

```
In [1]: import pandas as pd
        from geopy.geocoders import Nominatim
        import folium
```

```
In [3]: # Scrape table from wikipedia
        url = 'https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M'
        can_list = pd.read_html(url, header = 0)
        # Table of interest in position 0 of list can_list
        df = can_list[0]
        # Drop all rows with Borough = 'Not assigned'
        postal = df[df.Borough != 'Not assigned']
        # Change column name 'Posta Code' to 'Postal_Code'
        postal.columns = postal.columns.str.replace(' ', '_')
        # Read latitudes and longitudes for Toronto
        coord = pd.read_csv('Geospatial_Coordinates.csv')
        # Change column name 'Posta Code' to 'Postal_Code'
        coord.columns = coord.columns.str.replace(' ', '_')
        # Merge dataframes
        postal_tot = pd.merge(postal, coord, on=['Postal_Code'])
        postal_tot.head()
```

Out[3]:

	Postal_Code	Borough	Neighbourhood	Latitude	Longitude
0	M3A	North York	Parkwoods	43.753259	-79.329656
1	M4A	North York	Victoria Village	43.725882	-79.315572
2	M5A	Downtown Toronto	Regent Park, Harbourfront	43.654260	-79.360636
3	M6A	North York	Lawrence Manor, Lawrence Heights	43.718518	-79.464763
4	M7A	Downtown Toronto	Queen's Park, Ontario Provincial Government	43.662301	-79.389494

```
In [4]: print('The dataframe has {} boroughs and {} neighborhoods.'.format(
        len(postal_tot['Borough'].unique()),
        postal_tot.shape[0]
    )
    )
```

The dataframe has 10 boroughs and 103 neighborhoods.

## Use geopy library to get the latitude and longitude values of Toronto.

```
In [5]: address = 'Toronto, Ontario'

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

The geographical coordinate of Toronto are 43.6534817, -79.3839347.

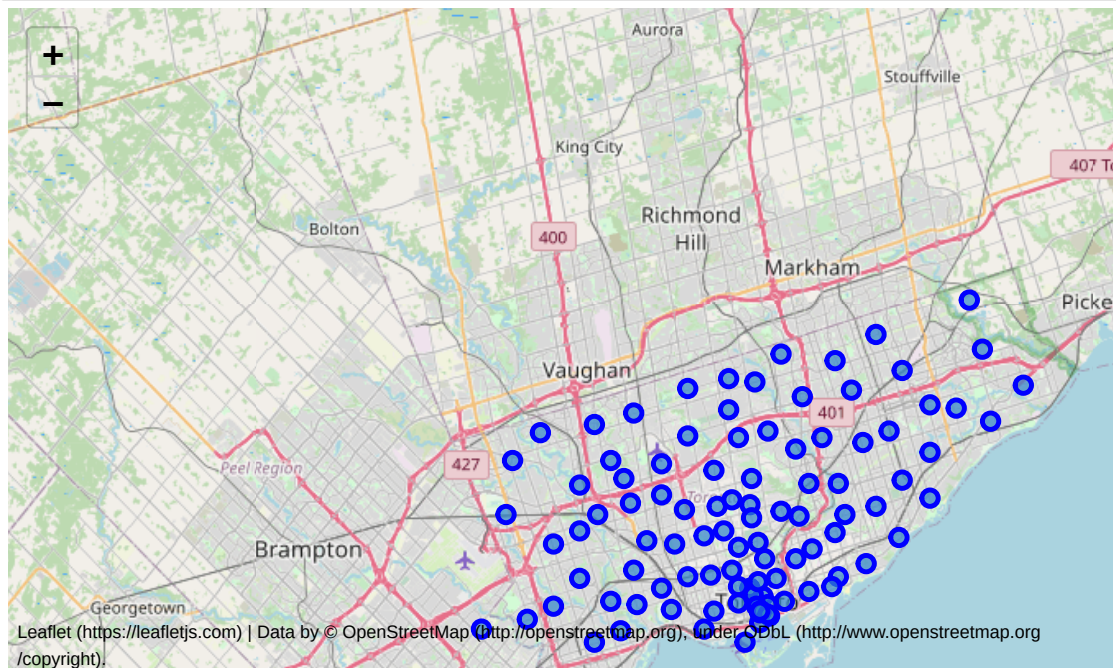
## Create a map of Toronto

```
In [6]: # create map of New York using latitude and longitude values
map_toronto = folium.Map(location=[latitude, longitude], zoom_start=10)

# add markers to map
for lat, lng, borough, neighborhood in zip(postal_tot['Latitude'],
                                           postal_tot['Longitude'],
                                           postal_tot['Borough'],
                                           postal_tot['Neighbourhood']):
    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_toronto)

map_toronto
```

Out[6]:



## Boroughs in Toronto

```
In [30]: postal_tot['Borough'].groupby(postal_tot['Borough'].tolist()).size()
```

```
Out[30]: Central Toronto      9
Downtown Toronto    19
East Toronto        5
East York           5
Etobicoke           12
Mississauga          1
North York          24
Scarborough         17
West Toronto        6
York                5
Name: Borough, dtype: int64
```

## Coordinates of Central Toronto

```
In [49]: centralT_data = postal_tot[postal_tot['Borough'] == 'Central Toronto'].reset_in
dex(drop=True)
centralT_data.head()
```

```
Out[49]:
```

	Postal_Code	Borough	Neighbourhood	Latitude	Longitude
0	M4N	Central Toronto	Lawrence Park	43.728020	-79.388790
1	M5N	Central Toronto	Roselawn	43.711695	-79.416936
2	M4P	Central Toronto	Davisville North	43.712751	-79.390197
3	M5P	Central Toronto	Forest Hill North & West, Forest Hill Road Park	43.696948	-79.411307
4	M4R	Central Toronto	North Toronto West, Lawrence Park	43.715383	-79.405678

```
In [52]: address = 'Central Toronto, Ontario'

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

The geograpical coordinate of Central Toronto are 43.6449033, -79.3818364.

```

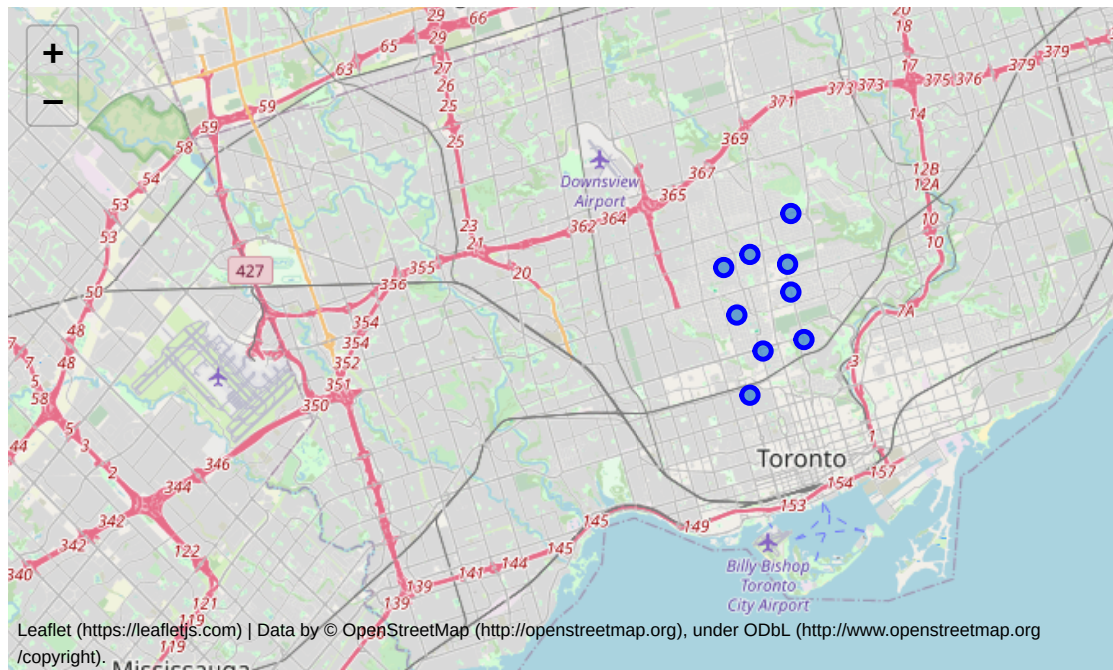
In [53]: # create map of Central Toronto using latitude and longitude values
map_central = folium.Map(location=[latitude, longitude], zoom_start=11)

# add markers to map
for lat, lng, label in zip(centralT_data['Latitude'],
                           centralT_data['Longitude'], centralT_data['Neighbour
hood']):
    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_central)

map_central

```

Out[53]:



## Data of Downtown Toronto

```
In [54]: downT_data = postal_tot[postal_tot['Borough'] == 'Downtown Toronto'].reset_index(drop=True)
downT_data.head()
```

Out[54]:

	Postal_Code	Borough	Neighbourhood	Latitude	Longitude
0	M5A	Downtown Toronto	Regent Park, Harbourfront	43.654260	-79.360636
1	M7A	Downtown Toronto	Queen's Park, Ontario Provincial Government	43.662301	-79.389494
2	M5B	Downtown Toronto	Garden District, Ryerson	43.657162	-79.378937
3	M5C	Downtown Toronto	St. James Town	43.651494	-79.375418
4	M5E	Downtown Toronto	Berczy Park	43.644771	-79.373306

```
In [55]: address = 'Downtown Toronto, Ontario'

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

The geograpical coordinate of Downtown Toronto are 43.6563221, -79.3809161.



```

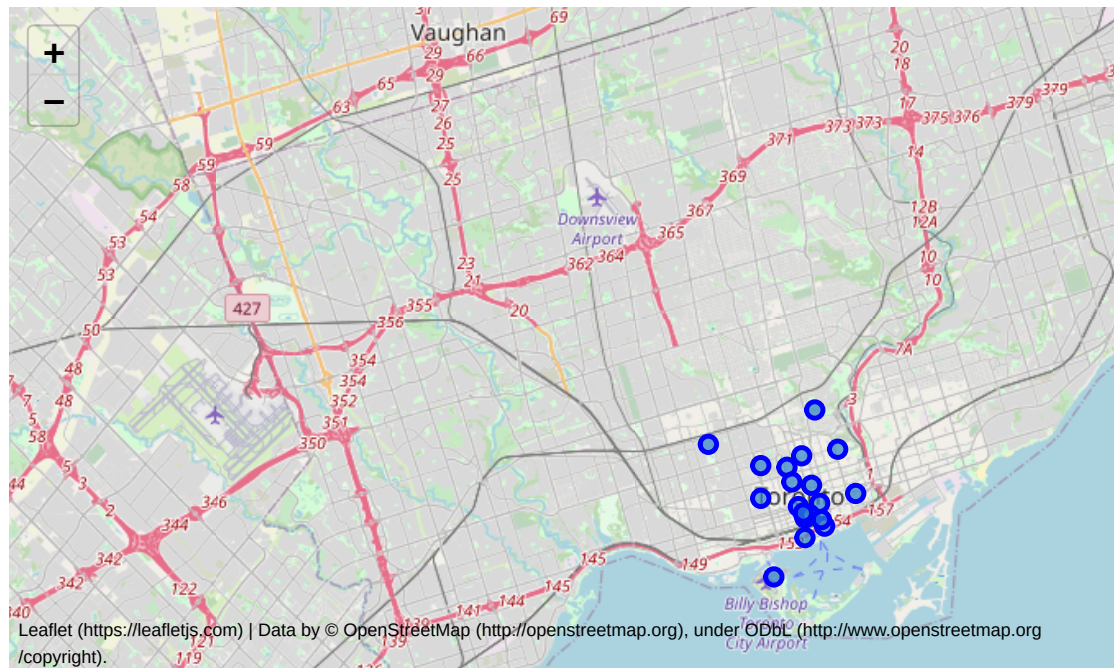
In [56]: # create map of Downtown Toronto using latitude and longitude values
map_downtown = folium.Map(location=[latitude, longitude], zoom_start=11)

# add markers to map
for lat, lng, label in zip(downT_data['Latitude'],
                           downT_data['Longitude'], downT_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_downtown)

map_downtown

```

Out[56]:



## Data of East Toronto

```
In [57]: eastT_data = postal_tot[postal_tot['Borough'] == 'East Toronto'].reset_index(drop=True)
eastT_data.head()
```

Out[57]:

	Postal_Code	Borough	Neighbourhood	Latitude	Longitude
0	M4E	East Toronto	The Beaches	43.676357	-79.293031
1	M4K	East Toronto	The Danforth West, Riverdale	43.679557	-79.352188
2	M4L	East Toronto	India Bazaar, The Beaches West	43.668999	-79.315572
3	M4M	East Toronto	Studio District	43.659526	-79.340923
4	M7Y	East Toronto	Business reply mail Processing Centre, South C...	43.662744	-79.321558

```
In [58]: address = 'East Toronto, Ontario'

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

The geograpical coordinate of East Toronto are 43.6247901, -79.3934918.

```

In [59]: # create map of East Toronto using latitude and longitude values
map_east = folium.Map(location=[latitude, longitude], zoom_start=11)

# add markers to map
for lat, lng, label in zip(eastT_data['Latitude'],
                           eastT_data['Longitude'], eastT_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_east)

map_east

```

Out[59]:



## Data of East York



```
In [60]: eastY_data = postal_tot[postal_tot['Borough'] == 'East York'].reset_index(drop=True)
eastY_data.head()
```

Out[60]:

	Postal_Code	Borough	Neighbourhood	Latitude	Longitude
0	M4B	East York	Parkview Hill, Woodbine Gardens	43.706397	-79.309937
1	M4C	East York	Woodbine Heights	43.695344	-79.318389
2	M4G	East York	Leaside	43.709060	-79.363452
3	M4H	East York	Thornccliffe Park	43.705369	-79.349372
4	M4J	East York	East Toronto, Broadview North (Old East York)	43.685347	-79.338106

```
In [61]: address = 'East York, Ontario'

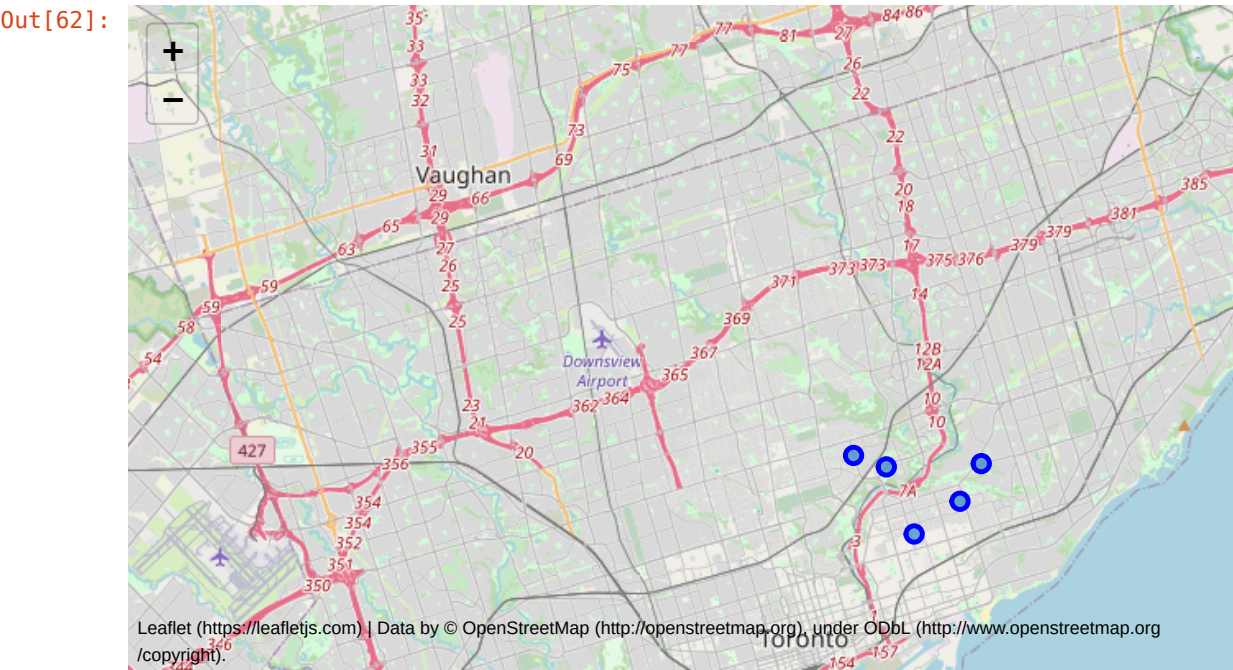
geolocator = Nominatim(user_agent="toronto_exp")
location = geolocator.geocode(address)
latitude = location.latitude
longitude = location.longitude
print('The geograpical coordinate of East York are {}, {}'.format(latitude, longitude))
```

The geograpical coordinate of East York are 43.699971000000005, -79.33251996261595.

```
In [62]: # create map of East York using latitude and longitude values
map_eastY = folium.Map(location=[latitude, longitude], zoom_start=11)

# add markers to map
for lat, lng, label in zip(eastY_data['Latitude'],
                           eastY_data['Longitude'], eastY_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_eastY)

map_eastY
```



Data of Mississauga

```
In [63]: missis_data = postal_tot[postal_tot['Borough'] == 'Mississauga'].reset_index(drop=True)
missis_data.head()
```

Out[63]:

	Postal_Code	Borough	Neighbourhood	Latitude	Longitude
0	M7R	Mississauga	Canada Post Gateway Processing Centre	43.636966	-79.615819

```
In [64]: address = 'Mississauga, Ontario'

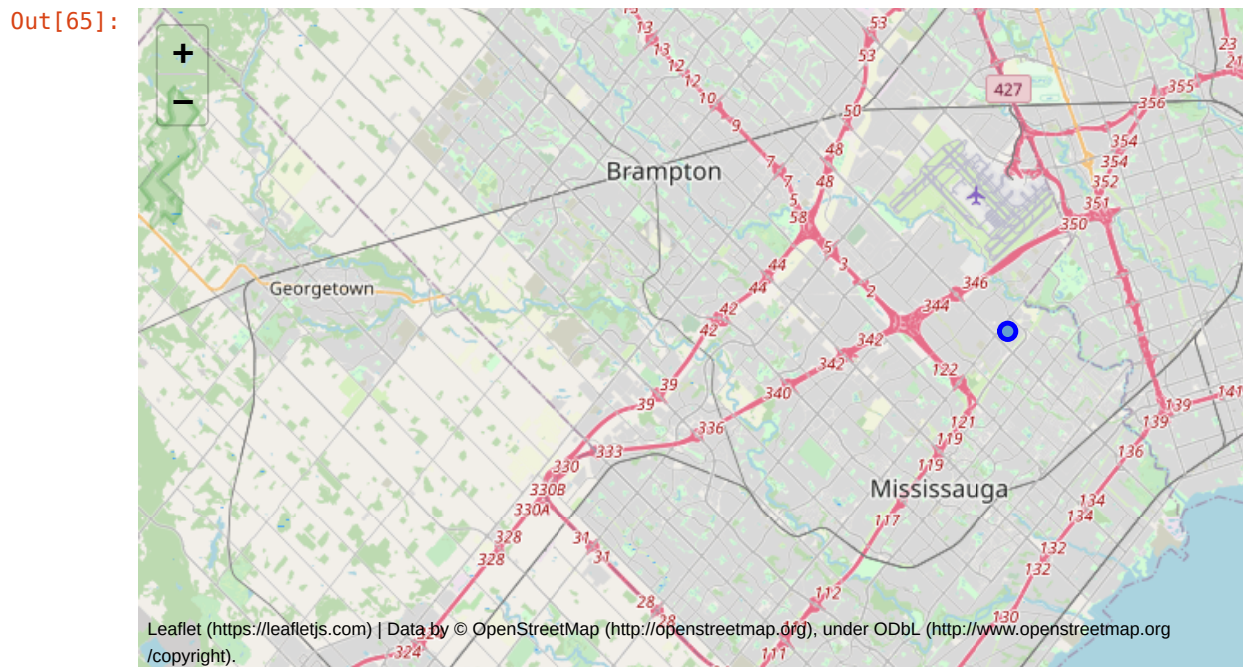
geolocator = Nominatim(user_agent="toronto_exp")
location = geolocator.geocode(address)
latitude = location.latitude
longitude = location.longitude
print('The geographical coordinate of Mississauga are {}, {}'.format(latitude,
longitude))
```

The geographical coordinate of Mississauga are 43.590338, -79.645729.

```
In [65]: # create map of Mississauga using latitude and longitude values
map_missis = folium.Map(location=[latitude, longitude], zoom_start=11)

# add markers to map
for lat, lng, label in zip(missis_data['Latitude'],
                           missis_data['Longitude'], missis_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_missis)
```

map\_missis



## Data of Etobicoke

```
In [66]: etobicoke_data = postal_tot[postal_tot['Borough'] == 'Etobicoke'].reset_index(drop=True)
etobicoke_data.head()
```

Out[66]:

	Postal_Code	Borough	Neighbourhood	Latitude	Longitude
0	M9A	Etobicoke	Islington Avenue, Humber Valley Village	43.667856	-79.532242
1	M9B	Etobicoke	West Deane Park, Princess Gardens, Martin Grov...	43.650943	-79.554724
2	M9C	Etobicoke	Eringate, Bloordale Gardens, Old Burnhamthorpe...	43.643515	-79.577201
3	M9P	Etobicoke	Westmount	43.696319	-79.532242
4	M9R	Etobicoke	Kingsview Village, St. Phillips, Martin Grove ...	43.688905	-79.554724

```
In [67]: address = 'Etobicoke, Ontario'

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

The geograpical coordinate of Etobicoke are 43.6435559, -79.5656326.

```

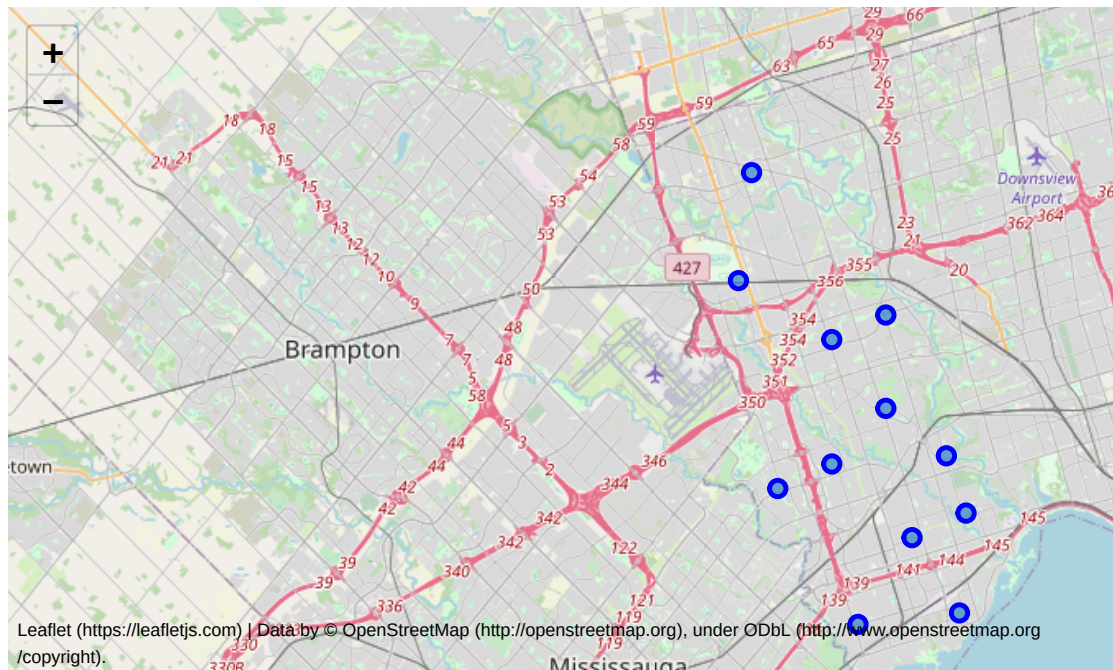
In [68]: # create map of Etobicoke using latitude and longitude values
map_etobicoke = folium.Map(location=[latitude, longitude], zoom_start=11)

# add markers to map
for lat, lng, label in zip(etobicoke_data['Latitude'],
                           etobicoke_data['Longitude'], etobicoke_data['Neighbo
urhood']):
    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_etobicoke)

map_etobicoke

```

Out[68]:



## Data of North York

```
In [69]: northY_data = postal_tot[postal_tot['Borough'] == 'North York'].reset_index(drop=True)
northY_data.head()
```

Out[69]:

	Postal_Code	Borough	Neighbourhood	Latitude	Longitude
0	M3A	North York	Parkwoods	43.753259	-79.329656
1	M4A	North York	Victoria Village	43.725882	-79.315572
2	M6A	North York	Lawrence Manor, Lawrence Heights	43.718518	-79.464763
3	M3B	North York	Don Mills	43.745906	-79.352188
4	M6B	North York	Glencairn	43.709577	-79.445073

```
In [70]: address = 'North York, Ontario'

geolocator = Nominatim(user_agent="toronto_exp")
location = geolocator.geocode(address)
latitude = location.latitude
longitude = location.longitude
print('The geograpical coordinate of North York are {}, {}'.format(latitude, longitude))
```

The geograpical coordinate of North York are 43.7543263, -79.44911696639593.



```

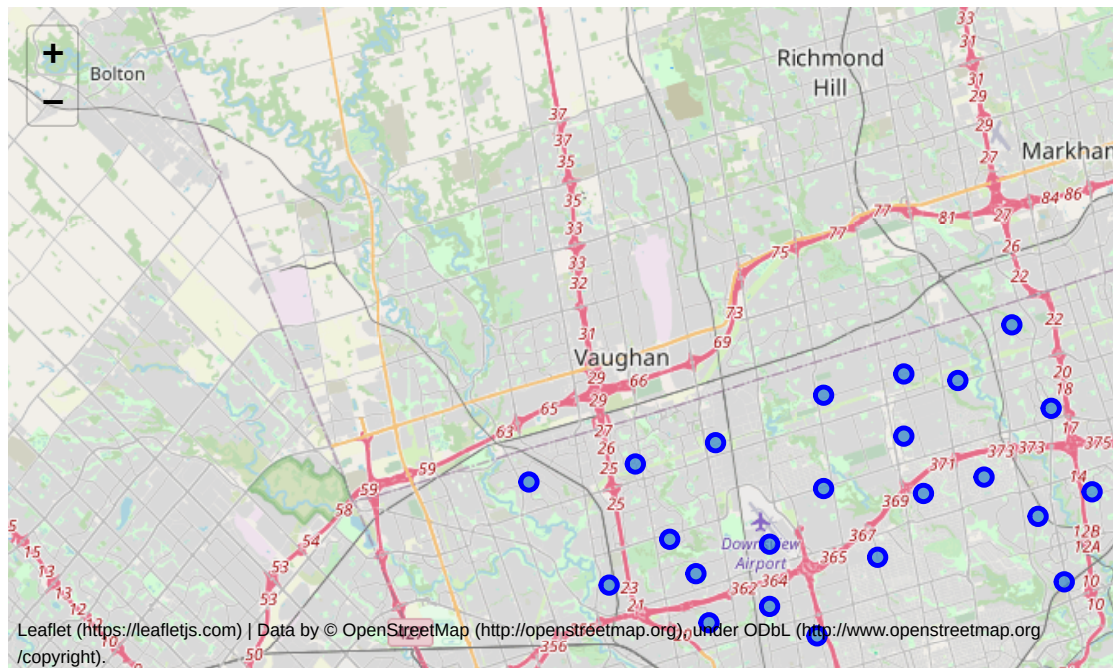
In [71]: # create map of North York using latitude and longitude values
map_northY = folium.Map(location=[latitude, longitude], zoom_start=11)

# add markers to map
for lat, lng, label in zip(northY_data['Latitude'],
                           northY_data['Longitude'], northY_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_northY)

map_northY

```

Out[71]:



## Data of Scarborough

```
In [72]: scarb_data = postal_tot[postal_tot['Borough'] == 'Scarborough'].reset_index(drop=True)
scarb_data.head()
```

Out[72]:

	Postal_Code	Borough	Neighbourhood	Latitude	Longitude
0	M1B	Scarborough	Malvern, Rouge	43.806686	-79.194353
1	M1C	Scarborough	Rouge Hill, Port Union, Highland Creek	43.784535	-79.160497
2	M1E	Scarborough	Guildwood, Morningside, West Hill	43.763573	-79.188711
3	M1G	Scarborough	Woburn	43.770992	-79.216917
4	M1H	Scarborough	Cedarbrae	43.773136	-79.239476

```
In [73]: address = 'Scarborough, Ontario'

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

The geograpical coordinate of Scarborough are 43.773077, -79.257774.

```

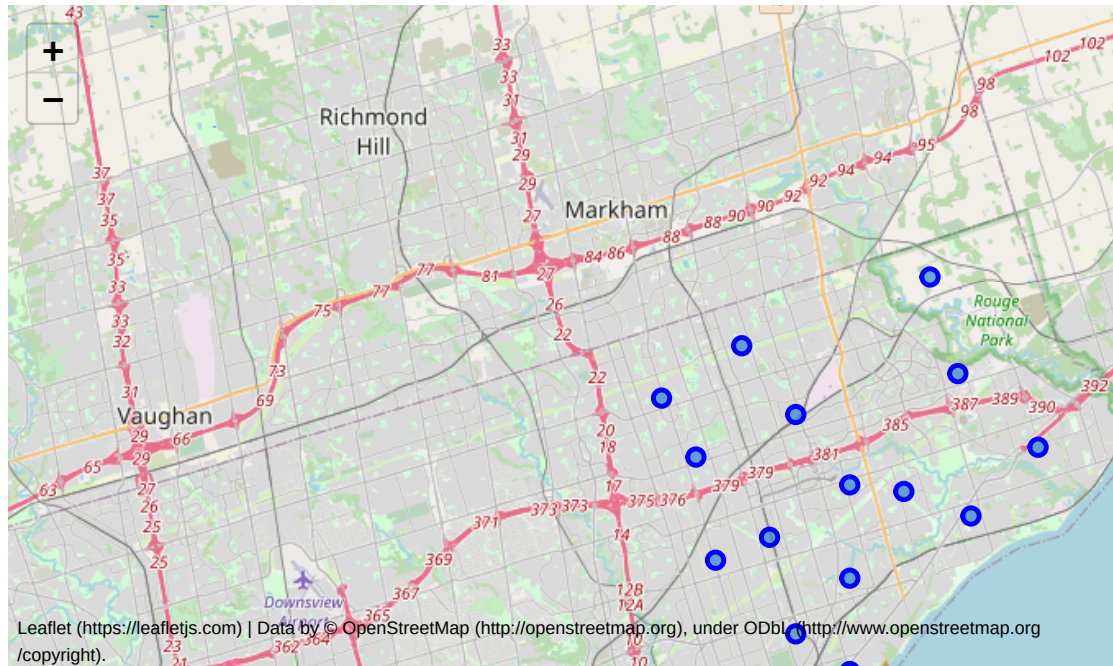
In [74]: # create map of Scarborough using latitude and longitude values
map_scarb = folium.Map(location=[latitude, longitude], zoom_start=11)

# add markers to map
for lat, lng, label in zip(scarb_data['Latitude'],
                           scarb_data['Longitude'], scarb_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_scarb)

map_scarb

```

Out[74]:



## Data of West Toronto

```
In [75]: westT_data = postal_tot[postal_tot['Borough'] == 'West Toronto'].reset_index(drop=True)
westT_data.head()
```

Out[75]:

	Postal_Code	Borough	Neighbourhood	Latitude	Longitude
0	M6H	West Toronto	Dufferin, Dovercourt Village	43.669005	-79.442259
1	M6J	West Toronto	Little Portugal, Trinity	43.647927	-79.419750
2	M6K	West Toronto	Brockton, Parkdale Village, Exhibition Place	43.636847	-79.428191
3	M6P	West Toronto	High Park, The Junction South	43.661608	-79.464763
4	M6R	West Toronto	Parkdale, Roncesvalles	43.648960	-79.456325

```
In [76]: address = 'West Toronto, Ontario'

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

The geograpical coordinate of West Toronto are 43.6449033, -79.3818364.

```

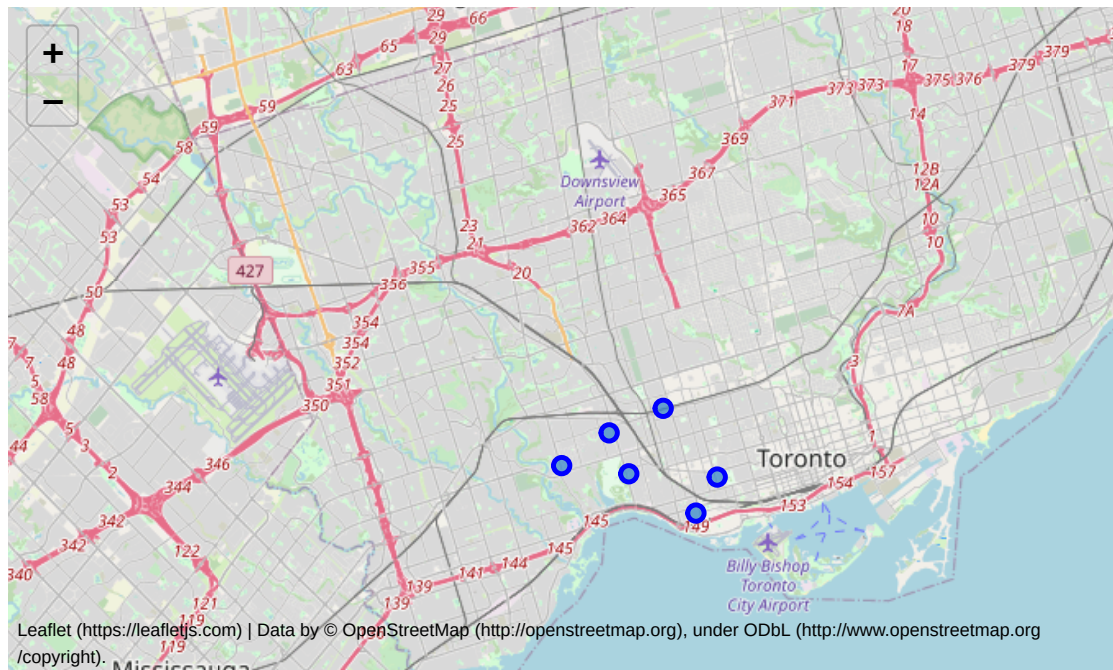
In [77]: # create map of West Toronto using latitude and longitude values
map_westT = folium.Map(location=[latitude, longitude], zoom_start=11)

# add markers to map
for lat, lng, label in zip(westT_data['Latitude'],
                           westT_data['Longitude'], westT_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_westT)

map_westT

```

Out[77]:



## Data of York

```
In [78]: york_data = postal_tot[postal_tot['Borough'] == 'York'].reset_index(drop=True)
york_data.head()
```

Out[78]:

	Postal_Code	Borough	Neighbourhood	Latitude	Longitude
0	M6C	York	Humewood-Cedarvale	43.693781	-79.428191
1	M6E	York	Caledonia-Fairbanks	43.689026	-79.453512
2	M6M	York	Del Ray, Mount Dennis, Keelsdale and Silverthorn	43.691116	-79.476013
3	M6N	York	Runnymede, The Junction North	43.673185	-79.487262
4	M9N	York	Weston	43.706876	-79.518188

```
In [79]: address = 'York, Ontario'

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

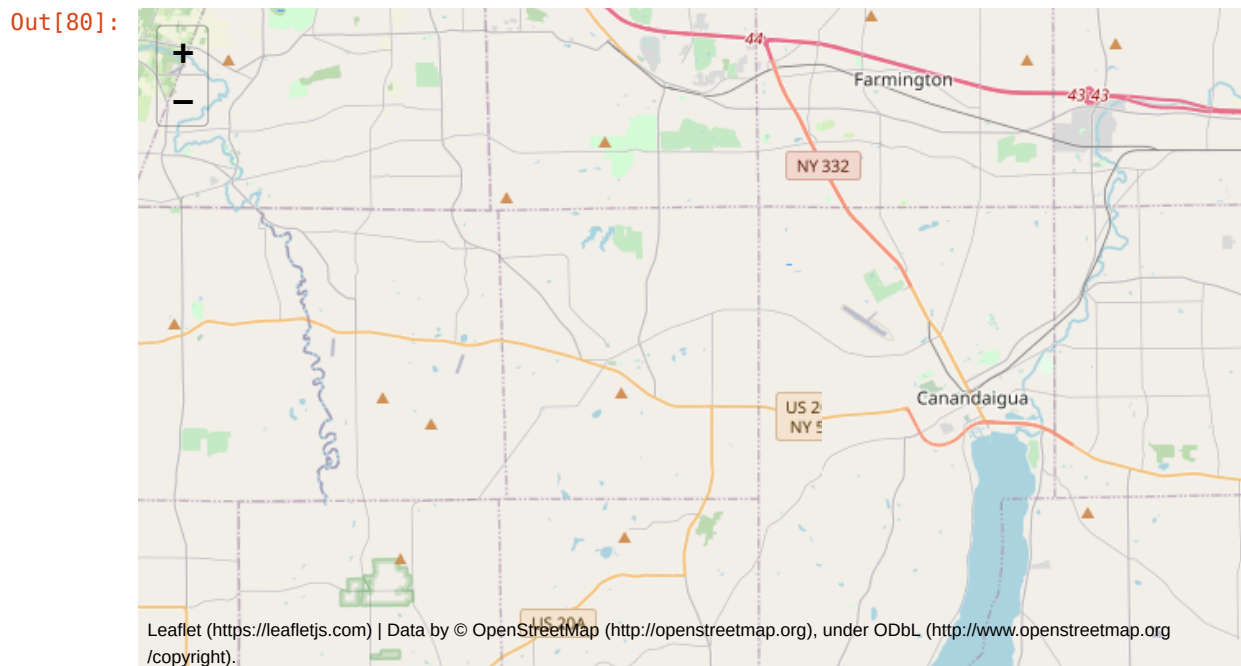
The geograpical coordinate of York are 42.8580624, -77.295025.



```
In [80]: # create map of York using latitude and longitude values
map_york = folium.Map(location=[latitude, longitude], zoom_start=11)

# add markers to map
for lat, lng, label in zip(york_data['Latitude'],
                           york_data['Longitude'], york_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_york)

map_york
```



In [ ]: