

The_Battle_of_Neighborhoods_Part_2

December 13, 2020

0.1 Capstone Project - The Battle of Neighborhoods

1.Introductions & Business Problem:

Having a successful restaurant is a difficult task that requires significant amount of time and ensuring your menu is original and distinct compared to others. Having a successful restaurant in New York City is the pinnacle for some chefs career. So, it is evident that to survive in such competitive market it is very important to strategically plan. Factors need to be studied in order to decide on the Location such as:

1. New York Population
2. New York City Demographics
3. Are there any Farmers Markets, Wholesale markets etc nearby so that the ingredients can be purchased fresh to maintain quality and cost?
4. Are there any venues like Gyms, Entertainment zones, Parks etc nearby where floating population is high etc
5. Who are the competitors in that location?
6. Cuisine served / Menu of the competitors
7. Segmentation of the Borough Even though well-funded XYZ Company Ltd. need to choose the correct location to start its first venture. If this is successful, they can replicate the same in other locations. This would interest anyone who wants to start a new restaurant in New York city.

2. Data:

One city will be analysed in this project: New York City. We will be using the below datasets for analysing New York city

Data 1: Neighbourhood has a total of 5 boroughs and 306 neighbourhoods. In order to segment the neighbourhoods and explore them, we will essentially need a dataset that contains the 5 boroughs and the neighbourhoods that exist in each borough as well as the latitude and longitude coordinates of each neighbourhood. 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 neighbourhoods of New York city.

Data 2: Italian restaurants in each neighbourhood of New York city. Data source: Foursquare API Description: By using this api we will get all the venues in each neighbourhood. We can filter these venues to get only Indian restaurants. Data 3: 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.

3. 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

```
In [8]: 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

!pip install geocoder

import os
!conda install -c conda-forge folium
import folium # map rendering library
!conda install -c conda-forge geocoder
!conda install -c conda-forge geopy --yes
import geocoder
from geopy.geocoders import Nominatim # convert an address into latitude and longitude
# 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.')
```

Collecting geocoder

Downloading <https://files.pythonhosted.org/packages/4f/6b/13166c909ad2f2d76b929a4227c952630e>

100% || 102kB 3.4MB/s a 0:00:011

Requirement already satisfied: click in /Applications/Anaconda/anaconda/lib/python3.6/site-packages

Requirement already satisfied: requests in /Applications/Anaconda/anaconda/lib/python3.6/site-packages

Collecting ratelim (from geocoder)

Downloading <https://files.pythonhosted.org/packages/f2/98/7e6d147fd16a10a5f821db6e25f192265d>

Collecting future (from geocoder)

Downloading <https://files.pythonhosted.org/packages/45/0b/38b06fd9b92dc2b68d58b75f900e97884c>

100% || 829kB 694kB/s ta 0:00:011

Requirement already satisfied: six in /Applications/Anaconda/anaconda/lib/python3.6/site-packages

Requirement already satisfied: chardet<4,>=3.0.2 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages

Requirement already satisfied: idna<3,>=2.5 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages

Requirement already satisfied: urllib3!=1.25.0,!1.25.1,<1.26,>=1.21.1 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages

Requirement already satisfied: certifi>=2017.4.17 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages

Requirement already satisfied: decorator in /Applications/Anaconda/anaconda/lib/python3.6/site-packages

Building wheels for collected packages: future

Running setup.py bdist_wheel for future ... done

Stored in directory: /Users/arielromero/Library/Caches/pip/wheels/8b/99/a0/81daf51dcd359a937

Successfully built future

Installing collected packages: ratelim, future, geocoder

Successfully installed future-0.18.2 geocoder-1.38.1 ratelim-0.1.6

You are using pip version 9.0.1, however version 20.3.1 is available. You should consider upgrading

Collecting package metadata (repodata.json): done

Solving environment: \ WARNING conda.resolve:_get_sat_solver_cls(57): Could not run SAT solver failed with initial frozen solve. Retrying with flexible solve.

CondaDependencyError: Cannot run solver. No functioning SAT implementations available.

Collecting package metadata (repodata.json): done

Solving environment: / WARNING conda.resolve:_get_sat_solver_cls(57): Could not run SAT solver failed with initial frozen solve. Retrying with flexible solve.

CondaDependencyError: Cannot run solver. No functioning SAT implementations available.

Collecting package metadata (repodata.json): done

Solving environment: - WARNING conda.resolve:_get_sat_solver_cls(57): Could not run SAT solver failed with initial frozen solve. Retrying with flexible solve.

CondaDependencyError: Cannot run solver. No functioning SAT implementations available.

Libraries imported.

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

```
In [9]: 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 interact 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 [10]: def get_venues(lat, lng):  
  
        #set variables  
        radius=1000  
        LIMIT=100  
        CLIENT_ID = 'OGOKFCU55P01WMUAE5ZSE1NRPQQIP5F0J5EY1ZIOIKHQDNYG' # your Foursquare  
        CLIENT_SECRET = 'QU5PJIGT233ERHLCVAPFPLYPGJ1KDN1YJYTFJHRBADVWJWM' # your Foursquare  
        VERSION = '20180605' # Foursquare API version
```

```

#url to fetch data from foursquare api
url = 'https://api.foursquare.com/v2/venues/explore?&client_id={}&client_secret={}&v={}&lat={}&lng={}&radius={}&limit={}'
        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 [11]: def get_venue_details(venue_id):

    CLIENT_ID = 'OGOKFCU55P01WMUAE5ZSE1NRPQQIP5FOJ5EY1ZIOIKHQDNYG' # your Foursquare CLIENT_ID
    CLIENT_SECRET = 'QU5PJIGT233ERHLCVAPFPLYPGJ1KDN1YJYTFJHRBADVWJWM' # your Foursquare CLIENT_SECRET
    VERSION = '20180605' # Foursquare API version

    #url to fetch data from foursquare api
    url = 'https://api.foursquare.com/v2/venues/{venue_id}?&client_id={CLIENT_ID}&client_secret={CLIENT_SECRET}&v={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,venue_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 function to get the new york city data such as Boroughs, Neighborhoods along with their latitude and longitude.

```

In [12]: 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}, ignore_index=True)

return new_york_data

```

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

```

In [15]: # get new york data
new_york_data=get_new_york_data()

```

```

In [16]: new_york_data.head()

```

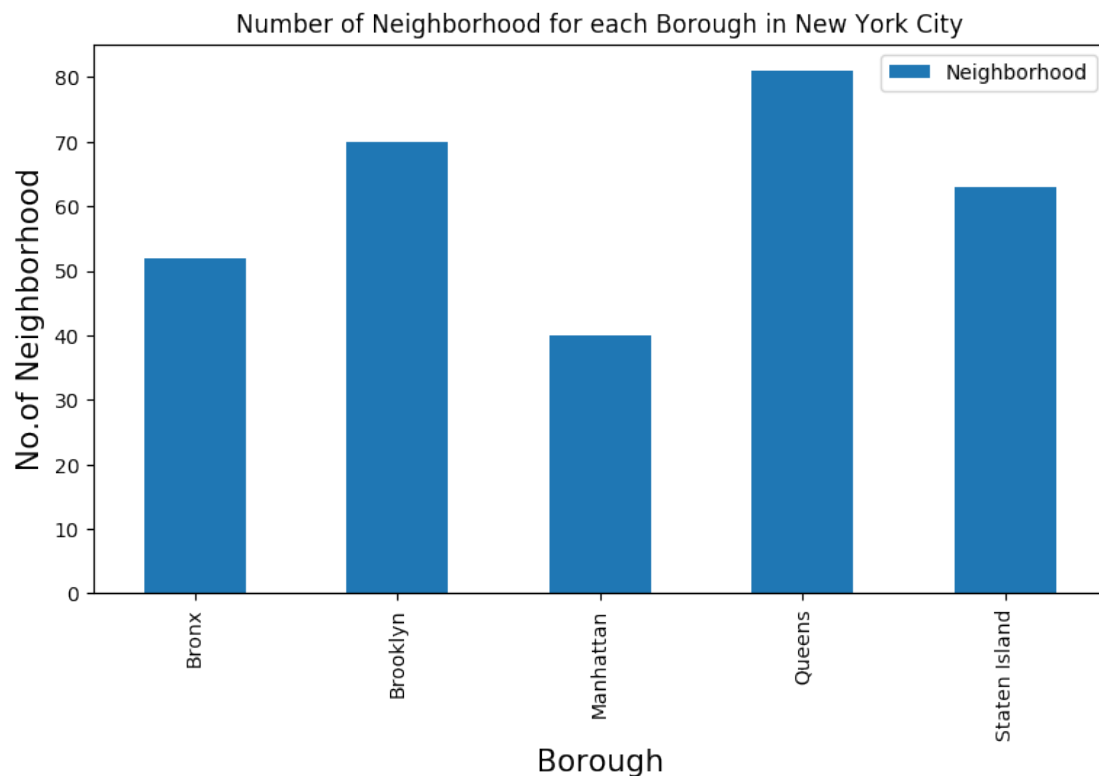
```
Out[16]:
```

	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 [17]: new_york_data.shape
```

```
Out[17]: (306, 4)
```

```
In [18]: 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()
```



Now we will collect Spanish restaurants for each Neighborhood

```
In [24]: # prepare neighborhood list that contains Italian restaurants
column_names=['Borough', 'Neighborhood', 'ID','Name']
italian_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)
    italian_restaurants=venues[venues['Category']=='Italian Restaurant']
    print('(',count,'/',len(new_york_data),')','Italian Restaurants in '+Neighborhood)
    for restaurant_detail in italian_restaurants.values.tolist():
        id, name , category=restaurant_detail
        italian_rest_ny = italian_rest_ny.append({'Borough': Borough,
                                                    'Neighborhood': Neighborhood,
                                                    'ID': id,
                                                    'Name' : name
                                                    }, ignore_index=True)

    count+=1

( 1 / 306 ) Italian Restaurants in Wakefield, Bronx:0
( 2 / 306 ) Italian Restaurants in Co-op City, Bronx:0
( 3 / 306 ) Italian Restaurants in Eastchester, Bronx:0
( 4 / 306 ) Italian Restaurants in Fieldston, Bronx:0
( 5 / 306 ) Italian Restaurants in Riverdale, Bronx:1
( 6 / 306 ) Italian Restaurants in Kingsbridge, Bronx:1
( 7 / 306 ) Italian Restaurants in Marble Hill, Manhattan:0
( 8 / 306 ) Italian Restaurants in Woodlawn, Bronx:1
( 9 / 306 ) Italian Restaurants in Norwood, Bronx:0
( 10 / 306 ) Italian Restaurants in Williamsbridge, Bronx:0
( 11 / 306 ) Italian Restaurants in Baychester, Bronx:2
( 12 / 306 ) Italian Restaurants in Pelham Parkway, Bronx:3
( 13 / 306 ) Italian Restaurants in City Island, Bronx:3
( 14 / 306 ) Italian Restaurants in Bedford Park, Bronx:1
( 15 / 306 ) Italian Restaurants in University Heights, Bronx:0
( 16 / 306 ) Italian Restaurants in Morris Heights, Bronx:0
( 17 / 306 ) Italian Restaurants in Fordham, Bronx:10
( 18 / 306 ) Italian Restaurants in East Tremont, Bronx:0
( 19 / 306 ) Italian Restaurants in West Farms, Bronx:0
( 20 / 306 ) Italian Restaurants in High Bridge, Bronx:0
( 21 / 306 ) Italian Restaurants in Melrose, Bronx:2
( 22 / 306 ) Italian Restaurants in Mott Haven, Bronx:1
( 23 / 306 ) Italian Restaurants in Port Morris, Bronx:0
( 24 / 306 ) Italian Restaurants in Longwood, Bronx:0
( 25 / 306 ) Italian Restaurants in Hunts Point, Bronx:0
( 26 / 306 ) Italian Restaurants in Morrisania, Bronx:1
( 27 / 306 ) Italian Restaurants in Soundview, Bronx:0
( 28 / 306 ) Italian Restaurants in Clason Point, Bronx:0
```

(29 / 306) Italian Restaurants in Throgs Neck, Bronx:6
 (30 / 306) Italian Restaurants in Country Club, Bronx:4
 (31 / 306) Italian Restaurants in Parkchester, Bronx:0
 (32 / 306) Italian Restaurants in Westchester Square, Bronx:1
 (33 / 306) Italian Restaurants in Van Nest, Bronx:2
 (34 / 306) Italian Restaurants in Morris Park, Bronx:5
 (35 / 306) Italian Restaurants in Belmont, Bronx:15
 (36 / 306) Italian Restaurants in Spuyten Duyvil, Bronx:1
 (37 / 306) Italian Restaurants in North Riverdale, Bronx:2
 (38 / 306) Italian Restaurants in Pelham Bay, Bronx:4
 (39 / 306) Italian Restaurants in Schuylerville, Bronx:3
 (40 / 306) Italian Restaurants in Edgewater Park, Bronx:6
 (41 / 306) Italian Restaurants in Castle Hill, Bronx:0
 (42 / 306) Italian Restaurants in Olinville, Bronx:0
 (43 / 306) Italian Restaurants in Pelham Gardens, Bronx:1
 (44 / 306) Italian Restaurants in Concourse, Bronx:1
 (45 / 306) Italian Restaurants in Unionport, Bronx:0
 (46 / 306) Italian Restaurants in Edenwald, Bronx:0
 (47 / 306) Italian Restaurants in Bay Ridge, Brooklyn:6
 (48 / 306) Italian Restaurants in Bensonhurst, Brooklyn:4
 (49 / 306) Italian Restaurants in Sunset Park, Brooklyn:1
 (50 / 306) Italian Restaurants in Greenpoint, Brooklyn:2
 (51 / 306) Italian Restaurants in Gravesend, Brooklyn:1
 (52 / 306) Italian Restaurants in Brighton Beach, Brooklyn:0
 (53 / 306) Italian Restaurants in Sheepshead Bay, Brooklyn:5
 (54 / 306) Italian Restaurants in Manhattan Terrace, Brooklyn:0
 (55 / 306) Italian Restaurants in Flatbush, Brooklyn:1
 (56 / 306) Italian Restaurants in Crown Heights, Brooklyn:0
 (57 / 306) Italian Restaurants in East Flatbush, Brooklyn:0
 (58 / 306) Italian Restaurants in Kensington, Brooklyn:0
 (59 / 306) Italian Restaurants in Windsor Terrace, Brooklyn:5
 (60 / 306) Italian Restaurants in Prospect Heights, Brooklyn:1
 (61 / 306) Italian Restaurants in Brownsville, Brooklyn:0
 (62 / 306) Italian Restaurants in Williamsburg, Brooklyn:1
 (63 / 306) Italian Restaurants in Bushwick, Brooklyn:2
 (64 / 306) Italian Restaurants in Bedford Stuyvesant, Brooklyn:1
 (65 / 306) Italian Restaurants in Brooklyn Heights, Brooklyn:4
 (66 / 306) Italian Restaurants in Cobble Hill, Brooklyn:6
 (67 / 306) Italian Restaurants in Carroll Gardens, Brooklyn:6
 (68 / 306) Italian Restaurants in Red Hook, Brooklyn:0
 (69 / 306) Italian Restaurants in Gowanus, Brooklyn:4
 (70 / 306) Italian Restaurants in Fort Greene, Brooklyn:5
 (71 / 306) Italian Restaurants in Park Slope, Brooklyn:1
 (72 / 306) Italian Restaurants in Cypress Hills, Brooklyn:0
 (73 / 306) Italian Restaurants in East New York, Brooklyn:0
 (74 / 306) Italian Restaurants in Starrett City, Brooklyn:1
 (75 / 306) Italian Restaurants in Canarsie, Brooklyn:0
 (76 / 306) Italian Restaurants in Flatlands, Brooklyn:0

(77 / 306) Italian Restaurants in Mill Island, Brooklyn:0
 (78 / 306) Italian Restaurants in Manhattan Beach, Brooklyn:5
 (79 / 306) Italian Restaurants in Coney Island, Brooklyn:1
 (80 / 306) Italian Restaurants in Bath Beach, Brooklyn:3
 (81 / 306) Italian Restaurants in Borough Park, Brooklyn:0
 (82 / 306) Italian Restaurants in Dyker Heights, Brooklyn:2
 (83 / 306) Italian Restaurants in Gerritsen Beach, Brooklyn:2
 (84 / 306) Italian Restaurants in Marine Park, Brooklyn:2
 (85 / 306) Italian Restaurants in Clinton Hill, Brooklyn:6
 (86 / 306) Italian Restaurants in Sea Gate, Brooklyn:0
 (87 / 306) Italian Restaurants in Downtown, Brooklyn:1
 (88 / 306) Italian Restaurants in Boerum Hill, Brooklyn:1
 (89 / 306) Italian Restaurants in Prospect Lefferts Gardens, Brooklyn:2
 (90 / 306) Italian Restaurants in Ocean Hill, Brooklyn:0
 (91 / 306) Italian Restaurants in City Line, Brooklyn:0
 (92 / 306) Italian Restaurants in Bergen Beach, Brooklyn:1
 (93 / 306) Italian Restaurants in Midwood, Brooklyn:0
 (94 / 306) Italian Restaurants in Prospect Park South, Brooklyn:1
 (95 / 306) Italian Restaurants in Georgetown, Brooklyn:4
 (96 / 306) Italian Restaurants in East Williamsburg, Brooklyn:3
 (97 / 306) Italian Restaurants in North Side, Brooklyn:1
 (98 / 306) Italian Restaurants in South Side, Brooklyn:1
 (99 / 306) Italian Restaurants in Ocean Parkway, Brooklyn:3
 (100 / 306) Italian Restaurants in Fort Hamilton, Brooklyn:4
 (101 / 306) Italian Restaurants in Chinatown, Manhattan:0
 (102 / 306) Italian Restaurants in Washington Heights, Manhattan:1
 (103 / 306) Italian Restaurants in Inwood, Manhattan:0
 (104 / 306) Italian Restaurants in Hamilton Heights, Manhattan:2
 (105 / 306) Italian Restaurants in Manhattanville, Manhattan:4
 (106 / 306) Italian Restaurants in Central Harlem, Manhattan:1
 (107 / 306) Italian Restaurants in East Harlem, Manhattan:4
 (108 / 306) Italian Restaurants in Upper East Side, Manhattan:8
 (109 / 306) Italian Restaurants in Yorkville, Manhattan:4
 (110 / 306) Italian Restaurants in Lenox Hill, Manhattan:7
 (111 / 306) Italian Restaurants in Roosevelt Island, Manhattan:2
 (112 / 306) Italian Restaurants in Upper West Side, Manhattan:5
 (113 / 306) Italian Restaurants in Lincoln Square, Manhattan:5
 (114 / 306) Italian Restaurants in Clinton, Manhattan:3
 (115 / 306) Italian Restaurants in Midtown, Manhattan:1
 (116 / 306) Italian Restaurants in Murray Hill, Manhattan:1
 (117 / 306) Italian Restaurants in Chelsea, Manhattan:2
 (118 / 306) Italian Restaurants in Greenwich Village, Manhattan:10
 (119 / 306) Italian Restaurants in East Village, Manhattan:1
 (120 / 306) Italian Restaurants in Lower East Side, Manhattan:3
 (121 / 306) Italian Restaurants in Tribeca, Manhattan:3
 (122 / 306) Italian Restaurants in Little Italy, Manhattan:3
 (123 / 306) Italian Restaurants in Soho, Manhattan:7
 (124 / 306) Italian Restaurants in West Village, Manhattan:10

(125 / 306) Italian Restaurants in Manhattan Valley, Manhattan:2
 (126 / 306) Italian Restaurants in Morningside Heights, Manhattan:4
 (127 / 306) Italian Restaurants in Gramercy, Manhattan:4
 (128 / 306) Italian Restaurants in Battery Park City, Manhattan:0
 (129 / 306) Italian Restaurants in Financial District, Manhattan:1
 (130 / 306) Italian Restaurants in Astoria, Queens:2
 (131 / 306) Italian Restaurants in Woodside, Queens:0
 (132 / 306) Italian Restaurants in Jackson Heights, Queens:1
 (133 / 306) Italian Restaurants in Elmhurst, Queens:0
 (134 / 306) Italian Restaurants in Howard Beach, Queens:4
 (135 / 306) Italian Restaurants in Corona, Queens:2
 (136 / 306) Italian Restaurants in Forest Hills, Queens:2
 (137 / 306) Italian Restaurants in Kew Gardens, Queens:0
 (138 / 306) Italian Restaurants in Richmond Hill, Queens:1
 (139 / 306) Italian Restaurants in Flushing, Queens:0
 (140 / 306) Italian Restaurants in Long Island City, Queens:3
 (141 / 306) Italian Restaurants in Sunnyside, Queens:1
 (142 / 306) Italian Restaurants in East Elmhurst, Queens:1
 (143 / 306) Italian Restaurants in Maspeth, Queens:2
 (144 / 306) Italian Restaurants in Ridgewood, Queens:3
 (145 / 306) Italian Restaurants in Glendale, Queens:1
 (146 / 306) Italian Restaurants in Rego Park, Queens:1
 (147 / 306) Italian Restaurants in Woodhaven, Queens:0
 (148 / 306) Italian Restaurants in Ozone Park, Queens:1
 (149 / 306) Italian Restaurants in South Ozone Park, Queens:1
 (150 / 306) Italian Restaurants in College Point, Queens:0
 (151 / 306) Italian Restaurants in Whitestone, Queens:5
 (152 / 306) Italian Restaurants in Bayside, Queens:3
 (153 / 306) Italian Restaurants in Auburndale, Queens:2
 (154 / 306) Italian Restaurants in Little Neck, Queens:6
 (155 / 306) Italian Restaurants in Douglaston, Queens:5
 (156 / 306) Italian Restaurants in Glen Oaks, Queens:1
 (157 / 306) Italian Restaurants in Bellerose, Queens:2
 (158 / 306) Italian Restaurants in Kew Gardens Hills, Queens:0
 (159 / 306) Italian Restaurants in Fresh Meadows, Queens:0
 (160 / 306) Italian Restaurants in Briarwood, Queens:0
 (161 / 306) Italian Restaurants in Jamaica Center, Queens:0
 (162 / 306) Italian Restaurants in Oakland Gardens, Queens:2
 (163 / 306) Italian Restaurants in Queens Village, Queens:0
 (164 / 306) Italian Restaurants in Hollis, Queens:0
 (165 / 306) Italian Restaurants in South Jamaica, Queens:0
 (166 / 306) Italian Restaurants in St. Albans, Queens:0
 (167 / 306) Italian Restaurants in Rochdale, Queens:0
 (168 / 306) Italian Restaurants in Springfield Gardens, Queens:0
 (169 / 306) Italian Restaurants in Cambria Heights, Queens:0
 (170 / 306) Italian Restaurants in Rosedale, Queens:0
 (171 / 306) Italian Restaurants in Far Rockaway, Queens:0
 (172 / 306) Italian Restaurants in Broad Channel, Queens:0

(173 / 306) Italian Restaurants in Breezy Point, Queens:0
 (174 / 306) Italian Restaurants in Steinway, Queens:6
 (175 / 306) Italian Restaurants in Beechhurst, Queens:6
 (176 / 306) Italian Restaurants in Bay Terrace, Queens:0
 (177 / 306) Italian Restaurants in Edgemere, Queens:0
 (178 / 306) Italian Restaurants in Arverne, Queens:0
 (179 / 306) Italian Restaurants in Rockaway Beach, Queens:0
 (180 / 306) Italian Restaurants in Neponsit, Queens:1
 (181 / 306) Italian Restaurants in Murray Hill, Queens:0
 (182 / 306) Italian Restaurants in Floral Park, Queens:1
 (183 / 306) Italian Restaurants in Holliswood, Queens:0
 (184 / 306) Italian Restaurants in Jamaica Estates, Queens:0
 (185 / 306) Italian Restaurants in Queensboro Hill, Queens:0
 (186 / 306) Italian Restaurants in Hillcrest, Queens:1
 (187 / 306) Italian Restaurants in Ravenswood, Queens:4
 (188 / 306) Italian Restaurants in Lindenwood, Queens:3
 (189 / 306) Italian Restaurants in Laurelton, Queens:0
 (190 / 306) Italian Restaurants in Lefrak City, Queens:1
 (191 / 306) Italian Restaurants in Belle Harbor, Queens:1
 (192 / 306) Italian Restaurants in Rockaway Park, Queens:1
 (193 / 306) Italian Restaurants in Somerville, Queens:0
 (194 / 306) Italian Restaurants in Brookville, Queens:0
 (195 / 306) Italian Restaurants in Bellaire, Queens:3
 (196 / 306) Italian Restaurants in North Corona, Queens:0
 (197 / 306) Italian Restaurants in Forest Hills Gardens, Queens:2
 (198 / 306) Italian Restaurants in St. George, Staten Island:3
 (199 / 306) Italian Restaurants in New Brighton, Staten Island:3
 (200 / 306) Italian Restaurants in Stapleton, Staten Island:0
 (201 / 306) Italian Restaurants in Rosebank, Staten Island:4
 (202 / 306) Italian Restaurants in West Brighton, Staten Island:3
 (203 / 306) Italian Restaurants in Grymes Hill, Staten Island:0
 (204 / 306) Italian Restaurants in Todt Hill, Staten Island:0
 (205 / 306) Italian Restaurants in South Beach, Staten Island:0
 (206 / 306) Italian Restaurants in Port Richmond, Staten Island:0
 (207 / 306) Italian Restaurants in Mariner's Harbor, Staten Island:2
 (208 / 306) Italian Restaurants in Port Ivory, Staten Island:0
 (209 / 306) Italian Restaurants in Castleton Corners, Staten Island:2
 (210 / 306) Italian Restaurants in New Springville, Staten Island:0
 (211 / 306) Italian Restaurants in Travis, Staten Island:1
 (212 / 306) Italian Restaurants in New Dorp, Staten Island:4
 (213 / 306) Italian Restaurants in Oakwood, Staten Island:0
 (214 / 306) Italian Restaurants in Great Kills, Staten Island:5
 (215 / 306) Italian Restaurants in Eltingville, Staten Island:3
 (216 / 306) Italian Restaurants in Annadale, Staten Island:0
 (217 / 306) Italian Restaurants in Woodrow, Staten Island:1
 (218 / 306) Italian Restaurants in Tottenville, Staten Island:4
 (219 / 306) Italian Restaurants in Tompkinsville, Staten Island:4
 (220 / 306) Italian Restaurants in Silver Lake, Staten Island:0

(221 / 306) Italian Restaurants in Sunnyside, Staten Island:0
 (222 / 306) Italian Restaurants in Ditmas Park, Brooklyn:1
 (223 / 306) Italian Restaurants in Wingate, Brooklyn:0
 (224 / 306) Italian Restaurants in Rugby, Brooklyn:0
 (225 / 306) Italian Restaurants in Park Hill, Staten Island:1
 (226 / 306) Italian Restaurants in Westerleigh, Staten Island:1
 (227 / 306) Italian Restaurants in Graniteville, Staten Island:0
 (228 / 306) Italian Restaurants in Arlington, Staten Island:0
 (229 / 306) Italian Restaurants in Arrochar, Staten Island:2
 (230 / 306) Italian Restaurants in Grasmere, Staten Island:4
 (231 / 306) Italian Restaurants in Old Town, Staten Island:7
 (232 / 306) Italian Restaurants in Dongan Hills, Staten Island:7
 (233 / 306) Italian Restaurants in Midland Beach, Staten Island:0
 (234 / 306) Italian Restaurants in Grant City, Staten Island:4
 (235 / 306) Italian Restaurants in New Dorp Beach, Staten Island:1
 (236 / 306) Italian Restaurants in Bay Terrace, Staten Island:3
 (237 / 306) Italian Restaurants in Huguenot, Staten Island:1
 (238 / 306) Italian Restaurants in Pleasant Plains, Staten Island:0
 (239 / 306) Italian Restaurants in Butler Manor, Staten Island:0
 (240 / 306) Italian Restaurants in Charleston, Staten Island:3
 (241 / 306) Italian Restaurants in Rossville, Staten Island:0
 (242 / 306) Italian Restaurants in Arden Heights, Staten Island:1
 (243 / 306) Italian Restaurants in Greenridge, Staten Island:1
 (244 / 306) Italian Restaurants in Heartland Village, Staten Island:0
 (245 / 306) Italian Restaurants in Chelsea, Staten Island:1
 (246 / 306) Italian Restaurants in Bloomfield, Staten Island:0
 (247 / 306) Italian Restaurants in Bulls Head, Staten Island:2
 (248 / 306) Italian Restaurants in Carnegie Hill, Manhattan:3
 (249 / 306) Italian Restaurants in Noho, Manhattan:3
 (250 / 306) Italian Restaurants in Civic Center, Manhattan:3
 (251 / 306) Italian Restaurants in Midtown South, Manhattan:4
 (252 / 306) Italian Restaurants in Richmond Town, Staten Island:3
 (253 / 306) Italian Restaurants in Shore Acres, Staten Island:4
 (254 / 306) Italian Restaurants in Clifton, Staten Island:2
 (255 / 306) Italian Restaurants in Concord, Staten Island:5
 (256 / 306) Italian Restaurants in Emerson Hill, Staten Island:1
 (257 / 306) Italian Restaurants in Randall Manor, Staten Island:1
 (258 / 306) Italian Restaurants in Howland Hook, Staten Island:0
 (259 / 306) Italian Restaurants in Elm Park, Staten Island:2
 (260 / 306) Italian Restaurants in Remsen Village, Brooklyn:1
 (261 / 306) Italian Restaurants in New Lots, Brooklyn:0
 (262 / 306) Italian Restaurants in Paerdegat Basin, Brooklyn:0
 (263 / 306) Italian Restaurants in Mill Basin, Brooklyn:3
 (264 / 306) Italian Restaurants in Jamaica Hills, Queens:0
 (265 / 306) Italian Restaurants in Utopia, Queens:1
 (266 / 306) Italian Restaurants in Pomonok, Queens:1
 (267 / 306) Italian Restaurants in Astoria Heights, Queens:3
 (268 / 306) Italian Restaurants in Claremont Village, Bronx:0

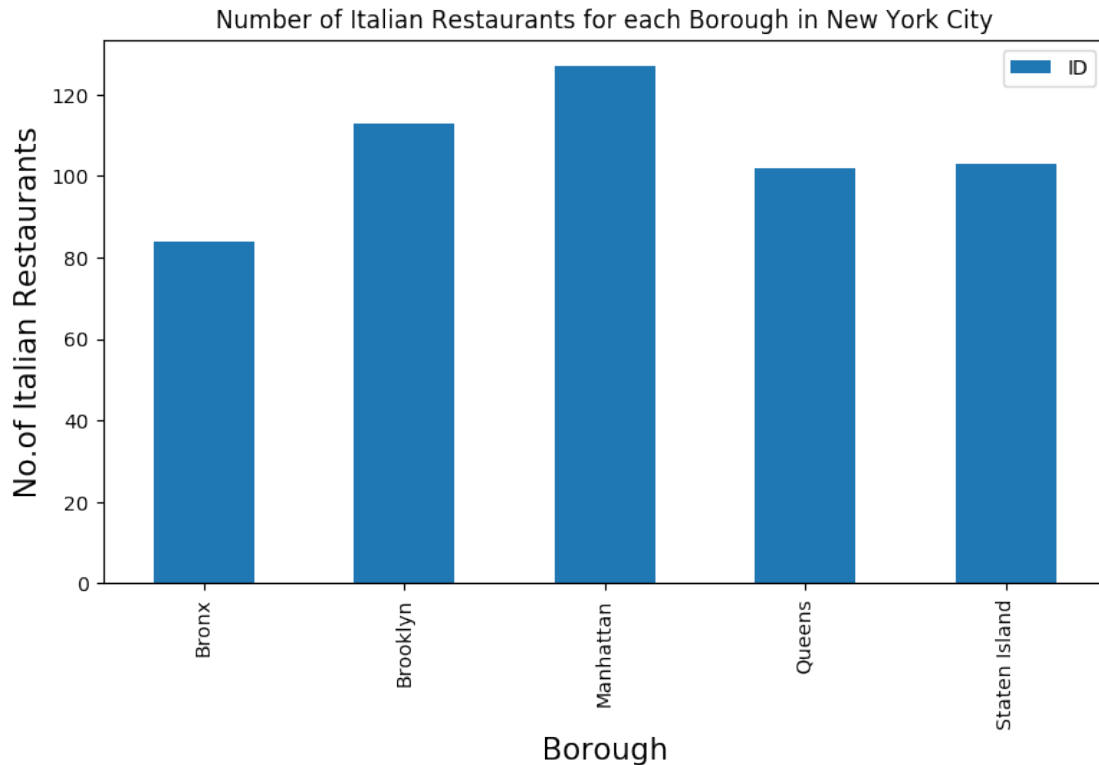
```
( 269 / 306 ) Italian Restaurants in Concourse Village, Bronx:2
( 270 / 306 ) Italian Restaurants in Mount Eden, Bronx:0
( 271 / 306 ) Italian Restaurants in Mount Hope, Bronx:0
( 272 / 306 ) Italian Restaurants in Sutton Place, Manhattan:5
( 273 / 306 ) Italian Restaurants in Hunters Point, Queens:7
( 274 / 306 ) Italian Restaurants in Turtle Bay, Manhattan:1
( 275 / 306 ) Italian Restaurants in Tudor City, Manhattan:0
( 276 / 306 ) Italian Restaurants in Stuyvesant Town, Manhattan:3
( 277 / 306 ) Italian Restaurants in Flatiron, Manhattan:4
( 278 / 306 ) Italian Restaurants in Sunnyside Gardens, Queens:3
( 279 / 306 ) Italian Restaurants in Blissville, Queens:0
( 280 / 306 ) Italian Restaurants in Fulton Ferry, Brooklyn:2
( 281 / 306 ) Italian Restaurants in Vinegar Hill, Brooklyn:2
( 282 / 306 ) Italian Restaurants in Weeksville, Brooklyn:0
( 283 / 306 ) Italian Restaurants in Broadway Junction, Brooklyn:0
( 284 / 306 ) Italian Restaurants in Dumbo, Brooklyn:2
( 285 / 306 ) Italian Restaurants in Manor Heights, Staten Island:0
( 286 / 306 ) Italian Restaurants in Willowbrook, Staten Island:1
( 287 / 306 ) Italian Restaurants in Sandy Ground, Staten Island:1
( 288 / 306 ) Italian Restaurants in Egbertville, Staten Island:1
( 289 / 306 ) Italian Restaurants in Roxbury, Queens:0
( 290 / 306 ) Italian Restaurants in Homecrest, Brooklyn:1
( 291 / 306 ) Italian Restaurants in Middle Village, Queens:1
( 292 / 306 ) Italian Restaurants in Prince's Bay, Staten Island:0
( 293 / 306 ) Italian Restaurants in Lighthouse Hill, Staten Island:2
( 294 / 306 ) Italian Restaurants in Richmond Valley, Staten Island:2
( 295 / 306 ) Italian Restaurants in Malba, Queens:1
( 296 / 306 ) Italian Restaurants in Highland Park, Brooklyn:0
( 297 / 306 ) Italian Restaurants in Madison, Brooklyn:1
( 298 / 306 ) Italian Restaurants in Bronxdale, Bronx:5
( 299 / 306 ) Italian Restaurants in Allerton, Bronx:0
( 300 / 306 ) Italian Restaurants in Kingsbridge Heights, Bronx:0
( 301 / 306 ) Italian Restaurants in Erasmus, Brooklyn:0
( 302 / 306 ) Italian Restaurants in Hudson Yards, Manhattan:3
( 303 / 306 ) Italian Restaurants in Hammels, Queens:0
( 304 / 306 ) Italian Restaurants in Bayswater, Queens:0
( 305 / 306 ) Italian Restaurants in Queensbridge, Queens:3
( 306 / 306 ) Italian Restaurants in Fox Hills, Staten Island:0
```

```
In [25]: italian_rest_ny.shape
```

```
Out[25]: (529, 4)
```

```
In [26]: plt.figure(figsize=(9,5), dpi = 100)
         # title
         plt.title('Number of Italian Restaurants for each Borough in New York City')
         #On x-axis
```

```
plt.xlabel('Borough', fontsize = 15)
#On y-axis
plt.ylabel('No. of Italian Restaurants', fontsize=15)
#giving a bar plot
italian_rest_ny.groupby('Borough')['ID'].count().plot(kind='bar')
#legend
plt.legend()
#displays the plot
plt.show()
```



```
In [32]: italian_rest_ny[italian_rest_ny['Neighborhood']=='Forest Hills']
```

```
Out[32]:
```

	Borough	Neighborhood	ID	Name
284	Queens	Forest Hills	4c8d2ce6f87e224bfb6d3b05	Tuscan Hills
285	Queens	Forest Hills	4ba0203af964a520105c37e3	Portofino Ristorante

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

```
In [34]: # prepare neighborhood list that contains indian restaurants
column_names=['Borough', 'Neighborhood', 'ID', 'Name', 'Likes', 'Rating', 'Tips']
italian_rest_stats_ny=pd.DataFrame(columns=column_names)
count=1
```

```

for row in italian_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 restaurants 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(italian_rest_ny),')','processed')
    italian_rest_stats_ny = italian_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	55aaee4d498e3cbb70e625d6	Bella Notte Pizzeria	9	6.8	4
(1 / 529) processed					
	ID	Name	Likes	Rating	Tips
0	55aaee4d498e3cbb70e625d6	Bella Notte Pizzeria	9	6.8	4
(2 / 529) processed					
	ID	Name	Likes	Rating	Tips
0	511edb6de4b0d58346fd272d	Patrizia's Of Woodlawn	18	8.5	14
(3 / 529) processed					
	ID	Name	Likes	Rating	Tips
0	4c9518076b35a143d5dc21dc	Fratelli's	22	8.7	6
(4 / 529) processed					
	ID	Name	Likes	Rating	Tips
0	5411894d498e4a254a11a46c	Olive Garden	26	7.4	8
(5 / 529) processed					
	ID	Name	Likes	Rating	Tips
0	4bf96ae65317a593d837017f	Enzo's	26	8.6	11
(6 / 529) processed					
	ID	Name	Likes	Rating	Tips
0	4b10591af964a5205f6e23e3	Patricia's	84	8.4	39
(7 / 529) processed					
	ID	Name	Likes	Rating	Tips
0	4b47f069f964a5208c4426e3	Pasta Pasta	9	6.3	8
(8 / 529) processed					
	ID	Name	Likes	Rating	Tips

0 4514ed4df964a520e5391fe3 Artie's Steak and Seafood 46 8.1 28
(9 / 529) processed

ID	Name	Likes	Rating	Tips
----	------	-------	--------	------

0 55905336498e1a9217de2a7a Scavello's On The Island 13 8.5 2
(10 / 529) processed

ID	Name	Likes	Rating	Tips
----	------	-------	--------	------

0 4b80a1c3f964a520488230e3 Portofino Restaurant 10 5.8 10
(11 / 529) processed

ID	Name	Likes	Rating	Tips
----	------	-------	--------	------

0 4b1712a8f964a520dbc123e3 Jolly Tinker 19 7.7 4
(12 / 529) processed

ID	Name	Likes	Rating	Tips
----	------	-------	--------	------

0 4acf80aef964a52025d420e3 Tino's Delicatessen 147 9.3 48
(13 / 529) processed

ID	Name	Likes	Rating	Tips
----	------	-------	--------	------

0 4bb6470cef159c7465b275f7 Calabria Pork Store 31 9.0 13
(14 / 529) processed

ID	Name	Likes	Rating	Tips
----	------	-------	--------	------

0 4b5a4c8ff964a52049bb28e3 Emilia's Restaurant 37 8.5 17
(15 / 529) processed

ID	Name	Likes	Rating	Tips
----	------	-------	--------	------

0 4b5514c4f964a5207cda27e3 Enzo's 42 8.4 19
(16 / 529) processed

ID	Name	Likes	Rating	Tips
----	------	-------	--------	------

0 59050f51b23dfa5f6649e678 Arthur Avenue Fiasco 10 8.2 4
(17 / 529) processed

ID	Name	Likes	Rating	Tips
----	------	-------	--------	------

0 4aa425bef964a5208e4520e3 Dominick's Restaurant 101 8.0 37
(18 / 529) processed

ID \

0 4af71916f964a520cf0522e3

Name	Likes	Rating	Tips
------	-------	--------	------

0 Michaelangelo's Coal Fired Brick Oven Pizza Re... 39 7.8 25
(19 / 529) processed

ID	Name	Likes	Rating	Tips
----	------	-------	--------	------

0 4c9b9e7b9c663704b90463fd Gerbasi Ristorante 15 7.3 12
(20 / 529) processed

ID	Name	Likes	Rating	Tips
----	------	-------	--------	------

0 53ff939c498e6b601dfa3979 San Gennaro Ristorante 17 7.2 1
(21 / 529) processed

ID \

0 4bc67f1104e8b713a833362d

Name	Likes	Rating	Tips
------	-------	--------	------

0 Ann & Tony's - An Original Arthur Avenue Resta... 12 6.8 8
(22 / 529) processed

ID	Name	Likes	Rating	Tips
----	------	-------	--------	------


```

0 5956be26123a195de6701c2b Porto Salvo      10      8.2      5
( 23 / 529 ) processed
      ID                               Name  Likes  Rating  Tips
0 4bb692672ea19521a6ecab2f Venice Restaurant & Pizzeria      8      7.4      9
( 24 / 529 ) processed
      ID      Name  Likes  Rating  Tips
0 4e6acfb1ae60950955a9b02b Wish 37      3      6.6      6
( 25 / 529 ) processed
      ID      Name  Likes  Rating  Tips
0 5956be26123a195de6701c2b Porto Salvo      10      8.2      5
( 26 / 529 ) processed
      ID      Name  Likes  Rating  Tips
0 4b4e3e87f964a5209de626e3 Patricia's of Tremont      47      8.2      29
( 27 / 529 ) processed
      ID      Name  Likes  Rating  Tips
0 4b958fccf964a52091a934e3 Ice House Cafe      11      7.4      14
( 28 / 529 ) processed
      ID      Name  Likes  Rating  Tips
0 4d4456d93616b60c953fe3c2 Tosca Marquee      20      6.8      14
( 29 / 529 ) processed
      ID      Name  Likes  Rating  Tips
0 4c1d717b8b3aa59363a99a5f Spoto's Italian Restaurant      6      6.6      11
( 30 / 529 ) processed
      ID      Name  Likes  Rating  Tips
0 4b6cb1c0f964a520d04c2ce3 Mamma Lucia's Pizza & Pasta      3      6.6      10
( 31 / 529 ) processed
      ID      Name  Likes  Rating  Tips
0 4b491198f964a5208f6426e3 Rino's Italian Restaurant      6      6.6      1
( 32 / 529 ) processed
      ID      Name  Likes  Rating  Tips
0 4c9e1ef2542b224b70a3f09f Lucca Italian Restaurant      7      8.0      4
( 33 / 529 ) processed
      ID      Name  Likes  Rating  \
0 4b85b6b3f964a5209b6e31e3 Giovanni's Italian Restaurant      11      7.5

Tips
0 10
( 34 / 529 ) processed
      ID      Name  Likes  Rating  Tips
0 4b634812f964a520936f2ae3 Vito's Deli      6      7.0      5
( 35 / 529 ) processed
Empty DataFrame
Columns: [ID, Name, Likes, Rating, Tips]
Index: []
No data available for id= 51f69c7a498e0655f8d77b3e
( 36 / 529 ) processed
      ID      Name  Likes  Rating  Tips
0 51aa5120498ec578a5ad0ac4 The Pines      4      6.9      4

```

(37 / 529) processed

	ID	Name	Likes	Rating	Tips
0	3fd66200f964a5207bf11ee3	F & J Pine Tavern	177	8.7	72

(38 / 529) processed

	ID	Name	Likes	Rating	Tips
0	4bd1d5fdcaff95211c6ed1f0	900 Park Restaurant	57	7.3	19

(39 / 529) processed

	ID	Name	Likes	Rating	Tips
0	4b10591af964a5205f6e23e3	Patricia's	84	8.4	39

(40 / 529) processed

	ID	Name	Likes	Rating	Tips
0	4bf96ae65317a593d837017f	Enzo's	26	8.6	11

(41 / 529) processed

	ID	Name	Likes	Rating	Tips
0	4bd1d5fdcaff95211c6ed1f0	900 Park Restaurant	57	7.3	19

(42 / 529) processed

	ID	Name	Likes	Rating	Tips
0	51aa5120498ec578a5ad0ac4	The Pines	4	6.9	4

(43 / 529) processed

	ID	Name	Likes	Rating	Tips
0	4b47f069f964a5208c4426e3	Pasta Pasta	9	6.3	8

(44 / 529) processed

	ID	Name	Likes	Rating	Tips
0	4acf80aef964a52025d420e3	Tino's Delicatessen	147	9.3	48

(45 / 529) processed

	ID	Name	Likes	Rating	Tips
0	4bb6470cef159c7465b275f7	Calabria Pork Store	31	9.0	13

(46 / 529) processed

	ID	Name	Likes	Rating	Tips
0	4af0fa29f964a52060e021e3	Antonio's Trattoria	119	8.9	44

(47 / 529) processed

	ID	Name	Likes	Rating	Tips
0	59050f51b23dfa5f6649e678	Arthur Avenue Fiasco	10	8.2	4

(48 / 529) processed

	ID	Name	Likes	Rating	Tips
0	4b5514c4f964a5207cda27e3	Enzo's	42	8.4	19

(49 / 529) processed

	ID	Name	Likes	Rating	Tips
0	4b5a4c8ff964a52049bb28e3	Emilia's Restaurant	37	8.5	17

(50 / 529) processed

	ID	Name	Likes	Rating	Tips
0	4a8e261cf964a5201c1220e3	Roberto's	65	8.5	23

(51 / 529) processed

KeyError Traceback (most recent call last)

```
<ipython-input-34-3cf63315f1e6> in <module>()
      8     Borough,Neighborhood,ID,Name=row
      9     try:
----> 10         venue_details=get_venue_details(ID)
      11         print(venue_details)
      12         id,name,likes,rating,tips=venue_details.values.tolist()[0]
```

```
<ipython-input-11-ffd0194894df> in get_venue_details(venue_id)
      14     # get all the data
      15     results = requests.get(url).json()
----> 16     venue_data=results['response']['venue']
      17     venue_details=[]
      18     try:
```

KeyError: 'venue'

```
In [35]: italian_rest_stats_ny.shape
```

```
Out[35]: (51, 7)
```

```
In [36]: italian_rest_ny.shape
```

```
Out[36]: (529, 4)
```

So we got data for all restaurants. Now let's 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 [38]: italian_rest_stats_ny.to_csv('italian_rest_stats_ny.csv', index=False)
```

Let's verify the data from saved csv file

```
In [39]: italian_rest_stats_ny_csv=pd.read_csv('italian_rest_stats_ny.csv')
```

```
In [40]: italian_rest_stats_ny_csv.shape
```

```
Out[40]: (51, 7)
```

```
In [41]: italian_rest_stats_ny_csv.head()
```

```
Out[41]:
```

	Borough	Neighborhood	ID	Name \
0	Bronx	Riverdale	55aaee4d498e3cbb70e625d6	Bella Notte Pizzeria
1	Bronx	Kingsbridge	55aaee4d498e3cbb70e625d6	Bella Notte Pizzeria
2	Bronx	Woodlawn	511edb6de4b0d58346fd272d	Patrizia's Of Woodlawn
3	Bronx	Baychester	4c9518076b35a143d5dc21dc	Fratelli's

4	Bronx	Baychester	5411894d498e4a254a11a46c	Olive Garden
---	-------	------------	--------------------------	--------------

	Likes	Rating	Tips
0	9	6.8	4
1	9	6.8	4
2	18	8.5	14
3	22	8.7	6
4	26	7.4	8

```
In [42]: italian_rest_stats_ny.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 51 entries, 0 to 50
Data columns (total 7 columns):
Borough          51 non-null object
Neighborhood      51 non-null object
ID                51 non-null object
Name              51 non-null object
Likes             51 non-null object
Rating            51 non-null float64
Tips              51 non-null object
dtypes: float64(1), object(6)
memory usage: 2.9+ KB
```

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

```
In [44]: italian_rest_stats_ny['Likes']=italian_rest_stats_ny['Likes'].astype('float64')
```

```
In [45]: italian_rest_stats_ny['Tips']=italian_rest_stats_ny['Tips'].astype('float64')
```

```
In [46]: italian_rest_stats_ny.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 51 entries, 0 to 50
Data columns (total 7 columns):
Borough          51 non-null object
Neighborhood      51 non-null object
ID                51 non-null object
Name              51 non-null object
Likes             51 non-null float64
Rating            51 non-null float64
Tips              51 non-null float64
dtypes: float64(3), object(4)
memory usage: 2.9+ KB
```

```
In [47]: # Resturant with maximum Likes
         italian_rest_stats_ny.iloc[italian_rest_stats_ny['Likes'].idxmax()]
```

```
Out [47]: Borough          Bronx
          Neighborhood      Van Nest
          ID                3fd66200f964a5207bf11ee3
          Name              F & J Pine Tavern
          Likes             177
          Rating            8.7
          Tips              72
          Name: 37, dtype: object
```

```
In [48]: # Restaurant with maximum Rating
         italian_rest_stats_ny.iloc[italian_rest_stats_ny['Rating'].idxmax()]
```

```
Out [48]: Borough          Bronx
          Neighborhood      Fordham
          ID                4acf80aef964a52025d420e3
          Name              Tino's Delicatessen
          Likes             147
          Rating            9.3
          Tips              48
          Name: 12, dtype: object
```

```
In [49]: # Restaurant with maximum Tips
         italian_rest_stats_ny.iloc[italian_rest_stats_ny['Tips'].idxmax()]
```

```
Out [49]: Borough          Bronx
          Neighborhood      Van Nest
          ID                3fd66200f964a5207bf11ee3
          Name              F & J Pine Tavern
          Likes             177
          Rating            8.7
          Tips              72
          Name: 37, dtype: object
```

Now lets visualize neighborhood with maximum average rating of resturants

```
In [50]: ny_neighborhood_stats=italian_rest_stats_ny.groupby('Neighborhood',as_index=False).mean()
         ny_neighborhood_stats.columns=['Neighborhood','Average Rating']
```

```
In [51]: ny_neighborhood_stats.sort_values(['Average Rating'],ascending=False).head(10)
```

```
Out [51]:
```

	Neighborhood	Average Rating
2	Belmont	8.685714
16	Woodlawn	8.500000
9	Morrisania	8.200000
5	Fordham	8.050000
0	Baychester	8.050000
14	Van Nest	8.000000
7	Melrose	7.800000
11	Pelham Parkway	7.766667
1	Bedford Park	7.700000
8	Morris Park	7.500000

Above are the top neighborhoods with top average rating of Italian restaurants

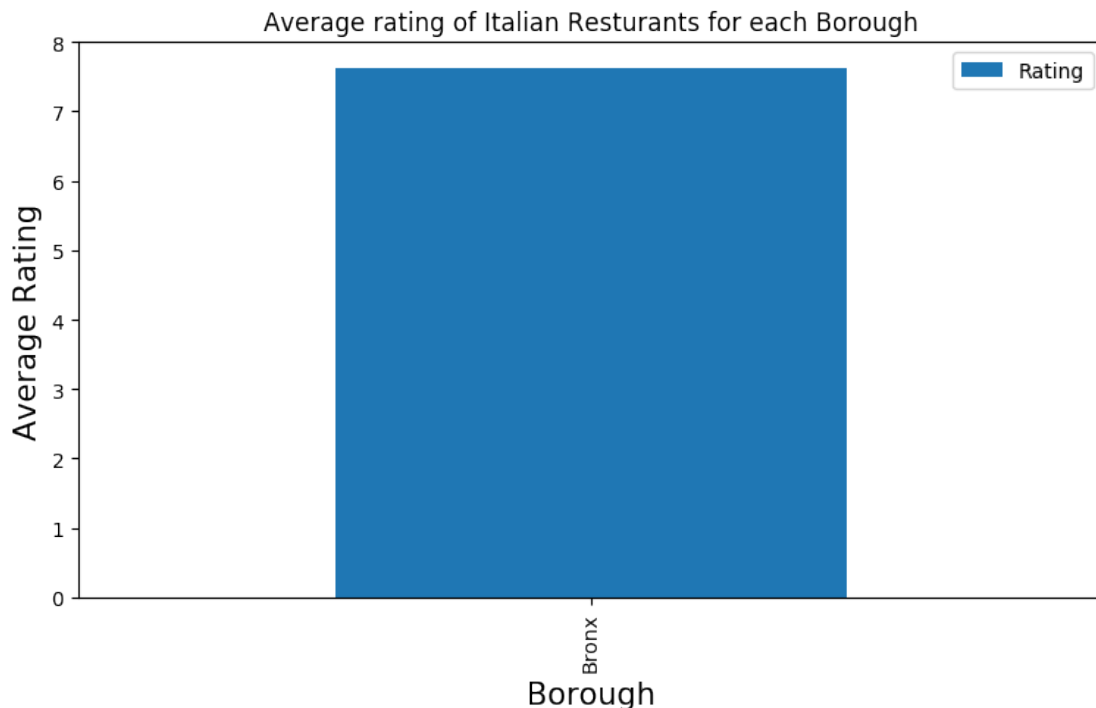
```
In [53]: ny_borough_stats=italian_rest_stats_ny.groupby('Borough',as_index=False).mean()[['Borough',  
ny_borough_stats.columns=['Borough','Average Rating']
```

```
In [54]: ny_borough_stats.sort_values(['Average Rating'],ascending=False).head()
```

```
Out[54]:   Borough  Average Rating  
0    Bronx          7.615686
```

Similarly these are the average rating of Indian Restaurants for each Borough
Lets visualize it

```
In [56]: plt.figure(figsize=(9,5), dpi = 100)  
         # title  
         plt.title('Average rating of Italian 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  
         italian_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 [57]: ny_neighborhood_stats=ny_neighborhood_stats[ny_neighborhood_stats['Average Rating']>=9.0]
ny_neighborhood_stats
```

```
Out[57]: Empty DataFrame
Columns: [Neighborhood, Average Rating]
Index: []
```

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

```
In [58]: ny_neighborhood_stats=pd.merge(ny_neighborhood_stats,new_york_data, on='Neighborhood')
ny_neighborhood_stats=ny_neighborhood_stats[['Borough','Neighborhood','Latitude','Longitude']]
ny_neighborhood_stats
```

```
Out[58]: Empty DataFrame
Columns: [Borough, Neighborhood, Latitude, Longitude, Average Rating]
Index: []
```

Now we will show this data on a map

```
In [60]: #create map and display it
ny_map = folium.Map(location=geo_location('New York'), zoom_start=12)

# 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 [61]: ny_neighborhood_stats['Label']=ny_neighborhood_stats['Neighborhood']+', '+ny_neighborhood_stats['Longitude']+', '+ny_neighborhood_stats['Latitude']
```

```
In [63]: # 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[63]: <folium.folium.Map at 0x117c6a438>
```

Results 1. We see that Manhattan has the most Italian restaurants out of all the Boroughs.

Conclusion

The highest rated restaurants are located in Belmont. Bronx has the least amount of restaurants out of all the Boroughs.

```
In [2]: !pip install rise
```

```
Collecting rise
```

```
Using cached rise-5.7.1-py2.py3-none-any.whl (4.3 MB)
```

```
Collecting notebook>=6.0
```

```
Using cached notebook-6.1.5-py3-none-any.whl (9.5 MB)
```

```
Requirement already satisfied: nbconvert in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (5.4.0)
```

```
Requirement already satisfied: ipython-genutils in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (0.2.0)
```

```
Requirement already satisfied: traitlets>=4.2.1 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (4.2.1)
```

```
Requirement already satisfied: ipykernel in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (4.9.0)
```

```
Requirement already satisfied: Jinja2 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (2.10.1)
```

```
Requirement already satisfied: nbformat in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (4.0.1)
```

```
Collecting argon2-cffi
```

```
Using cached argon2_cffi-20.1.0-cp36-abi3-macosx_10_7_x86_64.whl (100 kB)
```

```
Requirement already satisfied: cffi>=1.0.0 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (1.12.2)
```

```
Requirement already satisfied: six in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (1.12.0)
```

```
Requirement already satisfied: pyparser in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (1.0.0)
```

```
Requirement already satisfied: MarkupSafe>=0.23 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (1.1.1)
```

```
Collecting jupyter-client>=5.3.4
```

```
Using cached jupyter_client-6.1.7-py3-none-any.whl (108 kB)
```

```
Requirement already satisfied: traitlets>=4.2.1 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (4.2.1)
```

```
Requirement already satisfied: python-dateutil>=2.1 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (2.8.1)
```

```
Collecting jupyter-core>=4.6.1
```

```
Using cached jupyter_core-4.7.0-py3-none-any.whl (82 kB)
```

```
Requirement already satisfied: traitlets>=4.2.1 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (4.2.1)
```

```
Requirement already satisfied: mistune!=0.6 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (0.7.0)
```

```
Requirement already satisfied: Jinja2 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (2.10.1)
```

```
Requirement already satisfied: pygments in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (2.7.2)
```

```
Requirement already satisfied: traitlets>=4.2.1 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (4.2.1)
```

```
Requirement already satisfied: nbformat in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (4.0.1)
```

```
Requirement already satisfied: entrypoints>=0.2.2 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (0.3)
```

```
Requirement already satisfied: bleach in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (3.1.0)
```

```
Requirement already satisfied: pandocfilters>=1.4.1 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (1.4.1)
```

```
Requirement already satisfied: testpath in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (0.4.2)
```

```
Requirement already satisfied: six in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (1.12.0)
```

```
Requirement already satisfied: html5lib!=0.9999,!=0.99999,<0.99999999,>=0.999 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages (1.0.1)
```



```

Requirement already satisfied: six in /Applications/Anaconda/anaconda/lib/python3.6/site-packages
Collecting prometheus-client
  Using cached prometheus_client-0.9.0-py2.py3-none-any.whl (53 kB)
Requirement already satisfied: six in /Applications/Anaconda/anaconda/lib/python3.6/site-packages
Collecting pyzmq>=17
  Using cached pyzmq-20.0.0-cp36-cp36m-macosx_10_9_intel.whl (1.4 MB)
Collecting Send2Trash
  Using cached Send2Trash-1.5.0-py3-none-any.whl (12 kB)
Collecting terminado>=0.8.3
  Using cached terminado-0.9.1-py3-none-any.whl (13 kB)
Requirement already satisfied: ptyprocess in /Applications/Anaconda/anaconda/lib/python3.6/site-packages
Collecting tornado>=5.0
  Using cached tornado-6.1-cp36-cp36m-macosx_10_9_x86_64.whl (416 kB)
Installing collected packages: tornado, pyzmq, jupyter-core, terminado, Send2Trash, prometheus-client
Attempting uninstall: tornado
  Found existing installation: tornado 4.5.3
  Uninstalling tornado-4.5.3:
    Successfully uninstalled tornado-4.5.3
Attempting uninstall: pyzmq
  Found existing installation: pyzmq 16.0.2
ERROR: Cannot uninstall 'pyzmq'. It is a distutils installed project and thus we cannot accurately

```

```
In [7]: !pip install nbconvert
```

```

Requirement already satisfied: nbconvert in /Applications/Anaconda/anaconda/lib/python3.6/site-packages
Requirement already satisfied: mistune!=0.6 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages
Requirement already satisfied: Jinja2 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages
Requirement already satisfied: Pygments in /Applications/Anaconda/anaconda/lib/python3.6/site-packages
Requirement already satisfied: traitlets>=4.2 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages
Requirement already satisfied: jupyter_core in /Applications/Anaconda/anaconda/lib/python3.6/site-packages
Requirement already satisfied: nbformat in /Applications/Anaconda/anaconda/lib/python3.6/site-packages
Requirement already satisfied: entrypoints>=0.2.2 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages
Requirement already satisfied: bleach in /Applications/Anaconda/anaconda/lib/python3.6/site-packages
Requirement already satisfied: pandocfilters>=1.4.1 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages
Requirement already satisfied: testpath in /Applications/Anaconda/anaconda/lib/python3.6/site-packages
Requirement already satisfied: six in /Applications/Anaconda/anaconda/lib/python3.6/site-packages
Requirement already satisfied: HTML5lib!=0.9999,!=0.99999,<0.99999999,>=0.999 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages
Requirement already satisfied: MarkupSafe>=0.23 in /Applications/Anaconda/anaconda/lib/python3.6/site-packages

```

```
In [ ]:
```