
## 29             -73.98304  19104   Customer         NA      0
## 30             -73.98692  15937 Subscriber       1967      1
```

What are some things that we want to know about this data? Number of men and women? What years does the data cover? Average length of ride?

What are some ways to do calculations? To see summary statistics of a variable in a dataframe or a vector, use summary() To add up values in a vector, use sum() To get the mean, use mean() To get the median, use median() To get variance and standard deviation, use var() and sd()

max() and min() will give you maxmimum and minimum values, while which.max() would give you the index of the value that is the maximum in a vector

BEWARE OF NAs

To test or compare values, you can use inequalities. The code will give back a TRUE or FALSE.

```
2<3
```

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

```
10>15
```

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

```
3==4
```

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

```
3!=4
```

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

```
c(1,2,3,4,5)<=3
```

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

```
"Hello"=="World"
```

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

```
"Hello"=="Hello"
```

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

```
# lets start with getting a number of unique bikes
# length() gives you how long a vector is
# unique() removes duplicates from a vector

length(citibike$bikeid)
```

```
## [1] 4212
```

```
unique(citibike$birth.year)
```

```
##  [1] 1986 1985 1982 1976 1959 1979 1987 1991 1990 1981 1988 1984 1971 1989 1957
## [16]   NA 1978 1983 1963 1969 1967 1973 1980 1970 1966 1958 1953 1972 1975 1956
## [31] 1944 1974 1952 1992 1960 1962 1965 1993 1964 1977 1968 1947 1997 1994 1954
## [46] 1955 1961 1995 1942 1949 1998 1999 1951 1950 1941 1946 1996 1940
```

```
length(unique(citibike$bikeid)) # 2,989 differnt bikes are used in this data set
```

```
## [1] 2989
```

```
# what are some statistics about the length of rides?

summary(citibike)
```

```
##   tripduration       starttime           stoptime         start.station.id
##  Min.   :    60.0   Length:4212        Length:4212        Min.   :301
##  1st Qu.:   379.0   Class :character   Class :character   1st Qu.:301
##  Median :   627.0   Mode  :character   Mode  :character   Median :301
##  Mean   :   843.4                                         Mean   :301
##  3rd Qu.:  1028.0                                         3rd Qu.:301
##  Max.   :126180.0                                         Max.   :301
##
##  start.station.name start.station.latitude start.station.longitude
##  Length:4212        Min.   :40.72          Min.   :-73.98
##  Class :character   1st Qu.:40.72          1st Qu.:-73.98
##  Mode  :character   Median :40.72          Median :-73.98
##                     Mean   :40.72          Mean   :-73.98
##                     3rd Qu.:40.72          3rd Qu.:-73.98
##                     Max.   :40.72          Max.   :-73.98
##
##  end.station.id   end.station.name   end.station.latitude end.station.longitude
##  Min.   :  79.0   Length:4212        Min.   :40.68        Min.   :-74.02
##  1st Qu.: 285.0   Class :character   1st Qu.:40.72        1st Qu.:-74.00
```

```
##  Median : 361.0   Mode  :character   Median :40.73        Median :-73.99
##  Mean   : 425.4                      Mean   :40.73        Mean   :-73.99
##  3rd Qu.: 445.0                      3rd Qu.:40.73        3rd Qu.:-73.98
##  Max.   :3223.0                      Max.   :40.77        Max.   :-73.94
##
##      bikeid        usertype           birth.year       gender
##  Min.   :14538   Length:4212        Min.   :1940   Min.   :0.000
##  1st Qu.:17478   Class :character   1st Qu.:1974   1st Qu.:1.000
##  Median :20529   Mode  :character   Median :1983   Median :1.000
##  Mean   :20017                      Mean   :1980   Mean   :1.108
##  3rd Qu.:22616                      3rd Qu.:1988   3rd Qu.:1.000
##  Max.   :24353                      Max.   :1999   Max.   :2.000
##                                     NA's   :530
```

```
summary(citibike$tripduration)
```

```
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
##     60.0    379.0    627.0    843.4   1028.0 126180.0
```

```
mean(citibike$tripduration)
```

```
## [1] 843.3981
```

```
sd(citibike$tripduration)
```

```
## [1] 2201.217
```

```
mean(citibike$birth.year) # why is this giving an error?
```

```
## [1] NA
```

```
# now let's get the number of rides by men and women

# What are the values in the gender column?
unique(citibike$gender)
```

```
## [1] 1 2 0
```

```
# what if we only want to see rides by women? How could we make that as a new variable?

# code for getting the data frame that only has rides by women:


# code for the number of rides by women? By men?


# What is the average age of the person in the dataset?
```

```
table(citibike$end.station.name)
```

What are the most common destinations?

```
##
##   Center Blvd\xe5\xca& Borden Ave                 1 Ave & E 15 St
##                                1                              33
##                  1 Ave & E 18 St                 1 Ave & E 30 St
##                                8                              28
##                  1 Ave & E 44 St                10 Ave & W 28 St
##                               11                               5
##                 11 Ave & W 27 St                 2 Ave & E 31 St
##                                9                               4
##                  2 Ave & E 58 St          3 Ave & Schermerhorn St
##                                3                               2
##                  5 Ave & E 29 St               6 Ave & Broome St
##                               18                               9
##                 6 Ave & Canal St                 6 Ave & W 33 St
##                                4                              17
##                  8 Ave & W 31 St                 8 Ave & W 33 St
##                                7                               3
##                  9 Ave & W 14 St                 9 Ave & W 16 St
##                               14                               5
##                  9 Ave & W 18 St                 9 Ave & W 22 St
##                                4                               6
##           Allen St & E Houston St             Allen St & Hester St
##                               26                              34
##           Allen St & Rivington St     Atlantic Ave & Fort Greene Pl
##                               24                               2
##          Atlantic Ave & Furman St               Avenue D & E 12 St
##                                3                               3
##                Avenue D & E 3 St                Avenue D & E 8 St
##                               13                              35
##              Bank St & Hudson St           Barclay St & Church St
##                                4                              20
##             Barrow St & Hudson St            Bayard St & Baxter St
##                                7                              14
##          Bedford Ave & Nassau Ave             Bedford Ave & S 9 St
##                                2                               1
##                Berry St & N 8 St      Bialystoker Pl & Delancey St
##                                2                              31
##              Broad St & Bridge St            Broadway & Battery Pl
##                                6                               2
##               Broadway & Berry St               Broadway & E 14 St
##                                2                              81
##                Broadway & E 22 St               Broadway & W 24 St
##                               25                               7
##                Broadway & W 29 St               Broadway & W 32 St
##                                9                               3
##                Broadway & W 36 St               Broadway & W 37 St
##                                8                               8
##                Broadway & W 39 St               Broadway & W 41 St
```

```
##                                7                                6
##               Broadway & W 49 St               Broadway & W 51 St
##                                1                                1
##               Broadway & W 53 St               Broadway & W 60 St
##                                1                                7
##     Brooklyn Bridge Park - Pier 2              Bus Slip & State St
##                                4                                2
##          Bushwick Ave & Powers St             Canal St & Rutgers St
##                                2                               25
##               Carmine St & 6 Ave          Catherine St & Monroe St
##                               33                               10
##            Central Park S & 6 Ave          Centre St & Chambers St
##                                3                               19
##              Centre St & Worth St                      Cherry St
##                               16                                9
##     Christopher St & Greenwich St              Clark St & Henry St
##                               55                                3
##           Clermont Ave & Park Ave          Cleveland Pl & Spring St
##                                1                               45
##              Cliff St & Fulton St       Clinton Ave & Flushing Ave
##                                9                                1
##             Clinton St & Grand St       Columbia St & Rivington St
##                               27                               12
##     Cumberland St & Lafayette Ave                 Dean St & 4 Ave
##                                2                                3
##       DeKalb Ave & S Portland Ave             Division St & Bowery
##                                1                               22
##           Driggs Ave & N Henry St          Duane St & Greenwich St
##                                1                                4
##                  E 10 St & 5 Ave               E 10 St & Avenue A
##                                5                               45
##                  E 11 St & 1 Ave                  E 11 St & 2 Ave
##                               46                               53
##                E 11 St & Broadway                  E 12 St & 3 Ave
##                               16                               26
##                E 13 St & Avenue A               E 14 St & Avenue B
##                               64                               74
##                  E 15 St & 3 Ave                  E 16 St & 5 Ave
##                               31                               19
##               E 16 St & Irving Pl               E 17 St & Broadway
##                                9                               51
##                  E 19 St & 3 Ave                   E 2 St & 2 Ave
##                               11                               97
##                 E 2 St & Avenue B                E 2 St & Avenue C
##                               82                               36
##                  E 20 St & 2 Ave               E 20 St & FDR Drive
##                                6                               11
##                E 20 St & Park Ave                  E 23 St & 1 Ave
##                               13                               28
##               E 24 St & Park Ave S                  E 25 St & 1 Ave
##                               22                                9
##                  E 25 St & 2 Ave                  E 27 St & 1 Ave
##                               12                               19
##                   E 3 St & 1 Ave               E 30 St & Park Ave S
```

```
##                             57                                  8
##                 E 31 St & 3 Ave                E 32 St & Park Ave
##                             13                                 18
##                 E 33 St & 2 Ave                   E 33 St & 5 Ave
##                             17                                 14
##          E 37 St & Lexington Ave                   E 39 St & 2 Ave
##                              5                                 16
##                 E 39 St & 3 Ave                    E 4 St & 2 Ave
##                              6                                 20
##                 E 40 St & 5 Ave                   E 43 St & 2 Ave
##                              7                                  1
##          E 43 St & Vanderbilt Ave                   E 45 St & 3 Ave
##                              1                                 11
##                 E 47 St & 1 Ave                   E 47 St & 2 Ave
##                              2                                  4
##               E 5 St & Avenue C                   E 51 St & 1 Ave
##                             32                                  7
##          E 51 St & Lexington Ave                   E 52 St & 2 Ave
##                             10                                  3
##          E 53 St & Lexington Ave              E 53 St & Madison Ave
##                              7                                 13
##                 E 55 St & 2 Ave                   E 55 St & 3 Ave
##                              1                                  1
##          E 55 St & Lexington Ave                   E 58 St & 3 Ave
##                              3                                  1
##                E 6 St & Avenue B                 E 6 St & Avenue D
##                             34                                 24
##               E 60 St & York Ave                 E 7 St & Avenue A
##                              4                                 67
##                E 9 St & Avenue C           Elizabeth St & Hester St
##                             61                                 27
##           Emerson Pl & Myrtle Ave                FDR Drive & E 35 St
##                              1                                  7
##            Forsyth St & Broome St              Forsyth St & Canal St
##                             42                                  6
##           Franklin St & Dupont St           Franklin St & W Broadway
##                              3                                 14
##                Front St & Gold St                Front St & Maiden Ln
##                              1                                 24
##              Fulton St & Broadway           Fulton St & Clermont Ave
##                              2                                  1
##            Fulton St & William St        Gallatin Pl & Livingston St
##                              8                                  1
##         Graham Ave & Conselyea St Grand Army Plaza & Central Park S
##                              1                                  8
##              Grand St & Greene St             Grand St & Havemeyer St
##                              7                                  4
##                   Great Jones St               Greenwich Ave & 8 Ave
##                             98                                 24
##         Greenwich Ave & Charles St          Greenwich St & N Moore St
##                             10                                 15
##        Greenwich St & W Houston St           Greenwich St & Warren St
##                             18                                  4
##            Harrison St & Hudson St                 Henry St & Grand St
```

```
##                              1                              23
##           Hicks St & Montague St            Howard St & Centre St
##                              2                              17
##             Hudson St & Reade St         India St & Manhattan Ave
##                              1                               1
##                Jay St & Tech Pl             John St & William St
##                              2                               4
##               Kent Ave & N 7 St              Kent Ave & S 11 St
##                              2                               1
##            Lafayette St & E 8 St         Lafayette St & Jersey St
##                             96                             137
##            LaGuardia Pl & W 3 St            Laight St & Hudson St
##                             56                               1
##      Lawrence St & Willoughby St       Lefferts Pl & Franklin Ave
##                              1                               1
##           Leonard St & Church St          Lexington Ave & E 24 St
##                              6                              18
##          Lexington Ave & E 29 St            Liberty St & Broadway
##                             15                               8
##          Lispenard St & Broadway            Little West St & 1 Pl
##                              5                               4
##            Lorimer St & Broadway         MacDougal St & Prince St
##                              2                              28
##     MacDougal St & Washington Sq          Madison St & Clinton St
##                              8                               4
##       Madison St & Montgomery St             Maiden Ln & Pearl St
##                             10                               5
##            Market St & Cherry St          Mercer St & Bleecker St
##                             34                              43
##            Mercer St & Spring St    Metropolitan Ave & Bedford Ave
##                              8                              19
##    Metropolitan Ave & Meeker Ave          Milton St & Franklin St
##                              1                               4
##          Monroe St & Bedford Ave               Mott St & Prince St
##                              1                              79
##              Murray St & West St       Myrtle Ave & St Edwards St
##                              2                               1
##             N 11 St & Wythe Ave            N 12 St & Bedford Ave
##                              4                               3
##             N 6 St & Bedford Ave             N 8 St & Driggs Ave
##                              1                               2
##          Nassau Ave & Russell St              Nassau St & Navy St
##                              1                               2
##           Norfolk St & Broome St          Norman Ave & Leonard St
##                             33                               3
##                   Old Fulton St              Old Slip & Front St
##                              4                              17
##         Pearl St & Hanover Square             Peck Slip & Front St
##                              3                              37
##           Perry St & Bleecker St            Pershing Square North
##                              4                              12
##            Pershing Square South             Pike St & E Broadway
##                             12                               4
##              Pike St & Monroe St             Pitt St & Stanton St
```

```
##                             5                             6
##             Reade St & Broadway       Rivington St & Chrystie St
##                            13                            23
##          Rivington St & Ridge St            S 3 St & Bedford Ave
##                            23                             5
##               S 4 St & Wythe Ave                 S 5 Pl & S 4 St
##                            15                            33
##       S Portland Ave & Hanson Pl          Shevchenko Pl & E 7 St
##                             2                            59
##       South End Ave & Liberty St        South St & Gouverneur Ln
##                             8                            13
##          South St & Whitehall St           Spruce St & Nassau St
##                            15                             4
##          St James Pl & Oliver St           St James Pl & Pearl St
##                             1                             3
##              St Marks Pl & 1 Ave               St Marks Pl & 2 Ave
##                            41                            40
##             Stagg St & Union Ave         Stanton St & Chrystie St
##                             1                            19
##           Stanton St & Mangin St          Suffolk St & Stanton St
##                            28                            26
##      Sullivan St & Washington Sq          University Pl & E 14 St
##                            50                            35
##         Vesey Pl & River Terrace                 W 11 St & 6 Ave
##                             7                             5
##                W 13 St & 5 Ave                 W 13 St & 6 Ave
##                            18                            12
##                W 13 St & 7 Ave           W 14 St & The High Line
##                            31                             7
##                W 15 St & 7 Ave           W 16 St & The High Line
##                            10                             5
##                W 17 St & 8 Ave                 W 18 St & 6 Ave
##                             5                            17
##               W 20 St & 11 Ave                 W 20 St & 7 Ave
##                             4                             7
##                W 20 St & 8 Ave                 W 21 St & 6 Ave
##                             2                            31
##               W 22 St & 10 Ave                 W 22 St & 8 Ave
##                             4                             7
##                W 24 St & 7 Ave                 W 25 St & 6 Ave
##                             1                             6
##               W 26 St & 10 Ave                 W 26 St & 8 Ave
##                             7                             3
##                W 27 St & 7 Ave                 W 29 St & 9 Ave
##                            23                             1
##                W 31 St & 7 Ave                 W 33 St & 7 Ave
##                            12                             2
##               W 34 St & 11 Ave                W 37 St & 10 Ave
##                             1                             2
##                W 37 St & 5 Ave                 W 38 St & 8 Ave
##                             3                             5
##                W 39 St & 9 Ave                W 4 St & 7 Ave S
##                             1                            18
##                W 41 St & 8 Ave                 W 43 St & 10 Ave
```

```
##                                25                                 1
##                  W 43 St & 6 Ave                  W 44 St & 5 Ave
##                                 2                                 5
##                  W 45 St & 6 Ave                  W 45 St & 8 Ave
##                                 3                                 3
##                 W 46 St & 11 Ave                 W 47 St & 10 Ave
##                                 1                                 2
##                  W 51 St & 6 Ave                  W 52 St & 5 Ave
##                                 6                                 3
##                  W 52 St & 9 Ave                  W 53 St & 10 Ave
##                                 2                                 2
##                  W 54 St & 9 Ave                  W 56 St & 6 Ave
##                                 2                                11
##                 W 59 St & 10 Ave           W Broadway & Spring St
##                                 2                                12
##             Warren St & Church St       Washington Ave & Greene Ave
##                                 3                                 1
##             Washington Pl & 6 Ave          Washington Pl & Broadway
##                                42                                13
##               Washington Square E     Washington St & Gansevoort St
##                                24                                 9
##           Water - Whitehall Plaza           Watts St & Greenwich St
##                                 1                                 8
##             West St & Chambers St                   West Thames St
##                                10                                 5
##              William St & Pine St      Wythe Ave & Metropolitan Ave
##                                 8                                13
##                  York St & Jay St
##                                 1
```

```
# not easy to see what was the most common?
```

```
sort(table(citibike$end.station.name),decreasing=TRUE)[1:10]
```

```
##
## Lafayette St & Jersey St           Great Jones St           E 2 St & 2 Ave
##                      137                       98                       97
##    Lafayette St & E 8 St        E 2 St & Avenue B       Broadway & E 14 St
##                       96                       82                       81
##      Mott St & Prince St       E 14 St & Avenue B        E 7 St & Avenue A
##                       79                       74                       67
##       E 13 St & Avenue A
##                       64
```

Let's save our progress

```
## "","x"
## "1","C:/Users/16094/Documents/Year 2 - Princeton/Fall 2023/R Tutoring/SPIA_R_Seminars/Week 1/Data/Fi
```

FOR EXTRA TIME Is there a difference in trip time at rush hour? Late at night?

Find the number of trips by the two types of users?

Are women or men more likely to be subscribers?