

Capstone Project - Final Assignment

November 30, 2019

```
[1]: #Download and execute all the libraries

import numpy as np # library to handle data in a vectorized manner

import pandas as pd # library for data analysis
pd.set_option('display.max_columns', None)
pd.set_option('display.max_rows', None)

import json # library to handle JSON files

!conda install -c conda-forge geopy --yes # uncomment this line if you haven't
↳ completed the Foursquare API lab
from geopy.geocoders import Nominatim # convert an address into latitude and
↳ longitude values

import requests # library to handle requests
from pandas.io.json import json_normalize # tranform JSON file into a pandas
↳ dataframe

# Matplotlib and associated plotting modules
import matplotlib.cm as cm
import matplotlib.colors as colors

# import k-means from clustering stage
from sklearn.cluster import KMeans

#!conda install -c conda-forge folium=0.5.0 --yes # uncomment this line if you
↳ haven't completed the Foursquare API lab
import folium # map rendering library

print('Libraries imported.')
```

Solving environment: done

==> WARNING: A newer version of conda exists. <==
current version: 4.5.11

latest version: 4.7.12

Please update conda by running

```
$ conda update -n base -c defaults conda
```

Package Plan

environment location: /home/jupyterlab/conda/envs/python

added / updated specs:

- geopy

The following packages will be downloaded:

package	build		
certifi-2019.11.28	py36_0	149 KB	conda-forge
scikit-learn-0.20.1	py36h22eb022_0	5.7 MB	
liblapack-3.8.0	11_openblas	10 KB	conda-forge
scipy-1.3.2	py36h921218d_0	18.0 MB	conda-forge
geographiclib-1.50	py_0	34 KB	conda-forge
libopenblas-0.3.6	h5a2b251_2	7.7 MB	
liblapacke-3.8.0	11_openblas	10 KB	conda-forge
numpy-1.17.3	py36h95a1406_0	5.2 MB	conda-forge
libcblas-3.8.0	11_openblas	10 KB	conda-forge
libblas-3.8.0	11_openblas	10 KB	conda-forge
geopy-1.20.0	py_0	57 KB	conda-forge
blas-2.11	openblas	10 KB	conda-forge
Total:		36.9 MB	

The following NEW packages will be INSTALLED:

geographiclib:	1.50-py_0	conda-forge
geopy:	1.20.0-py_0	conda-forge
libblas:	3.8.0-11_openblas	conda-forge
libcblas:	3.8.0-11_openblas	conda-forge
liblapack:	3.8.0-11_openblas	conda-forge
liblapacke:	3.8.0-11_openblas	conda-forge
libopenblas:	0.3.6-h5a2b251_2	

The following packages will be UPDATED:

blas:	1.1-openblas	conda-forge -->
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```

2.11-openblas          conda-forge
certifi:                2019.9.11-py36_0          conda-forge -->
2019.11.28-py36_0      conda-forge
numpy:                  1.16.2-py36_blas_openblas1522bff_0  conda-forge
[blas_openblas] --> 1.17.3-py36h95a1406_0 conda-forge
scipy:                  1.2.1-py36_blas_openblas1522bff_0  conda-forge
[blas_openblas] --> 1.3.2-py36h921218d_0  conda-forge

```

The following packages will be DOWNGRADED:

```

scikit-learn: 0.20.1-py36_blas_openblashebf5e3_1200 conda-forge
[blas_openblas] --> 0.20.1-py36h22eb022_0

```

Downloading and Extracting Packages

```

certifi-2019.11.28 | 149 KB | ##### | 100%
scikit-learn-0.20.1 | 5.7 MB | ##### | 100%
liblapack-3.8.0 | 10 KB | ##### | 100%
scipy-1.3.2 | 18.0 MB | ##### | 100%
geographiclib-1.50 | 34 KB | ##### | 100%
libopenblas-0.3.6 | 7.7 MB | ##### | 100%
liblapacke-3.8.0 | 10 KB | ##### | 100%
numpy-1.17.3 | 5.2 MB | ##### | 100%
libcblas-3.8.0 | 10 KB | ##### | 100%
libblas-3.8.0 | 10 KB | ##### | 100%
geopy-1.20.0 | 57 KB | ##### | 100%
blas-2.11 | 10 KB | ##### | 100%

```

Preparing transaction: done

Verifying transaction: done

Executing transaction: done

Libraries imported.

```

[2]: #Importing the dataset
!wget -q -O 'newyork_data.json' https://cocl.us/new_york_dataset
print('Data downloaded!')

```

Data downloaded!

```

[3]: #Load data
with open('newyork_data.json') as json_data:
    newyork_data = json.load(json_data)

```

```

[4]: #Define the dataframe columns
column_names = ['Borough', 'Neighborhood', 'Latitude', 'Longitude']

# instantiate the dataframe
neighborhoods = pd.DataFrame(columns=column_names)

```

```
[5]: #Empty dataframe
neighborhoods
```

```
[5]: Empty DataFrame
Columns: [Borough, Neighborhood, Latitude, Longitude]
Index: []
```

```
[7]: #Define a list of the neighborhoods
neighborhoods_data = newyork_data['features']

#Put data into the dataframe
for data in neighborhoods_data:
    borough = neighborhood_name = data['properties']['borough']
    neighborhood_name = data['properties']['name']

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

    neighborhoods = neighborhoods.append({'Borough': borough,
                                          'Neighborhood': neighborhood_name,
                                          'Latitude': neighborhood_lat,
                                          'Longitude': neighborhood_lon},
                                         ignore_index=True)
```

```
[8]: #Examine the results
neighborhoods.head()
```

```
[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
```

```
[9]: print('The dataframe has {} boroughs and {} neighborhoods.'.format(
        len(neighborhoods['Borough'].unique()),
        neighborhoods.shape[0]
    )
)
```

The dataframe has 5 boroughs and 612 neighborhoods.

```
[10]: #Use geopy library to get the latitude and longitude values of New York City.
address = 'New York City, NY'

geolocator = Nominatim(user_agent="ny_explorer")
```

```

location = geolocator.geocode(address)
latitude = location.latitude
longitude = location.longitude
print('The geograpical coordinate of New York City are {}, {}'.format(
    latitude, longitude))

```

The geograpical coordinate of New York City are 40.7127281, -74.0060152.

```

[11]: # create map of New York using latitude and longitude values
map_newyork = folium.Map(location=[latitude, longitude], zoom_start=10)

# add markers to map
for lat, lng, borough, neighborhood in zip(neighborhoods['Latitude'],
    neighborhoods['Longitude'], neighborhoods['Borough'],
    neighborhoods['Neighborhood']):
    label = '{} {}'.format(neighborhood, borough)
    label = folium.Popup(label, parse_html=True)
    folium.CircleMarker(
        [lat, lng],
        radius=5,
        popup=label,
        color='blue',
        fill=True,
        fill_color='#3186cc',
        fill_opacity=0.7,
        parse_html=False).add_to(map_newyork)

map_newyork

```

[11]: <folium.folium.Map at 0x7fdde1491860>

```

[12]: #Filter out the neighborhoods in Manhattan.
manhattan_data = neighborhoods[neighborhoods['Borough'] == 'Manhattan'].
    reset_index(drop=True)
manhattan_data.head()

```

```

[12]:
   Borough      Neighborhood  Latitude  Longitude
0  Manhattan      Marble Hill   40.876551  -73.910660
1  Manhattan      Chinatown    40.715618  -73.994279
2  Manhattan  Washington Heights  40.851903  -73.936900
3  Manhattan           Inwood   40.867684  -73.921210
4  Manhattan  Hamilton Heights  40.823604  -73.949688

```

```

[13]: #Get the geographical coordinates of Manhattan.
address = 'Manhattan, NY'

geolocator = Nominatim(user_agent="ny_explorer")

```

```
location = geolocator.geocode(address)
latitude = location.latitude
longitude = location.longitude
print('The geograpical coordinate of Manhattan are {}, {}'.format(latitude,
↪longitude))
```

The geograpical coordinate of Manhattan are 40.7896239, -73.9598939.

```
[14]: #Visualize Manhattan the neighborhoods
# create map of Manhattan using latitude and longitude values
map_manhattan = folium.Map(location=[latitude, longitude], zoom_start=11)

# add markers to map
for lat, lng, label in zip(manhattan_data['Latitude'],
↪manhattan_data['Longitude'], manhattan_data['Neighborhood']):
    label = folium.Popup(label, parse_html=True)
    folium.CircleMarker(
        [lat, lng],
        radius=5,
        popup=label,
        color='blue',
        fill=True,
        fill_color='#3186cc',
        fill_opacity=0.7,
        parse_html=False).add_to(map_manhattan)

map_manhattan
```

[14]: <folium.folium.Map at 0x7fdde0a77f28>

```
[15]: #Explore the neighborhoods using Foursquare API
CLIENT_ID = 'VVOKMVVYGLAFRQCX4ALWCCQJCYYGSCMTGB2G52IBVI1H5YJ' # your
↪Foursquare ID
CLIENT_SECRET = 'JOX1HBCWQEFPLCOKOHMEF5MN4JWJ150AL25ZGODYVSVYD5V3' # your
↪Foursquare Secret
VERSION = '20180605' # Foursquare API version

print('Your credentails:')
print('CLIENT_ID: ' + CLIENT_ID)
print('CLIENT_SECRET: ' + CLIENT_SECRET)
```

Your credentails:

CLIENT_ID: VVOKMVVYGLAFRQCX4ALWCCQJCYYGSCMTGB2G52IBVI1H5YJ

CLIENT_SECRET: JOX1HBCWQEFPLCOKOHMEF5MN4JWJ150AL25ZGODYVSVYD5V3

```
[16]: #Get the neighborhood's latitude and longitude values.
```

```

neighborhood_latitude = manhattan_data.loc[0, 'Latitude'] # neighborhood
↳ latitude value
neighborhood_longitude = manhattan_data.loc[0, 'Longitude'] # neighborhood
↳ longitude value

neighborhood_name = manhattan_data.loc[0, 'Neighborhood'] # neighborhood name

print('Latitude and longitude values of {} are {}, {}.'.
↳format(neighborhood_name,

↳neighborhood_latitude,

↳neighborhood_longitude))

```

Latitude and longitude values of Marble Hill are 40.87655077879964,
-73.91065965862981.

```

[17]: #Get top 100 venues of each neighborhood
def getNearbyVenues(names, latitudes, longitudes, radius=500):

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

        # create the API request URL
        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)

        # make the GET request
        results = requests.get(url).json()["response"]["groups"][0]["items"]

        # return only relevant information for each nearby venue
        venues_list.append([
            name,
            lat,
            lng,
            v['venue']['name'],
            v['venue']['location']['lat'],
            v['venue']['location']['lng'],
            v['venue']['categories'][0]['name']) for v in results])

```

```

    nearby_venues = pd.DataFrame([item for venue_list in venues_list for item_
↳in venue_list])
    nearby_venues.columns = ['Neighborhood',
                             'Neighborhood Latitude',
                             'Neighborhood Longitude',
                             'Venue',
                             'Venue Latitude',
                             'Venue Longitude',
                             'Venue Category']

    return(nearby_venues)

```

```

[18]: LIMIT = 100 # limit of number of venues returned by Foursquare API
      radius = 500

      manhattan_venues = getNearbyVenues(names=manhattan_data['Neighborhood'],
                                         latitudes=manhattan_data['Latitude'],
                                         longitudes=manhattan_data['Longitude']
                                         )

```

Marble Hill
 Chinatown
 Washington Heights
 Inwood
 Hamilton Heights
 Manhattanville
 Central Harlem
 East Harlem
 Upper East Side
 Yorkville
 Lenox Hill
 Roosevelt Island
 Upper West Side
 Lincoln Square
 Clinton
 Midtown
 Murray Hill
 Chelsea
 Greenwich Village
 East Village
 Lower East Side
 Tribeca
 Little Italy
 Soho
 West Village
 Manhattan Valley

Morningside Heights
Gramercy
Battery Park City
Financial District
Carnegie Hill
Noho
Civic Center
Midtown South
Sutton Place
Turtle Bay
Tudor City
Stuyvesant Town
Flatiron
Hudson Yards
Marble Hill
Chinatown
Washington Heights
Inwood
Hamilton Heights
Manhattanville
Central Harlem
East Harlem
Upper East Side
Yorkville
Lenox Hill
Roosevelt Island
Upper West Side
Lincoln Square
Clinton
Midtown
Murray Hill
Chelsea
Greenwich Village
East Village
Lower East Side
Tribeca
Little Italy
Soho
West Village
Manhattan Valley
Morningside Heights
Gramercy
Battery Park City
Financial District
Carnegie Hill
Noho
Civic Center
Midtown South

Sutton Place
 Turtle Bay
 Tudor City
 Stuyvesant Town
 Flatiron
 Hudson Yards

```
[19]: print(manhattan_venues.shape)
      manhattan_venues.head()
```

(6606, 7)

```
[19]: Neighborhood Neighborhood Latitude Neighborhood Longitude \
0 Marble Hill 40.876551 -73.91066
1 Marble Hill 40.876551 -73.91066
2 Marble Hill 40.876551 -73.91066
3 Marble Hill 40.876551 -73.91066
4 Marble Hill 40.876551 -73.91066

      Venue Venue Latitude Venue Longitude Venue Category
0 Arturo's 40.874412 -73.910271 Pizza Place
1 Bikram Yoga 40.876844 -73.906204 Yoga Studio
2 Tibbett Diner 40.880404 -73.908937 Diner
3 Starbucks 40.877531 -73.905582 Coffee Shop
4 Blink Fitness Riverdale 40.877147 -73.905837 Gym
```

```
[20]: #Check the number of venues returned to each neighborhood
      manhattan_venues['Venue Category'].head()
      manhattan_venues.groupby('Neighborhood').count()
```

```
[20]: Neighborhood Latitude Neighborhood Longitude Venue \
Neighborhood
Battery Park City 196 196 196
Carnegie Hill 200 200 200
Central Harlem 90 90 90
Chelsea 200 200 200
Chinatown 200 200 200
Civic Center 200 200 200
Clinton 200 200 200
East Harlem 80 80 80
East Village 200 200 200
Financial District 200 200 200
Flatiron 200 200 200
Gramercy 200 200 200
Greenwich Village 200 200 200
Hamilton Heights 120 120 120
Hudson Yards 164 164 164
Inwood 114 114 114
```

Lenox Hill	200	200	200
Lincoln Square	200	200	200
Little Italy	200	200	200
Lower East Side	106	106	106
Manhattan Valley	104	104	104
Manhattanville	82	82	82
Marble Hill	46	46	46
Midtown	200	200	200
Midtown South	200	200	200
Morningside Heights	78	78	78
Murray Hill	200	200	200
Noho	200	200	200
Roosevelt Island	56	56	56
Soho	200	200	200
Stuyvesant Town	36	36	36
Sutton Place	200	200	200
Tribeca	200	200	200
Tudor City	160	160	160
Turtle Bay	200	200	200
Upper East Side	200	200	200
Upper West Side	200	200	200
Washington Heights	174	174	174
West Village	200	200	200
Yorkville	200	200	200

	Venue Latitude	Venue Longitude	Venue Category
Neighborhood			
Battery Park City	196	196	196
Carnegie Hill	200	200	200
Central Harlem	90	90	90
Chelsea	200	200	200
Chinatown	200	200	200
Civic Center	200	200	200
Clinton	200	200	200
East Harlem	80	80	80
East Village	200	200	200
Financial District	200	200	200
Flatiron	200	200	200
Gramercy	200	200	200
Greenwich Village	200	200	200
Hamilton Heights	120	120	120
Hudson Yards	164	164	164
Inwood	114	114	114
Lenox Hill	200	200	200
Lincoln Square	200	200	200
Little Italy	200	200	200
Lower East Side	106	106	106

Manhattan Valley	104	104	104
Manhattanville	82	82	82
Marble Hill	46	46	46
Midtown	200	200	200
Midtown South	200	200	200
Morningside Heights	78	78	78
Murray Hill	200	200	200
Noho	200	200	200
Roosevelt Island	56	56	56
Soho	200	200	200
Stuyvesant Town	36	36	36
Sutton Place	200	200	200
Tribeca	200	200	200
Tudor City	160	160	160
Turtle Bay	200	200	200
Upper East Side	200	200	200
Upper West Side	200	200	200
Washington Heights	174	174	174
West Village	200	200	200
Yorkville	200	200	200

```
[21]: #Check the number of unique categories returned
print('There are {} uniques categories.'.format(len(manhattan_venues['Venue_
→Category'].unique())))
```

There are 334 uniques categories.

```
[22]: manhattan_venues['Venue Category'].unique()
```

```
[22]: array(['Pizza Place', 'Yoga Studio', 'Diner', 'Coffee Shop', 'Gym',
'Donut Shop', 'Seafood Restaurant', 'Department Store',
'Tennis Stadium', 'Pharmacy', 'Discount Store', 'Supplement Shop',
'American Restaurant', 'Ice Cream Shop', 'Miscellaneous Shop',
'Video Game Store', 'Steakhouse', 'Sandwich Place', 'Kids Store',
'Shopping Mall', 'Deli / Bodega', 'Cocktail Bar',
'Greek Restaurant', 'Hotel', 'Chinese Restaurant', 'Spa', 'Bakery',
'English Restaurant', 'Museum', 'Tea Room', 'Indie Movie Theater',
'New American Restaurant', 'Bike Shop', 'Noodle House',
'Hotpot Restaurant', 'Roof Deck', 'Spanish Restaurant',
'Bubble Tea Shop', 'Salon / Barbershop', 'Historic Site',
'Garden Center', 'Asian Restaurant', 'Record Shop',
'Korean Restaurant', 'Thai Restaurant', 'Organic Grocery',
'Cosmetics Shop', 'Boutique', 'Sake Bar', 'Vietnamese Restaurant',
'Malay Restaurant', 'Supermarket', 'Italian Restaurant',
'Furniture / Home Store', 'Dim Sum Restaurant', 'Music Venue',
'Ramen Restaurant', 'Dessert Shop', 'Snack Place',
'Paper / Office Supplies Store', 'Optical Shop', 'Massage Studio',
```

'Dumpling Restaurant', 'Gift Shop', 'Austrian Restaurant',
 'Japanese Restaurant', 'Mexican Restaurant', 'Shoe Store',
 'Karaoke Bar', 'Vegetarian / Vegan Restaurant', 'Bar',
 'Taiwanese Restaurant', 'Shanghai Restaurant', 'Café',
 'Restaurant', 'Burger Joint', 'Park', 'Market', 'Pet Café',
 'Wine Shop', 'Frozen Yogurt Shop', 'Breakfast Spot',
 'Liquor Store', 'Tapas Restaurant', 'Scenic Lookout', 'Pool',
 'Caribbean Restaurant', 'Latin American Restaurant',
 'Indian Restaurant', 'Mobile Phone Shop', 'Lounge',
 'Grocery Store', 'Pet Store', 'Gym / Fitness Center',
 'Accessories Store', 'Plaza', 'Wine Bar', 'Sushi Restaurant',
 'Clothing Store', 'Rental Car Location', 'Arepa Restaurant',
 'Bank', 'Rest Area', 'Women's Store', 'Shipping Store',
 'Sporting Goods Shop', 'Salad Place', 'Farmers Market', 'Bistro',
 'Veterinarian', 'Playground', 'Dog Run', 'Empanada Restaurant',
 'History Museum', 'Fast Food Restaurant', 'Juice Bar',
 'Tattoo Parlor', 'Bus Station', 'Smoke Shop',
 'Mediterranean Restaurant', 'Food Truck', 'School', 'Gastropub',
 'Pub', 'Hookah Bar', 'Climbing Gym', 'BBQ Joint', 'Bike Trail',
 'Japanese Curry Restaurant', 'Food & Drink Shop',
 'Cuban Restaurant', 'Music School', 'Thrift / Vintage Store',
 'Fried Chicken Joint', 'Cycle Studio', 'French Restaurant',
 'Beer Bar', 'Library', 'Ethiopian Restaurant',
 'African Restaurant', 'Jazz Club', 'Bagel Shop', 'Bookstore',
 'Art Gallery', 'Cafeteria', 'Southern / Soul Food Restaurant',
 'Event Space', 'Public Art', 'Athletics & Sports', 'Dance Studio',
 'Taco Place', 'Performing Arts Venue', 'Gas Station',
 'Convenience Store', 'Hotel Bar', 'Chocolate Shop',
 'Burrito Place', 'Sculpture Garden', 'Exhibit', 'Bridal Shop',
 'Art Museum', 'Turkish Restaurant', 'Electronics Store',
 'Gourmet Shop', 'Hobby Shop', 'Beer Store', 'Video Store',
 'Monument / Landmark', 'Health & Beauty Service', 'Butcher',
 'Hot Dog Joint', 'German Restaurant', 'Daycare',
 'Peruvian Restaurant', 'Gymnastics Gym',
 'College Academic Building', 'Health Food Store',
 'Czech Restaurant', 'Middle Eastern Restaurant',
 'Afghan Restaurant', 'Lingerie Store', 'Non-Profit', 'Club House',
 'Toy / Game Store', 'Building', 'Pilates Studio',
 'Outdoors & Recreation', 'Waterfront',
 'Residential Building (Apartment / Condo)', 'Indie Theater',
 'Soccer Field', 'Kosher Restaurant', 'Bus Line', 'Dry Cleaner',
 'Movie Theater', 'Trail', 'Cupcake Shop', 'Nail Salon', 'Garden',
 'Flower Shop', 'Arts & Crafts Store', 'Drugstore', 'Street Art',
 'Speakeasy', 'Sports Bar', 'Used Bookstore', 'Israeli Restaurant',
 'Opera House', 'Theater', 'Concert Hall', 'College Arts Building',
 'Fountain', 'Circus', 'High School', 'College Bookstore',
 'Recreation Center', 'General Entertainment', 'Comedy Club',

```

'Pie Shop', 'Food Court', 'Poke Place', 'Dive Bar',
'Caucasian Restaurant', 'Tiki Bar', 'Christmas Market',
'Skating Rink', 'Szechuan Restaurant', 'Tailor Shop',
'Hawaiian Restaurant', 'Theme Park Ride / Attraction',
'Food Stand', 'General College & University', 'Boxing Gym',
'Brazilian Restaurant', 'Men's Store', 'Jewish Restaurant',
'Martial Arts Dojo', 'Resort', 'Nightclub', 'Fish Market',
'Office', 'College Theater', 'Paella Restaurant',
'Photography Studio', 'Creperie', 'Physical Therapist',
'Smoothie Shop', 'Flea Market', 'Cheese Shop', 'Udon Restaurant',
'Rock Club', 'Lebanese Restaurant', 'Gaming Cafe',
'Eastern European Restaurant', 'Moroccan Restaurant',
'Swiss Restaurant', 'Scandinavian Restaurant', 'Antique Shop',
'Filipino Restaurant', 'Soup Place', 'Argentinian Restaurant',
'Auto Workshop', 'Tennis Court', 'Gym Pool', 'Whisky Bar',
'Volleyball Court', 'Mini Golf', 'Modern European Restaurant',
'Skate Park', 'Bike Rental / Bike Share', 'Basketball Court',
'Newsstand', 'Design Studio', 'Falafel Restaurant',
'Jewelry Store', 'Australian Restaurant', 'Ski Shop',
'Music Store', 'Candy Store', 'Board Shop', 'Hardware Store',
'Piano Bar', 'Gay Bar', 'Hostel', 'Wings Joint',
'Outdoor Sculpture', 'College Cafeteria', 'Irish Pub', 'Arcade',
'Bed & Breakfast', 'Social Club', 'South Indian Restaurant',
'Cooking School', 'Memorial Site', 'Tree', 'Auditorium',
'Boat or Ferry', 'Beer Garden', "Doctor's Office",
'Coworking Space', 'Community Center', 'Himalayan Restaurant',
'Herbs & Spices Store', 'Venezuelan Restaurant', 'Adult Boutique',
'Molecular Gastronomy Restaurant', 'Medical Center', 'Baby Store',
'Strip Club', 'Cajun / Creole Restaurant', 'Laundry Service',
'Camera Store', 'Golf Course', 'Leather Goods Store',
'Big Box Store', 'South American Restaurant',
'Financial or Legal Service', 'Spiritual Center',
'Persian Restaurant', 'Cambodian Restaurant',
'Tourist Information Center', 'Duty-free Shop', 'Bridge',
'Soba Restaurant', 'Heliport', 'Baseball Field', 'Pet Service',
'Harbor / Marina', 'Sports Club', 'Russian Restaurant',
'Kebab Restaurant', 'Pedestrian Plaza', 'Pakistani Restaurant',
'Stables'], dtype=object)

```

```

[ ]: #The following venue categories will be considered when choosing the land.
      #Doctor's Office, Medical Center
      #School, High School, General College & University
      #Pharmacy, Drugstore
      #Supermarket, Grocery Store
      #Clothing Store
      #Bus Station, Bus Stop, Bus Line, Metro Station

```

```
#Department Store, Discount Store, Shopping Mall, Convenience Store,
↳Electronics Store
#Bank
#Gas Station
#Gym, Gym / Fitness Center, Weight Loss Center
```

```
[ ]: #Assigning values for each venue category based on the importance. There are 10
↳clusters.
#Cluster 1 - Doctor's Office, Medical Center - 10
#Cluster 2 - School, High School, General College & University - 9
#Cluster 3 - Pharmacy, Drugstore - 8
#Cluster 4 - Supermarket, Grocery Store - 7
#Cluster 5 - Clothing Store - 6
#Cluster 6 - Bus Station, Bus Stop, Bus Line, Metro Station - 5
#Cluster 7 - Department Store, Discount Store, Shopping Mall, Convenience
↳Store, Electronics Store - 4
#Cluster 8 - Bank - 3
#Cluster 9 - Gas Station - 2
#Cluster 10 - Gym, Gym / Fitness Center, Weight Loss Center - 1
```

```
[23]: #Assign values for each category and display them in a new column named 'Values'
d = {"Doctor's Office":10, 'Medical Center':10, 'School':9, 'High School':9,
↳'General College & University':9, 'Pharmacy':8, 'Drugstore':8, 'Supermarket':
↳7, 'Grocery Store':7, 'Clothing Store':6, 'Bus Station':5, 'Bus Stop':5,
↳'Bus Line':5, 'Metro Station':5, 'Department Store':4, 'Discount Store':4,
↳'Shopping Mall':4, 'Convenience Store':4, 'Electronics Store':4, 'Bank':3,
↳'Gas Station':2, 'Gym':1, 'Gym / Fitness Center':1, 'Weight Loss Center':1}
manhattan_venues['Value'] = manhattan_venues['Venue Category'].map(d)
manhattan_venues.head()
```

```
[23]: Neighborhood Neighborhood Latitude Neighborhood Longitude \
0 Marble Hill 40.876551 -73.91066
1 Marble Hill 40.876551 -73.91066
2 Marble Hill 40.876551 -73.91066
3 Marble Hill 40.876551 -73.91066
4 Marble Hill 40.876551 -73.91066

Venue Venue Latitude Venue Longitude Venue Category \
0 Arturo's 40.874412 -73.910271 Pizza Place
1 Bikram Yoga 40.876844 -73.906204 Yoga Studio
2 Tibbett Diner 40.880404 -73.908937 Diner
3 Starbucks 40.877531 -73.905582 Coffee Shop
4 Blink Fitness Riverdale 40.877147 -73.905837 Gym

Value
0 NaN
1 NaN
```

```
2    NaN
3    NaN
4    1.0
```

```
[24]: #Check the unique neighborhoods
manhattan_neighborhoods = manhattan_venues['Neighborhood'].unique()
manhattan_neighborhoods
```

```
[24]: array(['Marble Hill', 'Chinatown', 'Washington Heights', 'Inwood',
        'Hamilton Heights', 'Manhattanville', 'Central Harlem',
        'East Harlem', 'Upper East Side', 'Yorkville', 'Lenox Hill',
        'Roosevelt Island', 'Upper West Side', 'Lincoln Square', 'Clinton',
        'Midtown', 'Murray Hill', 'Chelsea', 'Greenwich Village',
        'East Village', 'Lower East Side', 'Tribeca', 'Little Italy',
        'Soho', 'West Village', 'Manhattan Valley', 'Morningside Heights',
        'Gramercy', 'Battery Park City', 'Financial District',
        'Carnegie Hill', 'Noho', 'Civic Center', 'Midtown South',
        'Sutton Place', 'Turtle Bay', 'Tudor City', 'Stuyvesant Town',
        'Flatiron', 'Hudson Yards'], dtype=object)
```

```
[25]: Marble_Hill = manhattan_venues[manhattan_venues.Neighborhood == 'Marble Hill']
Marble_Hill = Marble_Hill['Value'].sum()
print('Marble Hill = ',(Marble_Hill))

Chinatown = manhattan_venues[manhattan_venues.Neighborhood == 'Chinatown']
Chinatown = Chinatown['Value'].sum()
print('Chinatown = ',(Chinatown))

Washington_Heights = manhattan_venues[manhattan_venues.Neighborhood == 'Washington Heights']
Washington_Heights = Washington_Heights['Value'].sum()
print('Washington Heights = ',(Washington_Heights))

Inwood = manhattan_venues[manhattan_venues.Neighborhood == 'Inwood']
Inwood = Inwood['Value'].sum()
print('Inwood = ',(Inwood))

Hamilton_Heights = manhattan_venues[manhattan_venues.Neighborhood == 'Hamilton Heights']
Hamilton_Heights = Hamilton_Heights['Value'].sum()
print('Hamilton Heights = ',(Hamilton_Heights))

Manhattanville = manhattan_venues[manhattan_venues.Neighborhood == 'Manhattanville']
Manhattanville = Manhattanville['Value'].sum()
print('Manhattanville = ',(Manhattanville))
```



```

Central_Harlem = manhattan_venues[manhattan_venues.Neighborhood == 'Central_
↳Harlem']
Central_Harlem = Central_Harlem['Value'].sum()
print('Central Harlem = ',(Central_Harlem))

East_Harlem = manhattan_venues[manhattan_venues.Neighborhood == 'East Harlem']
East_Harlem = East_Harlem['Value'].sum()
print('East Harlem = ',(East_Harlem))

Upper_East_Side = manhattan_venues[manhattan_venues.Neighborhood == 'Upper East_
↳Side']
Upper_East_Side = Upper_East_Side['Value'].sum()
print('Upper East Side = ',(Upper_East_Side))

Yorkville = manhattan_venues[manhattan_venues.Neighborhood == 'Yorkville']
Yorkville = Yorkville['Value'].sum()
print('Yorkville = ',(Yorkville))

Lenox_Hill = manhattan_venues[manhattan_venues.Neighborhood == 'Lenox Hill']
Lenox_Hill = Lenox_Hill['Value'].sum()
print('Lenox Hill = ',(Lenox_Hill))

Roosevelt_Island = manhattan_venues[manhattan_venues.Neighborhood == 'Roosevelt_
↳Island']
Roosevelt_Island = Roosevelt_Island['Value'].sum()
print('Roosevelt Island = ',(Roosevelt_Island))

Upper_West_Side = manhattan_venues[manhattan_venues.Neighborhood == 'Upper West_
↳Side']
Upper_West_Side = Upper_West_Side['Value'].sum()
print('Upper West Side = ',(Upper_West_Side))

Lincoln_Square = manhattan_venues[manhattan_venues.Neighborhood == 'Lincoln_
↳Square']
Lincoln_Square = Lincoln_Square['Value'].sum()
print('Lincoln_Square = ',(Lincoln_Square))

Clinton = manhattan_venues[manhattan_venues.Neighborhood == 'Clinton']
Clinton = Clinton['Value'].sum()
print('Clinton = ',(Clinton))

Midtown = manhattan_venues[manhattan_venues.Neighborhood == 'Midtown']
Midtown = Midtown['Value'].sum()
print('Midtown = ',(Midtown))

Murray_Hill = manhattan_venues[manhattan_venues.Neighborhood == 'Murray Hill']
Murray_Hill = Murray_Hill['Value'].sum()

```

```

print('Murray Hill = ',(Murray_Hill))

Chelsea = manhattan_venues[manhattan_venues.Neighborhood == 'Chelsea']
Chelsea = Chelsea['Value'].sum()
print('Chelsea = ',(Chelsea))

Greenwich_Village = manhattan_venues[manhattan_venues.Neighborhood == 'Greenwich Village']
Greenwich_Village = Greenwich_Village['Value'].sum()
print('Greenwich Village = ',(Greenwich_Village))

East_Village = manhattan_venues[manhattan_venues.Neighborhood == 'East Village']
East_Village = East_Village['Value'].sum()
print('East Village = ',(East_Village))

Lower_East_Side = manhattan_venues[manhattan_venues.Neighborhood == 'Lower East Side']
Lower_East_Side = Lower_East_Side['Value'].sum()
print('Lower East Side = ',(Lower_East_Side))

Tribeca = manhattan_venues[manhattan_venues.Neighborhood == 'Tribeca']
Tribeca = Tribeca['Value'].sum()
print('Tribeca = ',(Tribeca))

Little_Italy = manhattan_venues[manhattan_venues.Neighborhood == 'Little Italy']
Little_Italy = Little_Italy['Value'].sum()
print('Little Italy = ',(Little_Italy))

Soho = manhattan_venues[manhattan_venues.Neighborhood == 'Soho']
Soho = Soho['Value'].sum()
print('Soho = ',(Soho))

West_Village = manhattan_venues[manhattan_venues.Neighborhood == 'West Village']
West_Village = West_Village['Value'].sum()
print('West Village = ',(West_Village))

Manhattan_Valley = manhattan_venues[manhattan_venues.Neighborhood == 'Manhattan Valley']
Manhattan_Valley = Manhattan_Valley['Value'].sum()
print('Manhattan Valley = ',(Manhattan_Valley))

Morningside_Heights = manhattan_venues[manhattan_venues.Neighborhood == 'Morningside Heights']
Morningside_Heights = Morningside_Heights['Value'].sum()
print('Morningside Heights = ',(Morningside_Heights))

Gramercy = manhattan_venues[manhattan_venues.Neighborhood == 'Gramercy']

```

```

Gramercy = Gramercy['Value'].sum()
print('Gramercy = ',(Gramercy))

Battery_Park_City = manhattan_venues[manhattan_venues.Neighborhood == 'Battery_
↳Park City']
Battery_Park_City = Battery_Park_City['Value'].sum()
print('Battery Park City = ',(Battery_Park_City))

Financial_District = manhattan_venues[manhattan_venues.Neighborhood ==
↳'Financial District']
Financial_District = Financial_District['Value'].sum()
print('Financial District = ',(Financial_District))

Carnegie_Hill = manhattan_venues[manhattan_venues.Neighborhood == 'Carnegie_
↳Hill']
Carnegie_Hill = Carnegie_Hill['Value'].sum()
print('Carnegie Hill = ',(Carnegie_Hill))

Noho = manhattan_venues[manhattan_venues.Neighborhood == 'Noho']
Noho = Noho['Value'].sum()
print('Noho = ',(Noho))

Civic_Center = manhattan_venues[manhattan_venues.Neighborhood == 'Civic Center']
Civic_Center = Civic_Center['Value'].sum()
print('Civic Center = ',(Civic_Center))

Midtown_South = manhattan_venues[manhattan_venues.Neighborhood == 'Midtown_
↳South']
Midtown_South = Midtown_South['Value'].sum()
print('Midtown South = ',(Midtown_South))

Sutton_Place = manhattan_venues[manhattan_venues.Neighborhood == 'Sutton Place']
Sutton_Place = Sutton_Place['Value'].sum()
print('Sutton Place = ',(Sutton_Place))

Turtle_Bay = manhattan_venues[manhattan_venues.Neighborhood == 'Turtle Bay']
Turtle_Bay = Turtle_Bay['Value'].sum()
print('Turtle Bay = ',(Turtle_Bay))

Tudor_City = manhattan_venues[manhattan_venues.Neighborhood == 'Tudor City']
Tudor_City = Tudor_City['Value'].sum()
print('Tudor City = ',(Tudor_City))

Stuyvesant_Town = manhattan_venues[manhattan_venues.Neighborhood == 'Stuyvesant_
↳Town']
Stuyvesant_Town = Stuyvesant_Town['Value'].sum()
print('Stuyvesant Town = ',(Stuyvesant_Town))

```

```

Flatiron = manhattan_venues[manhattan_venues.Neighborhood == 'Flatiron']
Flatiron = Flatiron['Value'].sum()
print('Flatiron = ',(Flatiron))

Hudson_Yards = manhattan_venues[manhattan_venues.Neighborhood == 'Hudson Yards']
Hudson_Yards = Hudson_Yards['Value'].sum()
print('Hudson Yards = ',(Hudson_Yards))

```

```

Marble Hill = 42.0
Chinatown = 32.0
Washington Heights = 130.0
Inwood = 54.0
Hamilton_Heights = 42.0
Manhattanville = 30.0
Central Harlem = 4.0
East Harlem = 44.0
Upper East Side = 54.0
Yorkville = 36.0
Lenox Hill = 26.0
Roosevelt Island = 46.0
Upper West Side = 40.0
Lincoln_Square = 76.0
Clinton = 42.0
Midtown = 92.0
Murray Hill = 26.0
Chelsea = 26.0
Greenwich Village = 72.0
East Village = 0.0
Lower East Side = 28.0
Tribeca = 36.0
Little Italy = 52.0
Soho = 130.0
West Village = 0.0
Manhattan Valley = 0.0
Morningside Heights = 44.0
Gramercy = 66.0
Battery Park City = 92.0
Financial District = 54.0
Carnegie Hill = 80.0
Noho = 30.0
Civic Center = 46.0
Midtown South = 70.0
Sutton Place = 68.0
Turtle Bay = 18.0
Tudor City = 20.0
Stuyvesant Town = 6.0

```

```
Flatiron = 78.0
Hudson Yards = 64.0
```

```
[26]: manhattan_venues_renamed = manhattan_venues.rename(columns={"Venue Category":
↳ "Venue_Category"})
manhattan_venues_renamed.head()
```

```
[26]: Neighborhood Neighborhood Latitude Neighborhood Longitude \
0 Marble Hill 40.876551 -73.91066
1 Marble Hill 40.876551 -73.91066
2 Marble Hill 40.876551 -73.91066
3 Marble Hill 40.876551 -73.91066
4 Marble Hill 40.876551 -73.91066

Venue Venue Latitude Venue Longitude Venue_Category \
0 Arturo's 40.874412 -73.910271 Pizza Place
1 Bikram Yoga 40.876844 -73.906204 Yoga Studio
2 Tibbett Diner 40.880404 -73.908937 Diner
3 Starbucks 40.877531 -73.905582 Coffee Shop
4 Blink Fitness Riverdale 40.877147 -73.905837 Gym

Value
0 NaN
1 NaN
2 NaN
3 NaN
4 1.0
```

```
[27]: #Neighborhoods with a Doctor's Office and/or Medical Center
manhattan_venues_filtered = manhattan_venues_renamed[(manhattan_venues_renamed.
↳ Venue_Category == 'Medical Center') | (manhattan_venues_renamed.Venue_Category_
↳ == "Doctor's Office")]
manhattan_venues_filtered
```

```
[27]: Neighborhood Neighborhood Latitude Neighborhood Longitude \
2327 Financial District 40.707107 -74.010665
2658 Civic Center 40.715229 -74.005415
5630 Financial District 40.707107 -74.010665
5961 Civic Center 40.715229 -74.005415

Venue Venue Latitude Venue Longitude \
2327 One Medical 40.706204 -74.011712
2658 Water4Dogs Rehabilitaion Center 40.716838 -74.005922
5630 One Medical 40.706204 -74.011712
5961 Water4Dogs Rehabilitaion Center 40.716838 -74.005922

Venue_Category Value
```

2327	Doctor's Office	10.0
2658	Medical Center	10.0
5630	Doctor's Office	10.0
5961	Medical Center	10.0

```
[28]: #Neighborhoods with a School and/or high school and/or general college and
↳university
manhattan_venues_filtered_1 =
↳manhattan_venues_renamed[(manhattan_venues_renamed.Venue_Category ==
↳'School')|(manhattan_venues_renamed.Venue_Category == 'High
↳School')|(manhattan_venues_renamed.Venue_Category == 'General College &
↳University')]
manhattan_venues_filtered_1
```

[28]:	Neighborhood	Neighborhood Latitude	Neighborhood Longitude \
287	Hamilton Heights	40.823604	-73.949688
307	Hamilton Heights	40.823604	-73.949688
760	Roosevelt Island	40.762160	-73.949168
865	Upper West Side	40.787658	-73.977059
904	Lincoln Square	40.773529	-73.985338
1143	Midtown	40.754691	-73.981669
1723	Tribeca	40.721522	-74.010683
2756	Midtown South	40.748510	-73.988713
3590	Hamilton Heights	40.823604	-73.949688
3610	Hamilton Heights	40.823604	-73.949688
4063	Roosevelt Island	40.762160	-73.949168
4168	Upper West Side	40.787658	-73.977059
4207	Lincoln Square	40.773529	-73.985338
4446	Midtown	40.754691	-73.981669
5026	Tribeca	40.721522	-74.010683
6059	Midtown South	40.748510	-73.988713

	Venue	Venue Latitude \
287	Harlem School of the Arts	40.822053
307	P.S 153 - Adam Clayton Powell	40.825864
760	PS 217	40.763923
865	PS 166 The Richard Rodgers School of Arts and ...	40.789088
904	Fiorello H. LaGuardia High School of Music & A...	40.774048
1143	Columbia University Club of New York	40.754656
1723	Stuyvesant High School	40.717609
2756	The Magnet Training Center	40.747701
3590	Harlem School of the Arts	40.822053
3610	P.S 153 - Adam Clayton Powell	40.825864
4063	PS 217	40.763923
4168	PS 166 The Richard Rodgers School of Arts and ...	40.789088
4207	Fiorello H. LaGuardia High School of Music & A...	40.774048
4446	Columbia University Club of New York	40.754656

5026	Stuyvesant High School	40.717609
6059	The Magnet Training Center	40.747701

	Venue Longitude	Venue_Category	Value
287	-73.945824	School	9.0
307	-73.947443	School	9.0
760	-73.947946	School	9.0
865	-73.972421	School	9.0
904	-73.985012	High School	9.0
1143	-73.981502	General College & University	9.0
1723	-74.013203	High School	9.0
2756	-73.986858	School	9.0
3590	-73.945824	School	9.0
3610	-73.947443	School	9.0
4063	-73.947946	School	9.0
4168	-73.972421	School	9.0
4207	-73.985012	High School	9.0
4446	-73.981502	General College & University	9.0
5026	-74.013203	High School	9.0
6059	-73.986858	School	9.0

```
[29]: #Neighborhoods with a Pharmacy and/or Drugstore
manhattan_venues_filtered_2 =
    ↳manhattan_venues_renamed[(manhattan_venues_renamed.Venue_Category ==
    ↳'Pharmacy')|(manhattan_venues_renamed.Venue_Category == 'Drugstore')]
manhattan_venues_filtered_2
```

[29]:	Neighborhood	Neighborhood Latitude	Neighborhood Longitude \
9	Marble Hill	40.876551	-73.910660
96	Chinatown	40.715618	-73.994279
205	Washington Heights	40.851903	-73.936900
229	Inwood	40.867684	-73.921210
420	East Harlem	40.792249	-73.944182
631	Yorkville	40.775930	-73.947118
852	Upper West Side	40.787658	-73.977059
975	Lincoln Square	40.773529	-73.985338
1627	Lower East Side	40.717807	-73.980890
2111	Morningside Heights	40.808000	-73.963896
2224	Gramercy	40.737210	-73.981376
3312	Marble Hill	40.876551	-73.910660
3399	Chinatown	40.715618	-73.994279
3508	Washington Heights	40.851903	-73.936900
3532	Inwood	40.867684	-73.921210
3723	East Harlem	40.792249	-73.944182
3934	Yorkville	40.775930	-73.947118
4155	Upper West Side	40.787658	-73.977059
4278	Lincoln Square	40.773529	-73.985338

4930	Lower East Side	40.717807	-73.980890
5414	Morningside Heights	40.808000	-73.963896
5527	Gramercy	40.737210	-73.981376

	Venue	Venue Latitude	Venue Longitude	Venue_Category \
9	Rite Aid	40.875467	-73.908906	Pharmacy
96	Stanley's Pharmacy	40.715782	-73.990544	Pharmacy
205	Rite Aid	40.852092	-73.931349	Pharmacy
229	Dichter Pharmacy	40.867987	-73.920727	Pharmacy
420	Duane Reade	40.791228	-73.944528	Pharmacy
631	Duane Reade	40.776406	-73.947014	Pharmacy
852	Face Values And Beyond	40.790775	-73.975007	Drugstore
975	Rite Aid	40.777195	-73.983038	Pharmacy
1627	CVS pharmacy	40.714582	-73.981786	Pharmacy
2111	Hartley Pharmacy	40.809272	-73.959231	Pharmacy
2224	Walgreens	40.733226	-73.980689	Pharmacy
3312	Rite Aid	40.875467	-73.908906	Pharmacy
3399	Stanley's Pharmacy	40.715782	-73.990544	Pharmacy
3508	Rite Aid	40.852092	-73.931349	Pharmacy
3532	Dichter Pharmacy	40.867987	-73.920727	Pharmacy
3723	Duane Reade	40.791228	-73.944528	Pharmacy
3934	Duane Reade	40.776406	-73.947014	Pharmacy
4155	Face Values And Beyond	40.790775	-73.975007	Drugstore
4278	Rite Aid	40.777195	-73.983038	Pharmacy
4930	CVS pharmacy	40.714582	-73.981786	Pharmacy
5414	Hartley Pharmacy	40.809272	-73.959231	Pharmacy
5527	Walgreens	40.733226	-73.980689	Pharmacy

	Value
9	8.0
96	8.0
205	8.0
229	8.0
420	8.0
631	8.0
852	8.0
975	8.0
1627	8.0
2111	8.0
2224	8.0
3312	8.0
3399	8.0
3508	8.0
3532	8.0
3723	8.0
3934	8.0
4155	8.0


```
4278    8.0
4930    8.0
5414    8.0
5527    8.0
```

```
[30]: #Scorable venues in Soho
Soho = manhattan_venues[(manhattan_venues.Neighborhood == 'Soho')].dropna()
Soho
```

```
[30]:      Neighborhood  Neighborhood Latitude  Neighborhood Longitude \
1841          Soho          40.722184          -74.000657
1853          Soho          40.722184          -74.000657
1858          Soho          40.722184          -74.000657
1863          Soho          40.722184          -74.000657
1865          Soho          40.722184          -74.000657
1875          Soho          40.722184          -74.000657
1884          Soho          40.722184          -74.000657
1886          Soho          40.722184          -74.000657
1904          Soho          40.722184          -74.000657
1909          Soho          40.722184          -74.000657
1915          Soho          40.722184          -74.000657
5144          Soho          40.722184          -74.000657
5156          Soho          40.722184          -74.000657
5161          Soho          40.722184          -74.000657
5166          Soho          40.722184          -74.000657
5168          Soho          40.722184          -74.000657
5178          Soho          40.722184          -74.000657
5187          Soho          40.722184          -74.000657
5189          Soho          40.722184          -74.000657
5207          Soho          40.722184          -74.000657
5212          Soho          40.722184          -74.000657
5218          Soho          40.722184          -74.000657
```

```
      Venue  Venue Latitude  Venue Longitude \
1841  Saturdays Surf NYC      40.720746      -73.999346
1853  Theory Greene Street      40.722265      -74.001956
1858  John Varvatos SoHo      40.723752      -74.000393
1863  Sunrise Mart      40.723192      -74.002775
1865  Acne Studios      40.721688      -74.002298
1875  Totokaelo      40.722013      -73.998662
1884  rag & bone      40.724120      -73.999298
1886  Sonos      40.724510      -74.000056
1904  UNIQLO      40.723377      -73.997974
1909  A.P.C.      40.724413      -73.998758
1915  Outdoor Voices      40.720490      -73.998024
5144  Saturdays Surf NYC      40.720746      -73.999346
5156  Theory Greene Street      40.722265      -74.001956
```

5161	John Varvatos SoHo	40.723752	-74.000393
5166	Sunrise Mart	40.723192	-74.002775
5168	Acne Studios	40.721688	-74.002298
5178	Totokaelo	40.722013	-73.998662
5187	rag & bone	40.724120	-73.999298
5189	Sonos	40.724510	-74.000056
5207	UNIQLO	40.723377	-73.997974
5212	A.P.C.	40.724413	-73.998758
5218	Outdoor Voices	40.720490	-73.998024

	Venue Category	Value
1841	Clothing Store	6.0
1853	Clothing Store	6.0
1858	Clothing Store	6.0
1863	Supermarket	7.0
1865	Clothing Store	6.0
1875	Clothing Store	6.0
1884	Clothing Store	6.0
1886	Electronics Store	4.0
1904	Clothing Store	6.0
1909	Clothing Store	6.0
1915	Clothing Store	6.0
5144	Clothing Store	6.0
5156	Clothing Store	6.0
5161	Clothing Store	6.0
5166	Supermarket	7.0
5168	Clothing Store	6.0
5178	Clothing Store	6.0
5187	Clothing Store	6.0
5189	Electronics Store	4.0
5207	Clothing Store	6.0
5212	Clothing Store	6.0
5218	Clothing Store	6.0

```
[31]: #Scorable venues in Washington Heights
Washington_Heights = manhattan_venues[manhattan_venues.Neighborhood ==
↳ 'Washington Heights'].dropna()
Washington_Heights
```

```
[31]:
```

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	\
161	Washington Heights	40.851903	-73.9369	
167	Washington Heights	40.851903	-73.9369	
168	Washington Heights	40.851903	-73.9369	
175	Washington Heights	40.851903	-73.9369	
182	Washington Heights	40.851903	-73.9369	
188	Washington Heights	40.851903	-73.9369	
190	Washington Heights	40.851903	-73.9369	

202	Washington Heights	40.851903	-73.9369
203	Washington Heights	40.851903	-73.9369
204	Washington Heights	40.851903	-73.9369
205	Washington Heights	40.851903	-73.9369
206	Washington Heights	40.851903	-73.9369
208	Washington Heights	40.851903	-73.9369
3464	Washington Heights	40.851903	-73.9369
3470	Washington Heights	40.851903	-73.9369
3471	Washington Heights	40.851903	-73.9369
3478	Washington Heights	40.851903	-73.9369
3485	Washington Heights	40.851903	-73.9369
3491	Washington Heights	40.851903	-73.9369
3493	Washington Heights	40.851903	-73.9369
3505	Washington Heights	40.851903	-73.9369
3506	Washington Heights	40.851903	-73.9369
3507	Washington Heights	40.851903	-73.9369
3508	Washington Heights	40.851903	-73.9369
3509	Washington Heights	40.851903	-73.9369
3511	Washington Heights	40.851903	-73.9369

	Venue	Venue Latitude	Venue Longitude \
161	Frank's Market	40.855334	-73.937162
167	Blink Fitness Washington Heights	40.848489	-73.936794
168	Planet Fitness	40.847536	-73.937937
175	Moscow on the Hudson	40.850959	-73.938645
182	Gap Factory Store	40.848929	-73.938591
188	Chase Bank	40.855020	-73.936760
190	Capital One Bank	40.849556	-73.934961
202	Bravo Supermarkets	40.850675	-73.935908
203	Key Food	40.853873	-73.933878
204	Dan's Supermarket	40.851829	-73.932393
205	Rite Aid	40.852092	-73.931349
206	Lucille Roberts	40.848487	-73.934636
208	Fitz Grocery	40.854797	-73.933327
3464	Frank's Market	40.855334	-73.937162
3470	Blink Fitness Washington Heights	40.848489	-73.936794
3471	Planet Fitness	40.847536	-73.937937
3478	Moscow on the Hudson	40.850959	-73.938645
3485	Gap Factory Store	40.848929	-73.938591
3491	Chase Bank	40.855020	-73.936760
3493	Capital One Bank	40.849556	-73.934961
3505	Bravo Supermarkets	40.850675	-73.935908
3506	Key Food	40.853873	-73.933878
3507	Dan's Supermarket	40.851829	-73.932393
3508	Rite Aid	40.852092	-73.931349
3509	Lucille Roberts	40.848487	-73.934636
3511	Fitz Grocery	40.854797	-73.933327

	Venue Category	Value
161	Grocery Store	7.0
167	Gym	1.0
168	Gym / Fitness Center	1.0
175	Grocery Store	7.0
182	Clothing Store	6.0
188	Bank	3.0
190	Bank	3.0
202	Grocery Store	7.0
203	Supermarket	7.0
204	Supermarket	7.0
205	Pharmacy	8.0
206	Gym	1.0
208	Grocery Store	7.0
3464	Grocery Store	7.0
3470	Gym	1.0
3471	Gym / Fitness Center	1.0
3478	Grocery Store	7.0
3485	Clothing Store	6.0
3491	Bank	3.0
3493	Bank	3.0
3505	Grocery Store	7.0
3506	Supermarket	7.0
3507	Supermarket	7.0
3508	Pharmacy	8.0
3509	Gym	1.0
3511	Grocery Store	7.0

```
[32]: #Scorable venues in Upper West Side since it has a school and a drugstore
Upper_West_Side = manhattan_venues[manhattan_venues.Neighborhood == 'Upper West_
↪Side'].dropna()
Upper_West_Side
```

```
[32]:      Neighborhood Neighborhood Latitude Neighborhood Longitude \
833   Upper West Side      40.787658      -73.977059
845   Upper West Side      40.787658      -73.977059
852   Upper West Side      40.787658      -73.977059
865   Upper West Side      40.787658      -73.977059
873   Upper West Side      40.787658      -73.977059
4136  Upper West Side      40.787658      -73.977059
4148  Upper West Side      40.787658      -73.977059
4155  Upper West Side      40.787658      -73.977059
4168  Upper West Side      40.787658      -73.977059
4176  Upper West Side      40.787658      -73.977059
```

```
Venue Venue Latitude \
```

833	Crunch Fitness - 83rd Street	40.785269
845	Fhitting Room UWS	40.787886
852	Face Values And Beyond	40.790775
865	PS 166 The Richard Rodgers School of Arts and ...	40.789088
873	SLT UWS	40.787981
4136	Crunch Fitness - 83rd Street	40.785269
4148	Fhitting Room UWS	40.787886
4155	Face Values And Beyond	40.790775
4168	PS 166 The Richard Rodgers School of Arts and ...	40.789088
4176	SLT UWS	40.787981

	Venue Longitude	Venue Category	Value
833	-73.975845	Gym / Fitness Center	1.0
845	-73.971262	Gym	1.0
852	-73.975007	Drugstore	8.0
865	-73.972421	School	9.0
873	-73.971362	Gym / Fitness Center	1.0
4136	-73.975845	Gym / Fitness Center	1.0
4148	-73.971262	Gym	1.0
4155	-73.975007	Drugstore	8.0
4168	-73.972421	School	9.0
4176	-73.971362	Gym / Fitness Center	1.0