In [223]:

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

import pandas as pd # library for data analsysis
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 l
ongitude values

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

# 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.')

# Scrape Wikipedia page
df = pd.read_html("https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canad
a:_M", header = 0)
#Export dataframe to excel file
headings = ['Postcode', 'Borough', 'Neighbourhood']
df[0].to_csv("df.csv", index=False)
df = pd.DataFrame(df[0],columns=headings)
#Ignoring cells with a borough that is 'Not assigned'
df=df[~(df['Borough']== 'Not assigned')]
#Combining into one row with the neighborhoods separated with a comma
df=df.groupby(['Postcode','Borough'],as_index=False).agg(lambda x : x.sum() if
x.dtype=='float64' else ', '.join(x))
#Not assigned neighborhood will be the same as the borough
df.loc[df.Neighbourhood == 'Not assigned', 'Neighbourhood'] = df['Borough']
#print the number of rows of your dataframe.
df.shape
headings = ['Postcode', 'Latitude', 'Longitude']
df1 = pd.read_csv("https://cocl.us/Geospatial_data" , names=headings, skiprows
=1)
result=pd.merge(df, df1, on='Postcode', how='inner')
```

```
Collecting package metadata: done
Solving environment: done

# All requested packages already installed.

Collecting package metadata: done
Solving environment: done

# All requested packages already installed.

Libraries imported.
```

In [224]:

```
toronto_data= result[result.Borough.str.contains('Toronto', case=False)]
toronto_data.reset_index(drop=True)
toronto_data
address = 'Toronto'
```

In [225]:

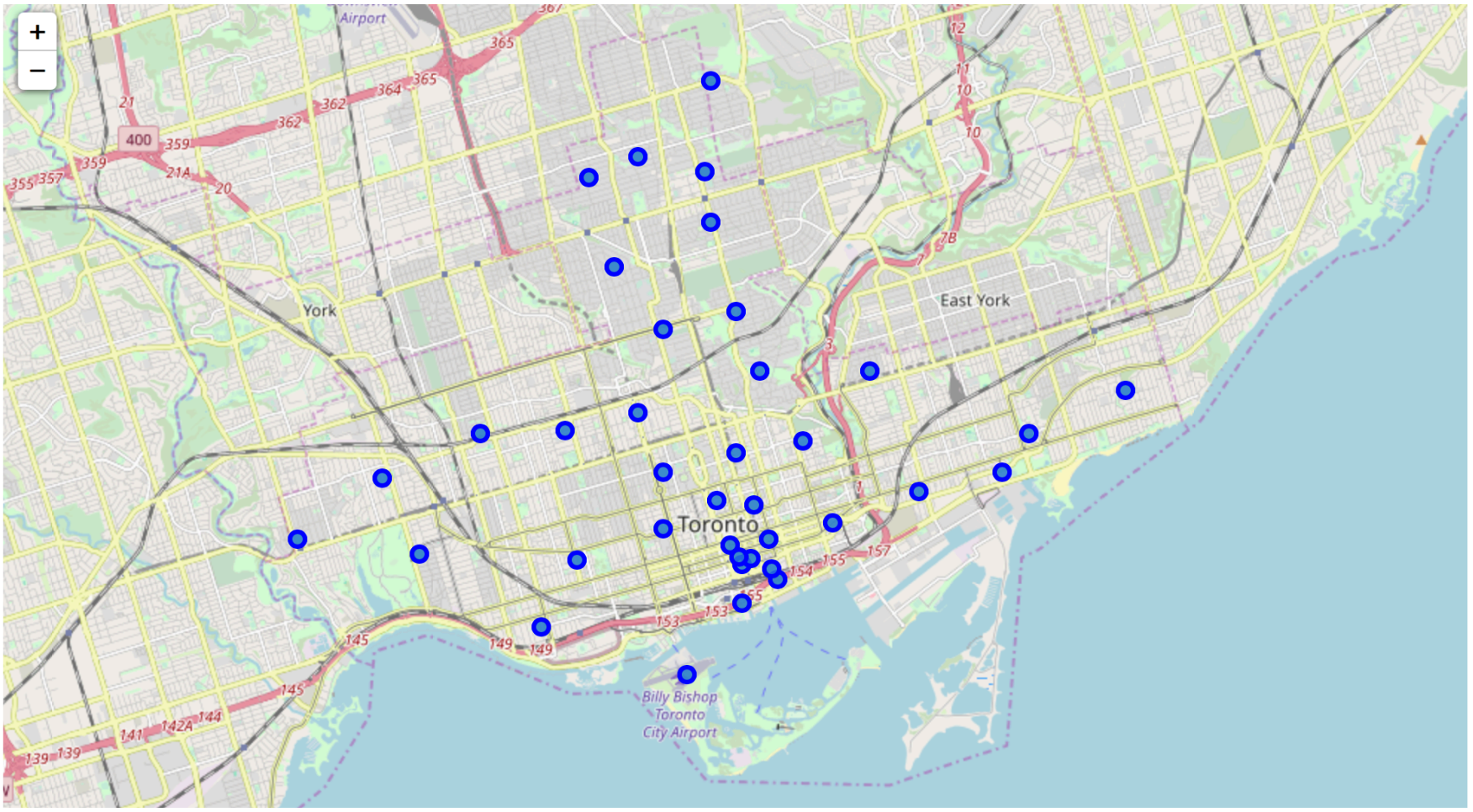
```
geolocator = Nominatim(user_agent="ny_explorer")
location = geolocator.geocode(address)
latitude = location.latitude
longitude = location.longitude
print('The geograpical coordinate of Toronto are {}, {}.'.format(latitude, lon
gitude))
```

```
The geograpical coordinate of Toronto are 43.653963, -79.387207.
```

In [226]:

```
# map_toronto = folium.Map(location=[latitude, longitude], zoom_start=11)

# add markers to map
for lat, lng, label in zip(toronto_data.Latitude, toronto_data.Longitude, toro
nto_data.Neighbourhood):
    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_toronto)

map_toronto
```

Out[226]:


Airport
York
East York
Toronto
Billy Bishop
Toronto
City Airport
400

In [227]:

```
CLIENT_ID = 'J4Q3Q0XZV1VS4DHWIOV11SIL3CN5ZRU5WQQGJFHZSACBTZE1' # your Foursqua
re ID
CLIENT_SECRET = 'OZHSLJXO0X3JIZFFZ1F4DNYT0SBOMTDEJQOBTC22EQS441X4' # your Four
square Secret
VERSION = '20190223' # Foursquare API version
neighbourhood_latitude = toronto_data.iloc[0, 3] # neighborhood latitude value
neighbourhood_longitude = toronto_data.iloc[0, 4] # neighborhood longitude val
ue
neighbourhood_name = toronto_data.iloc[0, 2] # neighborhood name

print('Latitude and longitude values of {} are {}, {}.'.format(neighbourhood_n
ame,
                                                               neighbourhood_l
atitude,
                                                               neighbourhood_l
ongitude))
LIMIT = 100 # limit of number of venues returned by Foursquare API
radius = 500 # define radius
url = 'https://api.foursquare.com/v2/venues/explore?&client_id={}&client_secre
t={}&v={}&ll={},{}&radius={}&limit={}'.format(
    CLIENT_ID,
    CLIENT_SECRET,
    VERSION,
    neighbourhood_latitude,
    neighbourhood_longitude,
    radius,
    LIMIT)
#url # display URL
results = requests.get(url).json()
#result
```

```
Latitude and longitude values of The Beaches are 43.67635739999999
, -79.2930312.
```

In [228]:

```
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={}&clie
nt_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 = ['Neighbourhood',
                  'Neighbourhood Latitude',
                  'Neighbourhood Longitude',
                  'Venue',
                  'Venue Latitude',
                  'Venue Longitude',
                  'Venue Category']

    return(nearby_venues)
toronto_venues = getNearbyVenues(names=toronto_data['Neighbourhood'],
                                 latitudes=toronto_data['Latitude'],
                                 longitudes=toronto_data['Longitude']
                                )
```

The Beaches
The Danforth West, Riverdale
The Beaches West, India Bazaar
Studio District
Lawrence Park
Davisville North
North Toronto West
Davisville
Moore Park, Summerhill East
Deer Park, Forest Hill SE, Rathnelly, South Hill, Summerhill West
Rosedale
Cabbagetown, St. James Town
Church and Wellesley
Harbourfront, Regent Park
Ryerson, Garden District
St. James Town
Berczy Park
Central Bay Street
Adelaide, King, Richmond
Harbourfront East, Toronto Islands, Union Station
Design Exchange, Toronto Dominion Centre
Commerce Court, Victoria Hotel
Roselawn
Forest Hill North, Forest Hill West
The Annex, North Midtown, Yorkville
Harbord, University of Toronto
Chinatown, Grange Park, Kensington Market
CN Tower, Bathurst Quay, Island airport, Harbourfront West, King a
nd Spadina, Railway Lands, South Niagara
Stn A PO Boxes 25 The Esplanade
First Canadian Place, Underground city
Christie
Dovercourt Village, Dufferin
Little Portugal, Trinity
Brockton, Exhibition Place, Parkdale Village
High Park, The Junction South
Parkdale, Roncesvalles
Runnymede, Swansea
Business Reply Mail Processing Centre 969 Eastern

In [229]:

```
print(toronto_venues.shape)
toronto_venues.head()
```

```
(1699, 7)
```

Out[229]:

	Neighbourhood	Neighbourhood Latitude	Neighbourhood Longitude	Venue	Venue Latitude	Venue Longitude	C
0	The Beaches	43.676357	-79.293031	The Big Carrot Natural Food Market	43.678879	-79.297734	He
1	The Beaches	43.676357	-79.293031	Grover Pub and Grub	43.679181	-79.297215	
2	The Beaches	43.676357	-79.293031	Starbucks	43.678798	-79.298045	Cof
3	The Beaches	43.676357	-79.293031	Upper Beaches	43.680563	-79.292869	Neigh
4	The Danforth West, Riverdale	43.679557	-79.352188	Pantheon	43.677621	-79.351434	R

In [230]:

```
toronto_venues.groupby('Neighbourhood').count()
```

Out[230]:

Neighbourhood	Neighbourhood Latitude	Neighbourhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Adelaide, King, Richmond	100	100	100	100	100	100
Berczy Park	57	57	57	57	57	57
Brockton, Exhibition Place, Parkdale Village	19	19	19	19	19	19
Business Reply Mail Processing Centre 969 Eastern	18	18	18	18	18	18
CN Tower, Bathurst Quay, Island airport, Harbourfront West, King and Spadina, Railway Lands, South Niagara	13	13	13	13	13	13

Cabbagetown, St. James Town	43	43	43	43	43	43
Central Bay Street	81	81	81	81	81	81
Chinatown, Grange Park, Kensington Market	100	100	100	100	100	100
Christie	16	16	16	16	16	16
Church and Wellesley	86	86	86	86	86	86
Commerce Court, Victoria Hotel	100	100	100	100	100	100
Davisville	38	38	38	38	38	38
Davisville North	9	9	9	9	9	9
Deer Park, Forest Hill SE, Rathnelly, South Hill, Summerhill West	15	15	15	15	15	15
Design Exchange, Toronto Dominion Centre	100	100	100	100	100	100
Dovercourt Village, Dufferin	20	20	20	20	20	20
First Canadian Place, Underground city	100	100	100	100	100	100
Forest Hill North, Forest Hill West	4	4	4	4	4	4
Harbord, University of Toronto	35	35	35	35	35	35
Harbourfront East, Toronto Islands, Union Station	100	100	100	100	100	100
Harbourfront, Regent Park	47	47	47	47	47	47
High Park, The Junction South	23	23	23	23	23	23
Lawrence Park	4	4	4	4	4	4
Little Portugal, Trinity	63	63	63	63	63	63
Moore Park, Summerhill East	3	3	3	3	3	3
North Toronto West	21	21	21	21	21	21
Parkdale, Roncesvalles	16	16	16	16	16	16

Roncesvalles						
Rosedale	4	4	4	4	4	4
Roselawn	3	3	3	3	3	3
Runnymede, Swansea	38	38	38	38	38	38
Ryerson, Garden District	100	100	100	100	100	100
St. James Town	100	100	100	100	100	100
Stn A PO Boxes 25 The Esplanade	94	94	94	94	94	94
Studio District	40	40	40	40	40	40
The Annex, North Midtown, Yorkville	24	24	24	24	24	24
The Beaches	4	4	4	4	4	4
The Beaches West, India Bazaar	19	19	19	19	19	19
The Danforth West, Riverdale	42	42	42	42	42	42

In [231]:

```
print('There are {} uniques categories.'.format(len(toronto_venues['Venue Category'].unique())))

# Analyze Each Neighbourhood
# one hot encoding
toronto_onehot = pd.get_dummies(toronto_venues[['Venue Category']], prefix="", prefix_sep="")

# add neighbourhood column back to dataframe
toronto_onehot['Neighbourhood'] = toronto_venues['Neighbourhood']

# move neighbourhood column to the first column
fixed_columns = [toronto_onehot.columns[-1]] + list(toronto_onehot.columns[:-1])
toronto_onehot = toronto_onehot[fixed_columns]
```

```
There are 237 uniques categories.
```

In [232]:

```
toronto_onehot.head()
toronto_onehot.shape
```

Out[232]:

```
(1699, 238)
```

In [233]:

```
toronto_grouped = toronto_onehot.groupby('Neighbourhood').mean().reset_index()
toronto_grouped
toronto_grouped.shape
```

Out[233]:

```
(38, 238)
```

In [214]:

```
num_top_venues = 5

for hood in toronto_grouped['Neighbourhood']:
    print("----"+hood+"----")
    temp = toronto_grouped[toronto_grouped['Neighbourhood'] == hood].T.reset_i
ndex()
    temp.columns = ['venue','freq']
    temp = temp.iloc[1:]
    temp['freq'] = temp['freq'].astype(float)
    temp = temp.round({'freq': 2})
    print(temp.sort_values('freq', ascending=False).reset_index(drop=True).hea
d(num_top_venues))
    print('\n')
```

```
----Adelaide, King, Richmond----
                venue  freq
0         Coffee Shop  0.06
1                Café  0.05
2      Thai Restaurant  0.04
3           Steakhouse  0.04
4  American Restaurant  0.04


----Berczy Park----
               venue  freq
0         Coffee Shop  0.07
1        Cocktail Bar  0.05
2          Restaurant  0.05
3  Italian Restaurant  0.04
4               Café  0.04


----Brockton, Exhibition Place, Parkdale Village----
                  venue  freq
0        Breakfast Spot  0.11
1                 Café  0.11
2          Coffee Shop  0.11
3  Gym / Fitness Center  0.05
4  Caribbean Restaurant  0.05


----Business Reply Mail Processing Centre 969 Eastern----
           venue  freq
0    Yoga Studio  0.06
```

```
1         Butcher  0.06
2  Garden Center  0.06
3          Garden  0.06
4     Pizza Place  0.06


----CN Tower, Bathurst Quay, Island airport, Harbourfront West, Ki
ng and Spadina, Railway Lands, South Niagara----
               venue  freq
0     Airport Lounge  0.15
1    Airport Service  0.15
2  Airport Terminal  0.15
3           Boutique  0.08
4    Harbor / Marina  0.08


----Cabbagetown, St. James Town----
          venue  freq
0  Coffee Shop  0.09
1   Restaurant  0.07
2         Café  0.05
3  Pizza Place  0.05
4       Bakery  0.05


----Central Bay Street----
                 venue  freq
0         Coffee Shop  0.16
1                Café  0.07
2  Italian Restaurant  0.05
3                 Bar  0.04
4        Burger Joint  0.04


----Chinatown, Grange Park, Kensington Market----
                           venue  freq
0                           Café  0.07
1                            Bar  0.06
2          Vietnamese Restaurant  0.05
3  Vegetarian / Vegan Restaurant  0.05
4                    Coffee Shop  0.04


----Christie----
                venue  freq
0                Café  0.19
1       Grocery Store  0.19
2                Park  0.12
3  Italian Restaurant  0.06
4              Diner  0.06


----Church and Wellesley----
                 venue  freq
0  Japanese Restaurant  0.07
1          Coffee Shop  0.06
2     Sushi Restaurant  0.06
```

```
3              Gay Bar  0.05
4           Restaurant  0.03


----Commerce Court, Victoria Hotel----
                 venue  freq
0          Coffee Shop  0.10
1                Café  0.07
2           Restaurant  0.06
3                Hotel  0.06
4  American Restaurant  0.04


----Davisville----
             venue  freq
0   Sandwich Place  0.08
1     Dessert Shop  0.08
2      Pizza Place  0.08
3            Café  0.05
4  Thai Restaurant  0.05


----Davisville North----
               venue  freq
0                Gym  0.11
1              Hotel  0.11
2     Breakfast Spot  0.11
3  Food & Drink Shop  0.11
4     Sandwich Place  0.11


----Deer Park, Forest Hill SE, Rathnelly, South Hill, Summerhill W
est----
                venue  freq
0  Convenience Store  0.13
1                Pub  0.13
2         Coffee Shop  0.13
3          Bagel Shop  0.07
4          Sports Bar  0.07


----Design Exchange, Toronto Dominion Centre----
                 venue  freq
0          Coffee Shop  0.15
1                Café  0.09
2              Hotel  0.08
3           Restaurant  0.04
4  American Restaurant  0.04


----Dovercourt Village, Dufferin----
                  venue  freq
0              Pharmacy  0.10
1                Bakery  0.10
2           Supermarket  0.10
3               Brewery  0.05
4  Fast Food Restaurant  0.05
```

```
----First Canadian Place, Underground city----
                venue  freq
0                Café  0.08
1          Coffee Shop  0.08
2               Hotel  0.06
3          Restaurant  0.05
4  American Restaurant  0.04


----Forest Hill North, Forest Hill West----
                venue  freq
0  Mexican Restaurant  0.25
1    Sushi Restaurant  0.25
2               Trail  0.25
3       Jewelry Store  0.25
4      Adult Boutique  0.00


----Harbord, University of Toronto----
                venue  freq
0                Café  0.11
1              Bakery  0.06
2  Japanese Restaurant  0.06
3                 Bar  0.06
4           Bookstore  0.06


----Harbourfront East, Toronto Islands, Union Station----
         venue  freq
0  Coffee Shop  0.14
1        Hotel  0.05
2     Aquarium  0.05
3         Café  0.04
4  Pizza Place  0.04


----Harbourfront, Regent Park----
         venue  freq
0  Coffee Shop  0.15
1         Café  0.06
2       Bakery  0.06
3         Park  0.06
4          Pub  0.06


----High Park, The Junction South----
                   venue  freq
0      Mexican Restaurant  0.09
1                   Café  0.09
2  Furniture / Home Store  0.04
3          Grocery Store  0.04
4              Speakeasy  0.04


----Lawrence Park----
```

```
                venue  freq
0                Park  0.25
1         Swim School  0.25
2  Dim Sum Restaurant  0.25
3            Bus Line  0.25
4      Adult Boutique  0.00


----Little Portugal, Trinity----
              venue  freq
0               Bar  0.13
1       Men's Store  0.06
2       Coffee Shop  0.05
3  Asian Restaurant  0.05
4             Café  0.03


----Moore Park, Summerhill East----
                venue  freq
0          Playground  0.33
1                 Gym  0.33
2          Restaurant  0.33
3           Nightclub  0.00
4  Mexican Restaurant  0.00


----North Toronto West----
                   venue  freq
0            Coffee Shop  0.10
1          Clothing Store  0.10
2     Sporting Goods Shop  0.10
3            Yoga Studio  0.05
4  Furniture / Home Store  0.05


----Parkdale, Roncesvalles----
            venue  freq
0  Breakfast Spot  0.12
1       Gift Shop  0.12
2      Restaurant  0.06
3   Movie Theater  0.06
4       Bookstore  0.06


----Rosedale----
                     venue  freq
0                    Park  0.50
1              Playground  0.25
2                   Trail  0.25
3  New American Restaurant  0.00
4             Men's Store  0.00


----Roselawn----
               venue  freq
0       Home Service  0.33
1             Garden  0.33
```

```
2        Music Venue  0.33
3  Martial Arts Dojo  0.00
4        Men's Store  0.00


----Runnymede, Swansea----
                venue  freq
0         Coffee Shop  0.11
1         Pizza Place  0.08
2               Café  0.08
3    Sushi Restaurant  0.05
4  Italian Restaurant  0.05


----Ryerson, Garden District----
                       venue  freq
0           Clothing Store  0.09
1              Coffee Shop  0.09
2                    Café  0.04
3  Middle Eastern Restaurant  0.03
4           Cosmetics Shop  0.03


----St. James Town----
           venue  freq
0     Coffee Shop  0.07
1      Restaurant  0.06
2           Hotel  0.05
3            Café  0.05
4  Clothing Store  0.04


----Stn A PO Boxes 25 The Esplanade----
                venue  freq
0         Coffee Shop  0.11
1          Restaurant  0.05
2                Café  0.04
3           Beer Bar  0.03
4  Italian Restaurant  0.03


----Studio District----
                venue  freq
0                Café  0.10
1         Coffee Shop  0.08
2   Italian Restaurant  0.05
3  American Restaurant  0.05
4              Bakery  0.05


----The Annex, North Midtown, Yorkville----
            venue  freq
0     Coffee Shop  0.12
1  Sandwich Place  0.12
2            Café  0.12
3     Pizza Place  0.08
4  History Museum  0.04
```

```
----The Beaches----
               venue  freq
0  Health Food Store  0.25
1                Pub  0.25
2        Coffee Shop  0.25
3       Neighborhood  0.25
4     Adult Boutique  0.00


----The Beaches West, India Bazaar----
            venue  freq
0  Sandwich Place  0.11
1    Liquor Store  0.05
2         Brewery  0.05
3   Movie Theater  0.05
4      Steakhouse  0.05


----The Danforth West, Riverdale----
                venue  freq
0    Greek Restaurant  0.24
1         Coffee Shop  0.10
2      Ice Cream Shop  0.07
3  Italian Restaurant  0.05
4           Bookstore  0.05
```

In [234]:

```
def return_most_common_venues(row, num_top_venues):
    row_categories = row.iloc[1:]
    row_categories_sorted = row_categories.sort_values(ascending=False)

    return row_categories_sorted.index.values[0:num_top_venues]

num_top_venues = 10

indicators = ['st', 'nd', 'rd']

# create columns according to number of top venues
columns = ['Neighbourhood']
for ind in np.arange(num_top_venues):
    try:
        columns.append('{}{} Most Common Venue'.format(ind+1, indicators[ind])
)
    except:
        columns.append('{}th Most Common Venue'.format(ind+1))

# create a new dataframe
neighborhoods_venues_sorted = pd.DataFrame(columns=columns)
neighborhoods_venues_sorted['Neighbourhood'] = toronto_grouped['Neighbourhood'
]

for ind in np.arange(toronto_grouped.shape[0]):
    neighborhoods_venues_sorted.iloc[ind, 1:] = return_most_common_venues(toro
nto_grouped.iloc[ind, :], num_top_venues)

neighborhoods_venues_sorted.head()
```

Out[234]:

	Neighbourhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7t C
0	Adelaide, King, Richmond	Coffee Shop	Café	Thai Restaurant	American Restaurant	Steakhouse	Clothing Store	Res
1	Berczy Park	Coffee Shop	Restaurant	Cocktail Bar	Café	Cheese Shop	Bakery	Stea
2	Brockton, Exhibition Place, Parkdale Village	Café	Breakfast Spot	Coffee Shop	Furniture / Home Store	Performing Arts Venue	Climbing Gym	Res
3	Business Reply Mail Processing Centre 969 Eastern	Yoga Studio	Recording Studio	Smoke Shop	Skate Park	Brewery	Burrito Place	
4	CN Tower, Bathurst Quay, Island airport, Harbo...	Airport Lounge	Airport Service	Airport Terminal	Boat or Ferry	Boutique	Airport	Foo

In [235]:

```
# Examine Clusters
# set number of clusters
kclusters = 5

toronto_grouped_clustering = toronto_grouped.drop('Neighbourhood', 1)

# run k-means clustering
kmeans = KMeans(n_clusters=kclusters, random_state=0).fit(toronto_grouped_clus
tering)

# check cluster labels generated for each row in the dataframe
kmeans.labels_[0:10]
```

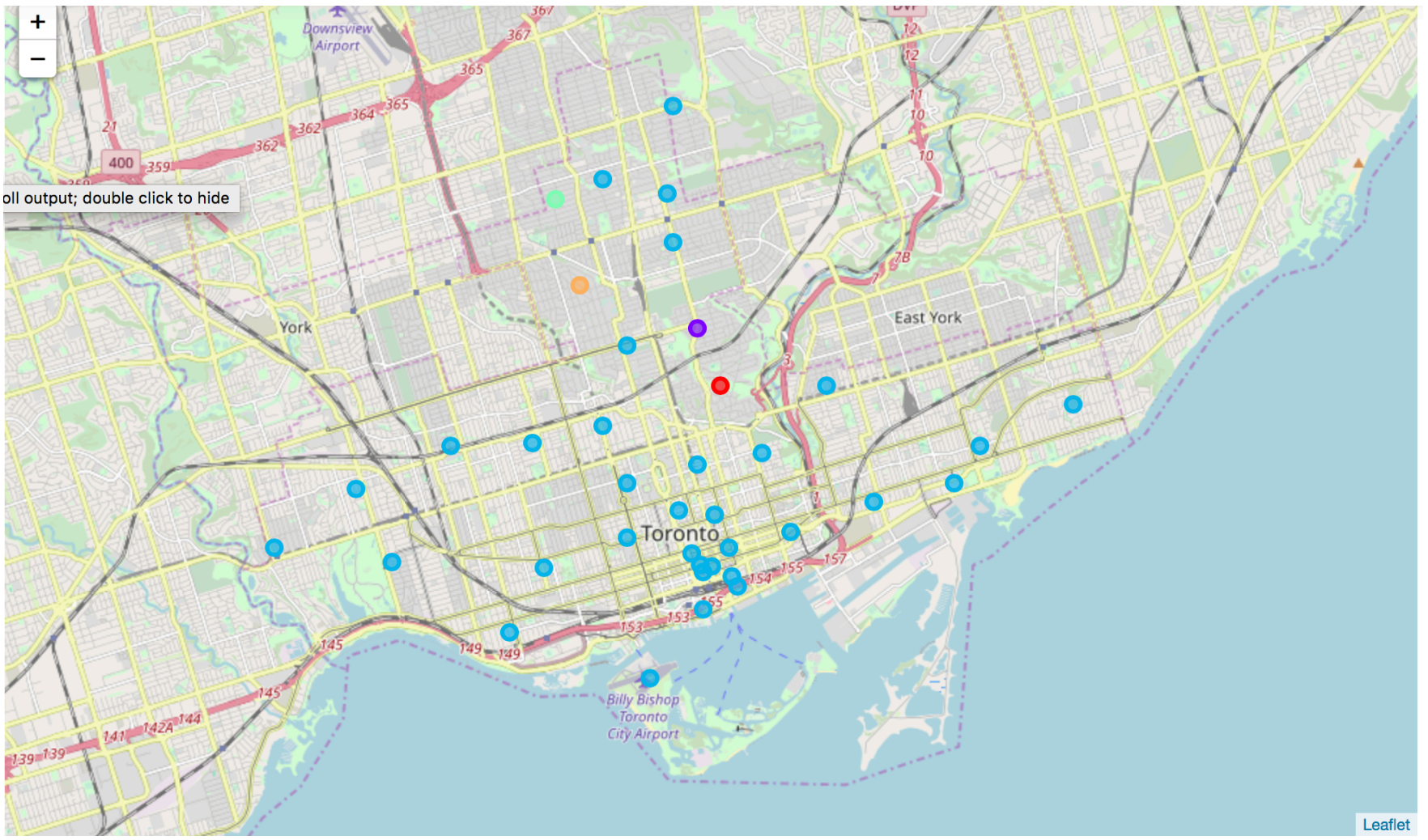
Out[235]:

```
array([2, 2, 2, 2, 2, 2, 2, 2, 2, 2], dtype=int32)
```

In [236]:

```
# add clustering labels
neighborhoods_venues_sorted.insert(0, 'Cluster Labels', kmeans.labels_)

toronto_merged = toronto_data

# merge toronto_grouped with toronto_data to add latitude/longitude for each n
eighborhood
toronto_merged = toronto_merged.join(neighborhoods_venues_sorted.set_index('Ne
ighbourhood'), on='Neighbourhood')

toronto_merged.head() # check the last columns!
# create map
map_clusters = folium.Map(location=[latitude, longitude], zoom_start=11)

# set color scheme for the clusters
x = np.arange(kclusters)
ys = [i + x + (i*x)**2 for i in range(kclusters)]
colors_array = cm.rainbow(np.linspace(0, 1, len(ys)))
rainbow = [colors.rgb2hex(i) for i in colors_array]

# add markers to the map
markers_colors = []
for lat, lon, poi, cluster in zip(toronto_merged['Latitude'], toronto_merged['
Longitude'], toronto_merged['Neighbourhood'], toronto_merged['Cluster Labels']
):
    label = folium.Popup(str(poi) + ' Cluster ' + str(cluster), parse_html=Tru
e)
    folium.CircleMarker(
        [lat, lon],
        radius=5,
        popup=label,
        color=rainbow[cluster-1],
        fill=True,
        fill_color=rainbow[cluster-1],
        fill_opacity=0.7).add_to(map_clusters)

map_clusters
```

Out[236]:


Downsview Airport
York
East York
Toronto
Billy Bishop Toronto City Airport
400
Leaflet

In [237]:

```
toronto_merged.loc[toronto_merged['Cluster Labels'] == 0, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
```

Out[237]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	
50	Downtown Toronto	0	Park	Playground	Trail	Diner	Fast Food Restaurant	Farmers Market	R

In [238]:

```
toronto_merged.loc[toronto_merged['Cluster Labels'] == 1, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
```

Out[238]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	
48	Central Toronto	1	Playground	Gym	Restaurant	Diner	Fast Food Restaurant	Farmers Market	R

In [241]:

```
toronto_merged.loc[toronto_merged['Cluster Labels'] == 2, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
```

Out[241]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6 C
37	East Toronto	2	Neighborhood	Health Food Store	Coffee Shop	Pub	Yoga Studio	
41	East Toronto	2	Greek Restaurant	Coffee Shop	Ice Cream Shop	Bookstore	Italian Restaurant	
42	East Toronto	2	Sandwich Place	Liquor Store	Italian Restaurant	Pet Store	Gym	Piz
43	East Toronto	2	Café	Coffee Shop	Italian Restaurant	Bakery	American Restaurant	
44	Central Toronto	2	Park	Swim School	Dim Sum Restaurant	Bus Line	Yoga Studio	I
45	Central Toronto	2	Sandwich Place	Burger Joint	Breakfast Spot	Gym	Grocery Store	
46	Central	2	Coffee Shop	Clothing	Sporting Goods	Yoga Studio	Furniture / Home	F

	Toronto			Store	Shop		Store	
47	Central Toronto	2	Sandwich Place	Dessert Shop	Pizza Place	Sushi Restaurant	Restaurant	Re
49	Central Toronto	2	Convenience Store	Pub	Coffee Shop	Pizza Place	Sports Bar	Re
51	Downtown Toronto	2	Coffee Shop	Restaurant	Bakery	Italian Restaurant	Café	
52	Downtown Toronto	2	Japanese Restaurant	Coffee Shop	Sushi Restaurant	Gay Bar	Restaurant	
53	Downtown Toronto	2	Coffee Shop	Café	Pub	Park	Bakery	B
54	Downtown Toronto	2	Coffee Shop	Clothing Store	Café	Middle Eastern Restaurant	Cosmetics Shop	J Re
55	Downtown Toronto	2	Coffee Shop	Restaurant	Hotel	Café	Clothing Store	
56	Downtown Toronto	2	Coffee Shop	Restaurant	Cocktail Bar	Café	Cheese Shop	
57	Downtown Toronto	2	Coffee Shop	Café	Italian Restaurant	Bar	Burger Joint	
58	Downtown Toronto	2	Coffee Shop	Café	Thai Restaurant	American Restaurant	Steakhouse	
59	Downtown Toronto	2	Coffee Shop	Aquarium	Hotel	Café	Pizza Place	
60	Downtown Toronto	2	Coffee Shop	Café	Hotel	Restaurant	American Restaurant	Ga
61	Downtown Toronto	2	Coffee Shop	Café	Restaurant	Hotel	American Restaurant	Re
65	Central Toronto	2	Coffee Shop	Café	Sandwich Place	Pizza Place	BBQ Joint	Re
66	Downtown Toronto	2	Café	Coffee Shop	Bakery	Bookstore	Restaurant	
67	Downtown Toronto	2	Café	Bar	Vietnamese Restaurant	Vegetarian / Vegan Restaurant	Coffee Shop	
68	Downtown Toronto	2	Airport Lounge	Airport Service	Airport Terminal	Boat or Ferry	Boutique	
69	Downtown Toronto	2	Coffee Shop	Restaurant	Café	Cocktail Bar	Italian Restaurant	Re
70	Downtown Toronto	2	Coffee Shop	Café	Hotel	Restaurant	American Restaurant	Ga
75	Downtown Toronto	2	Café	Grocery Store	Park	Convenience Store	Nightclub	Ba
76	West Toronto	2	Supermarket	Bakery	Pharmacy	Café	Discount Store	
77	West Toronto	2	Bar	Men's Store	Asian Restaurant	Coffee Shop	Cocktail Bar	Viet Re
	West			Breakfast	Coffee	Furniture /	Performing	

78	Toronto	2	Café	Spot	Shop	Home Store	Arts Venue	
82	West Toronto	2	Mexican Restaurant	Café	Flea Market	Thai Restaurant	Bakery	
83	West Toronto	2	Breakfast Spot	Gift Shop	Bookstore	Burger Joint	Movie Theater	
84	West Toronto	2	Coffee Shop	Café	Pizza Place	Sushi Restaurant	Italian Restaurant	Pl
87	East Toronto	2	Yoga Studio	Recording Studio	Smoke Shop	Skate Park	Brewery	

In [239]:

```
toronto_merged.loc[toronto_merged['Cluster Labels'] == 3, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
```

Out[239]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Com V
63	Central Toronto	3	Home Service	Music Venue	Garden	Yoga Studio	Dog Run	Fast Food Restaurant	Far M

In [240]:

```
toronto_merged.loc[toronto_merged['Cluster Labels'] == 4, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
```

Out[240]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7t Co
64	Central Toronto	4	Mexican Restaurant	Trail	Sushi Restaurant	Jewelry Store	Yoga Studio	Dog Run	Fas Res

In [ ]:

```

```