Coursera Capstone
The battle of Neighborhoods

Introduction :

New York city is the most populous city in the US. With a population of almost 9 Millions over 790 km2. New York city is also the most densely populated major city in the US.

Situated on one of the world's largest natural harbors, New York City is composed of five boroughs, each of which is a county of the State of New York.

The city and its metropolitan area constitute the premier gateway for legal immigration to the United States. As many as 800 languages are spoken in New York,[18] making it the most linguistically diverse city in the world. New York is home to more than 3.2 million residents born outside the United States.

With all its diverse culture, we have diverse food. There are a lot of restaurants in New York city, and each restaurant belong to a different culture, such as Chinese, Italian, French and more.

In this project, we will find the answers of those questions :

I'm a French, and I would like to know:

1. Visualize major parts of NYC which have great French restaurant.
2. What is the best location for French restaurant in NYC ?
3. Which Area have potential French restaurant market ?
4. Which all areas lack French restaurants ?
5. Which is the best place to stay if you like French Food ?

For this project, we will need :

•New York city Neighborhood has a total of 5 boroughs and 306 neighborhoods. In order to segement the neighborhoods and explore them, we will essentially need a dataset that contains the 5 boroughs and the neighborhoods that exist in each borough as well as the the latitude and logitude coordinates of each neighborhood.

- Data source : https://cocl.us/new_york_dataset
- Description : This data set contains all information to explore New York city neighborhood

- French restaurants in neighborhood of New York city
  - Data source : https://data.cityofnewyork.us/City-Government/Borough-Boundaries/tqmj-j8zm
  - Description : with this geo space data we will get borough boundaries for New York city and this will help us visualize choropleth map.

- Foursquare API to get information about venues

Methodology :

First, we collecting the New York city data from https://cocl.us/new_york_dataset
Then we will find all venues for each neighborhoods using the Foursquare API

```
Entrée [8]: new_york_data=get_new_york_data()

Entrée [9]: new_york_data.head(10)
```

Out[9]:

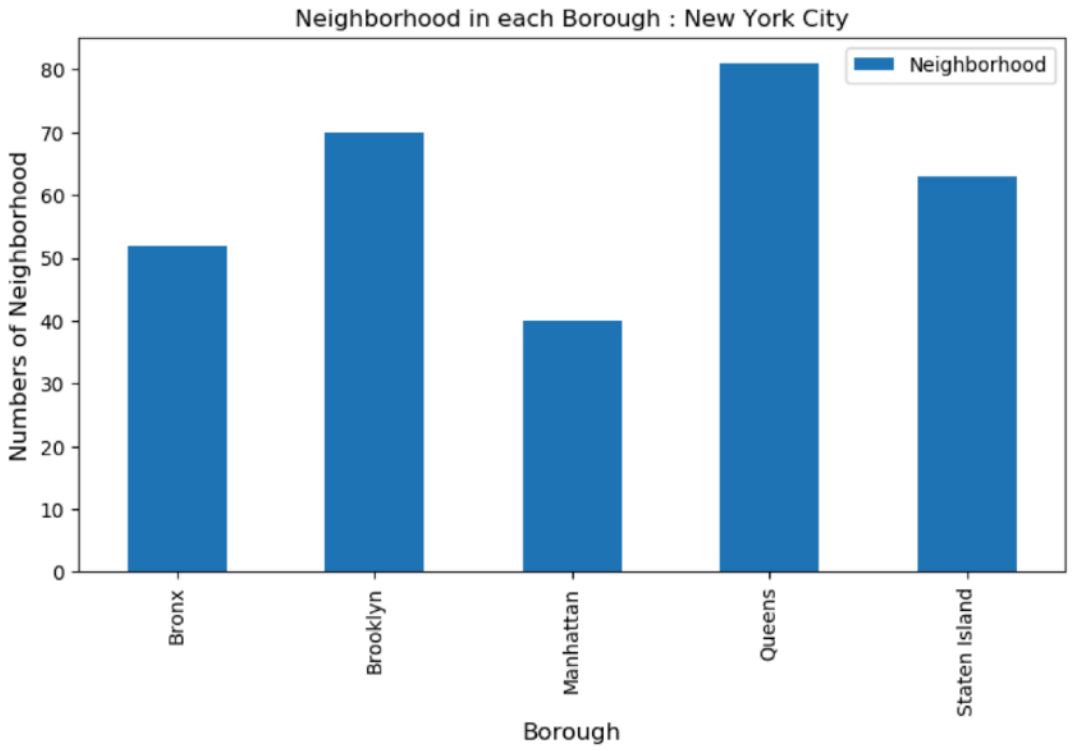
	Borough	Neighborhood	Latitude	Longitude
0	Bronx	Wakefield	40.894705	-73.847201
1	Bronx	Co-op City	40.874294	-73.829939
2	Bronx	Eastchester	40.887556	-73.827806
3	Bronx	Fieldston	40.895437	-73.905643
4	Bronx	Riverdale	40.890834	-73.912585
5	Bronx	Kingsbridge	40.881687	-73.902818
6	Manhattan	Marble Hill	40.876551	-73.910660
7	Bronx	Woodlawn	40.898273	-73.867315
8	Bronx	Norwood	40.877224	-73.879391
9	Bronx	Williamsbridge	40.881039	-73.857446

```
Entrée [10]: new_york_data.shape
```

Out[10]: (306, 4)

now let's see with bar plot different neigborhoods in New York City

Entrée [11]:
```
plt.figure(figsize=(9,5), dpi = 100)
plt.title('Neighborhood in each Borough : New York City')
plt.xlabel('Borough', fontsize = 12)
plt.ylabel('Numbers of Neighborhood', fontsize=12)
new_york_data.groupby('Borough')['Neighborhood'].count().plot(kind='bar'
plt.legend()
plt.show()
```



We will collect data about French restaurant in NYC

Entrée [20]:
```
frenchRest.head()
```

Out[20]:

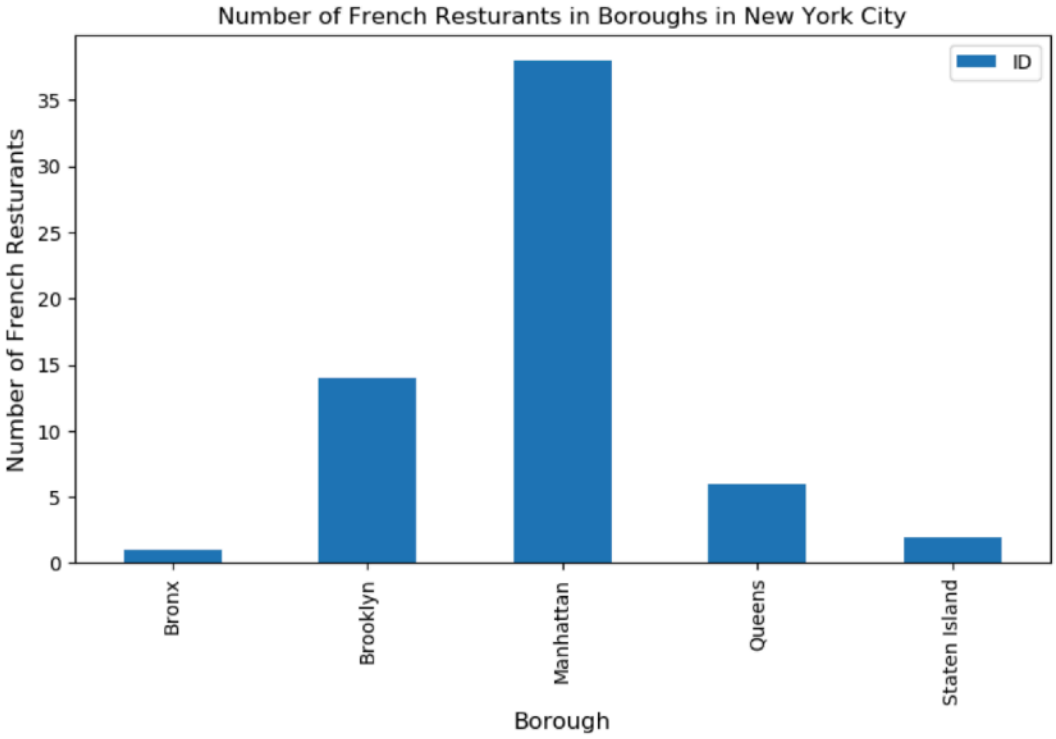
	Borough	Neighborhood	ID	Name
0	Bronx	City Island	4d7aa83ee540f04d66ba16dc	Bistro SK
1	Brooklyn	Greenpoint	58fd34584382ab70ad90083e	Chez Ma Tante
2	Brooklyn	Greenpoint	4bcf1883c564ef3ba33beff0	Le Gamin
3	Brooklyn	Windsor Terrace	4e7d174cb6340a4da75a2cca	Le Paddock
4	Brooklyn	Bedford Stuyvesant	5003007de4b06d50188aa593	Le Paris Dakar

Entrée [21]:
```
frenchRest.shape
```

Out[21]: (61, 4)

We can see that we have 61 French Restaurants in New York City

Entrée [22]:
```
plt.figure(figsize=(9,5), dpi = 100)
plt.title('Number of French Resturants in Boroughs in New York City')
plt.xlabel('Borough', fontsize = 12)
plt.ylabel('Number of French Resturants', fontsize=12)
frenchRest.groupby('Borough')['ID'].count().plot(kind='bar')
plt.legend()
plt.show()
```



Then we will use the Foursquare API to get the Ratings, tips, likes of all French restaurants

Entrée [27]:
```
frenchRestanalysis.head(10)
```

Out[27]:

	Borough	Neighborhood	ID	Name	Likes	Rating	Tips
0	Bronx	City Island	4d7aa83ee540f04d66ba16dc	Bistro SK	13	7.6	7
1	Brooklyn	Greenpoint	58fd34584382ab70ad90083e	Chez Ma Tante	212	8.7	58
2	Brooklyn	Greenpoint	4bcf1883c564ef3ba33beff0	Le Gamin	158	8.0	73
3	Brooklyn	Windsor Terrace	4e7d174cb6340a4da75a2cca	Le Paddock	135	8.8	56
4	Brooklyn	Bedford Stuyvesant	5003007de4b06d50188aa593	Le Paris Dakar	145	8.4	41
5	Brooklyn	Brooklyn Heights	4f7f8b86e4b088077df30175	Chez Moi	201	8.4	75
6	Brooklyn	Cobble Hill	4f7f8b86e4b088077df30175	Chez Moi	201	8.4	75
7	Brooklyn	Gowanus	51e7e612498e001aa73959dd	Olivier Bistro	109	8.0	38
8	Brooklyn	Downtown	530931a5498e4079544a5f13	French Louie	569	8.5	115
9	Brooklyn	Downtown	4d20bc3af7a9a143bcab2f9f	The Little Sweet Café	65	8.1	32

Entrée [28]:
```
frenchRestanalysis.shape
```

Out[28]: (50, 7)

We will sort Neighborhoods and boroughs

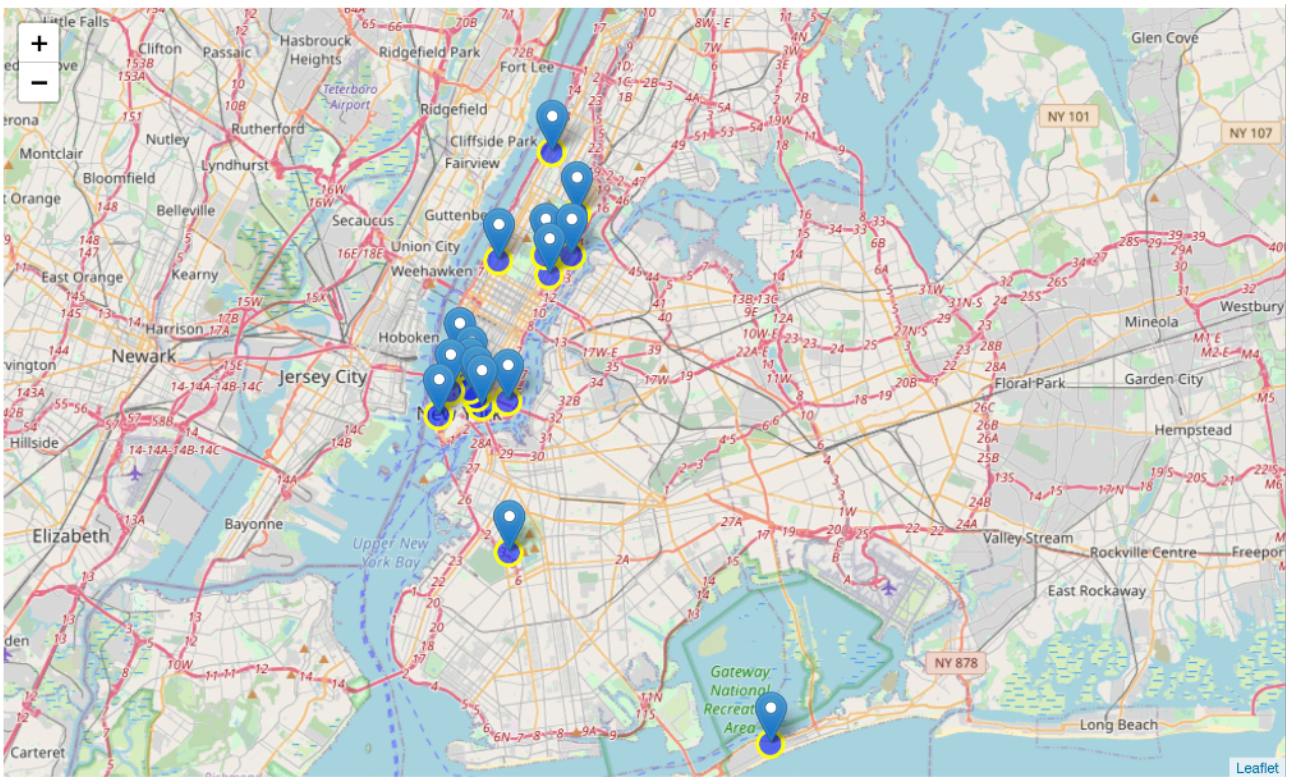
	Neighborhood	Average Rating
10	East Harlem	9.30
25	Soho	8.90
13	Greenwich Village	8.90
5	Chinatown	8.90
16	Little Italy	8.90
18	Lower East Side	8.85
30	Yorkville	8.80
29	Windsor Terrace	8.80
28	West Village	8.75
23	Rockaway Park	8.70

	Borough	Average Rating
2	Manhattan	8.683871
1	Brooklyn	8.330769
3	Queens	8.025000
0	Bronx	7.600000
4	Staten Island	7.200000

We will consider all the neighborhoods with average rating greater or equal 8.5 to visualize on map and join the dataset to the original New York Data to get Latitude et Longitude

	Borough	Neighborhood	Latitude	Longitude	Average Rating
0	Manhattan	Battery Park City	40.711932	-74.016869	8.60
1	Manhattan	Chinatown	40.715618	-73.994279	8.90
2	Manhattan	East Harlem	40.792249	-73.944182	9.30
3	Manhattan	Greenwich Village	40.726933	-73.999914	8.90
4	Manhattan	Lenox Hill	40.768113	-73.958860	8.60
5	Manhattan	Lincoln Square	40.773529	-73.985338	8.70
6	Manhattan	Little Italy	40.719324	-73.997305	8.90
7	Manhattan	Lower East Side	40.717807	-73.980890	8.85
8	Manhattan	Manhattanville	40.816934	-73.957385	8.50
9	Queens	Rockaway Park	40.580343	-73.841534	8.70
10	Manhattan	Soho	40.722184	-74.000657	8.90
11	Manhattan	Tribeca	40.721522	-74.010683	8.60

Finally, we will visualize the neighborhood and borough base on average rating



Result :
we see that Manhattan is the best place to stay if we like French Food