

Captone project

February 11, 2021

0.1 Introduction: Business Problem

In this project we will use data science tools to identify which borough in New York City has the most unique places to visit.

0.2 Target audience

people looking to explore unique places to visit New York City

0.3 Background of the problem

people looking to explore unique places in New York City usually don't know which borough in New York City to visit that has the most unique places in New York City

0.4 Data to be used for project

foursquare location data (Borough, Borough Latitude, Borough Longitude, Venue, Venue Latitude, Venue Longitude, Venue Category)

0.5 Libraries used for project

requests(library to handle requests),pandas(library for data analysis),numpy(library to handle data in a vectorized manner),random(library for random number generation),Nominatim(module to convert an address into latitude and longitude values),Image&HTML(libraries for displaying images),json_normalize(transforming json file into a pandas dataframe library),folium(plotting library)

```
[2]: import requests # library to handle requests
import pandas as pd # library for data analysis
import numpy as np # library to handle data in a vectorized manner
import random # library for random number generation

!pip install geopy
from geopy.geocoders import Nominatim # module to convert an address into
    ↪ latitude and longitude values

# libraries for displaying images
from IPython.display import Image
from IPython.core.display import HTML
```

```

# transforming json file into a pandas dataframe library
from pandas.io.json import json_normalize

! pip install folium==0.5.0
import folium # plotting library

print('Folium installed')
print('Libraries imported.')

```

Collecting geopy

Downloading <https://files.pythonhosted.org/packages/0c/67/915668d0e286ca21a1da82a85ffe3d20528ec7212777b43ccd027d94023/geopy-2.1.0-py3-none-any.whl>
(112kB)

| 112kB 11.2MB/s eta 0:00:01

Collecting geographiclib<2,>=1.49 (from geopy)

Downloading <https://files.pythonhosted.org/packages/8b/62/26ec95a98ba64299163199e95ad1b0e34ad3f4e176e221c40245f211e425/geographiclib-1.50-py3-none-any.whl>

Installing collected packages: geographiclib, geopy

Successfully installed geographiclib-1.50 geopy-2.1.0

Requirement already satisfied: folium==0.5.0 in

/home/jupyterlab/conda/envs/python/lib/python3.6/site-packages (0.5.0)

Requirement already satisfied: requests in

/home/jupyterlab/conda/envs/python/lib/python3.6/site-packages (from folium==0.5.0) (2.25.0)

Requirement already satisfied: six in

/home/jupyterlab/conda/envs/python/lib/python3.6/site-packages (from folium==0.5.0) (1.15.0)

Requirement already satisfied: branca in

/home/jupyterlab/conda/envs/python/lib/python3.6/site-packages (from folium==0.5.0) (0.4.1)

Requirement already satisfied: jinja2 in

/home/jupyterlab/conda/envs/python/lib/python3.6/site-packages (from folium==0.5.0) (2.11.2)

Requirement already satisfied: chardet<4,>=3.0.2 in

/home/jupyterlab/conda/envs/python/lib/python3.6/site-packages (from requests->folium==0.5.0) (3.0.4)

Requirement already satisfied: urllib3<1.27,>=1.21.1 in

/home/jupyterlab/conda/envs/python/lib/python3.6/site-packages (from requests->folium==0.5.0) (1.25.11)

Requirement already satisfied: certifi>=2017.4.17 in

/home/jupyterlab/conda/envs/python/lib/python3.6/site-packages (from requests->folium==0.5.0) (2020.12.5)

Requirement already satisfied: idna<3,>=2.5 in

/home/jupyterlab/conda/envs/python/lib/python3.6/site-packages (from requests->folium==0.5.0) (2.10)

Requirement already satisfied: MarkupSafe>=0.23 in
/home/jupyterlab/conda/envs/python/lib/python3.6/site-packages (from
jinja2->folium==0.5.0) (1.1.1)
Folium installed
Libraries imported.

```
[3]: CLIENT_ID = 'DCLOPKPZWJHKZECVDMN21AVYC5T04XZJORSEFOQ05JGGYWVM'  
CLIENT_SECRET = 'WCLFWV2JQYTSQZLN2FJDJ5PC2PCSPVGPV4AGSBIY1MFLV0Q'  
ACCESS_TOKEN = 'BQ02FOJZR1UZBLRQH2NTOCYN5DDK1FWRL5GKLH3QDQHYB255'  
VERSION = '20180604'  
radius = 5000  
LIMIT = 100  
print('Your credentails:')  
print('CLIENT_ID: ' + CLIENT_ID)  
print('CLIENT_SECRET: ' + CLIENT_SECRET)
```

Your credentails:

CLIENT_ID: DCLOPKPZWJHKZECVDMN21AVYC5T04XZJORSEFOQ05JGGYWVM

CLIENT_SECRET: WCLFWV2JQYTSQZLN2FJDJ5PC2PCSPVGPV4AGSBIY1MFLV0Q

0.6 Created a dataframe containing name and location of all the boroughs of New York

```
[4]: data = {'Borough': ['Bronx', 'Brooklyn', 'Manhattan', 'Queens', 'Staten_↵  
↵Island'],  
            'Latitude': ['40.8466508', '40.6501038', '40.7896239', '40.7498243', '↵  
↵40.5834557'],  
            'Longitude': ['-73.8785937', '-73.9495823', '-73.9598939', '-73.↵  
↵7976337', '-74.1496048']  
            }  
  
df = pd.DataFrame (data, columns = ['Borough', 'Latitude', 'Longitude'])  
  
df
```

```
[4]:
```

	Borough	Latitude	Longitude
0	Bronx	40.8466508	-73.8785937
1	Brooklyn	40.6501038	-73.9495823
2	Manhattan	40.7896239	-73.9598939
3	Queens	40.7498243	-73.7976337
4	Staten Island	40.5834557	-74.1496048

```
[5]: df.dtypes
```

```
[5]: Borough      object  
Latitude      object  
Longitude      object
```

dtype: object

```
[6]: df["Latitude"] = pd.to_numeric(df["Latitude"], downcast="float")
df["Longitude"] = pd.to_numeric(df["Longitude"], downcast="float")
df.dtypes
```

```
[6]: Borough      object
Latitude    float32
Longitude    float32
dtype: object
```

```
[7]: latitude = 40.8466508
longitude = -73.8785937

map_borough = folium.Map(location=[latitude, longitude], zoom_start=12)
for borough, lat, lng in zip(df['Borough'], df['Latitude'], df['Longitude']):
    label = '{}'.format(borough)
    label = folium.Popup(label, parse_html=True)
    folium.CircleMarker(
        [lat, lng],
        radius=6,
        popup=label,
        color='blue',
        fill=True,
        fill_color='blue',
        fill_opacity=1,
        parse_html=False).add_to(map_borough)

map_borough
```

```
[7]: <folium.folium.Map at 0x7fd5efd9af98>
```

```
[ ]:
```

```
[8]: def getNearbyVenues(names, latitudes, longitudes):

    venues_list=[]
    for name, lat, lng in zip(names, latitudes, longitudes):
        print(name)

        url = 'https://api.foursquare.com/v2/venues/explore?
↳&client_id={}&client_secret={}&v={}&ll={},{}&radius={}&limit={}'.format(
            CLIENT_ID,
            CLIENT_SECRET,
            VERSION,
            lat,
            lng,
```

```

        radius,
        LIMIT)
    results= requests.get(url).json()["response"]['groups'][0]['items']

    #returning only relevant information for each nearby venue and append
    ↪to the list
    venues_list.append([
        name,
        lat,
        lng,
        ven['venue']['name'],
        ven['venue']['location']['lat'],
        ven['venue']['location']['lng'],
        ven['venue']['categories'][0]['name']) for ven in results])

    return (venues_list)

borough_venues = getNearbyVenues(names = df['Borough'],
                                  latitudes = df['Latitude'],
                                  longitudes = df['Longitude'])
borough_venues

```

Bronx
 Brooklyn
 Manhattan
 Queens
 Staten Island

```

[8]: [(('Bronx',
        40.846649169921875,
        -73.87859344482422,
        'Congo Gorilla Forest',
        40.8477740931664,
        -73.88160435479497,
        'Zoo'),
      ('Bronx',
        40.846649169921875,
        -73.87859344482422,
        'JungleWorld',
        40.84522652894162,
        -73.8771813890588,
        'Zoo'),
      ('Bronx',
        40.846649169921875,
        -73.87859344482422,
        'African Lions',
        40.847058199546495,

```

-73.8780235243182,
 'Zoo Exhibit'),
 ('Bronx',
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 'Grizzly Corner',
 40.849022925582624,
 -73.87773901220096,
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'Joes Italian Deli',
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 'Deli / Bodega'),
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 'Deli / Bodega'),
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 "Mike's Deli",
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 'Deli / Bodega'),
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 'World of Birds',
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'Zoo'),
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 'Food & Drink Shop'),
 ('Bronx',
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 "Borgatti's Ravioli & Egg Noodles",
 40.855014997992136,
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 'Food & Drink Shop'),
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 'Pizza Place'),
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 'TCK Martial Arts Academy',
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 'DeLillo Pastry Shop',

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 'Dessert Shop'),
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 'F & J Pine Tavern',
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 "Conti's Pastry Shoppe",
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 'The New York Botanical Garden',
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 "John & Joe's Pizzeria",
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 'Bakery'),
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 "Mario's Restaurant & Catering",
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 'Peggy Rockefeller Rose Garden',
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 'Garden'),
 ('Bronx',
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 'Enid A. Haupt Conservatory',
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 'Botanical Garden'),
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 'Yankee Pizza',
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 'Pizza Place'),
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 'Native Plant Garden at NYBG',
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 -73.87850216141788,
 'Garden'),
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 'Shop in the Garden',
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 'Gift Shop'),

('Bronx',
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 'The New York Botanical Gardens - The Rock Garden',
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 'Beer Garden'),
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 'Morrone Pastry Shop & Cafe',
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 'Dessert Shop'),
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 'La Masa',
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 'Arepa Restaurant'),
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 'NYBG Holiday Train Show',
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 'Primavera Pizzeria & Restaurant',
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-73.88876521498301,
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'Bar'),
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"Ann Clair's Salumeria",
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'Deli / Bodega'),
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'Peach Wave',
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'Frozen Yogurt Shop'),
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"John's Diner",
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('Bronx',
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```

'Edgar Allan Poe Cottage',
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 'History Museum'),
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 'Bronx Park Greenway/NYC Cycling Bike Path/Trail @ Allerton Ave',
 40.86632173117118,
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 'Trail'),
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 "Dunkin'",
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 ('Bronx',

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 'Mosholu Gate',
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 "Everett Children's Adventure Gardens",
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 'Family Garden - NYBG',
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 'Brisas Del Caribe Restaurant',
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 'Fresh Frutii',
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 'White Castle',
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 'Bronx Park',
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 'Park'),
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 'White Castle',
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 'Fast Food Restaurant'),
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 'Sal & Doms Bakery',
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 ('Bronx',
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 'Residence Inn by Marriott New York The Bronx at Metro Center Atrium',
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 -73.8425736,
 'Hotel'),
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 'Mexican Restaurant'),
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 'Juices for Life',
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 'Juice Bar'),
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 'La Estrellita Poblana',

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 'Sushi Restaurant'),
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'Cosmetics Shop'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Costco',
 40.572691331466544,
 -74.16882092754945,
 'Warehouse Store'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 "Ralph's Famous Italian Ices",
 40.573672676194874,
 -74.10696098032903,
 'Dessert Shop'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 "Dunkin'",
 40.58788893623654,
 -74.16532883678798,
 'Donut Shop'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 "Alfonso's Pastry Shoppe",
 40.61282236650595,
 -74.12729849865407,
 'Dessert Shop'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 "Ralph's Ices",
 40.5598048917645,
 -74.16927327526194,
 'Ice Cream Shop'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'HomeGoods',
 40.57466125488281,
 -74.16770935058594,
 'Department Store'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Belfiore Meats & Catering',

40.610116118071986,
 -74.14652307388414,
 'Italian Restaurant'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'A & C Superette',
 40.60508717320879,
 -74.12100822308966,
 'Deli / Bodega'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Taste Of India II',
 40.57212651619049,
 -74.11267401240129,
 'Indian Restaurant'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'AMC Dine-In Staten Island 11',
 40.580981214299264,
 -74.16721136454804,
 'Movie Theater'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'The Cake Chef',
 40.612884753962106,
 -74.1308372542201,
 'Bakery'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 "Max's Es-Ca",
 40.591488320573276,
 -74.10108934861441,
 'Italian Restaurant'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'HomeGoods',
 40.565139,
 -74.11303,
 'Furniture / Home Store'),
 ('Staten Island',
 40.58345413208008,

-74.14960479736328,
'Plaza Bagels & Deli',
40.57338689472842,
-74.11768802680378,
'Bagel Shop'),
('Staten Island',
40.58345413208008,
-74.14960479736328,
'La Strada',
40.573742673776685,
-74.11562734222126,
'Italian Restaurant'),
('Staten Island',
40.58345413208008,
-74.14960479736328,
"Macy's",
40.58353954977406,
-74.16528239016243,
'Department Store'),
('Staten Island',
40.58345413208008,
-74.14960479736328,
'Something Sweet',
40.57164273221767,
-74.11210681709342,
'Dessert Shop'),
('Staten Island',
40.58345413208008,
-74.14960479736328,
'Indoor Extreme Sports',
40.603198,
-74.190694,
'Recreation Center'),
('Staten Island',
40.58345413208008,
-74.14960479736328,
"Goodfella's Pizza & Restaurant",
40.61311430853664,
-74.12399889601244,
'Pizza Place'),
('Staten Island',
40.58345413208008,
-74.14960479736328,
'Sanma Japanese Restaurant',
40.61180973836901,
-74.15874947034513,
'Sushi Restaurant'),

('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 "Canlon's",
 40.56521399082132,
 -74.12679355909032,
 'Restaurant'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'La Fontana Restaurant',
 40.56829270499753,
 -74.12639466248552,
 'Italian Restaurant'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Precious Island Tea Shop',
 40.570726136335146,
 -74.11021898799076,
 'Dim Sum Restaurant'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 "Bagel N' Buns",
 40.610419286899,
 -74.1463047184718,
 'Bagel Shop'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Wine So Fine and Liquors',
 40.55963134765625,
 -74.16848754882812,
 'Wine Shop'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Island Cafe',
 40.61313392426478,
 -74.13058966398239,
 'Diner'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Nakata',
 40.587172659946596,

-74.10379592747928,
 'Japanese Restaurant'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Freshkills Park',
 40.57883097400664,
 -74.1878171503988,
 'Park'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Walgreens',
 40.5598153,
 -74.1664865,
 'Pharmacy'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Empire East',
 40.611896,
 -74.157533,
 'Chinese Restaurant'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Cucina Fresca',
 40.58136142634979,
 -74.11143749968348,
 'Italian Restaurant'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Great Kills Park',
 40.548113311332024,
 -74.12741661071777,
 'Park'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Brother's Pizza',
 40.62509643518737,
 -74.14399008324472,
 'Pizza Place'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,

'Empire East',
 40.56504284636723,
 -74.11429384830024,
 'Asian Restaurant'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Better Gourmet Health Kitchen',
 40.573943887949795,
 -74.10637975269493,
 'Food & Drink Shop'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Netcost Market',
 40.56467410007768,
 -74.13366301684205,
 'Grocery Store'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Cold Stone Creamery',
 40.590823,
 -74.164608,
 'Ice Cream Shop'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Zumiez',
 40.58200672977778,
 -74.12327625658739,
 'Clothing Store'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'A & S Salumeria and Bakery',
 40.6072059,
 -74.1636,
 'Deli / Bodega'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Rinconcito Paisa',
 40.6257873120808,
 -74.15503321906957,
 'Latin American Restaurant'),
 ('Staten Island',

40.58345413208008,
 -74.14960479736328,
 "Mario's",
 40.589676000000004,
 -74.10155,
 'Italian Restaurant'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Marshall's',
 40.587315,
 -74.166539,
 'Department Store'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'West Shore Inn Steakhouse',
 40.59414002159549,
 -74.18673466874999,
 'Steakhouse'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Da Noi Restaraunt',
 40.58778029506639,
 -74.19704127424215,
 'Italian Restaurant'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'European Wax Center',
 40.57306556113113,
 -74.10749485222351,
 'Health & Beauty Service'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Pastosa Ravioli',
 40.54530971582684,
 -74.1653639552597,
 'Gourmet Shop'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Campania Coal Fired Pizza',
 40.54320615990769,
 -74.16403266834551,

'Pizza Place'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Joe & Pat Pizzeria and Restaurant',
 40.61304647514354,
 -74.12212777422766,
 'Pizza Place'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'La Piazza',
 40.612126046664976,
 -74.15766325835641,
 'Pizza Place'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 "Alfonso's Pastry Shop",
 40.54503688560972,
 -74.1608523375123,
 'Bakery'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 "Dunkin'",
 40.560887859534056,
 -74.13511988649083,
 'Donut Shop'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'P.C. Richard & Son',
 40.589120196284775,
 -74.16661490803084,
 'Electronics Store'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 "Piccolino's italian Restaurant",
 40.55153846012257,
 -74.1497458477389,
 'Italian Restaurant'),
 ('Staten Island',
 40.58345413208008,
 -74.14960479736328,
 'Hilton Garden Inn',

```
40.6148942,
-74.1767925,
'Hotel')]]
```

0.7 Used Foursquare api to retrieve location data on boroughs giving us the Borough,borough latitude, borough longitude, venue,venue latitude, venue longitude and venue category then converted I formation into dataframe below

```
[9]: nearby_venues = pd.DataFrame([item for venue_list in borough_venues for item in venue_list])
nearby_venues.columns = ['Borough',
                          'Borough Latitude',
                          'Borough Longitude',
                          'Venue',
                          'Venue Latitude',
                          'Venue Longitude',
                          'Venue Category']
```

```
[10]: nearby_venues
```

```
[10]:
```

	Borough	Borough Latitude	Borough Longitude	\
0	Bronx	40.846649	-73.878593	
1	Bronx	40.846649	-73.878593	
2	Bronx	40.846649	-73.878593	
3	Bronx	40.846649	-73.878593	
4	Bronx	40.846649	-73.878593	
..	
495	Staten Island	40.583454	-74.149605	
496	Staten Island	40.583454	-74.149605	
497	Staten Island	40.583454	-74.149605	
498	Staten Island	40.583454	-74.149605	
499	Staten Island	40.583454	-74.149605	

	Venue	Venue Latitude	Venue Longitude	\
0	Congo Gorilla Forest	40.847774	-73.881604	
1	JungleWorld	40.845227	-73.877181	
2	African Lions	40.847058	-73.878024	
3	Grizzly Corner	40.849023	-73.877739	
4	Bronx Zoo	40.853107	-73.878094	
..	
495	Alfonso's Pastry Shop	40.545037	-74.160852	
496	Dunkin'	40.560888	-74.135120	
497	P.C. Richard & Son	40.589120	-74.166615	
498	Piccolino's italian Restaurant	40.551538	-74.149746	
499	Hilton Garden Inn	40.614894	-74.176793	


```

    Venue Category
0              Zoo
1              Zoo
2      Zoo Exhibit
3      Zoo Exhibit
4              Zoo
..           ...
495          Bakery
496      Donut Shop
497  Electronics Store
498  Italian Restaurant
499          Hotel

```

[500 rows x 7 columns]

```
[11]: new = nearby_venues[['Borough', 'Venue Category', 'Venue Latitude', 'Venue_
    ↳Longitude']].copy()
```

```
[12]: df_new = new.rename(columns={'Venue Category': 'Category', 'Venue Latitude':
    ↳'Latitude', 'Venue Longitude': 'Longitude'}, )
```

0.8 Created a new dataframe containing the only relevant information we needed like Borough, category longitude and latitude of venue

```
[13]: df_new
```

```
[13]:
    Borough      Category  Latitude  Longitude
0      Bronx          Zoo  40.847774 -73.881604
1      Bronx          Zoo  40.845227 -73.877181
2      Bronx  Zoo Exhibit  40.847058 -73.878024
3      Bronx  Zoo Exhibit  40.849023 -73.877739
4      Bronx          Zoo  40.853107 -73.878094
..       ...           ...       ...       ...
495  Staten Island    Bakery  40.545037 -74.160852
496  Staten Island  Donut Shop  40.560888 -74.135120
497  Staten Island  Electronics Store  40.589120 -74.166615
498  Staten Island  Italian Restaurant  40.551538 -74.149746
499  Staten Island      Hotel  40.614894 -74.176793

```

[500 rows x 4 columns]

```
[14]: df_new['Category'].value_counts()
```

```
[14]: Pizza Place      34
Park                  26
Italian Restaurant    24
Bakery                24

```

```

Coffee Shop          14
..
Taiwanese Restaurant 1
College Arts Building 1
Hot Dog Joint        1
Theme Park           1
Butcher              1
Name: Category, Length: 155, dtype: int64

```

0.9 Found out there is 155 unique places in New York City

```
[15]: print('There are {} Uniques Categories In total .'.
        ↳format(len(df_new['Category'].unique())))
```

There are 155 Uniques Categories In total .

0.10 Created a new data frame for the Bronx To determine how many unique places does the Bronx have

```
[16]: df_bronx=df_new[(df_new['Borough'] == 'Bronx')]
df_bronx
```

```
[16]:
```

	Borough	Category	Latitude	Longitude
0	Bronx	Zoo	40.847774	-73.881604
1	Bronx	Zoo	40.845227	-73.877181
2	Bronx	Zoo Exhibit	40.847058	-73.878024
3	Bronx	Zoo Exhibit	40.849023	-73.877739
4	Bronx	Zoo	40.853107	-73.878094
..
95	Bronx	Cuban Restaurant	40.837741	-73.834458
96	Bronx	Food	40.871159	-73.863050
97	Bronx	Vietnamese Restaurant	40.866956	-73.897839
98	Bronx	Italian Restaurant	40.863019	-73.843607
99	Bronx	Grocery Store	40.824016	-73.856396

[100 rows x 4 columns]

```
[17]: print('There are {} Uniques Categories In total the bronx .'.
        ↳format(len(df_bronx['Category'].unique())))
```

There are 42 Uniques Categories In total the bronx .

0.11 Created a new data frame for the Staten Island To determine how many unique places does the Staten Island have

```
[18]: df_staten_island=df_new[(df_new['Borough'] == 'Staten Island')]  
df_staten_island
```

```
[18]:
```

	Borough	Category	Latitude	Longitude
400	Staten Island	Trail	40.586616	-74.146917
401	Staten Island	Grocery Store	40.589997	-74.165715
402	Staten Island	Toy / Game Store	40.581963	-74.166272
403	Staten Island	Gastropub	40.581222	-74.167654
404	Staten Island	Clothing Store	40.580279	-74.166153
..
495	Staten Island	Bakery	40.545037	-74.160852
496	Staten Island	Donut Shop	40.560888	-74.135120
497	Staten Island	Electronics Store	40.589120	-74.166615
498	Staten Island	Italian Restaurant	40.551538	-74.149746
499	Staten Island	Hotel	40.614894	-74.176793

[100 rows x 4 columns]

```
[19]: print('There are {} Uniques Categories In total in Staten Island .'.  
→format(len(df_staten_island['Category'].unique())))
```

There are 53 Uniques Categories In total in Staten Island .

```
[20]: df_brooklyn=df_new[(df_new['Borough'] == 'Brooklyn')]  
df_brooklyn
```

```
[20]:
```

	Borough	Category	Latitude	Longitude
100	Brooklyn	Caribbean Restaurant	40.649091	-73.949243
101	Brooklyn	Theater	40.646110	-73.957175
102	Brooklyn	Restaurant	40.656012	-73.959912
103	Brooklyn	Caribbean Restaurant	40.654953	-73.959783
104	Brooklyn	Café	40.660007	-73.953362
..
195	Brooklyn	American Restaurant	40.681470	-73.955800
196	Brooklyn	Caribbean Restaurant	40.680807	-73.949525
197	Brooklyn	Fish Market	40.677063	-73.969198
198	Brooklyn	Bakery	40.678468	-73.968684
199	Brooklyn	Grocery Store	40.676101	-73.971784

[100 rows x 4 columns]

```
[21]: print('There are {} Uniques Categories In total in Brooklyn .'.  
→format(len(df_brooklyn['Category'].unique())))
```

There are 61 Uniques Categories In total in Brooklyn .

```
[22]: df_manhattan=df_new[(df_new['Borough'] == 'Manhattan')]  
df_manhattan
```

```
[22]:
```

	Borough	Category	Latitude	Longitude
200	Manhattan	Field	40.790160	-73.955498
201	Manhattan	Museum	40.785276	-73.957411
202	Manhattan	Reservoir	40.784213	-73.961058
203	Manhattan	Art Museum	40.784333	-73.957765
204	Manhattan	Café	40.787679	-73.953899
..
295	Manhattan	Liquor Store	40.767272	-73.959544
296	Manhattan	Concert Hall	40.773359	-73.982373
297	Manhattan	College Arts Building	40.773749	-73.982829
298	Manhattan	French Restaurant	40.766829	-73.967579
299	Manhattan	Theater	40.773354	-73.983827

[100 rows x 4 columns]

```
[23]: print('There are {} Uniques Categories In total in Manhattan .').  
↪format(len(df_manhattan['Category'].unique()))
```

There are 59 Uniques Categories In total in Manhattan .

0.12 Created a new data frame for the Queensd To determine how many unique places does the Queens have

```
[24]: df_queens=df_new[(df_new['Borough'] == ' Queens')]  
df_queens
```

```
[24]:
```

	Borough	Category	Latitude	Longitude
300	Queens	Pizza Place	40.758193	-73.795719
301	Queens	Park	40.747715	-73.808877
302	Queens	Bagel Shop	40.739460	-73.790554
303	Queens	Movie Theater	40.741098	-73.784097
304	Queens	Athletics & Sports	40.761575	-73.795557
..
395	Queens	Pizza Place	40.748445	-73.756498
396	Queens	Tapas Restaurant	40.770271	-73.793495
397	Queens	Park	40.772293	-73.769168
398	Queens	Pizza Place	40.761446	-73.770070
399	Queens	Gym	40.729120	-73.780555

[100 rows x 4 columns]

```
[25]: print('There are {} Uniques Categories In total in Queens .').  
↪format(len(df_queens['Category'].unique()))
```

There are 55 Uniques Categories In total in Queens .

0.13 Took each boroughs unique place count and Created another dataframe containing the total unique places under each borough

```
[26]: unique_bronx=len(df_bronx['Category'].unique())
unique_manhattan=len(df_manhattan['Category'].unique())
unique_brooklyn=len(df_brooklyn['Category'].unique())
unique_staten_island=len(df_queens['Category'].unique())
unique_queens=len(df_queens['Category'].unique())

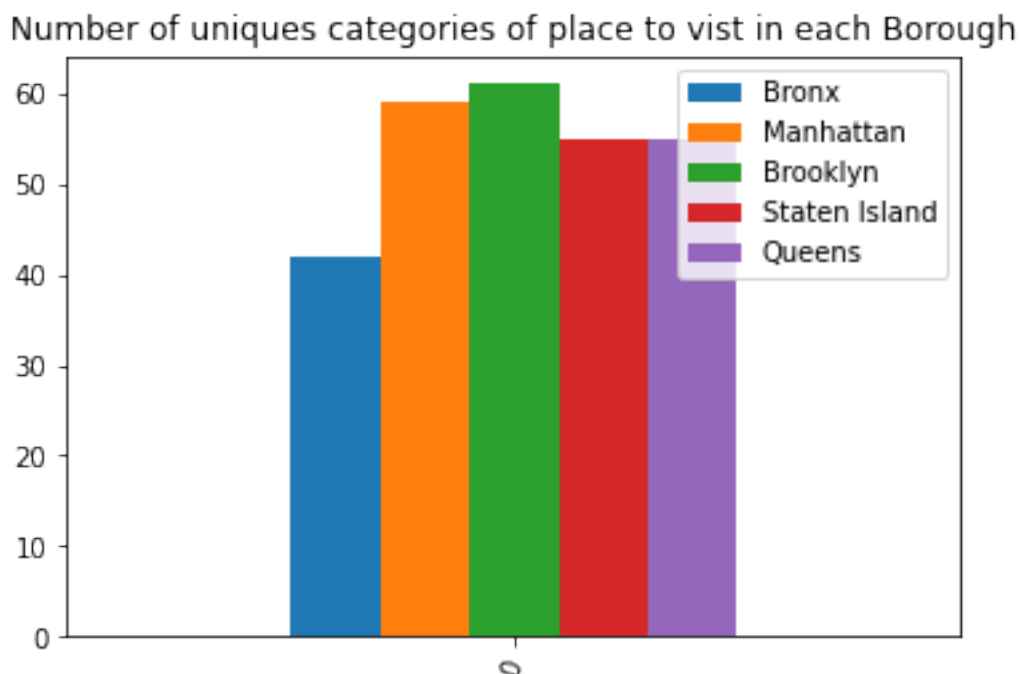
df_category={ 'Bronx':[unique_bronx], 'Manhattan':[unique_manhattan], 'Brooklyn':
    ↳[unique_brooklyn], 'Staten Island':[unique_staten_island], 'Queens':
    ↳[unique_queens],
}
df_category
df_category_list=pd.DataFrame (df_category, columns =_
    ↳['Bronx','Manhattan','Brooklyn','Staten Island','Queens'])
df_category_list
```

```
[26]:
```

	Bronx	Manhattan	Brooklyn	Staten Island	Queens
0	42	59	61	55	55

0.14 Used the information on the previous dataframe to create a bar chart to check which borough has the most unique places

```
[27]: df_category_list.plot.bar( rot=70, title="Number of unques categories of place_
    ↳to vist in each Borough");
```



0.15 As we can see Brooklyn has the most unique places Between the rest of the boroughs of New York

[]: