# SI 618 Homework 7

# Part 1 (40 points)

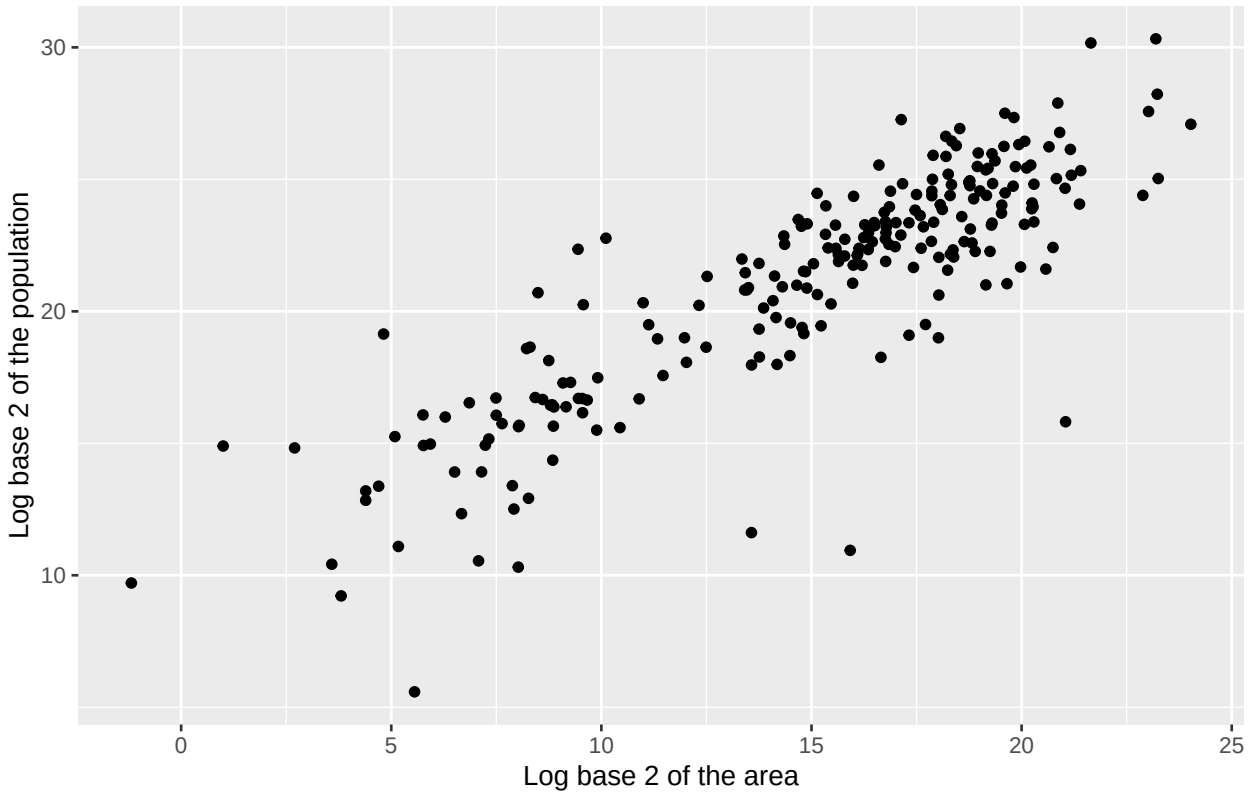
## Question 1: Load country data (5 points)

First the provided TSV data file is loaded into R using the **read.table()** function. Display the first 15 rows of the data frame:

```
##                country                          region      area
## 1          AFGHANISTAN                            Asia  650230.0
## 2              ALBANIA                          Europe   28748.0
## 3              ALGERIA                          Africa 2381741.0
## 4       AMERICAN SAMOA                         Oceania     199.0
## 5              ANDORRA                          Europe     468.0
## 6               ANGOLA                          Africa 1246700.0
## 7             ANGUILLA Central America & the Caribbean      91.0
## 8  ANTIGUA AND BARBUDA Central America & the Caribbean     442.6
## 9            ARGENTINA                   South America 2780400.0
## 10             ARMENIA                            Asia   29743.0
## 11               ARUBA Central America & the Caribbean     180.0
## 12           AUSTRALIA                         Oceania 7741220.0
## 13             AUSTRIA                          Europe   83871.0
## 14          AZERBAIJAN                            Asia   86600.0
## 15        BAHAMAS, THE Central America & the Caribbean   13880.0
##    population
## 1    30019928
## 2     3002859
## 3    37367226
## 4       54947
## 5       85082
## 6    18056072
## 7       15423
## 8       89018
## 9    42192494
## 10    2970495
## 11     107635
## 12   22015576
## 13    8219743
## 14    9493600
## 15     316182
```

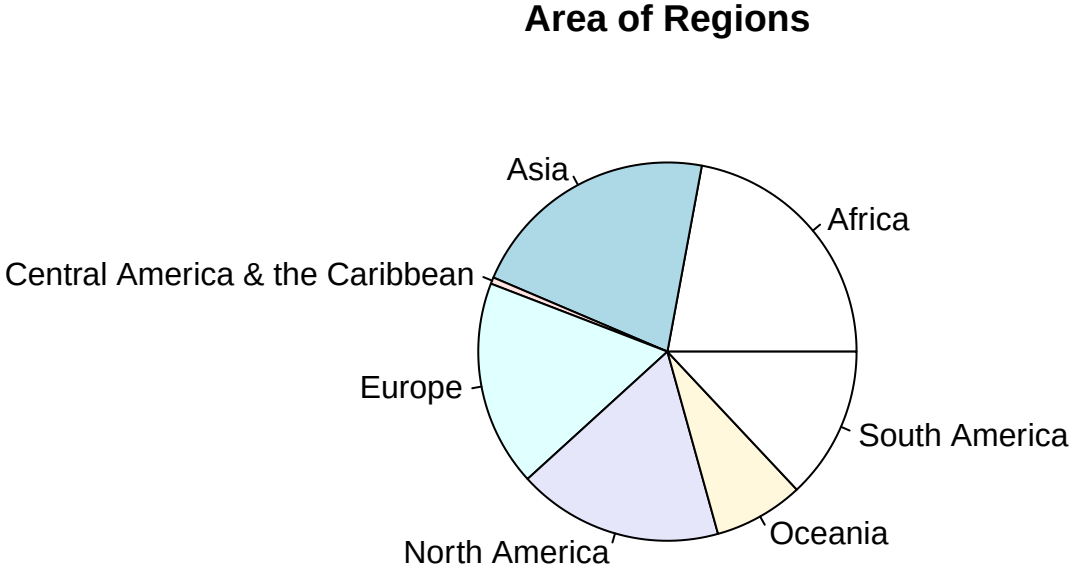
## Question 2: Scatter plot of log transformed data (5 points)

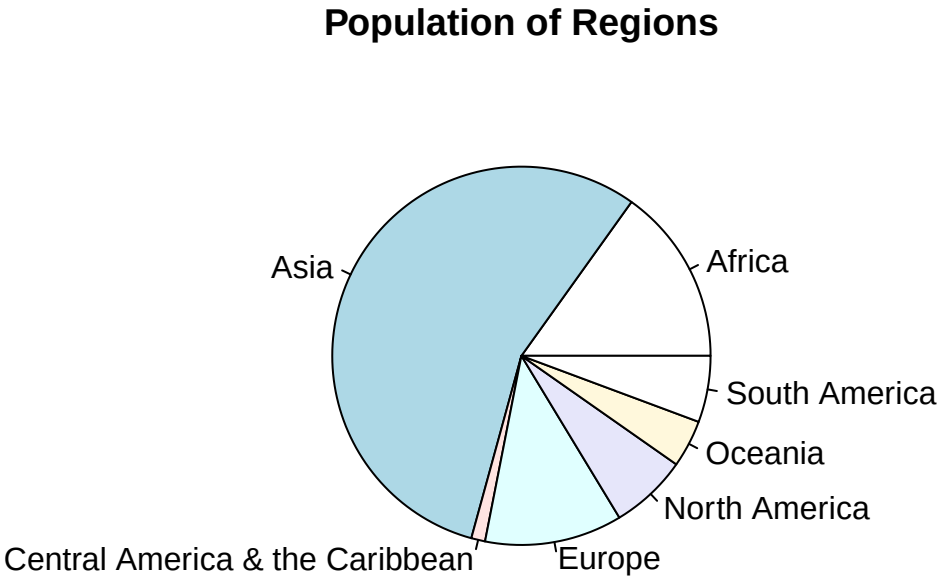
Logarithms (base 2) of the area and the population of each country are computed and used to produce the following scatter plot using the **qplot()** function. Use **{r echo=FALSE, fig.width=7}** for all of the plots.




### Question 3: Data aggregation by region (15 points)

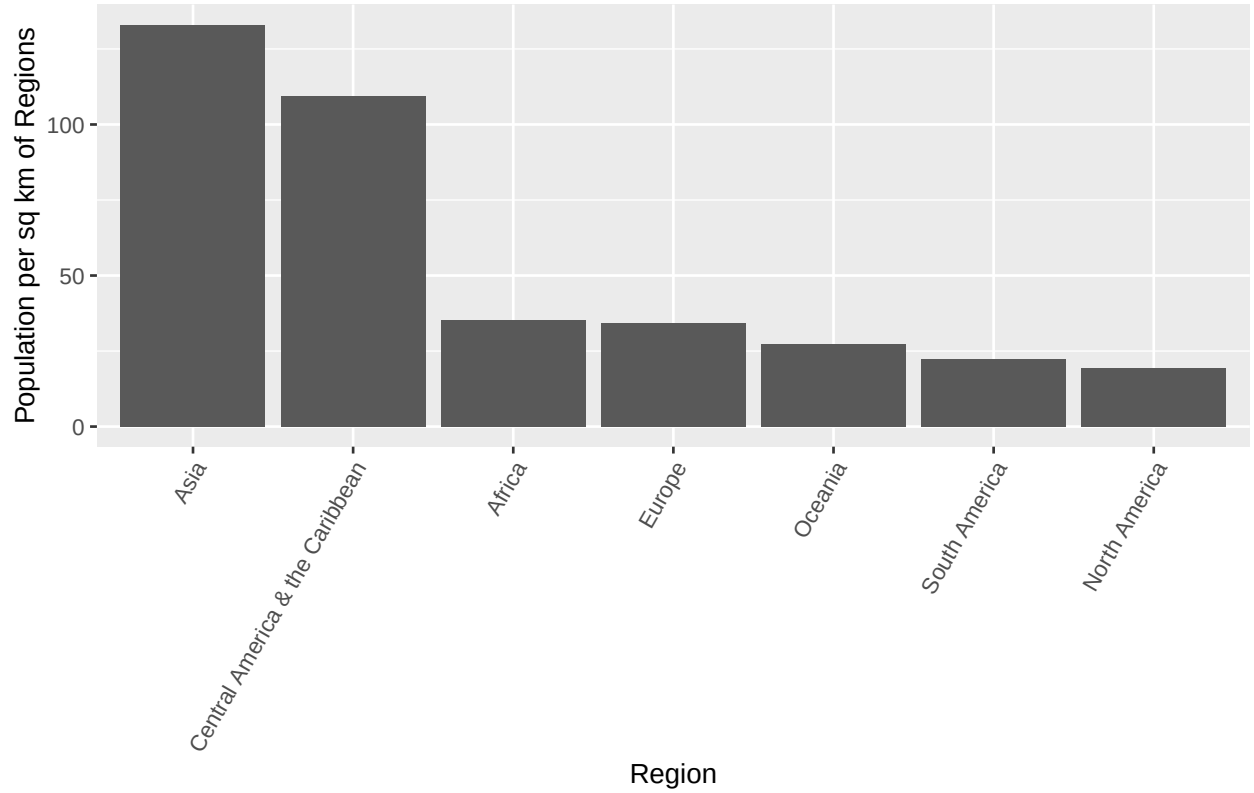
The areas and populations of all countries in a region are summed up using the **aggregate()** function, respectively. Then the following two pie charts are created using the **pie()** function.






### Question 4: Visualization of Population per sq km of Regions (15 points)

A new data frame is created to contain the population per sq km of each region using the **data.frame()** function. The data frame is then sorted by population per sq km in decreasing order with the help of the **reorder()** function. Finally, the following bar plot is created using the **qplot()** function with **geom="bar"**. In order to rotate the x-axis labels, add **+ theme(axis.text.x = element_text(angle = 60, hjust = 1))** at the end of the **qplot()** function call.



# Part 2 (60 points)

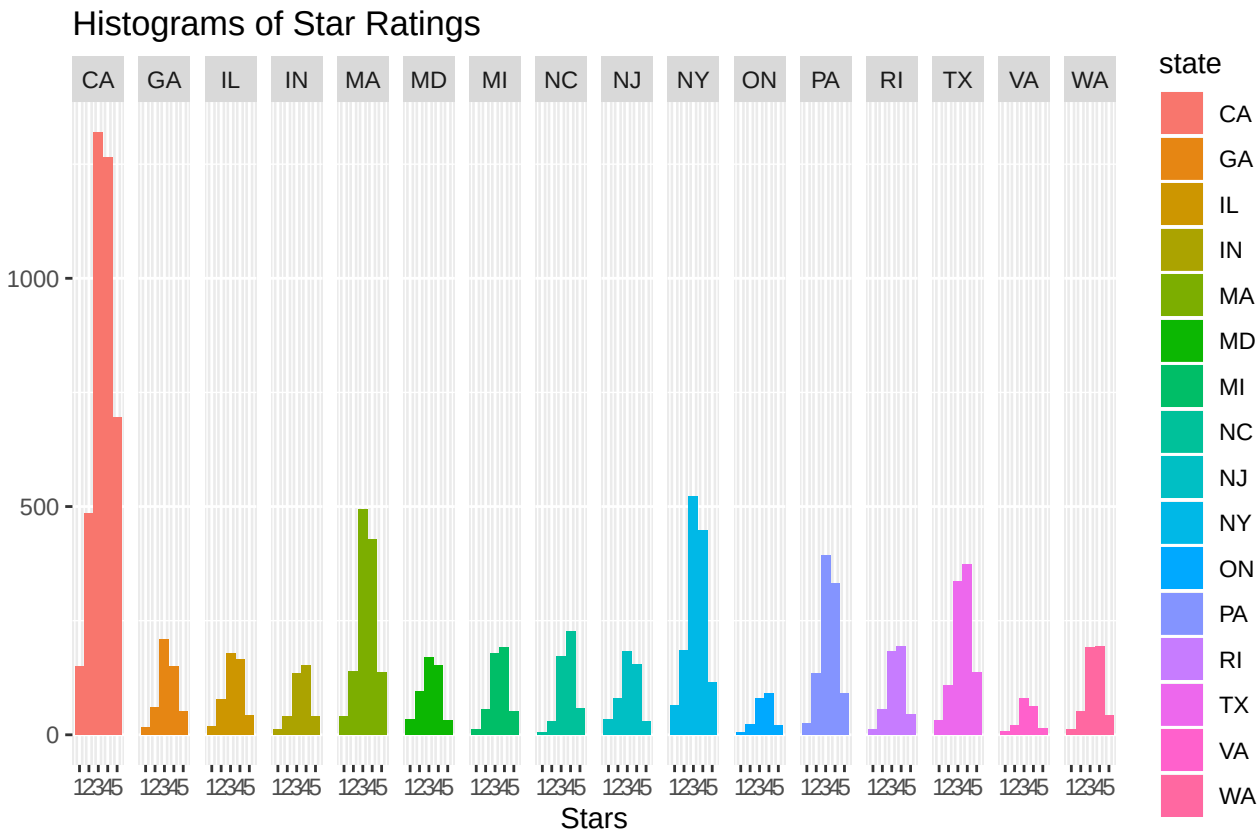
## Question 5: Load yelp data & generate summary (10 points)

Load the TSV data file: businessdata.tsv into a R data frame using the **read.table()** function. The city, state and main_category columns should be converted to factors. Then listwise deletion (http://en.wikipedia.org/wiki/Listwise_deletion) is applied to remove records with missing data (use the **na.omit()** function). Then the data.frame is converted to a data.table. Here is the summary of the data table:

```
##      name                         city          state          stars
##  Length:13137       Los Angeles    : 944   CA     :3917   Min.   :1.000
##  Class :character   Cambridge      : 924   NY     :1336   1st Qu.:3.000
##  Mode  :character   Austin         : 493   MA     :1240   Median :3.500
##                     Houston        : 492   TX     : 987   Mean   :3.628
##                     Berkeley       : 491   PA     : 979   3rd Qu.:4.500
##                     San Luis Obispo: 491   NC     : 494   Max.   :5.000
##                     (Other)        :9302   (Other):4184
##   review_count             main_category
##  Min.   :   2.00   Food           :1658
##  1st Qu.:   3.00   Shopping       : 502
##  Median :   7.00   Local Services : 446
##  Mean   :  26.86   Active Life    : 401
##  3rd Qu.:  21.00   Hair Salons    : 369
##  Max.   :2874.00   Hotels & Travel: 352
##                    (Other)        :9409
```

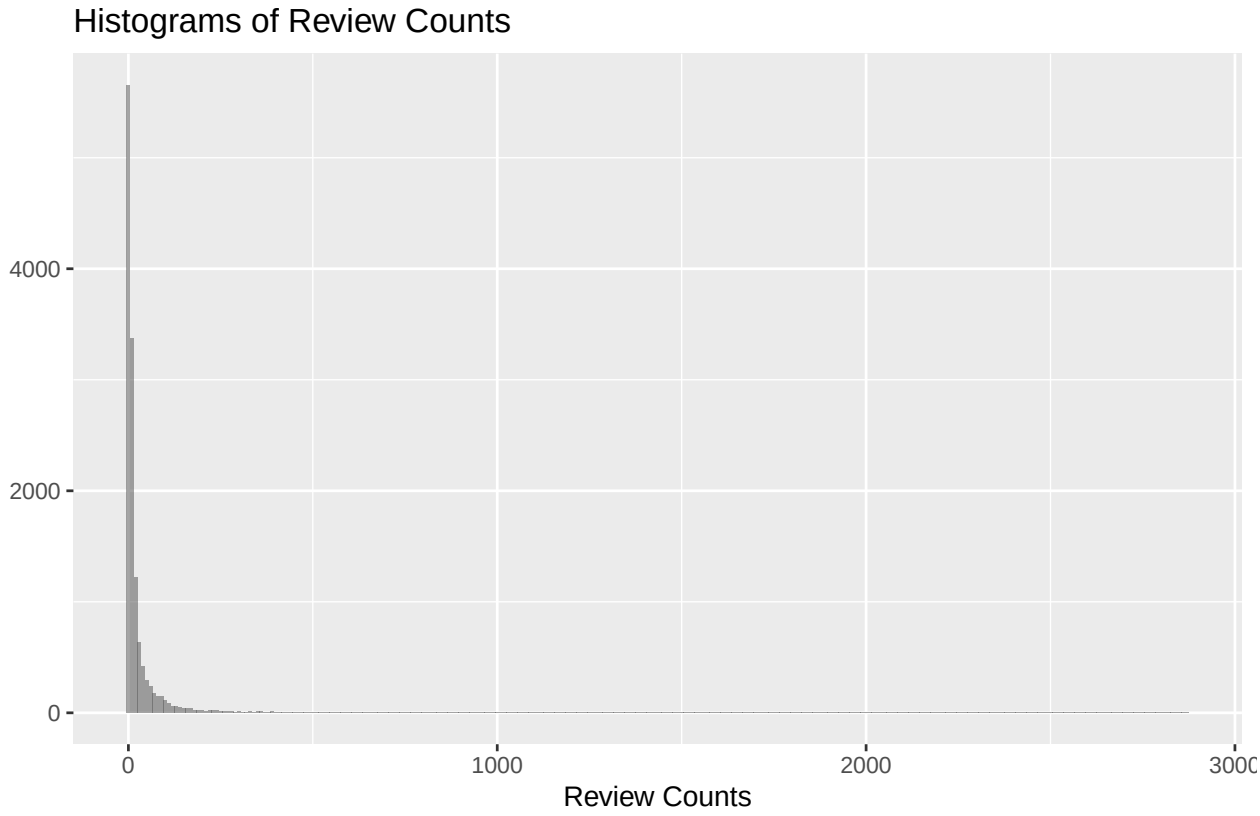
## Question 6: Histogram of Star Rating (10 points)

The Histogram of star ratings is plotted with the **qplot()** or **ggplot()** function. The actual counts plot is shown. (Use **binwidth=1**)

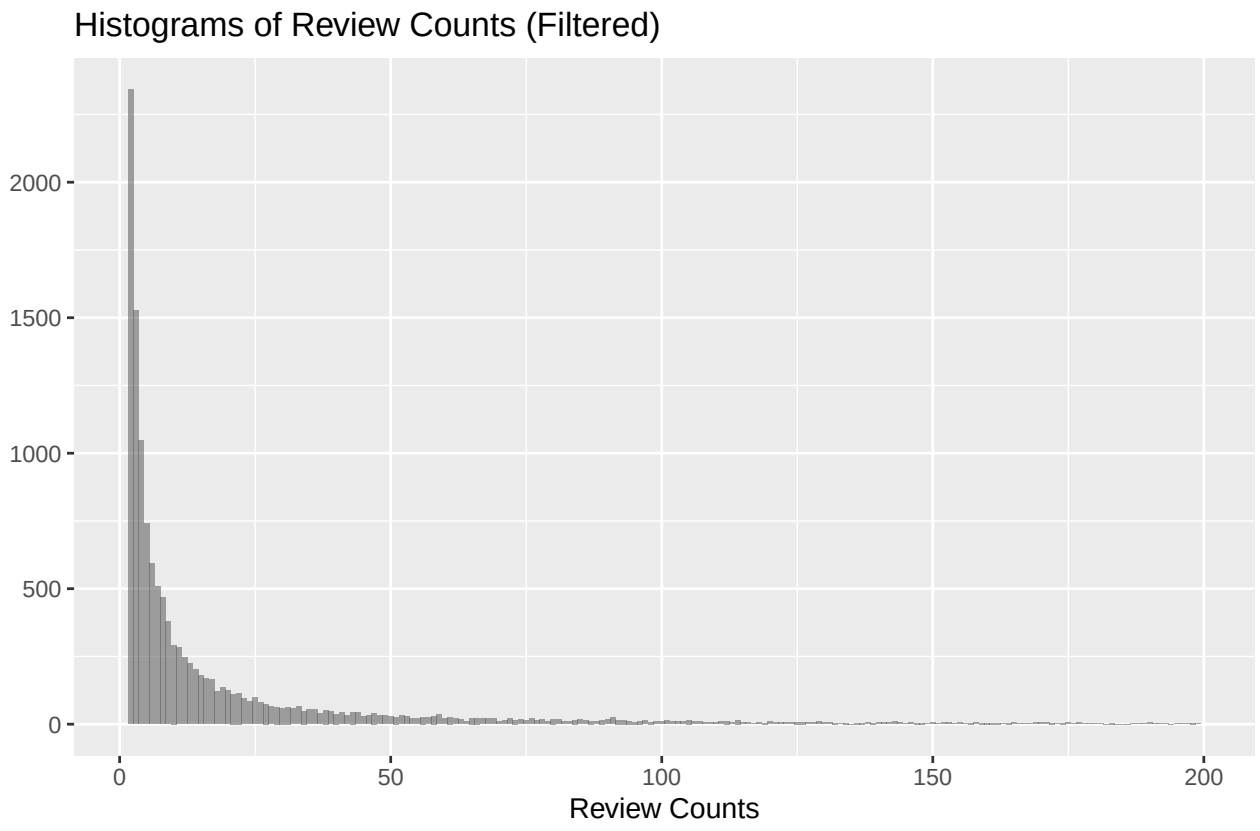



## Question 7: Histograms of Review Counts (10 points)

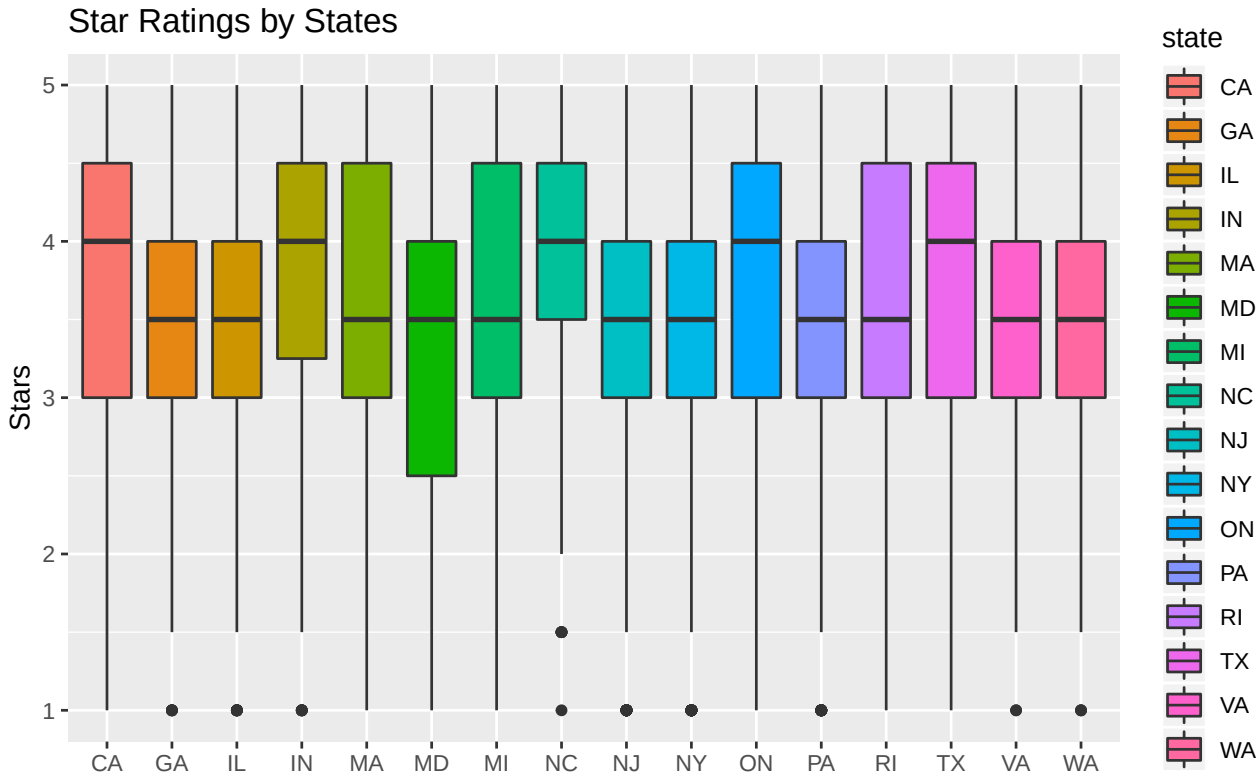
Histograms of review counts are plotted with the **qplot()** or **ggplot()** function. (Use **binwidth=10**)




We can see that the distribution of review counts has a long tail. To zoom in on the bars to the left of the 200 mark, we use the **data.table** syntax or the **subset()** function to select just the data with review count <= 200. And then plot the histogram again with **binwidth=1**.




**Question 8: Boxplot of Star Ratings by States (10 points)**



## Question 9: Bar Chart of Number of Businesses by State (10 points)

The states should be orderd by descreasing height of bars. Use the **reorder()** function.