NY Borough Airbnb Pricing

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Purpose

I want to investigate the relationship between price and location. I am using the New York City Airbnb Open Data dataset from Kaggle.

I have two questions I want to answer:

- How can price be broken down into categories? This will be helpful to summarize the data.
- How do price categories compare between the NY boroughs? In the dataset, a borough is called a "neighborhood group".

Explore Data

Read in the csv file.

```
# Read in data
airbnb <- read.csv('AB_NYC_2019.csv')</pre>
```

Print summary statistics.

```
# Summary stats
summary(airbnb)
```

```
##
          id
                                                        name
                        Hillside Hotel
                                                              18
                 2539
                        Home away from home
    1st Qu.: 9471945
##
                                                               17
   Median :19677284
##
                                                               16
    Mean
           :19017143
##
                        New york Multi-unit building
                                                               16
##
    3rd Qu.:29152178
                        Brooklyn Apartment
                                                              12
                        Loft Suite @ The Box House Hotel:
##
    Max.
           :36487245
                                                              11
##
                        (Other)
                                                           :48805
##
       host_id
                                 host_name
                                                   neighbourhood_group
                                      : 417
##
                         Michael
                                               Bronx
                                                             : 1091
    Min.
                  2438
##
    1st Qu.:
              7822033
                         David
                                         403
                                                Brooklyn
                                                              :20104
##
    Median : 30793816
                         Sonder (NYC):
                                         327
                                               Manhattan
                                                             :21661
##
           : 67620011
                         John
                                         294
                                                Queens
                                                             : 5666
                                         279
##
    3rd Qu.:107434423
                                               Staten Island: 373
                         Alex
##
           :274321313
                         Blueground
                                         232
                                      :46943
##
                         (Other)
##
               neighbourhood
                                    latitude
                                                    longitude
                                        :40.50
                                                         :-74.24
##
    Williamsburg
                       : 3920
                                Min.
                                                  Min.
    Bedford-Stuyvesant: 3714
                                 1st Qu.:40.69
                                                  1st Qu.:-73.98
##
   Harlem
                                Median :40.72
##
                       : 2658
                                                 Median :-73.96
   Bushwick
                       : 2465
                                Mean
                                        :40.73
                                                 Mean
                                                         :-73.95
##
   Upper West Side
                       : 1971
                                 3rd Qu.:40.76
                                                  3rd Qu.:-73.94
    Hell's Kitchen
                       : 1958
                                 Max.
                                        :40.91
                                                  Max.
                                                         :-73.71
##
   (Other)
                       :32209
```

```
price
##
                                            minimum_nights
             room_type
## Entire home/apt:25409
                          Min. :
                                      0.0
                                            Min. :
                                                       1.00
  Private room
                                                       1.00
                 :22326
                           1st Qu.:
                                     69.0
                                            1st Qu.:
                          Median : 106.0
##
  Shared room
                  : 1160
                                            Median :
                                                       3.00
##
                           Mean
                                : 152.7
                                            Mean
                                                       7.03
##
                           3rd Qu.: 175.0
                                                       5.00
                                            3rd Qu.:
##
                                 :10000.0
                                                  :1250.00
                           Max.
                                            Max.
##
##
   number_of_reviews
                         last_review
                                       reviews_per_month
                              :10052
                                       Min. : 0.010
##
  Min. : 0.00
   1st Qu.: 1.00
                     2019-06-23: 1413
                                      1st Qu.: 0.190
## Median : 5.00
                     2019-07-01: 1359
                                      Median : 0.720
         : 23.27
## Mean
                     2019-06-30: 1341
                                       Mean
                                              : 1.373
##
   3rd Qu.: 24.00
                     2019-06-24: 875
                                       3rd Qu.: 2.020
## Max. :629.00
                     2019-07-07: 718
                                       Max.
                                              :58.500
##
                     (Other)
                             :33137
                                       NA's
                                              :10052
##
  calculated_host_listings_count availability_365
## Min. : 1.000
                                 Min.
## 1st Qu.: 1.000
                                 1st Qu.: 0.0
## Median: 1.000
                                 Median: 45.0
## Mean
         : 7.144
                                 Mean
                                       :112.8
## 3rd Qu.: 2.000
                                 3rd Qu.:227.0
## Max.
          :327.000
                                 Max.
                                        :365.0
##
```

Clean data

I want to remove NA values. I also want to remove the prices of 0.

```
# Isolate price = 0 (free) and replace with NA
airbnb.free <- airbnb$price
airbnb.free[airbnb.free==0] = NA

# Create temporary copy
airbnb.tmp <- airbnb
# Add an temporary column with NA instead of 0
airbnb.tmp['Free'] <- airbnb.free

# Omit all NA values
airbnb.clean <- data.frame(na.omit(airbnb.tmp))

# Since NAs rows were ommitted for the whole data frame,
#I can drop the temporary columns
airbnb.clean <- airbnb.clean[1:16]

# Summary stats for the cleaned data frame
summary(airbnb.clean)</pre>
```

```
id
                                                     name
## Min.
          :
                2539
                       Home away from home
                                                           12
## 1st Qu.: 8719522
                      Loft Suite @ The Box House Hotel:
                                                           11
## Median :18869228
                      Private Room
                                                           10
## Mean
          :18095834
                      Brooklyn Apartment
                                                            9
```

```
3rd Qu.:27557992
                        Cozy Brooklyn Apartment
##
    Max.
           :36455809
                        New york Multi-unit building
                                                               8
                                                          :38775
##
                        (Other)
##
       host_id
                                                   neighbourhood_group
                                host_name
##
           :
                  2438
                         Michael
                                      :
                                         335
                                               Bronx
                                                             : 875
    1st Qu.: 7033514
                         David
                                               Brooklyn
##
                                         309
                                                             :16438
    Median: 28370925
                                               Manhattan
##
                         John
                                         250
                                                             :16632
                                         229
##
    Mean
           : 64239434
                         Alex
                                               Queens
                                                             : 4574
                         Sonder (NYC):
##
    3rd Qu.:101809002
                                         207
                                               Staten Island:
                                                                314
    Max.
##
           :273841667
                         Sarah
                                         179
##
                         (Other)
                                      :37324
                                                    longitude
##
                                    latitude
               neighbourhood
                       : 3162
                                                         :-74.24
##
    Williamsburg
                                Min.
                                        :40.51
                                                 Min.
    Bedford-Stuyvesant: 3137
                                1st Qu.:40.69
                                                  1st Qu.:-73.98
##
##
    Harlem
                       : 2206
                                Median :40.72
                                                 Median :-73.95
##
    Bushwick
                       : 1941
                                Mean
                                        :40.73
                                                 Mean
                                                         :-73.95
##
    Hell's Kitchen
                                3rd Qu.:40.76
                       : 1532
                                                  3rd Qu.:-73.94
##
    East Village
                       : 1490
                                Max.
                                        :40.91
                                                 Max.
                                                         :-73.71
                       :25365
    (Other)
##
##
              room_type
                                 price
                                                minimum nights
##
    Entire home/apt:20331
                             Min.
                                         10.0
                                                Min.
                                                            1.000
##
    Private room
                    :17658
                             1st Qu.:
                                         69.0
                                                1st Qu.:
                                                            1.000
##
    Shared room
                    : 844
                             Median :
                                        101.0
                                                Median :
                                                            2.000
                                        142.4
                                                            5.868
##
                             Mean
                                                Mean
##
                                                            4.000
                             3rd Qu.:
                                        170.0
                                                3rd Qu.:
##
                             Max.
                                     :10000.0
                                                Max.
                                                        :1250.000
##
##
    number_of_reviews
                           last_review
                                           reviews_per_month
##
    Min.
                       2019-06-23: 1412
                                           Min.
                                                   : 0.010
          : 1.0
    1st Qu.: 3.0
                                           1st Qu.: 0.190
##
                       2019-07-01: 1359
##
    Median: 9.0
                       2019-06-30: 1341
                                           Median : 0.720
##
    Mean
           : 29.3
                       2019-06-24:
                                     874
                                           Mean
                                                  : 1.373
##
    3rd Qu.: 33.0
                       2019-07-07:
                                     718
                                           3rd Qu.: 2.020
                       2019-07-02:
                                                  :58.500
           :629.0
                                     658
##
    Max.
                                           Max.
##
                       (Other)
                                  :32471
##
    calculated_host_listings_count availability_365
##
    Min.
           : 1.000
                                     Min.
                                            : 0.0
##
    1st Qu.: 1.000
                                     1st Qu.: 0.0
    Median :
              1.000
                                     Median: 55.0
##
##
    Mean
                                     Mean
                                            :114.9
           : 5.165
    3rd Qu.: 2.000
                                     3rd Qu.:229.0
##
    Max.
           :327.000
                                     Max.
                                            :365.0
```

Many of the features had disproportionately high maximums. Price (after the first round of cleaning) has an average of about \$150, but a max of \$9999. The "minimum nights" features has a maximum of 1250 nights, which I think could be a mistake as that would be a minimum rental span of over 3 years. The average required stay is under a week. I am going to limit the data set to stays at or under 7 days/1 week.

```
# Isolate required amount of nights to reserve a location
airbnb.min.stay <- airbnb.clean$minimum_nights
# Replace values over my minimum with NA
airbnb.min.stay[airbnb.min.stay > 7] = NA

# Create a temporary column, as done above
```

```
airbnb.tmp <- airbnb.clean
airbnb.tmp['minimum.stay'] <- airbnb.min.stay
airbnb.clean <- data.frame(na.omit(airbnb.tmp))
airbnb.clean <- airbnb.clean[1:16]</pre>
```

There are other features with high maximums as well. "Number of reviews", "reviews per month"", and "calculated host listings count" have high maximums, but these values seem plausible. Finally, "availability 365" includes locations that are completely book and those that are not booked at all. If these locations are not rented at all, they may serve as an example of what to do/not to do. For this reason, the lowest and highest numbers are valuable parts of the data set.

First, I'm going to make a subset of the data to specifically addresses my traveler questions. I am going to pull price, latitude & longitude, neighborhood, and neighborhood group from the traveler.clean data frame. I will be referring to the neighborhood groups as "boroughs," as this is their proper name.

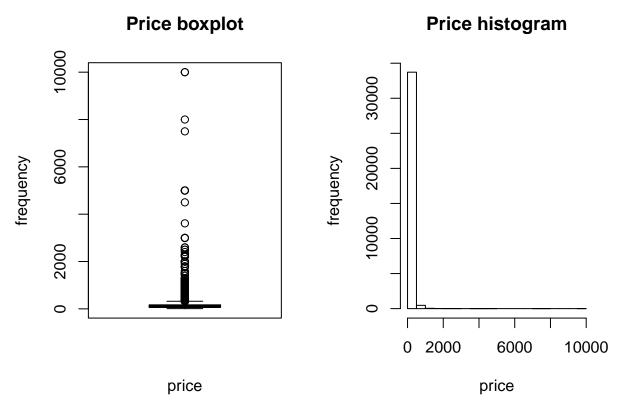
```
airbnb.traveler <- data.frame(airbnb.clean$price)
colnames(airbnb.traveler) <- 'price'
airbnb.traveler['latitude'] <- airbnb.clean$latitude
airbnb.traveler['longitude'] <- airbnb.clean$longitude
airbnb.traveler['neighborhood'] <- airbnb.clean$neighbourhood
airbnb.traveler['neighborhood_group'] <- airbnb.clean$neighbourhood_group</pre>
summary(airbnb.traveler)
```

```
##
        price
                          latitude
                                         longitude
##
    Min.
               10.0
                      Min.
                              :40.51
                                       Min.
                                               :-74.24
               69.0
                      1st Qu.:40.69
##
    1st Qu.:
                                       1st Qu.:-73.98
    Median :
              100.0
                      Median :40.72
                                       Median :-73.95
##
    Mean
              141.4
                      Mean
                              :40.73
                                       Mean
                                               :-73.95
##
    3rd Qu.:
              170.0
                       3rd Qu.:40.76
                                       3rd Qu.:-73.93
           :10000.0
                              :40.91
                                               :-73.71
##
    Max.
                      Max.
                                       Max.
##
##
                neighborhood
                                    neighborhood_group
##
   Williamsburg
                       : 2845
                                Bronx
                                              : 832
##
    Bedford-Stuyvesant: 2817
                                Brooklyn
                                              :14736
## Harlem
                       : 1974
                                Manhattan
                                              :14181
## Bushwick
                       : 1761
                                              : 4220
                                Queens
                       : 1338
   East Village
                                Staten Island: 300
  Hell's Kitchen
                       : 1303
##
    (Other)
                       :22231
```

How can I break down price into categories?

I want to develop categories for price, but first I need to get an overall sense of the data.

```
# Display data using base stats
par(mfrow=c(1,2))
boxplot(airbnb.traveler$price,main="Price boxplot",xlab='price',ylab='frequency')
hist(airbnb.traveler$price,main="Price histogram",xlab='price',ylab='frequency')
```



The boxplot shows that there are a lot of outliers in the price feature. Due to these outliers, it's difficult to visualize most prices in the histogram. I am going to break down price into an outliers category and four expense categories: "cheap", "regular", "high", and "expensive".

```
## Min. 1st Qu. Median Mean 3rd Qu. Max.
## 10.0 69.0 100.0 141.4 170.0 10000.0
```

The mean value for the entire data set is only 141.4. I want to capture some of this range in a "cheap" category, and some in a "regular" category. The values below the first quartile will be assigned to the category "cheap". I am going to round up, so that rooms that are \$70 or less per night will go into this category.

Cheap price locations

a histogram to see how the data is distributed.

summary(airbnb.traveler\$price)

Summary statisticss

```
price.cheap <- airbnb.traveler$price[airbnb.traveler$price <= 70]
summary(price.cheap)
## Min. 1st Qu. Median Mean 3rd Qu. Max.</pre>
```

10.00 45.00 55.00 53.08 63.00 70.00

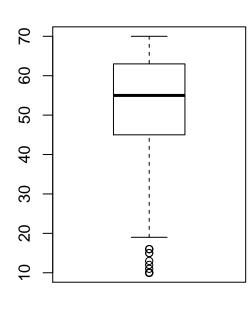
The lowest nightly price is \$10, but it looks like this must be a rare price because of the higher median and mean. I will use a boxplot to visualize the information from the summary statistics. I will also visualize with

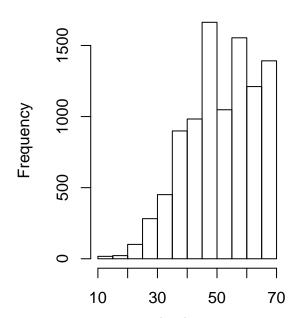
Visualize

```
par(mfrow=c(1,2))
boxplot(price.cheap,main="'Cheap' boxplot")
hist(price.cheap,main="'Cheap' histogram",xlab="")
```

'Cheap' boxplot

'Cheap' histogram





Very few cheap locations are below \$20 a night, with most falling in the \$40-\$70 range. The Airbnb locations with nightly prices below \$20 are outliers.

Regular price locations

Summary statistics

First, I'm going to exclude the cheap range from the airbnb data to create a new variable, price.regular

```
price.regular <- airbnb.traveler$price[airbnb.traveler$price > 70]
summary(price.regular)
```

```
## Min. 1st Qu. Median Mean 3rd Qu. Max.
## 71.0 99.0 139.0 175.8 200.0 10000.0
```

The outliers are still included at this point, so I need to define an upper boundary. Previously, I used the first quartile as a cut-off point. Here, I am going to use the 3rd quartile again as my cutoff instead to capture more variety. Thus, my upper boundary is 200.

```
price.regular <- price.regular[price.regular <= 200]
summary(price.regular)</pre>
```

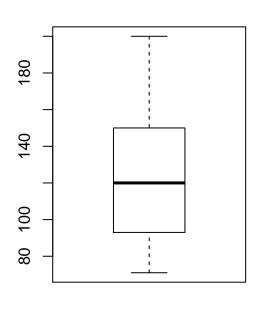
```
## Min. 1st Qu. Median Mean 3rd Qu. Max.
## 71.0 93.0 120.0 125.2 150.0 200.0
```

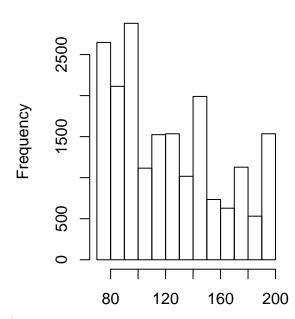
Visualize

```
par(mfrow=c(1,2))
boxplot(price.regular,main="'Regular' boxplot")
hist(price.regular,main="'Regular' histogram",xlab="")
```

'Regular' boxplot

'Regular' histogram





Many regular price locations are still below \sim \$150 a night. Next, I will define the "high price" locations. I will use 200 as my minimum.

High price locations

Summary statistics

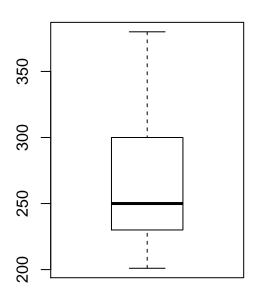
```
price.high <- airbnb.traveler$price[airbnb.traveler$price > 200]
summary(price.high)
##
      Min. 1st Qu.
                     Median
                                Mean 3rd Qu.
                                                  Max.
              246.2
                      285.0
                               362.1
                                        375.0 10000.0
I will use the 3rd quartile again for my upper limit, rounding up to 380.
price.high <- price.high[price.high <= 380]</pre>
summary(price.high)
##
      Min. 1st Qu.
                     Median
                                Mean 3rd Qu.
                                                  Max.
     201.0
              230.0
                      250.0
                                                 380.0
##
                               268.8
                                        300.0
```

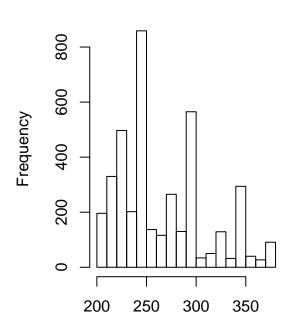
Visualize

```
par(mfrow=c(1,2))
boxplot(price.high,main="'High' boxplot")
hist(price.high,main="'High' histogram",xlab="")
```

'High' boxplot

'High' histogram





Expensive price locations

Summary statistics

```
price.expensive <- airbnb.traveler$price[airbnb.traveler$price > 380]
summary(price.expensive)

## Min. 1st Qu. Median Mean 3rd Qu. Max.
## 383.0 420.0 500.0 655.1 699.0 10000.0
```

I will follow the same procedure as before, rounding up to 700 this time. This means that price expensive will have the widest range of prices (320). Cheap, regular, and high prices all have ranges at or below 180.

```
price.expensive <- price.expensive[price.expensive <= 700]
summary(price.expensive)</pre>
```

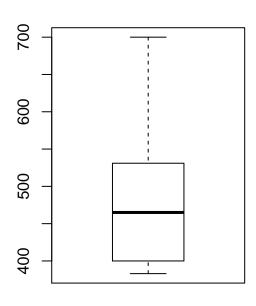
```
## Min. 1st Qu. Median Mean 3rd Qu. Max.
## 383 400 465 488 531 700
```

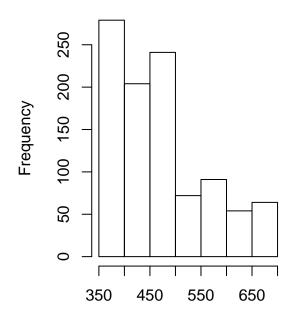
Visualize

```
par(mfrow=c(1,2))
boxplot(price.expensive,main="'Expensive' boxplot")
hist(price.expensive,main="'Expensive' histogram",xlab="")
```

'Expensive' boxplot

'Expensive' histogram





Price outliers

I still haven't addressed the highest values. They are relatively rare, but still worth considering for now. I will define a new variable and print summary statistics.

Summary statistics

```
price.outliers <- airbnb.traveler$price[airbnb.traveler$price > 700]
summary(price.outliers)

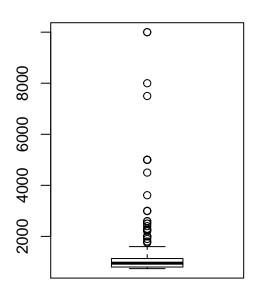
## Min. 1st Qu. Median Mean 3rd Qu. Max.
## 737 800 950 1284 1132 10000
```

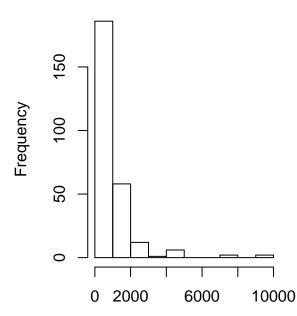
Visualize

```
par(mfrow=c(1,2))
boxplot(price.outliers,main="'Outliers' boxplot")
hist(price.outliers,main="'Outliers' histogram",xlab="")
```

'Outliers' boxplot

'Outliers' histogram





As shown in the histogram, very few locations approach the exceedingly high \$10,000 price point. This is shown in the outliers on the boxplot and in the sparse histogram. Since the number of Airbnb locations in the outliers category is so low, I am not going to further refine the category. Rather, I am going to exclude the entire outliers category from further analysis.

Add price category column

```
# Make vectors with category labels
# Repeat the category name X times, where X is the length
# of the original vector
cheap.var <- rep('cheap',length(price.cheap))</pre>
regular.var <- rep('regular',length(price.regular))</pre>
high.var <- rep('high',length(price.high))</pre>
expensive.var <- rep('expensive',length(price.expensive))</pre>
# Create one character vector with all category vectors
pricecol.char <- append(cheap.var,c(regular.var,high.var,expensive.var))</pre>
# Create one numeric vector with the prices in ascending order
pricecol.nums <- append(sort(price.cheap), c(sort(price.regular), sort(price.high), sort(price.expensiv</pre>
# The new price vectors aren't as long as the airbnb.traveler df
# The remaining length would have been the outlier category, which
# was removed.
# Create a variable for the missing length
missinglength <- length(airbnb.traveler$price) - length(pricecol.nums)</pre>
# Create a vector of NA values using the length variable
na.vals <- rep(NA, missinglength)
# Append the NA values to the price categories vector
price.cat.col <- append(pricecol.char,na.vals)</pre>
```

```
# Use arrange function from dplyr to sort the
# airbnb.traveler price column in ascending order
airbnb.traveler <- arrange(airbnb.traveler,price)</pre>
# Add in the price_category column to the traveler df
airbnb.traveler['price_category'] <- price.cat.col</pre>
# Remove NA values to clear excess rows
airbnb.traveler <- na.omit(airbnb.traveler)</pre>
summary(airbnb.traveler)
##
        price
                        latitude
                                       longitude
##
    Min.
           : 10.0
                    Min.
                            :40.51
                                     Min.
                                             :-74.24
                    1st Qu.:40.69
##
    1st Qu.: 69.0
                                     1st Qu.:-73.98
                    Median :40.72
   Median:100.0
                                     Median :-73.95
                                             :-73.95
##
  Mean
           :132.4
                    Mean
                            :40.73
                                     Mean
##
    3rd Qu.:168.0
                    3rd Qu.:40.76
                                     3rd Qu.:-73.93
   Max.
##
           :700.0
                    Max.
                            :40.91
                                     Max.
                                            :-73.71
##
##
                neighborhood
                                    neighborhood_group price_category
##
                       : 2840
                                                        Length: 34002
  Williamsburg
                                              : 831
                                Bronx
  Bedford-Stuyvesant: 2806
                                Brooklyn
                                              :14674
                                                        Class : character
## Harlem
                      : 1965
                                Manhattan
                                              :13983
                                                        Mode : character
## Bushwick
                      : 1759
                                Queens
                                              : 4214
## East Village
                      : 1329
                                Staten Island: 300
## Hell's Kitchen
                      : 1291
##
   (Other)
                       :22012
```

How much for an Airbnb in each borough?

Boroughs

The prevalence of each borough.

```
summary(airbnb.traveler$neighborhood_group)
```

```
## Bronx Brooklyn Manhattan Queens Staten Island
## 831 14674 13983 4214 300
```

Most Airbnb locations are in Brooklyn or Manhattan.

I created a subset for each borough and summarized each.

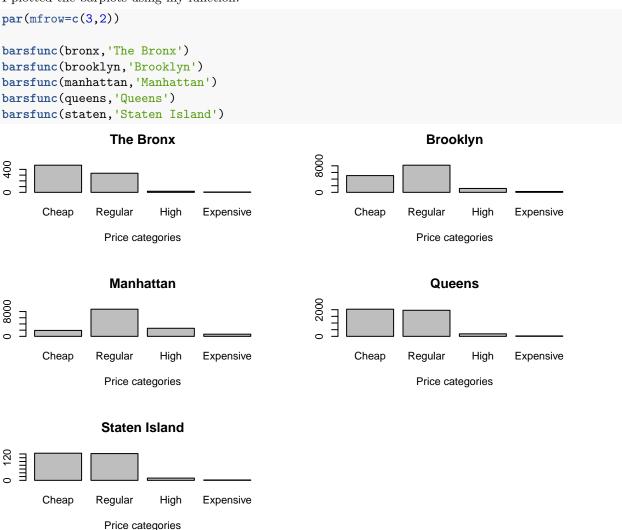
```
bronx <- subset(airbnb.traveler,neighborhood_group == 'Bronx')
summary(bronx)</pre>
```

```
neighborhood
##
        price
                        latitude
                                       longitude
##
   Min.
          : 20.00
                     Min.
                            :40.80
                                     Min.
                                            :-73.93
                                                       Mott Haven: 53
   1st Qu.: 45.00
                     1st Qu.:40.83
                                     1st Qu.:-73.91
                                                       Kingsbridge: 49
## Median : 65.00
                                     Median :-73.89
                     Median :40.85
                                                       Longwood
                                                                  : 47
## Mean
          : 79.87
                     Mean
                            :40.85
                                            :-73.88
                                                      Fordham
                                                                  : 44
                                     Mean
## 3rd Qu.: 95.00
                     3rd Qu.:40.87
                                     3rd Qu.:-73.86
                                                       Concourse : 40
## Max.
           :670.00
                     Max.
                            :40.91
                                            :-73.78
                                                       Wakefield: 38
                                     Max.
##
                                                       (Other)
                                                                  :560
##
       neighborhood_group price_category
```

```
Bronx
                 :831
                           Length:831
                 : 0
## Brooklyn
                           Class : character
## Manhattan
                 : 0
                           Mode :character
##
   Queens
                 : 0
##
   Staten Island:
##
##
brooklyn <- subset(airbnb.traveler,neighborhood_group == 'Brooklyn')</pre>
summary(brooklyn)
##
        price
                       latitude
                                      longitude
          : 10.0
                    Min.
                           :40.57
                                    Min.
                                            :-74.04
   1st Qu.: 60.0
                    1st Qu.:40.67
                                    1st Qu.:-73.96
## Median: 95.0
                    Median :40.69
                                    Median :-73.95
  Mean
                           :40.68
##
          :116.8
                    Mean
                                    Mean
                                           :-73.95
   3rd Qu.:150.0
                    3rd Qu.:40.70
                                    3rd Qu.:-73.93
##
  Max.
          :700.0
                    Max.
                           :40.74
                                    Max.
                                           :-73.86
##
##
                neighborhood
                                  neighborhood_group price_category
                                                      Length: 14674
## Williamsburg
                      :2840
                                            :
                                                0
                              Bronx
## Bedford-Stuyvesant:2806
                              Brooklyn
                                            :14674
                                                      Class :character
## Bushwick
                      :1759
                              Manhattan
                                                      Mode : character
                                           :
## Crown Heights
                      :1143
                              Queens
                                                Λ
                              Staten Island:
## Greenpoint
                      : 733
## Flatbush
                      : 456
  (Other)
                      :4937
manhattan <- subset(airbnb.traveler,neighborhood_group == 'Manhattan')</pre>
summary(manhattan)
##
        price
                       latitude
                                      longitude
                                                               neighborhood
   Min.
          : 10.0
                    Min.
                           :40.70
                                    Min.
                                           :-74.02
                                                      Harlem
                                                                     :1965
   1st Qu.: 90.0
                    1st Qu.:40.73
                                    1st Qu.:-73.99
                                                      East Village
                                                                     :1329
## Median :140.0
                    Median :40.76
                                    Median :-73.98
                                                      Hell's Kitchen: 1291
## Mean
         :164.6
                    Mean
                           :40.77
                                    Mean
                                          :-73.97
                                                      Upper West Side:1177
   3rd Qu.:200.0
                                                      Upper East Side:1081
##
                    3rd Qu.:40.80
                                    3rd Qu.:-73.95
##
   Max.
          :700.0
                    Max.
                           :40.88
                                    Max. :-73.91
                                                      East Harlem
                                                                     : 866
##
                                                      (Other)
                                                                     :6274
##
        neighborhood_group price_category
##
   Bronx
                      0
                           Length: 13983
   Brooklyn
                      0
                           Class : character
                 :13983
##
   Manhattan
                           Mode : character
##
   Queens
                      0
##
   Staten Island:
##
queens <- subset(airbnb.traveler,neighborhood_group == 'Queens')</pre>
summary(queens)
##
        price
                        latitude
                                       longitude
                                                                 neighborhood
## Min.
          : 10.00
                     Min.
                            :40.57
                                     Min.
                                            :-73.96
                                                       Astoria
                                                                       : 637
## 1st Qu.: 52.00
                     1st Qu.:40.71
                                     1st Qu.:-73.92
                                                       Long Island City: 377
## Median : 75.00
                     Median :40.75
                                                                       : 346
                                     Median :-73.89
                                                       Flushing
## Mean : 93.48
                     Mean
                           :40.73
                                     Mean
                                           :-73.87
                                                       Ridgewood
```

```
3rd Qu.:110.00
                     3rd Qu.:40.76
                                      3rd Qu.:-73.82
                                                        Sunnyside
##
    Max. :700.00
                     Max. :40.80
                                      Max. :-73.71
                                                        Ditmars Steinway: 234
##
                                                        (Other)
                                                                        :2107
##
        neighborhood_group price_category
##
    Bronx
                 :
                           Length: 4214
   Brooklyn
                     0
                            Class : character
##
  Manhattan
                           Mode : character
                     0
##
    Queens
                 :4214
    Staten Island:
##
##
staten <- subset(airbnb.traveler,neighborhood_group == 'Staten Island')</pre>
summary(staten)
##
                        latitude
                                        longitude
                                                               neighborhood
        price
          : 13.00
                     Min.
                             :40.51
                                      Min.
                                             :-74.24
                                                        Tompkinsville: 40
##
  1st Qu.: 50.00
                     1st Qu.:40.60
                                      1st Qu.:-74.12
                                                        St. George
                                                                     : 35
## Median: 73.50
                     Median :40.62
                                      Median :-74.09
                                                        Stapleton
                                                                      : 23
                                             :-74.10
                                                        Concord
                                                                      : 22
## Mean
          : 90.13
                           :40.61
                                      Mean
                     Mean
## 3rd Qu.:105.25
                     3rd Qu.:40.63
                                      3rd Qu.:-74.08
                                                        Arrochar
                                                                     : 20
                                      Max. :-74.06
## Max.
          :625.00
                            :40.65
                                                        Randall Manor: 16
                     Max.
##
                                                        (Other)
##
        neighborhood_group price_category
## Bronx
                 : 0
                           Length:300
                            Class : character
## Brooklyn
                 : 0
## Manhattan
                 : 0
                           Mode :character
## Queens
## Staten Island:300
##
##
I created a function to compute the amount of locations of each price category.
# Take in a dataframe and return the amount of each location
# per price category
numsfunc <- function(borough.df){</pre>
  num.cheap <- length(borough.df$price_category[borough.df$price_category == 'cheap'])</pre>
  num.reg <- length(borough.df$price_category[borough.df$price_category == 'regular'])</pre>
  num.high <- length(borough.df$price_category[borough.df$price_category == 'high'])</pre>
  num.exp <- length(borough.df$price_category[borough.df$price_category == 'expensive'])</pre>
   borough.nums <- c(num.cheap,num.reg,num.high,num.exp)
  return(borough.nums)
}
Next, I made a function to create a barplot, using the previous function for the length of the bars.
# Takes in a dataframe and the title for the barplot
# Outputs the barplot with the desired title
barsfunc <- function(borough.df,b.name){</pre>
  # Call previous function, numsfunc
  y <- numsfunc(borough.df)
  barplot(y,xlab = 'Price categories',names.arg=c('Cheap','Regular','High','Expensive'),
          main=b.name)
}
```

I plotted the barplots using my function.



Conclusion

Most boroughs have predominantly "cheap" (under \$70 per night) and "regular" pricing (over \$70 but under \$200 per night). Queens and Staten Island both have approximately the same amount of "cheap" and "regular" priced Airbnb locations. The two most prevalent boroughs, Manhattan and Brooklyn, both have more "regular" priced than "cheap" priced Airbnb locations. The Bronx has mostly "cheap" priced locations, with "regular" coming in second. Manhattan has more "high" and "expensive" price locations than the other boroughs. There are more "high" priced locations than "cheap" in Manhattan, unlike the other boroughs. In all boroughs, "high" and "expensive" priced Airbnb locations are relatively rare.

Key Take-Aways

- Budget-conscious travelers might prefer The Bronx
- The average tourist will likely gravitate toward Manhattan and Brooklyn, as there are many locations that are reasonably priced

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 $\bullet\,$ Travelers seeking more luxurious options will have the most luck in Manhattan