The Battle of Neighborhoods – Week 4

The City of New York, usually called either New York City (NYC) or simply New York (NY), is the most populous city in the United States. New York is also the most densely populated major city in the United States, and has been described as the cultural, financial and media capital of the world.

New York City is home to more than 3.2 million residents born outside the United States, the largest foreign-born population of any city in the world. Asians constituted the fastest-growing segment of the city's population between 2000 and 2010; Approximately 37% of the city's population is foreign born, and more than half of all children are born to mothers who are immigrants. Asian Americans in New York City, according to the 2010 Census, number more than one million, greater than the combined totals of San Francisco and Los Angeles. New York contains the highest total Asian population of any U.S. city proper. The New York City borough of Queens is home to the state's largest Asian American population in the United States and is also the most ethnically diverse urban area in the world.

A community numbering 20,000 Korean-Korean (Chaoxianzu or Joseonjok) is centered in Flushing, Queens. Koreans made up 1.2% of the city's population.

New York City's food culture includes an array of international cuisines influenced by the city's immigrant history. Korean and other Asian restaurants, sandwich joints, trattorias, diners, and coffeehouses are ubiquitous throughout the city. The city is home to "nearly one thousand of the finest and most diverse haute cuisine restaurants in the world", according to Michelin.

In this project, we will list and visualize the neighborhoods with good Korean restaurants.

For this project we need the following data:

- New York City data that contains list Boroughs, Neighborhoods along with their latitude and longitude.
  Data source : https://cocl.us/new_york_dataset
  Description : This data set contains the required information. And we will use this data set to explore various neighborhoods of new york city.
- Korean restaurants in each neighborhood of new york city
  Data source : Fousquare API
  Description : By using this api we will get all the venues in each neighborhood. We can filter these venues to get only Korean resturants.
- GeoSpace data
  Data source : https://data.cityofnewyork.us/City-Government/Borough-Boundaries/tqmj-j8zm
  Description : By using this geo space data we will get the New york Borough boundaries that will help us visualize choropleth map

Approach

- Collect the new york city data from https://cocl.us/new_york_dataset
- Using FourSquare API we will find all venues for each neighborhood
- Filter out all venues that are Korean Resturants

- Find rating , tips and like count for each Korean Resturants using FourSquare API
- Using rating for each resturant, we will sort that data
- Visualize the Ranking of neighborhoods using folium library(python)

Questions that can be asked using the datasets noted earlier:

- What is best location in New York City for Korean Cuisine ?
- Which areas have potential Korean Resturant Market ?
- Which all areas lack Korean Resturants ?
- Which is the best place to stay if I prefer Korean Cuisine ?

Analysis

We will import the required libraries for python.

- pandas and numpy for handling data.
- request module for using FourSquare API.
- geopy to get co-ordinates of City of New York.
- folium to visualize the results on a map

The Battle of Neighborhoods - Week 5

```
In [ ]:  #!pip install geopy
         #!pip install geocoder
```

```
In [1]:  import pandas as pd
         import numpy as np
         pd.set_option('display.max_columns', None)
         pd.set_option('display.max_rows', None)
         import requests
         from bs4 import BeautifulSoup
         import geocoder
         import os
         import folium # map rendering library
         from geopy.geocoders import Nominatim # convert an address into latitude and l
         ongitude values
         # Matplotlib and associated plotting modules
         import matplotlib.pyplot as plt
         import matplotlib.cm as cm
         import matplotlib.colors as colors
         %matplotlib inline


         print('Libraries imported.')
```

Libraries imported.

Now we define a function to get the geocodes i.e latitude and longitude of a given location using geopy.

```
In [2]:  def geo_location(address):
             # get geo location of address
             geolocator = Nominatim(user_agent="ny_explorer")
             location = geolocator.geocode(address)
             latitude = location.latitude
             longitude = location.longitude
             return latitude,longitude
```

We define a function to intract with FourSquare API and get top 100 venues within a radius of 1000 metres for a given latitude and longitude. Below function will return us the venue id , venue name and category.

```
In [3]: ##client_ID
        ##client_secret
        ##version
        ## client details
        CLIENT_ID = '...'
        CLIENT_SECRET = '...'
        VERSION = '...' # Foursquare API version
```

```
In [4]: def get_venues(lat,lng):

            #set variables
            radius=1000
            LIMIT=100
        #    CLIENT_ID = os.environ['CLIENT_ID'] # your Foursquare ID
        #    CLIENT_SECRET = os.environ['CLIENT_SECRET'] # your Foursquare Secret
        #    VERSION = '20180605' # Foursquare API version

            #url to fetch data from foursquare api
            url = 'https://api.foursquare.com/v2/venues/explore?&client_id={}&client_s
        ecret={}&v={}&ll={},{}&radius={}&limit={}'.format(
                CLIENT_ID,
                CLIENT_SECRET,
                VERSION,
                lat,
                lng,
                radius,
                LIMIT)

            # get all the data
            results = requests.get(url).json()
            venue_data=results["response"]['groups'][0]['items']
            venue_details=[]
            for row in venue_data:
                try:
                    venue_id=row['venue']['id']
                    venue_name=row['venue']['name']
                    venue_category=row['venue']['categories'][0]['name']
                    venue_details.append([venue_id,venue_name,venue_category])
                except KeyError:
                    pass

            column_names=['ID','Name','Category']
            df = pd.DataFrame(venue_details,columns=column_names)
            return df
```

Now we will define a function to get venue details like like count , rating , tip counts for a given venue id. This will be used for ranking.

```
In [5]: def get_venue_details(venue_id):

        #     CLIENT_ID = os.environ['CLIENT_ID'] # your Foursquare ID
        #     CLIENT_SECRET = os.environ['CLIENT_SECRET'] # your Foursquare Secret
        #     VERSION = '20180605' # Foursquare API version

            #url to fetch data from foursquare api
            url = 'https://api.foursquare.com/v2/venues/{}?&client_id={}&client_secret
        ={}&v={}'.format(
                    venue_id,
                    CLIENT_ID,
                    CLIENT_SECRET,
                    VERSION)

            # get all the data
            results = requests.get(url).json()
            venue_data=results['response']['venue']
            venue_details=[]
            try:
                venue_id=venue_data['id']
                venue_name=venue_data['name']
                venue_likes=venue_data['likes']['count']
                venue_rating=venue_data['rating']
                venue_tips=venue_data['tips']['count']
                venue_details.append([venue_id,venue_name,venue_likes,venue_rating,ven
        ue_tips])
            except KeyError:
                pass

            column_names=['ID','Name','Likes','Rating','Tips']
            df = pd.DataFrame(venue_details,columns=column_names)
            return df
```

Now we define a funtion to get the new york city data such as Boroughs, Neighborhoods along with their latitude and longitude.

```
In [6]: def get_new_york_data():
            url='https://cocl.us/new_york_dataset'
            resp=requests.get(url).json()
            # all data is present in features label
            features=resp['features']

            # define the dataframe columns
            column_names = ['Borough', 'Neighborhood', 'Latitude', 'Longitude']
            # instantiate the dataframe
            new_york_data = pd.DataFrame(columns=column_names)

            for data in features:
                borough = data['properties']['borough']
                neighborhood_name = data['properties']['name']

                neighborhood_latlon = data['geometry']['coordinates']
                neighborhood_lat = neighborhood_latlon[1]
                neighborhood_lon = neighborhood_latlon[0]

                new_york_data = new_york_data.append({'Borough': borough,
                                        'Neighborhood': neighborhood_name,
                                        'Latitude': neighborhood_lat,
                                        'Longitude': neighborhood_lon}, igno
        re_index=True)

            return new_york_data
```

We will call the above funtion to get the new york city data.

```
In [7]: # get new york data
        new_york_data=get_new_york_data()
```

```
In [8]: new_york_data.head()
```

Out[8]:

	Borough	Neighborhood	Latitude	Longitude
0	Bronx	Wakefield	40.894705	-73.847201
1	Bronx	Co-op City	40.874294	-73.829939
2	Bronx	Eastchester	40.887556	-73.827806
3	Bronx	Fieldston	40.895437	-73.905643
4	Bronx	Riverdale	40.890834	-73.912585

```
In [9]: new_york_data.shape
```

Out[9]: (306, 4)

So there are total of 306 different Neighborhoods in New York

In [10]:
```python
plt.figure(figsize=(9,5), dpi = 100)
# title
plt.title('Number of Neighborhood for each Borough in New York City')
#On x-axis
plt.xlabel('Borough', fontsize = 15)
#On y-axis
plt.ylabel('No.of Neighborhood', fontsize=15)
#giving a bar plot
new_york_data.groupby('Borough')['Neighborhood'].count().plot(kind='bar')
#Legend
plt.legend()
#displays the plot
plt.show()
```
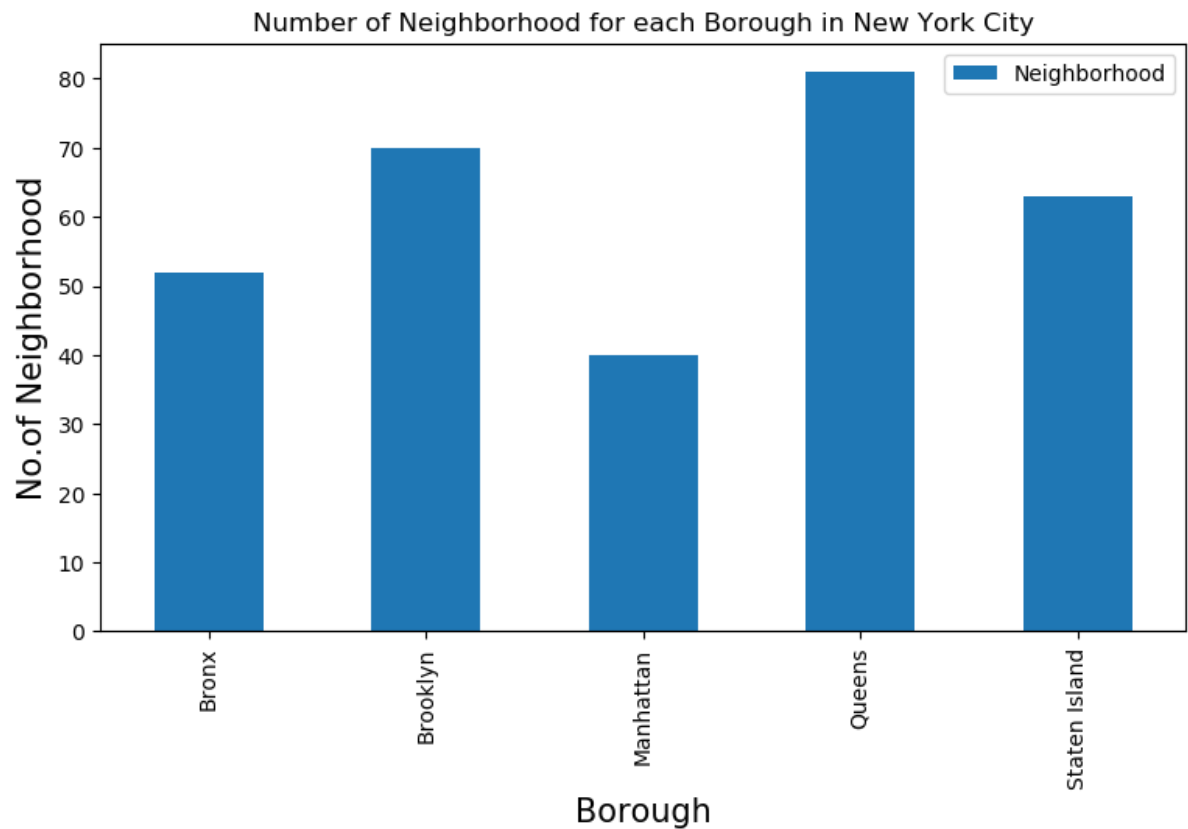

We see that Queens has highest number of neighborhoods

Now we will collect Korean resturants for each Neighborhood

In [11]:
```python
# prepare neighborhood list that contains korean resturants
column_names=['Borough', 'Neighborhood', 'ID','Name']
korean_rest_ny=pd.DataFrame(columns=column_names)
count=1
for row in new_york_data.values.tolist():
    Borough, Neighborhood, Latitude, Longitude=row
    venues = get_venues(Latitude,Longitude)
    korean_resturants=venues[venues['Category']=='Korean Restaurant']
    print('(',count,'/',len(new_york_data),')','Korean Resturants in '+Neighbo
rhood+', '+Borough+':'+str(len(korean_resturants)))
    for resturant_detail in korean_resturants.values.tolist():
        id, name , category=resturant_detail
        korean_rest_ny = korean_rest_ny.append({'Borough': Borough,
                                                'Neighborhood': Neighborhood,
                                                'ID': id,
                                                'Name' : name
                                               }, ignore_index=True)
    count+=1
```

```
( 1 / 306 ) Korean Resturants in Wakefield, Bronx:0
( 2 / 306 ) Korean Resturants in Co-op City, Bronx:0
( 3 / 306 ) Korean Resturants in Eastchester, Bronx:0
( 4 / 306 ) Korean Resturants in Fieldston, Bronx:0
( 5 / 306 ) Korean Resturants in Riverdale, Bronx:0
( 6 / 306 ) Korean Resturants in Kingsbridge, Bronx:0
( 7 / 306 ) Korean Resturants in Marble Hill, Manhattan:0
( 8 / 306 ) Korean Resturants in Woodlawn, Bronx:0
( 9 / 306 ) Korean Resturants in Norwood, Bronx:0
( 10 / 306 ) Korean Resturants in Williamsbridge, Bronx:0
( 11 / 306 ) Korean Resturants in Baychester, Bronx:0
( 12 / 306 ) Korean Resturants in Pelham Parkway, Bronx:0
( 13 / 306 ) Korean Resturants in City Island, Bronx:0
( 14 / 306 ) Korean Resturants in Bedford Park, Bronx:0
( 15 / 306 ) Korean Resturants in University Heights, Bronx:0
( 16 / 306 ) Korean Resturants in Morris Heights, Bronx:0
( 17 / 306 ) Korean Resturants in Fordham, Bronx:0
( 18 / 306 ) Korean Resturants in East Tremont, Bronx:0
( 19 / 306 ) Korean Resturants in West Farms, Bronx:0
( 20 / 306 ) Korean Resturants in High  Bridge, Bronx:0
( 21 / 306 ) Korean Resturants in Melrose, Bronx:0
( 22 / 306 ) Korean Resturants in Mott Haven, Bronx:0
( 23 / 306 ) Korean Resturants in Port Morris, Bronx:0
( 24 / 306 ) Korean Resturants in Longwood, Bronx:0
( 25 / 306 ) Korean Resturants in Hunts Point, Bronx:0
( 26 / 306 ) Korean Resturants in Morrisania, Bronx:0
( 27 / 306 ) Korean Resturants in Soundview, Bronx:0
( 28 / 306 ) Korean Resturants in Clason Point, Bronx:0
( 29 / 306 ) Korean Resturants in Throgs Neck, Bronx:0
( 30 / 306 ) Korean Resturants in Country Club, Bronx:0
( 31 / 306 ) Korean Resturants in Parkchester, Bronx:0
( 32 / 306 ) Korean Resturants in Westchester Square, Bronx:0
( 33 / 306 ) Korean Resturants in Van Nest, Bronx:0
( 34 / 306 ) Korean Resturants in Morris Park, Bronx:0
( 35 / 306 ) Korean Resturants in Belmont, Bronx:0
( 36 / 306 ) Korean Resturants in Spuyten Duyvil, Bronx:0
( 37 / 306 ) Korean Resturants in North Riverdale, Bronx:0
( 38 / 306 ) Korean Resturants in Pelham Bay, Bronx:0
( 39 / 306 ) Korean Resturants in Schuylerville, Bronx:0
( 40 / 306 ) Korean Resturants in Edgewater Park, Bronx:0
( 41 / 306 ) Korean Resturants in Castle Hill, Bronx:0
( 42 / 306 ) Korean Resturants in Olinville, Bronx:0
( 43 / 306 ) Korean Resturants in Pelham Gardens, Bronx:0
( 44 / 306 ) Korean Resturants in Concourse, Bronx:0
( 45 / 306 ) Korean Resturants in Unionport, Bronx:0
( 46 / 306 ) Korean Resturants in Edenwald, Bronx:0
( 47 / 306 ) Korean Resturants in Bay Ridge, Brooklyn:0
( 48 / 306 ) Korean Resturants in Bensonhurst, Brooklyn:1
( 49 / 306 ) Korean Resturants in Sunset Park, Brooklyn:0
( 50 / 306 ) Korean Resturants in Greenpoint, Brooklyn:0
( 51 / 306 ) Korean Resturants in Gravesend, Brooklyn:0
( 52 / 306 ) Korean Resturants in Brighton Beach, Brooklyn:1
( 53 / 306 ) Korean Resturants in Sheepshead Bay, Brooklyn:0
( 54 / 306 ) Korean Resturants in Manhattan Terrace, Brooklyn:0
( 55 / 306 ) Korean Resturants in Flatbush, Brooklyn:0
( 56 / 306 ) Korean Resturants in Crown Heights, Brooklyn:0
( 57 / 306 ) Korean Resturants in East Flatbush, Brooklyn:0
```

```
( 58 / 306 ) Korean Resturants in Kensington, Brooklyn:0
( 59 / 306 ) Korean Resturants in Windsor Terrace, Brooklyn:0
( 60 / 306 ) Korean Resturants in Prospect Heights, Brooklyn:1
( 61 / 306 ) Korean Resturants in Brownsville, Brooklyn:0
( 62 / 306 ) Korean Resturants in Williamsburg, Brooklyn:1
( 63 / 306 ) Korean Resturants in Bushwick, Brooklyn:0
( 64 / 306 ) Korean Resturants in Bedford Stuyvesant, Brooklyn:0
( 65 / 306 ) Korean Resturants in Brooklyn Heights, Brooklyn:0
( 66 / 306 ) Korean Resturants in Cobble Hill, Brooklyn:0
( 67 / 306 ) Korean Resturants in Carroll Gardens, Brooklyn:0
( 68 / 306 ) Korean Resturants in Red Hook, Brooklyn:0
( 69 / 306 ) Korean Resturants in Gowanus, Brooklyn:0
( 70 / 306 ) Korean Resturants in Fort Greene, Brooklyn:0
( 71 / 306 ) Korean Resturants in Park Slope, Brooklyn:1
( 72 / 306 ) Korean Resturants in Cypress Hills, Brooklyn:0
( 73 / 306 ) Korean Resturants in East New York, Brooklyn:0
( 74 / 306 ) Korean Resturants in Starrett City, Brooklyn:0
( 75 / 306 ) Korean Resturants in Canarsie, Brooklyn:0
( 76 / 306 ) Korean Resturants in Flatlands, Brooklyn:0
( 77 / 306 ) Korean Resturants in Mill Island, Brooklyn:0
( 78 / 306 ) Korean Resturants in Manhattan Beach, Brooklyn:0
( 79 / 306 ) Korean Resturants in Coney Island, Brooklyn:0
( 80 / 306 ) Korean Resturants in Bath Beach, Brooklyn:0
( 81 / 306 ) Korean Resturants in Borough Park, Brooklyn:0
( 82 / 306 ) Korean Resturants in Dyker Heights, Brooklyn:0
( 83 / 306 ) Korean Resturants in Gerritsen Beach, Brooklyn:0
( 84 / 306 ) Korean Resturants in Marine Park, Brooklyn:0
( 85 / 306 ) Korean Resturants in Clinton Hill, Brooklyn:0
( 86 / 306 ) Korean Resturants in Sea Gate, Brooklyn:0
( 87 / 306 ) Korean Resturants in Downtown, Brooklyn:0
( 88 / 306 ) Korean Resturants in Boerum Hill, Brooklyn:0
( 89 / 306 ) Korean Resturants in Prospect Lefferts Gardens, Brooklyn:1
( 90 / 306 ) Korean Resturants in Ocean Hill, Brooklyn:0
( 91 / 306 ) Korean Resturants in City Line, Brooklyn:0
( 92 / 306 ) Korean Resturants in Bergen Beach, Brooklyn:0
( 93 / 306 ) Korean Resturants in Midwood, Brooklyn:0
( 94 / 306 ) Korean Resturants in Prospect Park South, Brooklyn:0
( 95 / 306 ) Korean Resturants in Georgetown, Brooklyn:0
( 96 / 306 ) Korean Resturants in East Williamsburg, Brooklyn:0
( 97 / 306 ) Korean Resturants in North Side, Brooklyn:0
( 98 / 306 ) Korean Resturants in South Side, Brooklyn:1
( 99 / 306 ) Korean Resturants in Ocean Parkway, Brooklyn:0
( 100 / 306 ) Korean Resturants in Fort Hamilton, Brooklyn:0
( 101 / 306 ) Korean Resturants in Chinatown, Manhattan:0
( 102 / 306 ) Korean Resturants in Washington Heights, Manhattan:0
( 103 / 306 ) Korean Resturants in Inwood, Manhattan:0
( 104 / 306 ) Korean Resturants in Hamilton Heights, Manhattan:0
( 105 / 306 ) Korean Resturants in Manhattanville, Manhattan:0
( 106 / 306 ) Korean Resturants in Central Harlem, Manhattan:0
( 107 / 306 ) Korean Resturants in East Harlem, Manhattan:0
( 108 / 306 ) Korean Resturants in Upper East Side, Manhattan:0
( 109 / 306 ) Korean Resturants in Yorkville, Manhattan:0
( 110 / 306 ) Korean Resturants in Lenox Hill, Manhattan:0
( 111 / 306 ) Korean Resturants in Roosevelt Island, Manhattan:0
( 112 / 306 ) Korean Resturants in Upper West Side, Manhattan:0
( 113 / 306 ) Korean Resturants in Lincoln Square, Manhattan:0
( 114 / 306 ) Korean Resturants in Clinton, Manhattan:0
```

```
( 115 / 306 ) Korean Resturants in Midtown, Manhattan:0
( 116 / 306 ) Korean Resturants in Murray Hill, Manhattan:5
( 117 / 306 ) Korean Resturants in Chelsea, Manhattan:0
( 118 / 306 ) Korean Resturants in Greenwich Village, Manhattan:0
( 119 / 306 ) Korean Resturants in East Village, Manhattan:2
( 120 / 306 ) Korean Resturants in Lower East Side, Manhattan:0
( 121 / 306 ) Korean Resturants in Tribeca, Manhattan:1
( 122 / 306 ) Korean Resturants in Little Italy, Manhattan:0
( 123 / 306 ) Korean Resturants in Soho, Manhattan:0
( 124 / 306 ) Korean Resturants in West Village, Manhattan:0
( 125 / 306 ) Korean Resturants in Manhattan Valley, Manhattan:1
( 126 / 306 ) Korean Resturants in Morningside Heights, Manhattan:0
( 127 / 306 ) Korean Resturants in Gramercy, Manhattan:0
( 128 / 306 ) Korean Resturants in Battery Park City, Manhattan:0
( 129 / 306 ) Korean Resturants in Financial District, Manhattan:0
( 130 / 306 ) Korean Resturants in Astoria, Queens:1
( 131 / 306 ) Korean Resturants in Woodside, Queens:1
( 132 / 306 ) Korean Resturants in Jackson Heights, Queens:1
( 133 / 306 ) Korean Resturants in Elmhurst, Queens:1
( 134 / 306 ) Korean Resturants in Howard Beach, Queens:0
( 135 / 306 ) Korean Resturants in Corona, Queens:0
( 136 / 306 ) Korean Resturants in Forest Hills, Queens:0
( 137 / 306 ) Korean Resturants in Kew Gardens, Queens:0
( 138 / 306 ) Korean Resturants in Richmond Hill, Queens:0
( 139 / 306 ) Korean Resturants in Flushing, Queens:7
( 140 / 306 ) Korean Resturants in Long Island City, Queens:0
( 141 / 306 ) Korean Resturants in Sunnyside, Queens:2
( 142 / 306 ) Korean Resturants in East Elmhurst, Queens:0
( 143 / 306 ) Korean Resturants in Maspeth, Queens:0
( 144 / 306 ) Korean Resturants in Ridgewood, Queens:0
( 145 / 306 ) Korean Resturants in Glendale, Queens:0
( 146 / 306 ) Korean Resturants in Rego Park, Queens:0
( 147 / 306 ) Korean Resturants in Woodhaven, Queens:0
( 148 / 306 ) Korean Resturants in Ozone Park, Queens:0
( 149 / 306 ) Korean Resturants in South Ozone Park, Queens:0
( 150 / 306 ) Korean Resturants in College Point, Queens:1
( 151 / 306 ) Korean Resturants in Whitestone, Queens:0
( 152 / 306 ) Korean Resturants in Bayside, Queens:2
( 153 / 306 ) Korean Resturants in Auburndale, Queens:14
( 154 / 306 ) Korean Resturants in Little Neck, Queens:4
( 155 / 306 ) Korean Resturants in Douglaston, Queens:4
( 156 / 306 ) Korean Resturants in Glen Oaks, Queens:0
( 157 / 306 ) Korean Resturants in Bellerose, Queens:0
( 158 / 306 ) Korean Resturants in Kew Gardens Hills, Queens:0
( 159 / 306 ) Korean Resturants in Fresh Meadows, Queens:0
( 160 / 306 ) Korean Resturants in Briarwood, Queens:0
( 161 / 306 ) Korean Resturants in Jamaica Center, Queens:0
( 162 / 306 ) Korean Resturants in Oakland Gardens, Queens:5
( 163 / 306 ) Korean Resturants in Queens Village, Queens:0
( 164 / 306 ) Korean Resturants in Hollis, Queens:0
( 165 / 306 ) Korean Resturants in South Jamaica, Queens:0
( 166 / 306 ) Korean Resturants in St. Albans, Queens:0
( 167 / 306 ) Korean Resturants in Rochdale, Queens:0
( 168 / 306 ) Korean Resturants in Springfield Gardens, Queens:0
( 169 / 306 ) Korean Resturants in Cambria Heights, Queens:0
( 170 / 306 ) Korean Resturants in Rosedale, Queens:0
( 171 / 306 ) Korean Resturants in Far Rockaway, Queens:0
```

```
( 172 / 306 ) Korean Resturants in Broad Channel, Queens:0
( 173 / 306 ) Korean Resturants in Breezy Point, Queens:0
( 174 / 306 ) Korean Resturants in Steinway, Queens:0
( 175 / 306 ) Korean Resturants in Beechhurst, Queens:0
( 176 / 306 ) Korean Resturants in Bay Terrace, Queens:0
( 177 / 306 ) Korean Resturants in Edgemere, Queens:0
( 178 / 306 ) Korean Resturants in Arverne, Queens:0
( 179 / 306 ) Korean Resturants in Rockaway Beach, Queens:0
( 180 / 306 ) Korean Resturants in Neponsit, Queens:0
( 181 / 306 ) Korean Resturants in Murray Hill, Queens:36
( 182 / 306 ) Korean Resturants in Floral Park, Queens:0
( 183 / 306 ) Korean Resturants in Holliswood, Queens:0
( 184 / 306 ) Korean Resturants in Jamaica Estates, Queens:0
( 185 / 306 ) Korean Resturants in Queensboro Hill, Queens:0
( 186 / 306 ) Korean Resturants in Hillcrest, Queens:1
( 187 / 306 ) Korean Resturants in Ravenswood, Queens:1
( 188 / 306 ) Korean Resturants in Lindenwood, Queens:0
( 189 / 306 ) Korean Resturants in Laurelton, Queens:0
( 190 / 306 ) Korean Resturants in Lefrak City, Queens:0
( 191 / 306 ) Korean Resturants in Belle Harbor, Queens:0
( 192 / 306 ) Korean Resturants in Rockaway Park, Queens:0
( 193 / 306 ) Korean Resturants in Somerville, Queens:0
( 194 / 306 ) Korean Resturants in Brookville, Queens:0
( 195 / 306 ) Korean Resturants in Bellaire, Queens:0
( 196 / 306 ) Korean Resturants in North Corona, Queens:0
( 197 / 306 ) Korean Resturants in Forest Hills Gardens, Queens:0
( 198 / 306 ) Korean Resturants in St. George, Staten Island:0
( 199 / 306 ) Korean Resturants in New Brighton, Staten Island:0
( 200 / 306 ) Korean Resturants in Stapleton, Staten Island:0
( 201 / 306 ) Korean Resturants in Rosebank, Staten Island:0
( 202 / 306 ) Korean Resturants in West Brighton, Staten Island:0
( 203 / 306 ) Korean Resturants in Grymes Hill, Staten Island:0
( 204 / 306 ) Korean Resturants in Todt Hill, Staten Island:0
( 205 / 306 ) Korean Resturants in South Beach, Staten Island:0
( 206 / 306 ) Korean Resturants in Port Richmond, Staten Island:0
( 207 / 306 ) Korean Resturants in Mariner's Harbor, Staten Island:0
( 208 / 306 ) Korean Resturants in Port Ivory, Staten Island:0
( 209 / 306 ) Korean Resturants in Castleton Corners, Staten Island:0
( 210 / 306 ) Korean Resturants in New Springville, Staten Island:0
( 211 / 306 ) Korean Resturants in Travis, Staten Island:0
( 212 / 306 ) Korean Resturants in New Dorp, Staten Island:0
( 213 / 306 ) Korean Resturants in Oakwood, Staten Island:0
( 214 / 306 ) Korean Resturants in Great Kills, Staten Island:0
( 215 / 306 ) Korean Resturants in Eltingville, Staten Island:0
( 216 / 306 ) Korean Resturants in Annadale, Staten Island:0
( 217 / 306 ) Korean Resturants in Woodrow, Staten Island:0
( 218 / 306 ) Korean Resturants in Tottenville, Staten Island:0
( 219 / 306 ) Korean Resturants in Tompkinsville, Staten Island:0
( 220 / 306 ) Korean Resturants in Silver Lake, Staten Island:0
( 221 / 306 ) Korean Resturants in Sunnyside, Staten Island:0
( 222 / 306 ) Korean Resturants in Ditmas Park, Brooklyn:0
( 223 / 306 ) Korean Resturants in Wingate, Brooklyn:0
( 224 / 306 ) Korean Resturants in Rugby, Brooklyn:0
( 225 / 306 ) Korean Resturants in Park Hill, Staten Island:0
( 226 / 306 ) Korean Resturants in Westerleigh, Staten Island:0
( 227 / 306 ) Korean Resturants in Graniteville, Staten Island:0
( 228 / 306 ) Korean Resturants in Arlington, Staten Island:0
```

```
( 229 / 306 ) Korean Resturants in Arrochar, Staten Island:0
( 230 / 306 ) Korean Resturants in Grasmere, Staten Island:0
( 231 / 306 ) Korean Resturants in Old Town, Staten Island:0
( 232 / 306 ) Korean Resturants in Dongan Hills, Staten Island:0
( 233 / 306 ) Korean Resturants in Midland Beach, Staten Island:0
( 234 / 306 ) Korean Resturants in Grant City, Staten Island:0
( 235 / 306 ) Korean Resturants in New Dorp Beach, Staten Island:0
( 236 / 306 ) Korean Resturants in Bay Terrace, Staten Island:0
( 237 / 306 ) Korean Resturants in Huguenot, Staten Island:0
( 238 / 306 ) Korean Resturants in Pleasant Plains, Staten Island:0
( 239 / 306 ) Korean Resturants in Butler Manor, Staten Island:0
( 240 / 306 ) Korean Resturants in Charleston, Staten Island:0
( 241 / 306 ) Korean Resturants in Rossville, Staten Island:0
( 242 / 306 ) Korean Resturants in Arden Heights, Staten Island:0
( 243 / 306 ) Korean Resturants in Greenridge, Staten Island:0
( 244 / 306 ) Korean Resturants in Heartland Village, Staten Island:0
( 245 / 306 ) Korean Resturants in Chelsea, Staten Island:0
( 246 / 306 ) Korean Resturants in Bloomfield, Staten Island:0
( 247 / 306 ) Korean Resturants in Bulls Head, Staten Island:0
( 248 / 306 ) Korean Resturants in Carnegie Hill, Manhattan:0
( 249 / 306 ) Korean Resturants in Noho, Manhattan:1
( 250 / 306 ) Korean Resturants in Civic Center, Manhattan:1
( 251 / 306 ) Korean Resturants in Midtown South, Manhattan:9
( 252 / 306 ) Korean Resturants in Richmond Town, Staten Island:0
( 253 / 306 ) Korean Resturants in Shore Acres, Staten Island:0
( 254 / 306 ) Korean Resturants in Clifton, Staten Island:0
( 255 / 306 ) Korean Resturants in Concord, Staten Island:0
( 256 / 306 ) Korean Resturants in Emerson Hill, Staten Island:0
( 257 / 306 ) Korean Resturants in Randall Manor, Staten Island:0
( 258 / 306 ) Korean Resturants in Howland Hook, Staten Island:0
( 259 / 306 ) Korean Resturants in Elm Park, Staten Island:0
( 260 / 306 ) Korean Resturants in Remsen Village, Brooklyn:0
( 261 / 306 ) Korean Resturants in New Lots, Brooklyn:0
( 262 / 306 ) Korean Resturants in Paerdegat Basin, Brooklyn:0
( 263 / 306 ) Korean Resturants in Mill Basin, Brooklyn:0
( 264 / 306 ) Korean Resturants in Jamaica Hills, Queens:0
( 265 / 306 ) Korean Resturants in Utopia, Queens:1
( 266 / 306 ) Korean Resturants in Pomonok, Queens:1
( 267 / 306 ) Korean Resturants in Astoria Heights, Queens:0
( 268 / 306 ) Korean Resturants in Claremont Village, Bronx:0
( 269 / 306 ) Korean Resturants in Concourse Village, Bronx:0
( 270 / 306 ) Korean Resturants in Mount Eden, Bronx:0
( 271 / 306 ) Korean Resturants in Mount Hope, Bronx:0
( 272 / 306 ) Korean Resturants in Sutton Place, Manhattan:0
( 273 / 306 ) Korean Resturants in Hunters Point, Queens:0
( 274 / 306 ) Korean Resturants in Turtle Bay, Manhattan:0
( 275 / 306 ) Korean Resturants in Tudor City, Manhattan:0
( 276 / 306 ) Korean Resturants in Stuyvesant Town, Manhattan:1
( 277 / 306 ) Korean Resturants in Flatiron, Manhattan:0
( 278 / 306 ) Korean Resturants in Sunnyside Gardens, Queens:3
( 279 / 306 ) Korean Resturants in Blissville, Queens:0
( 280 / 306 ) Korean Resturants in Fulton Ferry, Brooklyn:0
( 281 / 306 ) Korean Resturants in Vinegar Hill, Brooklyn:0
( 282 / 306 ) Korean Resturants in Weeksville, Brooklyn:0
( 283 / 306 ) Korean Resturants in Broadway Junction, Brooklyn:0
( 284 / 306 ) Korean Resturants in Dumbo, Brooklyn:0
( 285 / 306 ) Korean Resturants in Manor Heights, Staten Island:0
```

```
( 286 / 306 ) Korean Resturants in Willowbrook, Staten Island:0
( 287 / 306 ) Korean Resturants in Sandy Ground, Staten Island:0
( 288 / 306 ) Korean Resturants in Egbertville, Staten Island:0
( 289 / 306 ) Korean Resturants in Roxbury, Queens:0
( 290 / 306 ) Korean Resturants in Homecrest, Brooklyn:0
( 291 / 306 ) Korean Resturants in Middle Village, Queens:0
( 292 / 306 ) Korean Resturants in Prince's Bay, Staten Island:0
( 293 / 306 ) Korean Resturants in Lighthouse Hill, Staten Island:0
( 294 / 306 ) Korean Resturants in Richmond Valley, Staten Island:0
( 295 / 306 ) Korean Resturants in Malba, Queens:1
( 296 / 306 ) Korean Resturants in Highland Park, Brooklyn:0
( 297 / 306 ) Korean Resturants in Madison, Brooklyn:0
( 298 / 306 ) Korean Resturants in Bronxdale, Bronx:0
( 299 / 306 ) Korean Resturants in Allerton, Bronx:0
( 300 / 306 ) Korean Resturants in Kingsbridge Heights, Bronx:0
( 301 / 306 ) Korean Resturants in Erasmus, Brooklyn:0
( 302 / 306 ) Korean Resturants in Hudson Yards, Manhattan:0
( 303 / 306 ) Korean Resturants in Hammels, Queens:0
( 304 / 306 ) Korean Resturants in Bayswater, Queens:0
( 305 / 306 ) Korean Resturants in Queensbridge, Queens:0
( 306 / 306 ) Korean Resturants in Fox Hills, Staten Island:0
```

Now that we have got all the korean resturants in new york city , we will analyze it

In [12]: `korean_rest_ny.head()`

Out[12]:

	Borough	Neighborhood	ID	Name
0	Brooklyn	Bensonhurst	57049cb4498efcebf6578c1b	Cafe Lily
1	Brooklyn	Brighton Beach	4c9d5c0303133704a96f5ed5	Cafe At Your Mother-in-Law
2	Brooklyn	Prospect Heights	4fa162e0e4b0badc81404a51	Kimchi Grill
3	Brooklyn	Williamsburg	52bf3053498e754b09a440b5	Dotory
4	Brooklyn	Park Slope	5bba42ff7dc9e1002cd1a1df	Haenyeo

In [13]: `korean_rest_ny.shape`

Out[13]: `(115, 4)`

We got 115 Korean Resturants across New York City

```
In [14]: plt.figure(figsize=(9,5), dpi = 100)
         # title
         plt.title('Number of Korean Resturants for each Borough in New York City')
         #On x-axis
         plt.xlabel('Borough', fontsize = 15)
         #On y-axis
         plt.ylabel('No.of Korean Resturants', fontsize=15)
         #giving a bar plot
         korean_rest_ny.groupby('Borough')['ID'].count().plot(kind='bar')
         #Legend
         plt.legend()
         #displays the plot
         plt.show()
```


Number of Korean Resturants for each Borough in New York City

We see that Queens has the largest number of korean resturants

```
In [15]: plt.figure(figsize=(9,5), dpi = 100)
         # title
         plt.title('Number of Korean Resturants for each Neighborhood in New York City'
         )
         #On x-axis
         plt.xlabel('Neighborhood', fontsize = 15)
         #On y-axis
         plt.ylabel('No.of Korean Resturants', fontsize=15)
         #giving a bar plot
         korean_rest_ny.groupby('Neighborhood')['ID'].count().nlargest(5).plot(kind='ba
         r')
         #Legend
         plt.legend()
         #displays the plot
         plt.show()
```

Number of Korean Resturants for each Neighborhood in New York City
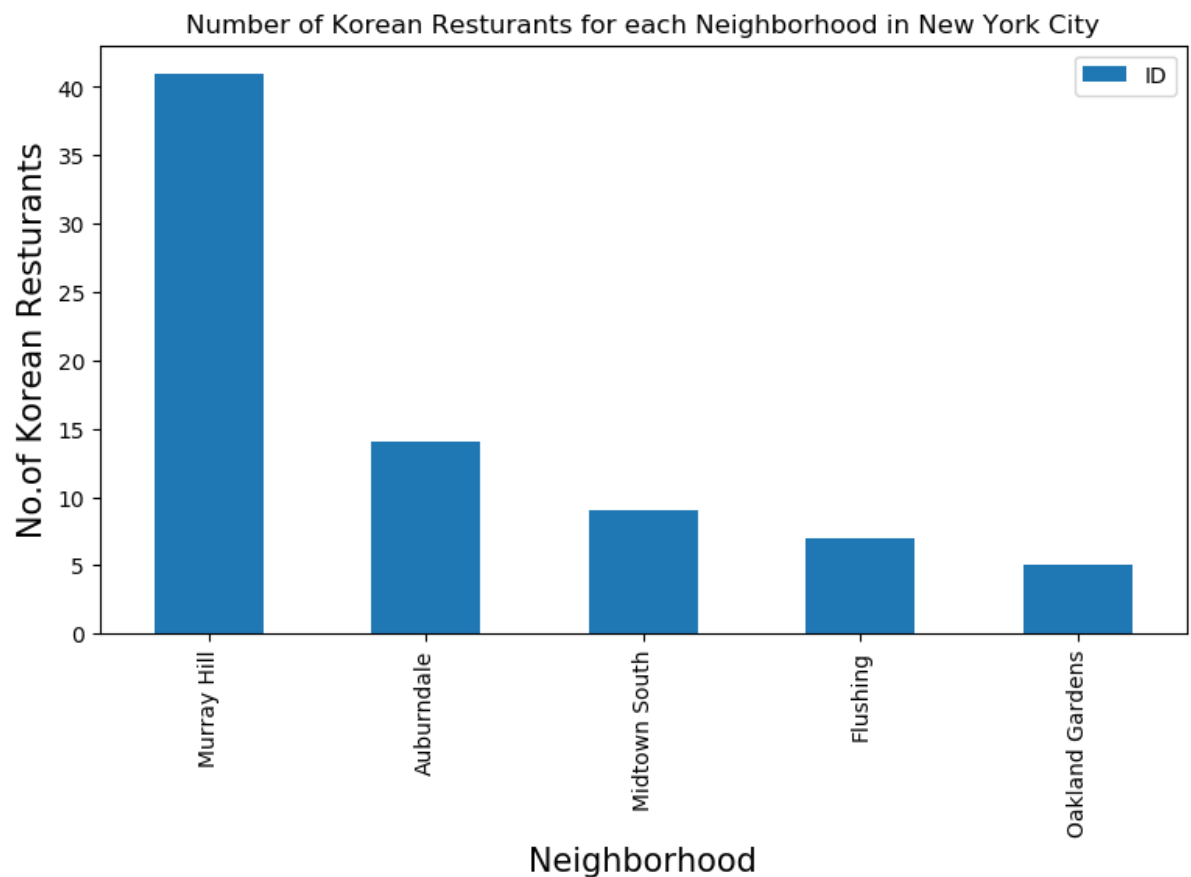
In [16]: `korean_rest_ny[korean_rest_ny['Neighborhood']=='Murray Hill']`

Out[16]:

	Borough	Neighborhood	ID	Name
7	Manhattan	Murray Hill	41e46880f964a520d81e1fe3	Don's Bogam Korean BBQ & Wine
8	Manhattan	Murray Hill	547d03e3498eb32c879589da	Baekjeong NYC (Kang Ho Dong Baekjeong)
9	Manhattan	Murray Hill	560b19b1498ee5e226c151f9	Her Name is Han
10	Manhattan	Murray Hill	517563f9498e0a4859d08fe4	BCD Tofu House
11	Manhattan	Murray Hill	4efe024000396c3b17c070e1	Take 31
59	Queens	Murray Hill	4b830e44f964a520ebf430e3	Hahm Ji Bach - 함지박
60	Queens	Murray Hill	4b8f0931f964a520d04533e3	Mapo BBQ
61	Queens	Murray Hill	49e10e0bf964a52089611fe3	Mad For Chicken
62	Queens	Murray Hill	4baeabe6f964a52037cd3be3	Kum Sung Chik Naengmyun
63	Queens	Murray Hill	56db53cc498eed9b68621019	SGD Tofu House
64	Queens	Murray Hill	5518a1a8498e4c7fe6268b88	Jongro BBQ
65	Queens	Murray Hill	5590598a498eb1c3f975b6a6	Mr. Tofu
66	Queens	Murray Hill	4c7ad3dda86837048bee144d	Geo Si Gi Restaurant
67	Queens	Murray Hill	4ad3bfabf964a52016e620e3	Han Joo
68	Queens	Murray Hill	57c0c497cd10e5cf8037c207	Butcher's Cut
69	Queens	Murray Hill	548cd91c498e98c507b00851	돌아온 1.5 닭갈비
70	Queens	Murray Hill	569ada51498eb50a95dab87f	Pizza Maru
71	Queens	Murray Hill	5147a0bce4b09c3bed35c23b	큰손 칼국수
72	Queens	Murray Hill	4ca67385b7106dcb6e3b5ea5	Bonjuk Korean Traditional Porridge Restaurant
73	Queens	Murray Hill	4bd3578041b9ef3b05f0ffe5	Tong Sam Gyup Goo Yi Restaurant
74	Queens	Murray Hill	51c612d9498e52a02241e27b	병천자매순대 (Byun Chung Soon Dae Restaurant) (Byun ...
75	Queens	Murray Hill	4eefef69be7ba3ed7b202455	Arirang
76	Queens	Murray Hill	58756dc845c3ed5546c88309	Sodam
77	Queens	Murray Hill	4c06f2c00e0a2d7f85abec0c	Hansol Young Yang Center
78	Queens	Murray Hill	5078a6d6e4b065f1dcd66110	Emone Korean Family Restaurant
79	Queens	Murray Hill	548b8548498e88452c81006e	Parksanbal Babs
80	Queens	Murray Hill	4a469916f964a5202ba91fe3	Picnic Garden BBQ Buffet House
81	Queens	Murray Hill	4e665433b0fb188e8f56fb2b	Su Ra Chung
82	Queens	Murray Hill	5521d4be498ed5c1ea40e4de	Yupdduk (동대문 엽기떡볶이) (Yupdduk)
83	Queens	Murray Hill	4cdf457c78ddf04ddd07a098	Myung San
84	Queens	Murray Hill	4bf814b25317a5934f1fff7e	Je Ju Do Restaurant
85	Queens	Murray Hill	4eb5c949cc2143e828277958	Kim Chayul's Myung Poom Kalbi
86	Queens	Murray Hill	4d85677302eb5481ee0744f5	Gugongtan

	Borough	Neighborhood	ID	Name
87	Queens	Murray Hill	4e41cfa1b61ca5ba3b1f6db5	TongTong Tonkatsu
88	Queens	Murray Hill	4b89c358f964a5207c4d32e3	Sam Won Gahk
89	Queens	Murray Hill	4e8b2f17775b3662040325e8	롤리김밥 Rolly Kimbab
90	Queens	Murray Hill	4ec2cccf8231a83de8cf15ed	DAHEEN WANG MANDOO
91	Queens	Murray Hill	4c119b91d41e76b0d3cc310d	Zurang
92	Queens	Murray Hill	4b79ffc4f964a520651e2fe3	Song's Family Food
93	Queens	Murray Hill	4f848a81e4b0c96e1d03e5db	Dae Bak
94	Queens	Murray Hill	5008ac8be4b0dfac2d882520	食客

Murray Hill in Queens has the highest number of Korean Resturants with a total count of 41.

Now we will get the ranking of each resturant for further analysis.

```
In [ ]:  #CLIENT_ID = '....'
         #CLIENT_SECRET = '....'
         #VERSION = '....' # Foursquare API version
```

```
In [17]:  # prepare neighborhood list that contains korean resturants
          column_names=['Borough', 'Neighborhood', 'ID','Name','Likes','Rating','Tips']
          korean_rest_stats_ny=pd.DataFrame(columns=column_names)
          count=1


          for row in korean_rest_ny.values.tolist():
              Borough,Neighborhood,ID,Name=row
              try:
                  venue_details=get_venue_details(ID)
                  print(venue_details)
                  id,name,likes,rating,tips=venue_details.values.tolist()[0]
              except IndexError:
                  print('No data available for id=',ID)
                  # we will assign 0 value for these resturants as they may have been
                  #recently opened or details does not exist in FourSquare Database
                  id,name,likes,rating,tips=[0]*5
              print('(',count,'/',len(korean_rest_ny),')','processed')
              korean_rest_stats_ny = korean_rest_stats_ny.append({'Borough': Borough,
                                                  'Neighborhood': Neighborhood,
                                                  'ID': id,
                                                  'Name' : name,
                                                  'Likes' : likes,
                                                  'Rating' : rating,
                                                  'Tips' : tips
                                                 }, ignore_index=True)

              count+=1
```

```
                              ID           Name  Likes  Rating  Tips
0  57049cb4498efcebf6578c1b  Cafe Lily      7     6.5      7
( 1 / 115 ) processed
                              ID                          Name  Likes  Rating  Tips
0  4c9d5c0303133704a96f5ed5  Cafe At Your Mother-in-Law    28     7.6    28
( 2 / 115 ) processed
                              ID          Name  Likes  Rating  Tips
0  4fa162e0e4b0badc81404a51  Kimchi Grill   289     8.4   108
( 3 / 115 ) processed
                              ID     Name  Likes  Rating  Tips
0  52bf3053498e754b09a440b5  Dotory   138     8.5    44
( 4 / 115 ) processed
                              ID      Name  Likes  Rating  Tips
0  5bba42ff7dc9e1002cd1a1df  Haenyeo    38     8.1     9
( 5 / 115 ) processed
                              ID         Name  Likes  Rating  Tips
0  5ae4e10ffe3740002d8a897e  Slow Loris    12     8.1     5
( 6 / 115 ) processed
                              ID     Name  Likes  Rating  Tips
0  52bf3053498e754b09a440b5  Dotory   138     8.5    44
( 7 / 115 ) processed
                              ID                         Name  Likes  Rating  \
0  41e46880f964a520d81e1fe3  Don's Bogam Korean BBQ & Wine   564     8.8

   Tips
0   145
( 8 / 115 ) processed
                              ID                                Name  Likes  \
0  547d03e3498eb32c879589da  Baekjeong NYC (Kang Ho Dong Baekjeong)   824

   Rating  Tips
0     9.2   155
( 9 / 115 ) processed
                              ID             Name  Likes  Rating  Tips
0  560b19b1498ee5e226c151f9  Her Name is Han   825     9.0   178
( 10 / 115 ) processed
                              ID            Name  Likes  Rating  Tips
0  517563f9498e0a4859d08fe4  BCD Tofu House  1198     9.1   198
( 11 / 115 ) processed
                              ID     Name  Likes  Rating  Tips
0  4efe024000396c3b17c070e1  Take 31   272     8.7    57
( 12 / 115 ) processed
                              ID               Name  Likes  Rating  Tips
0  578bec6c498e3150fc369f3b  Thursday Kitchen   269     8.9    70
( 13 / 115 ) processed
                              ID   Name  Likes  Rating  Tips
0  54cd73be498e9ab78644ab32  Oiji    322     9.0    79
( 14 / 115 ) processed
                              ID      Name  Likes  Rating  Tips
0  4e67f1c7d16433b90090c8f3  Jungsik   152     8.7    55
( 15 / 115 ) processed
                              ID    Name  Likes  Rating  Tips
0  56a14149498e9983c0199038  Mokja    23     8.0     6
( 16 / 115 ) processed
                              ID Name  Likes  Rating  Tips
0  5c0db9ecbfc6d0002c85e28e  Kal    11     8.1     4
( 17 / 115 ) processed
```

```
                                ID              Name   Likes   Rating   Tips
0   4aa44fa8f964a520554620e3   Chung Ki-Wa      24      7.7      18
( 18 / 115 ) processed
                                ID               Name   Likes   Rating   Tips
0   4b1dcb05f964a5205d1524e3   Hae Woon Dae      30      8.1      10
( 19 / 115 ) processed
                                ID               Name   Likes   Rating   Tips
0   4b1dcb05f964a5205d1524e3   Hae Woon Dae      30      8.1      10
( 20 / 115 ) processed
                                ID          Name   Likes   Rating   Tips
0   4ae39cb6f964a520439721e3   Debasaki      67      8.2      35
( 21 / 115 ) processed
                                ID          Name   Likes   Rating   Tips
0   4b80790bf964a5209b7530e3   Kim Ga Nae   104     7.9      45
( 22 / 115 ) processed
                                ID          Name   Likes   Rating   Tips
0   4aa5ae46f964a520264920e3   KumGangSan   96      7.5      36
( 23 / 115 ) processed
                                ID               Name   Likes   Rating   Tips
0   4abd475df964a520668920e3   San Soo Kap San   31      7.4      11
( 24 / 115 ) processed
                                ID            Name   Likes   Rating   Tips
0   57c0c497cd10e5cf8037c207   Butcher's Cut   11      8.3      1
( 25 / 115 ) processed
                                ID                             Name   Likes   Rating   \
0   4c86de6de602b1f78c9fc37a   Chung Moo Rollrice and Dongas     11      7.2

   Tips
0   10
( 26 / 115 ) processed
                                ID    Name   Likes   Rating   Tips
0   4bd6436dcfa7b713606927da   Gahwa   29      7.8      11
( 27 / 115 ) processed
                                ID   Name   Likes   Rating   Tips
0   5630104d498e08f2c7217877   Doma   17      7.5      4
( 28 / 115 ) processed
                                ID               Name   Likes   Rating   Tips
0   57ab54da498e7d61e0c1fe0e   Pelicana Chicken   24      7.6      7
( 29 / 115 ) processed
                                ID                   Name   Likes   Rating   Tips
0   4d3c9f7ea2e4b1f707f4ea25   Sky Garden @ Spa Castle   17      7.8      4
( 30 / 115 ) processed
                                ID           Name   Likes   Rating   Tips
0   4c8425a0d34ca1436d443c80   Ding Dong   3       6.6      8
( 31 / 115 ) processed
                                ID               Name   Likes   Rating   Tips
0   4c7193e2f3279c74b4f2a62d   BonChon Chicken   20      7.2      14
( 32 / 115 ) processed
                                ID   Name   Likes   Rating   Tips
0   4b565b29f964a520eb0c28e3   TANG   87      8.2      25
( 33 / 115 ) processed
                                ID       Name   Likes   Rating   Tips
0   4eefef69be7ba3ed7b202455   Arirang   20      8.4      13
( 34 / 115 ) processed
                                ID                               Name   Likes   Rating
\
0   4bd3578041b9ef3b05f0ffe5   Tong Sam Gyup Goo Yi Restaurant     36      8.4
```

```
     Tips
0    10
( 35 / 115 ) processed
                                ID            Name  Likes  Rating  Tips
0  4e9a22285503cfce742062a1  Galbi Ma Eul     28     7.4     9
( 36 / 115 ) processed
                                ID                 Name  Likes  Rating  Tips
0  4dd9a5cfc65bee535ae8e26f  Pado Sushi Restaurant    16     8.1     1
( 37 / 115 ) processed
                                ID          Name  Likes  Rating  Tips
0  4c49dd1ffbafc9282eb27fdb  Nolbu Sushi    17     7.1    11
( 38 / 115 ) processed
                                ID             Name  Likes  Rating  Tips
0  4bd2147ba8b3a593fc15675f  San Soo Kap San    42     6.6    16
( 39 / 115 ) processed
                                ID        Name  Likes  Rating  Tips
0  4cdf457c78ddf04ddd07a098  Myung San     8     7.0     3
( 40 / 115 ) processed
                                ID                  Name  Likes  Rating  Tips
0  4c1eb73bb4e62d7fcebade93  Bang Ga Ne Restaurant     5     6.8     1
( 41 / 115 ) processed
                                ID                 Name  Likes  Rating  Tips
0  4bf814b25317a5934f1fff7e  Je Ju Do Restaurant    12     7.0     5
( 42 / 115 ) processed
                                ID               Name  Likes  Rating  Tips
0  4bec93d8fd60a5939f403bf1  Gahwa Sulungtang    10     6.4     7
( 43 / 115 ) processed
                                ID                Name  Likes  Rating  Tips
0  4e8b2f17775b3662040325e8  롤리김밥 Rolly Kimbab    17     6.7     9
( 44 / 115 ) processed
                                ID                 Name  Likes  Rating  Tips
0  4b79ffc4f964a520651e2fe3  Song's Family Food    11     6.0    10
( 45 / 115 ) processed
Empty DataFrame
Columns: [ID, Name, Likes, Rating, Tips]
Index: []
No data available for id= 54bd8c20498e5618f8470325
( 46 / 115 ) processed
Empty DataFrame
Columns: [ID, Name, Likes, Rating, Tips]
Index: []
No data available for id= 5b3badba3731ee002cc9e31a
( 47 / 115 ) processed
Empty DataFrame
Columns: [ID, Name, Likes, Rating, Tips]
Index: []
No data available for id= 4c7af1aca8683704fa59154d
( 48 / 115 ) processed
Empty DataFrame
Columns: [ID, Name, Likes, Rating, Tips]
Index: []
No data available for id= 4c350e28a0ced13a3140196e
( 49 / 115 ) processed
Empty DataFrame
Columns: [ID, Name, Likes, Rating, Tips]
Index: []
```

```
            No data available for id= 4c71ac6dad69b60c49ac81b9
            ( 50 / 115 ) processed
            Empty DataFrame
            Columns: [ID, Name, Likes, Rating, Tips]
            Index: []
            No data available for id= 4c71ac6dad69b60c49ac81b9
            ( 51 / 115 ) processed
            Empty DataFrame
            Columns: [ID, Name, Likes, Rating, Tips]
            Index: []
            No data available for id= 4c7af1aca8683704fa59154d
            ( 52 / 115 ) processed
            Empty DataFrame
            Columns: [ID, Name, Likes, Rating, Tips]
            Index: []
            No data available for id= 5b3badba3731ee002cc9e31a
            ( 53 / 115 ) processed
            Empty DataFrame
            Columns: [ID, Name, Likes, Rating, Tips]
            Index: []
            No data available for id= 4c350e28a0ced13a3140196e
            ( 54 / 115 ) processed
                                    ID                  Name  Likes  Rating  Tips
            0  4c8adb923dc2a1cda816b132  Bi Won Korean Restaurant     21     7.7     8
            ( 55 / 115 ) processed
                                    ID             Name  Likes  Rating  Tips
            0  58efc04912c8f0495ec6865c  Chilsung Garden     15     7.7     1
            ( 56 / 115 ) processed
                                    ID          Name  Likes  Rating  Tips
            0  526c1acf11d288dc8354b7b9  Rolly Kimbab     26     7.2     9
            ( 57 / 115 ) processed
            Empty DataFrame
            Columns: [ID, Name, Likes, Rating, Tips]
            Index: []
            No data available for id= 4b9d4ce7f964a5209ba136e3
            ( 58 / 115 ) processed
            Empty DataFrame
            Columns: [ID, Name, Likes, Rating, Tips]
            Index: []
            No data available for id= 4c5ed60d857ca5936497d0cb
            ( 59 / 115 ) processed
                                    ID             Name  Likes  Rating  Tips
            0  4b830e44f964a520ebf430e3  Hahm Ji Bach - 함지박    212     8.8    81
            ( 60 / 115 ) processed
                                    ID      Name  Likes  Rating  Tips
            0  4b8f0931f964a520d04533e3  Mapo BBQ     79     8.6    32
            ( 61 / 115 ) processed
                                    ID             Name  Likes  Rating  Tips
            0  49e10e0bf964a52089611fe3  Mad For Chicken    216     9.1    69
            ( 62 / 115 ) processed
                                    ID                   Name  Likes  Rating  Tips
            0  4baeabe6f964a52037cd3be3  Kum Sung Chik Naengmyun     14     7.9     5
            ( 63 / 115 ) processed
                                    ID            Name  Likes  Rating  Tips
            0  56db53cc498eed9b68621019  SGD Tofu House     11     8.2     0
            ( 64 / 115 ) processed
                                    ID        Name  Likes  Rating  Tips
```

```
0   5518a1a8498e4c7fe6268b88    Jongro BBQ    47      7.8      7
( 65 / 115 ) processed
                                ID         Name   Likes   Rating   Tips
0   5590598a498eb1c3f975b6a6    Mr. Tofu       18      7.6       3
( 66 / 115 ) processed
                                ID                  Name   Likes   Rating   Tips
0   4c7ad3dda86837048bee144d    Geo Si Gi Restaurant       33      7.6      12
( 67 / 115 ) processed
                                ID       Name   Likes   Rating   Tips
0   4ad3bfabf964a52016e620e3    Han Joo     26      7.4      20
( 68 / 115 ) processed
                                ID           Name   Likes   Rating   Tips
0   57c0c497cd10e5cf8037c207    Butcher's Cut     11      8.3       1
( 69 / 115 ) processed
                                ID            Name   Likes   Rating   Tips
0   548cd91c498e98c507b00851    돌아온 1.5 닭갈비     15      7.8       4
( 70 / 115 ) processed
                                ID       Name   Likes   Rating   Tips
0   569ada51498eb50a95dab87f    Pizza Maru     25      7.3       9
( 71 / 115 ) processed
                                ID     Name   Likes   Rating   Tips
0   5147a0bce4b09c3bed35c23b    큰손 칼국수      6      7.2       1
( 72 / 115 ) processed
                                ID                                              Name   \
0   4ca67385b7106dcb6e3b5ea5    Bonjuk Korean Traditional Porridge Restaurant

    Likes   Rating   Tips
0      21     7.1      6
( 73 / 115 ) processed
                                ID                              Name   Likes   Rating
\
0   4bd3578041b9ef3b05f0ffe5    Tong Sam Gyup Goo Yi Restaurant       36      8.4

    Tips
0     10
( 74 / 115 ) processed
                                ID   \
0   51c612d9498e52a02241e27b

                                           Name   Likes   Rating   Tips
0   병천자매순대 (Byun Chung Soon Dae Restaurant) (Byun ...      16      7.2
4
( 75 / 115 ) processed
                                ID       Name   Likes   Rating   Tips
0   4eefef69be7ba3ed7b202455    Arirang     20      8.4      13
( 76 / 115 ) processed
                                ID      Name   Likes   Rating   Tips
0   58756dc845c3ed5546c88309    Sodam       9      7.2       2
( 77 / 115 ) processed
                                ID                        Name   Likes   Rating   Tips
0   4c06f2c00e0a2d7f85abec0c    Hansol Young Yang Center     10      7.7       5
( 78 / 115 ) processed
                                ID                              Name   Likes   Rating   \
0   5078a6d6e4b065f1dcd66110    Emone Korean Family Restaurant     10      6.9

    Tips
0      1
```

```
( 79 / 115 ) processed
                          ID           Name  Likes  Rating  Tips
0  548b8548498e88452c81006e  Parksanbal Babs     11     7.4     2
( 80 / 115 ) processed
                          ID                            Name  Likes  Rating  \
0  4a469916f964a5202ba91fe3  Picnic Garden BBQ Buffet House    117     6.9

   Tips
0    60
( 81 / 115 ) processed
                          ID         Name  Likes  Rating  Tips
0  4e665433b0fb188e8f56fb2b  Su Ra Chung      6     6.6     4
( 82 / 115 ) processed
                          ID                              Name  Likes  Rating  \
0  5521d4be498ed5c1ea40e4de  Yupdduk (동대문 엽기떡볶이) (Yupdduk)     10
6.7

   Tips
0     3
( 83 / 115 ) processed
                          ID        Name  Likes  Rating  Tips
0  4cdf457c78ddf04ddd07a098  Myung San      8     7.0     3
( 84 / 115 ) processed
                          ID               Name  Likes  Rating  Tips
0  4bf814b25317a5934f1fff7e  Je Ju Do Restaurant     12     7.0     5
( 85 / 115 ) processed
                          ID                         Name  Likes  Rating  \
0  4eb5c949cc2143e828277958  Kim Chayul's Myung Poom Kalbi      8     6.9

   Tips
0     7
( 86 / 115 ) processed
                          ID        Name  Likes  Rating  Tips
0  4d85677302eb5481ee0744f5  Gugongtan     13     6.2     7
( 87 / 115 ) processed
                          ID              Name  Likes  Rating  Tips
0  4e41cfa1b61ca5ba3b1f6db5  TongTong Tonkatsu      8     6.6     2
( 88 / 115 ) processed
                          ID          Name  Likes  Rating  Tips
0  4b89c358f964a5207c4d32e3  Sam Won Gahk     19     6.6     4
( 89 / 115 ) processed
                          ID               Name  Likes  Rating  Tips
0  4e8b2f17775b3662040325e8  롤리김밥 Rolly Kimbab     17     6.7     9
( 90 / 115 ) processed
                          ID                Name  Likes  Rating  Tips
0  4ec2cccf8231a83de8cf15ed  DAHEEN WANG MANDOO      5     5.9     7
( 91 / 115 ) processed
                          ID     Name  Likes  Rating  Tips
0  4c119b91d41e76b0d3cc310d  Zurang     13     6.1     4
( 92 / 115 ) processed
                          ID                Name  Likes  Rating  Tips
0  4b79ffc4f964a520651e2fe3  Song's Family Food     11     6.0    10
( 93 / 115 ) processed
Empty DataFrame
Columns: [ID, Name, Likes, Rating, Tips]
Index: []
No data available for id= 4f848a81e4b0c96e1d03e5db
```

```
( 94 / 115 ) processed
Empty DataFrame
Columns: [ID, Name, Likes, Rating, Tips]
Index: []
No data available for id= 5008ac8be4b0dfac2d882520
( 95 / 115 ) processed
Empty DataFrame
Columns: [ID, Name, Likes, Rating, Tips]
Index: []
No data available for id= 4dc9923322717adb0377893e
( 96 / 115 ) processed
                         ID      Name   Likes   Rating   Tips
0  5521c0a7498eef139bb748e7   Bonchon     47      7.6     11
( 97 / 115 ) processed
                         ID   Name   Likes   Rating   Tips
0  54cd73be498e9ab78644ab32   Oiji    322     9.0      79
( 98 / 115 ) processed
                         ID      Name   Likes   Rating   Tips
0  4e67f1c7d16433b90090c8f3   Jungsik    152    8.7      55
( 99 / 115 ) processed
                         ID        Name   Likes   Rating   Tips
0  540f86da498e020149fa7676   Jongro BBQ    798    9.3     148
( 100 / 115 ) processed
                         ID                          Name   Likes   Rating   Tips
0  5c01ccc14ac28a002c3cbd8d   Anytime Soju Bar and Eatery    27      8.9     26
( 101 / 115 ) processed
                         ID                 Name   Likes   Rating   Tips
0  5aab0d2ae179107b87768ff8   Samwon Garden BBQ     69      8.7     15
( 102 / 115 ) processed
                         ID             Name   Likes   Rating   Tips
0  517563f9498e0a4859d08fe4   BCD Tofu House   1198     9.1     198
( 103 / 115 ) processed
                         ID         Name   Likes   Rating   Tips
0  4a9d3c1af964a520ff3720e3   E-Mo Kimbap    107     8.7     42
( 104 / 115 ) processed
                         ID                                 Name   Likes  \
0  547d03e3498eb32c879589da   Baekjeong NYC (Kang Ho Dong Baekjeong)    824

   Rating   Tips
0    9.2    155
( 105 / 115 ) processed
                         ID                              Name   Likes   Rating  \
0  41e46880f964a520d81e1fe3   Don's Bogam Korean BBQ & Wine     564      8.8

   Tips
0   145
( 106 / 115 ) processed
                         ID              Name   Likes   Rating   Tips
0  560b19b1498ee5e226c151f9   Her Name is Han    825     9.0     178
( 107 / 115 ) processed
                         ID    Name   Likes   Rating   Tips
0  4efe024000396c3b17c070e1   Take 31   272    8.7      57
( 108 / 115 ) processed
Empty DataFrame
Columns: [ID, Name, Likes, Rating, Tips]
Index: []
No data available for id= 4dc9923322717adb0377893e
```

```
             ( 109 / 115 ) processed
             Empty DataFrame
             Columns: [ID, Name, Likes, Rating, Tips]
             Index: []
             No data available for id= 4dc9923322717adb0377893e
             ( 110 / 115 ) processed
                                     ID              Name  Likes  Rating  Tips
             0  578bec6c498e3150fc369f3b  Thursday Kitchen    269     8.9    70
             ( 111 / 115 ) processed
                                     ID     Name  Likes  Rating  Tips
             0  4c0c2765a1b32d7f49279cf0  Sik Gaek     77     8.4    42
             ( 112 / 115 ) processed
                                     ID             Name  Likes  Rating  Tips
             0  57ab54da498e7d61e0c1fe0e  Pelicana Chicken     24     7.6     7
             ( 113 / 115 ) processed
                                     ID  Name  Likes  Rating  Tips
             0  5630104d498e08f2c7217877  Doma     17     7.5     4
             ( 114 / 115 ) processed
                                     ID                 Name  Likes  Rating  Tips
             0  4d3c9f7ea2e4b1f707f4ea25  Sky Garden @ Spa Castle     17     7.8     4
             ( 115 / 115 ) processed
```

In [18]: `korean_rest_stats_ny.head()`

Out[18]:

	Borough	Neighborhood	ID	Name	Likes	Rating	Tips
0	Brooklyn	Bensonhurst	57049cb4498efcebf6578c1b	Cafe Lily	7	6.5	7
1	Brooklyn	Brighton Beach	4c9d5c0303133704a96f5ed5	Cafe At Your Mother-in-Law	28	7.6	28
2	Brooklyn	Prospect Heights	4fa162e0e4b0badc81404a51	Kimchi Grill	289	8.4	108
3	Brooklyn	Williamsburg	52bf3053498e754b09a440b5	Dotory	138	8.5	44
4	Brooklyn	Park Slope	5bba42ff7dc9e1002cd1a1df	Haenyeo	38	8.1	9

In [19]: `korean_rest_stats_ny.shape`

Out[19]: (115, 7)

In [20]: `korean_rest_ny.shape`

Out[20]: (115, 4)

So we got data for all resturants. Now lets save this data to a csv sheet, in case we by mistake modify it. As the number of calls to get details for venue are premium call and have limit of 500 per day, we will refer to saved data sheet csv if required.

In [21]: `korean_rest_stats_ny.to_csv('korean_rest_stats_ny.csv', index=False)`

Lets verify the data from saved csv file

In [22]: `korean_rest_stats_ny_csv=pd.read_csv('korean_rest_stats_ny.csv')`

In [23]: `korean_rest_stats_ny_csv.shape`

Out[23]: `(115, 7)`

In [24]: `korean_rest_stats_ny_csv.head()`

Out[24]:

	Borough	Neighborhood	ID	Name	Likes	Rating	Tips
0	Brooklyn	Bensonhurst	57049cb4498efcebf6578c1b	Cafe Lily	7	6.5	7
1	Brooklyn	Brighton Beach	4c9d5c0303133704a96f5ed5	Cafe At Your Mother-in-Law	28	7.6	28
2	Brooklyn	Prospect Heights	4fa162e0e4b0badc81404a51	Kimchi Grill	289	8.4	108
3	Brooklyn	Williamsburg	52bf3053498e754b09a440b5	Dotory	138	8.5	44
4	Brooklyn	Park Slope	5bba42ff7dc9e1002cd1a1df	Haenyeo	38	8.1	9

In [25]: `korean_rest_stats_ny.info()`

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 115 entries, 0 to 114
Data columns (total 7 columns):
Borough         115 non-null object
Neighborhood    115 non-null object
ID              115 non-null object
Name            115 non-null object
Likes           115 non-null object
Rating          115 non-null float64
Tips            115 non-null object
dtypes: float64(1), object(6)
memory usage: 6.4+ KB
```

We see that values like Likes, Tips are strig values. We would need to convert them into float for further analysis

In [26]: `korean_rest_stats_ny['Likes']=korean_rest_stats_ny['Likes'].astype('float64')`

In [27]: `korean_rest_stats_ny['Tips']=korean_rest_stats_ny['Tips'].astype('float64')`

In [28]: `korean_rest_stats_ny.info()`

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 115 entries, 0 to 114
Data columns (total 7 columns):
Borough         115 non-null object
Neighborhood    115 non-null object
ID              115 non-null object
Name            115 non-null object
Likes           115 non-null float64
Rating          115 non-null float64
Tips            115 non-null float64
dtypes: float64(3), object(4)
memory usage: 6.4+ KB
```

Now the data types looks correct

In [29]: `# Resturant with maximum Likes`
`korean_rest_stats_ny.iloc[korean_rest_stats_ny['Likes'].idxmax()]`

```
Out[29]: Borough                       Manhattan
         Neighborhood                 Murray Hill
         ID              517563f9498e0a4859d08fe4
         Name                     BCD Tofu House
         Likes                              1198
         Rating                              9.1
         Tips                                198
         Name: 10, dtype: object
```

In [30]: `# Resturant with maximum Rating`
`korean_rest_stats_ny.iloc[korean_rest_stats_ny['Rating'].idxmax()]`

```
Out[30]: Borough                       Manhattan
         Neighborhood               Midtown South
         ID              540f86da498e020149fa7676
         Name                         Jongro BBQ
         Likes                               798
         Rating                              9.3
         Tips                                148
         Name: 99, dtype: object
```

In [31]: `# Resturant with maximum Tips`
`korean_rest_stats_ny.iloc[korean_rest_stats_ny['Tips'].idxmax()]`

```
Out[31]: Borough                       Manhattan
         Neighborhood                 Murray Hill
         ID              517563f9498e0a4859d08fe4
         Name                     BCD Tofu House
         Likes                              1198
         Rating                              9.1
         Tips                                198
         Name: 10, dtype: object
```

Now lets visualize neighborhood with maximum average rating of resturants

In [32]:
```
ny_neighborhood_stats=korean_rest_stats_ny.groupby('Neighborhood',as_index=False).mean()[['Neighborhood','Rating']]
ny_neighborhood_stats.columns=['Neighborhood','Average Rating']
```

In [33]:
```
ny_neighborhood_stats.sort_values(['Average Rating'],ascending=False).head(10)
```

Out[33]:

	Neighborhood	Average Rating
18	Noho	9.000000
8	East Village	8.950000
16	Midtown South	8.933333
26	Stuyvesant Town	8.900000
29	Tribeca	8.700000
5	Civic Center	8.700000
31	Williamsburg	8.500000
25	South Side	8.500000
22	Prospect Heights	8.400000
12	Jackson Heights	8.100000

Above are the top neighborhoods with top average rating of Korean resturants

In [34]:
```
ny_borough_stats=korean_rest_stats_ny.groupby('Borough',as_index=False).mean()[['Borough','Rating']]
ny_borough_stats.columns=['Borough','Average Rating']
```

In [35]:
```
ny_borough_stats.sort_values(['Average Rating'],ascending=False).head()
```

Out[35]:

	Borough	Average Rating
1	Manhattan	8.876190
0	Brooklyn	7.957143
2	Queens	6.065517

Similarly these are the average rating of Korean Resturants for each Borough.

Lets visualize it.

In [36]:
```python
plt.figure(figsize=(9,5), dpi = 100)
# title
plt.title('Average rating of Korean Resturants for each Borough')
#On x-axis
plt.xlabel('Borough', fontsize = 15)
#On y-axis
plt.ylabel('Average Rating', fontsize=15)
#giving a bar plot
korean_rest_stats_ny.groupby('Borough').mean()['Rating'].plot(kind='bar')
#Legend
plt.legend()
#displays the plot
plt.show()
```
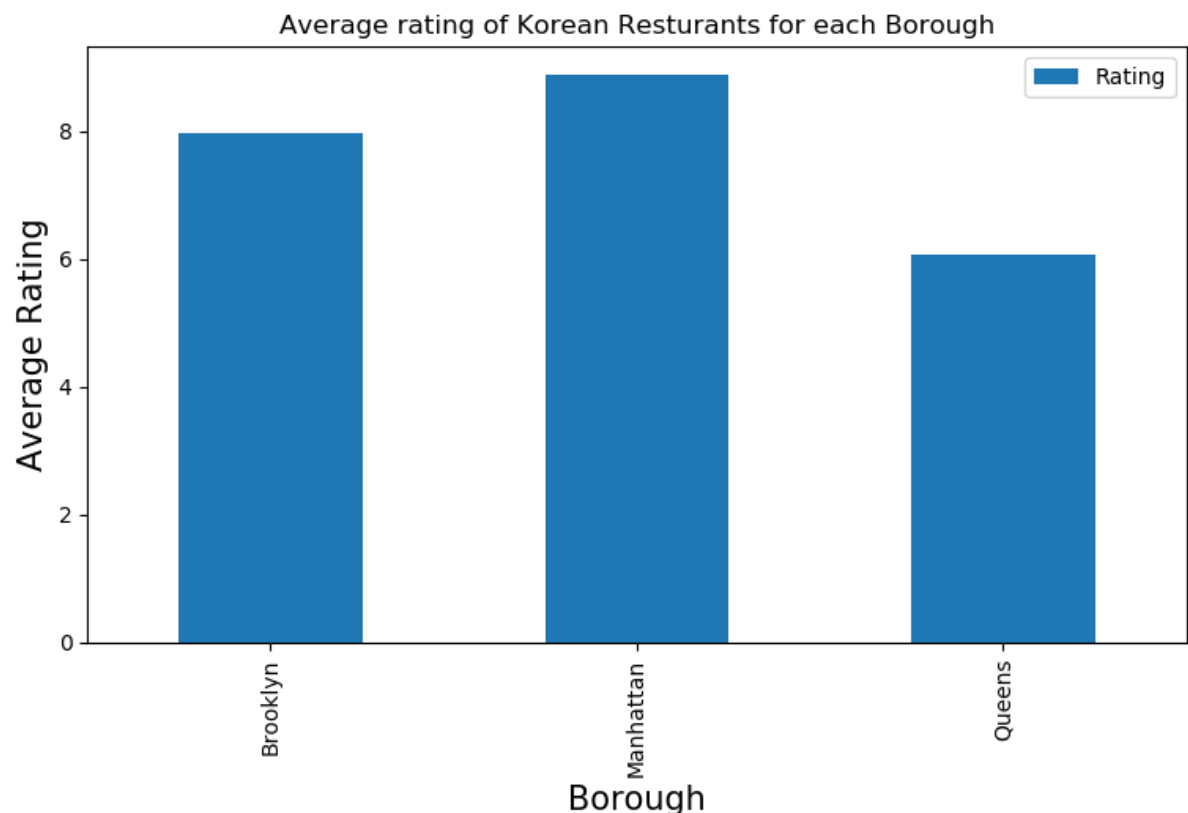

We will consider all the neighborhoods with average rating greater or equal 9.0 to visualize on map

In [43]:
```python
ny_neighborhood_stats=ny_neighborhood_stats[ny_neighborhood_stats['Average Rating']>=9.0]
```

In [44]:
```python
ny_neighborhood_stats
```

Out[44]:

	Neighborhood	Average Rating
18	Noho	9.0

We will join this dataset to original new york data to get longitude and latitude

```
In [45]: ny_neighborhood_stats=pd.merge(ny_neighborhood_stats,new_york_data, on='Neighb
         orhood')
```

```
In [46]: ny_neighborhood_stats=ny_neighborhood_stats[['Borough','Neighborhood','Latitud
         e','Longitude','Average Rating']]
```

```
In [47]: ny_neighborhood_stats
```

Out[47]:

	Borough	Neighborhood	Latitude	Longitude	Average Rating
0	Manhattan	Noho	40.723259	-73.988434	9.0

Now we will show this data on a map

```
In [48]: # create map and display it
         ny_map = folium.Map(location=geo_location('New York'), zoom_start=12)
```

```
In [49]: # instantiate a feature group for the incidents in the dataframe
         incidents = folium.map.FeatureGroup()

         # loop through the 100 crimes and add each to the incidents feature group
         for lat, lng, in ny_neighborhood_stats[['Latitude','Longitude']].values:
             incidents.add_child(
                 folium.CircleMarker(
                     [lat, lng],
                     radius=10, # define how big you want the circle markers to be
                     color='yellow',
                     fill=True,
                     fill_color='blue',
                     fill_opacity=0.6
                 )
             )
```

Lets add a new field to dataframe for labeling purpose

```
In [50]: ny_neighborhood_stats['Label']=ny_neighborhood_stats['Neighborhood']+', '+ny_n
         eighborhood_stats['Borough']+'('+ny_neighborhood_stats['Average Rating'].map(s
         tr)+')'
```

In [51]:
```python
# add pop-up text to each marker on the map
for lat, lng, label in ny_neighborhood_stats[['Latitude','Longitude','Label']]
.values:
    folium.Marker([lat, lng], popup=label).add_to(ny_map)
# add incidents to map
ny_map.add_child(incidents)
```

Out[51]:
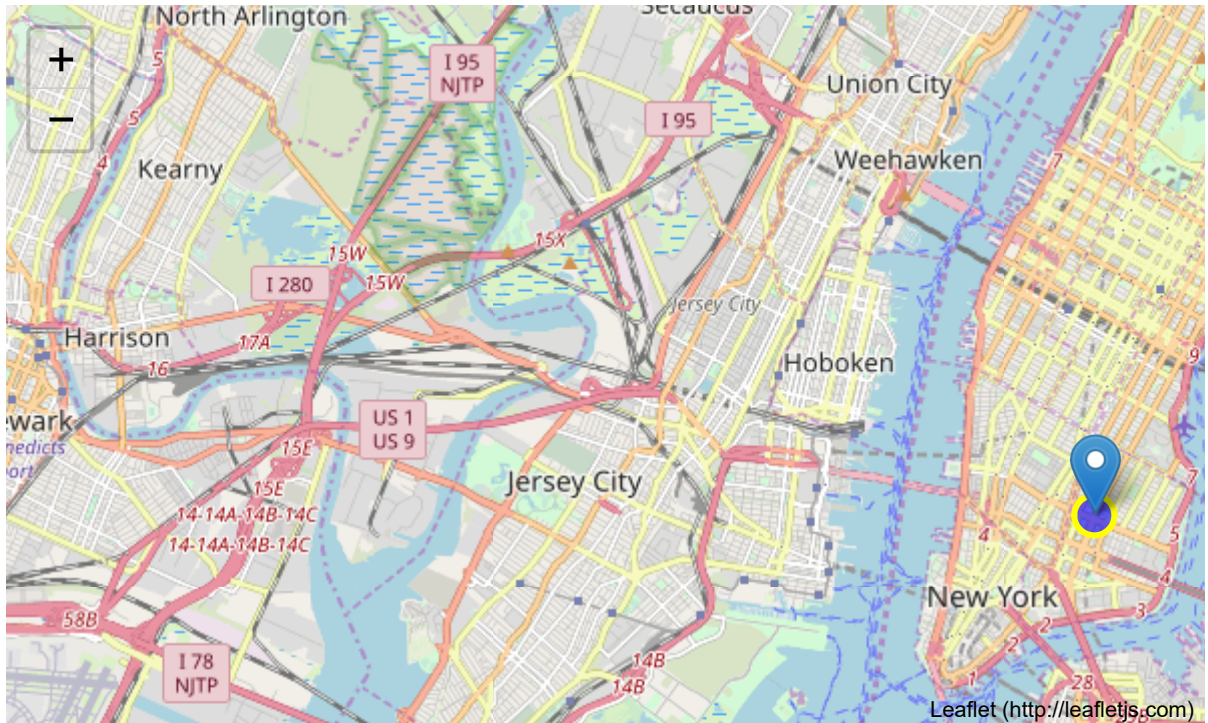
Now that we have visualized the Neighborhoods. Lets Visualize Boroughs based on average Rating

In [53]:
```python
ny_map = folium.Map(location=geo_location('New York'), zoom_start=12)
# borough boundaries downloaded from https://data.cityofnewyork.us/City-Govern
ment/Borough-Boundaries/tqmj-j8zm
ny_geo = r'Borough Boundaries.geojson'

ny_map.choropleth(
    geo_data=ny_geo,
    data=ny_borough_stats,
    columns=['Borough', 'Average Rating'],
    key_on='feature.properties.boro_name',
    fill_color='YlOrRd',
    fill_opacity=0.7,
    line_opacity=0.2,
    legend_name='Average Rating'
)

# display map
# as this is huge map data , we will save it to a file
ny_map.save('borough_rating.html')
```

The saved image can be downloaded at :
https://github.com/cvsrao/IBMDataScienceCapstone/blob/master/borough_rating.html
(https://github.com/cvsrao/IBMDataScienceCapstone/blob/master/borough_rating.html)

Conclusion

- Noho (Manhattan), East Village (Manhattan), Midtown South (Manhattan) are some of the best neighborhoods for korean cuisine.
- Queens have potential Korean Resturant Market.
- Staten Island and Bronx do not have any Korean Resturants.
- Manhattan is the best place to stay if you prefer Korean Cuisine.

Limitations

- The ranking is purely on basis of rating of resturants
- The accuracy of data depends purely depends on the data provided by FourSquare

```
In [ ]:
```

```
In [ ]:
```