1. Installing and Importing Python Libraries and Dependencies

In [1]:
```
!pip install geocoder
!pip install folium
```

```
Collecting geocoder
  Downloading https://files.pythonhosted.org/package
s/4f/6b/13166c909ad2f2d76b929a4227c952630ebaf0d729f6
317eb09cbceccbab/geocoder-1.38.1-py2.py3-none-any.wh l
(98kB)
     |████████████████████████████████| 102kB 17.1M B/s
ta 0:00:01
Requirement already satisfied: six in /opt/conda/env s/Python36/lib/python3.6/site-
                        packages (from geocode
r) (1.12.0)
Requirement already satisfied: requests in /opt/cond
a/envs/Python36/lib/python3.6/site-packages (from ge
ocoder) (2.21.0)
Requirement already satisfied: future in /opt/conda/
envs/Python36/lib/python3.6/site-packages (from geoc
oder) (0.17.1)
Collecting ratelim (from geocoder)
  Downloading https://files.pythonhosted.org/package
s/f2/98/7e6d147fd16a10a5f821db6e25f192265d6ecca3d829
57a4fdd592cad49c/ratelim-0.1.6-py2.py3-none-any.whl
Requirement already satisfied: click in /opt/conda/e
nvs/Python36/lib/python3.6/site-packages (from geoco
der) (7.0)
Requirement already satisfied: certifi>=2017.4.17 in
/opt/conda/envs/Python36/lib/python3.6/site-packages
(from requests->geocoder) (2019.9.11)
Requirement already satisfied: idna<2.9,>=2.5 in /op
t/conda/envs/Python36/lib/python3.6/site-packages (f rom
requests->geocoder) (2.8)
Requirement already satisfied: urllib3<1.25,>=1.21.1
in /opt/conda/envs/Python36/lib/python3.6/site-packa
ges (from requests->geocoder) (1.24.1)
Requirement already satisfied: chardet<3.1.0,>=3.0.2
in /opt/conda/envs/Python36/lib/python3.6/site-packa ges
(from requests->geocoder) (3.0.4)
Requirement already satisfied: decorator in /opt/con
da/envs/Python36/lib/python3.6/site-packages (from r
atelim->geocoder) (4.3.2)
Installing collected packages: ratelim, geocoder
Successfully installed geocoder-1.38.1 ratelim-0.1.6
Collecting folium
  Downloading https://files.pythonhosted.org/package ff
                                                      ff
```

```
...
                    s/72/ff/004bfe344150a064e558cb2aedeaa02ecbf75e60e1
                    48    a55a9198f0c41765/folium-0.10.0-py2.py3-none-
                    any.whl (91kB)
                    |████████████████████████████████| 92kB 12.7MB/ s
               eta 0:00:01
               Requirement already satisfied: jinja2>=2.9 in /opt/c
               onda/envs/Python36/lib/python3.6/site-packages (from
               folium) (2.10)
Requirement already satisfied: numpy in /opt/conda/e nvs/Python36/lib/python3.6/site-
                                packages (from foliu
               m) (1.15.4)
               Requirement already satisfied: requests in /opt/cond
               a/envs/Python36/lib/python3.6/site-packages (from fo
               lium) (2.21.0)
               Collecting branca>=0.3.0 (from folium)   Downloading
               https://files.pythonhosted.org/package
               s/63/36/1c93318e9653f4e414a2e0c3b98fc898b4970e939afe
               edeee6075dd3b703/branca-0.3.1-py3-none-any.whl
               Requirement already satisfied: MarkupSafe>=0.23 in /
               opt/conda/envs/Python36/lib/python3.6/site-packages
```

```
(from jinja2>=2.9->folium) (1.1.0)
Requirement already satisfied: certifi>=2017.4.17 in
/opt/conda/envs/Python36/lib/python3.6/site-packages   (from
requests->folium) (2019.9.11)
Requirement already satisfied: urllib3<1.25,>=1.21.1
in /opt/conda/envs/Python36/lib/python3.6/site-packa
ges (from requests->folium) (1.24.1)
Requirement already satisfied: idna<2.9,>=2.5 in /op
t/conda/envs/Python36/lib/python3.6/site-packages (f rom
requests->folium) (2.8)
Requirement already satisfied: chardet<3.1.0,>=3.0.2
in /opt/conda/envs/Python36/lib/python3.6/site-packa ges
(from requests->folium) (3.0.4)
Requirement already satisfied: six in /opt/conda/env s/Python36/lib/python3.6/site-
                          packages (from branca>
=0.3.0->folium) (1.12.0)
Installing collected packages: branca, folium
Successfully installed branca-0.3.1 folium-0.10.0 Importing
```

Libraries

In [2]:

```
import pandas as pd import
requests import numpy as np import
geocoder import folium import
requests  import matplotlib.cm as
cm import matplotlib.colors as
colors import json import xml
import matplotlib.pyplot as plt
%matplotlib inline import
warnings
warnings.filterwarnings("ignore")

from pandas.io.json import json_normalize
from sklearn.cluster import KMeans from
geopy.geocoders import Nominatim  from
bs4 import BeautifulSoup
```

```
pd.set_option('display.max_columns', None)
pd.set_option('display.max_rows', None)

print("All Required Libraries Imported!")
```

```
All Required Libraries Imported!
```

2. Data Extraction and Cleaning

Using BeautifulSoup Scraping List of Postal Codes of Given Wikipedia Page. Link:
https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M

In [3]:

```
url = "https://en.wikipedia.org/wiki/List_of_postal_
extracting_data = requests.get(url).text wiki_data =
BeautifulSoup(extracting_data, 'lxml')
```

Converting content of PostalCode HTML table as dataframe

In [4]:

```
column_names = ['Postalcode','Borough','Neighborhood
toronto = pd.DataFrame(columns = column_names)

content = wiki_data.find('div', class_='mw-parser-ou
table = content.table.tbody postcode = 0 borough = 0
neighborhood = 0
 for tr in
table.find_all('tr'):
    i = 0     for td in
tr.find_all('td'):         if i
== 0:
            postcode = td.text
i = i + 1         elif i == 1:
borough = td.text
i = i + 1         elif i == 2:
             neighborhood = td.text.strip('\n').repla
     toronto = toronto.append({'Postalcode': postcode
```

In [5]:

```
# clean dataframe
toronto = toronto[toronto.Borough!='Not assigned']
toronto = toronto[toronto.Borough!= 0]
toronto.reset_index(drop = True, inplace = True) i
= 0 for i in range(0,toronto.shape[0]):
    if toronto.iloc[i][2] == 'Not assigned':
toronto.iloc[i][2] = toronto.iloc[i][1]         i =
i+1
```

In [6]:

```
df = toronto.groupby(['Postalcode','Borough'])['Neig
 df = toronto.groupby([ Postalcode , Borough ])[ Neig
 df.head()
```

Out[6]:

	Postalcode	Borough	Neighborhood
0	M1B	Scarborough	Rouge, Malvern
1	M1C	Scarborough	Highland Creek, Rouge Hill, Port Union
2	M1E	Scarborough	Guildwood, Morningside, West Hill

3	M1G	Scarborough	Woburn
4	M1H	Scarborough	Cedarbrae

In [7]:

```
df.describe()
```

Out[7]:

	Postalcode	Borough	Neighborhood
count	103	103	103
unique	103	11	103
top	M2M	North York	York Mills West
freq	1	24	1

In [8]:

```
df = df.dropna() empty
= 'Not assigned'
df = df[(df.Postalcode != empty ) & (df.Borough != e
```

In [9]:

```
df.head()
```

Out[9]:

	Postalcode	Borough	Neighborhood
0	M1B	Scarborough	Rouge, Malvern
1	M1C	Scarborough	Highland Creek, Rouge Hill, Port Union
2	M1E	Scarborough	Guildwood, Morningside, West Hill
3	M1G	Scarborough	Woburn
4	M1H	Scarborough	Cedarbrae

In [10]:

```
def neighborhood_list(grouped):          return ',
'.join(sorted(grouped['Neighborhood'].

grp = df.groupby(['Postalcode', 'Borough']) df_2 =
grp.apply(neighborhood_list).reset_index(name
```

In [11]:

```
df 2.describe()                                    df_2.describe()
```

...

Out[11]:

	Postalcode	Borough	Neighborhood
count	103	103	103
unique	103	11	103
top	M2M	North York	York Mills West
freq	1	24	1

In [12]:

```
print(df_2.shape) df_2.head()
```

```
(103, 3)
```

Out[12]:

	Postalcode	Borough	Neighborhood
0	M1B	Scarborough	Rouge, Malvern
1	M1C	Scarborough	Highland Creek, Rouge Hill, Port Union
2	M1E	Scarborough	Guildwood, Morningside, West Hill
3	M1G	Scarborough	Woburn
4	M1H	Scarborough	Cedarbrae

In [13]:

```
def get_latilong(postal_code):
lati_long_coords = None
while(lati_long_coords is None):
g = geocoder.arcgis('{}, Toronto,
Ontario'.f          lati_long_coords =
g.latlng     return lati_long_coords
     get_latilong('M4G')
```

```
[43.70949500000006, -79.36398897099997]
```

Out[13]:

In [14]:

```
# Retrieving Postal Code Co-ordinates postal_codes =
df_2['Postalcode']     coords = [
get_latilong(postal_code) for postal_code
```

In [15]:

```
# Adding Columns Latitude & Longitude df_coords =
pd.DataFrame(coords, columns=['Latitude'
df_2['Latitude'] = df_coords['Latitude']
df_2['Longitude'] = df_coords['Longitude']
```

In [16]:
```
df_2[df_2.Postalcode == 'M5G']
```

Out[16]:

	Postalcode	Borough	Neighborhood	Latitude	Longitu
57	M5G	Central Bay Downtown Toronto	Central Bay Street	43.656091	-79.384 Downtown

In [17]:
```
df_2.head(10)
```

Out[17]:

	Postalcode	Borough	Neighborhood	Latitude	Longit
0	M1B	Scarborough	Rouge, Malvern	43.811525	-79.195
1	M1C	Scarborough	Highland Creek, Rouge Hill, Port Union	43.785665	-79.158
2	M1E	Scarborough	Guildwood, Morningside, West Hill	43.765815	-79.175
3	M1G	Scarborough	Woburn	43.768369	-79.217
4	M1H	Scarborough	Cedarbrae	43.769688	-79.239
5	M1J	Scarborough	Scarborough Village	43.743125	-79.231
6	M1K	Scarborough	East Birchmount Park, Ionview, Kennedy Park	43.726276	-79.263
7	M1L	Scarborough	Clairlea, Golden Mile, Oakridge	43.713054	-79.285
8	M1M	Scarborough	Cliffcrest, Cliffside, Scarborough Village West	43.724235	-79.227
9	M1N	Scarborough	Birch Cliff, Cliffside West	43.696770	-79.259

In [18]:

```
address = 'Scarborough,Toronto'

geolocator = Nominatim()
location = geolocator.geocode(address)
latitude_x = location.latitude longitude_y
= location.longitude
print('The Geograpical Co-ordinate of Seattle,Washin
```

```
The Geograpical Co-ordinate of Seattle,Washington ar e
43.773077, -79.257774.
```

3. Map of Scarborough

In [19]:

```
map_Scarborough = folium.Map(location=[latitude_x,  l
                                                    n
for lat, lng, nei in zip(df_2['Latitude'], df_2['Lo

    label = '{}'.format(nei)
    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_Scarborough)

map_Scarborough
```

Out[19]:

In [20]:

```
address = 'Scarborough,Toronto'

geolocator = Nominatim()
location = geolocator.geocode(address)
latitude_n1 = location.latitude longitude_n1
= location.longitude
print('The Geograpical Co-ordinate of Neighborhood_1
```

```
The Geograpical Co-ordinate of Neighborhood_1 are 4 3.773077,
-79.257774.
```

In [21]:

```
# @hiddel_cell
CLIENT_ID  =  'DPBYY4JUY3DU20ALPSUV4ONY2K1GOJJKJ1NIHBE
CLIENT_SECRET = '1MV443TYEP4HUO0WDUW5NQ5W10L2Y4G05NW
VERSION = '20180604' LIMIT
= 30
print('Your credentails:') print('CLIENT_ID:
'+CLIENT_ID) print('CLIENT_SECRET:
'+CLIENT_SECRET)
```

```
Your credentails:
CLIENT_ID: DPBYY4JUY3DU20ALPSUV4ONY2K1GOJJKJ1NIHBB32 XEMOVYY
```

```
CLIENT_SECRET: 1MV443TYEP4HUO0WDUW5NQ5W10L2Y4G05NWG1
1WIR3NUGC5B
```

In [22]:
```
radius = 700  LIMIT = 100 url =
'https://api.foursquare.com/v2/venues/explore?
    CLIENT_ID,
    CLIENT_SECRET,
VERSION,
latitude_n1,
longitude_n1,
radius,     LIMIT)
results = requests.get(url).json()
```

In [23]:
```
 venues=results['response']['groups'][0]['items']
 nearby_venues = json_normalize(venues)                b      l
nearby_venues .columns
```

Out[23]:
```
Index(['reasons.count', 'reasons.items', 'referralI
d', 'venue.categories',
       'venue.events.count', 'venue.events.summary',
'venue.id',
       'venue.location.address', 'venue.location.c  c',
'venue.location.city',
       'venue.location.country', 'venue.location.cro ssStreet',
       'venue.location.distance', 'venue.location.fo rmattedAddress',
       'venue.location.labeledLatLngs', 'venue.locat ion.lat',
       'venue.location.lng', 'venue.location.neighbo rhood',
       'venue.location.postalCode', 'venue.location.  state',
'venue.name',
       'venue.photos.count', 'venue.photos.groups',
                'venue.venuePage.id'],
dtype='object')
```

In [24]:
```
def get_category_type(row):
try:
        categories_list = row['categories']
except:
        categories_list = row['venue.categories']
             if
len(categories_list) == 0:
        return None
else:
        return categories_list[0]['name']
```

4. Nearby Venues/Locations

In [25]:
```
filtered_columns = ['venue.name', 'venue.categories' nearby_venues
=nearby_venues.loc[:, filtered_columns nearby_venues.head()
```

Out[25]:

	venue.name	venue.categories	venue.location.lat

...

0	Disney Store	[{'id': '4bf58dd8d48988d1f3941735', 'name': 'T...	43.775537		
1	American Eagle	[{'id': '4bf58dd8d48988d103951735',	43.775908	Outfitters	'name': 'C...
2	SEPHORA	[{'id': '4bf58dd8d48988d10c951735', 'name': 'C...	43.775017		
3	Canyon Creek	[{'id': '4bf58dd8d48988d1cc941735',	43.776959	Chophouse	'name': 'S...
4	Coliseum Scarborough	[{'id': '4bf58dd8d48988d17f941735',	43.775995		

Cinemas 'name': 'M...

5. Categories of Nearby Venues/Locations

In [26]:
```
nearby_venues['venue.categories'] = nearby_venues.ap

# clean columns
nearby_venues.columns = [col.split(".")[-1] for col
 nearby_venues.head(5)
```

Out[26]:

	name	categories	lat	lng
0		Toy / Game Store	Disney Store	43.775537 -79.256833
1	American Eagle Outfitters	Clothing Store	43.775908	-79.258352
2		Cosmetics Shop	SEPHORA	43.775017 -79.258109
3	Canyon Creek Chophouse		Steakhouse	43.776959 -79.261694
4	Coliseum Cinemas	Movie Theater	Scarborough	43.775995 -79.255649

In [27]:
```
# Top 10 Categories
a=pd.Series(nearby_venues.categories)
a.value_counts()[:10]
```

```
def getNearbyVenues(names, latitudes, longitudes, r a

    venues_list=[]
    for name, lat, lng in zip(names, latitudes, lon g
print(name)                                          /
        url = 'https://api.foursquare.com/v2/venues
            CLIENT_ID,
            CLIENT_SECRET,
```

Out[27]:
```
Clothing Store         8 Coffee
Shop            5
Restaurant              3
Cosmetics Shop          3
Sporting Goods Shop     2
Pharmacy                2
Wings Joint             2
Tea Room                2
Sandwich Place          2
Electronics Store       1
Name: categories, dtype: int64
```

In [28]:

```
            VERSION,
            S O ,
```

```
            lat,                                    e
lng,
radius,
            LIMIT)

        # making GET request
        venue_results = requests.get(url).json()["r
        # return only relevant information for each
venues_list.append([(             name,             r
lat,              lng,                              s
            v['venue']['name'],
            v['venue']['location']['lat'],
v['venue']['location']['lng'],
v['venue']['categories'][0]['name']) fo

    nearby_venues = pd.DataFrame([item for venue_li
nearby_venues.columns = ['Neighborhood',
                  'Neighborhood Latitude',
                  'Neighborhood Longitude',
                  'Venue',
                  'Venue Latitude',
                  'Venue Longitude',
                  'Venue Category']

    return(nearby_venues)
```

In [29]:

```
# Nearby Venues
 Scarborough_venues = getNearbyVenues(names=df_2['Nei
                                      latitudes=df_2['L
                                      longitudes=df_2['
                                     )
```

```
Rouge, Malvern
Highland Creek, Rouge Hill, Port Union
Guildwood, Morningside, West Hill
Woburn
Cedarbrae
Scarborough Village
East Birchmount Park, Ionview, Kennedy Park Clairlea,
Golden Mile, Oakridge
Cliffcrest, Cliffside, Scarborough Village West
Birch Cliff, Cliffside West
Dorset Park, Scarborough Town Centre, Wexford Height s
Maryvale, Wexford
Agincourt
Clarks Corners, Sullivan, Tam O'Shanter
Agincourt North, L'Amoreaux East, Milliken, Steeles
East
L'Amoreaux West
Upper Rouge
Hillcrest Village
Fairview, Henry Farm, Oriole
Bayview Village
Silver Hills, York Mills
Newtonbrook Willowdale
Newtonbrook, Willowdale
Willowdale South
York Mills West
Willowdale West Parkwoods
Don Mills North
Flemingdon Park, Don Mills South
Bathurst Manor, Downsview North, Wilson Heights
Northwood Park, York University
CFB Toronto, Downsview East
Downsview West
Downsview Central
Downsview Northwest
Victoria Village
Woodbine Gardens, Parkview Hill
Woodbine Heights
The Beaches
Leaside
Thorncliffe Park
East Toronto
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, Su
mmerhill 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
Bedford Park, Lawrence Manor East
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, Harbourfron t
West, King and Spadina, Railway Lands, South Niaga
ra
Stn A PO Boxes 25 The Esplanade
First Canadian Place, Underground city
Lawrence Heights, Lawrence Manor
Glencairn
Humewood-Cedarvale
Caledonia-Fairbanks
Christie
Dovercourt Village, Dufferin
Little Portugal, Trinity
Brockton, Exhibition Place, Parkdale Village
, , g
Downsview, North Park, Upwood Park
Del Ray, Keelesdale, Mount Dennis, Silverthorn
The Junction North, Runnymede
High Park, The Junction South
Parkdale, Roncesvalles
Runnymede, Swansea
Queen's Park
Canada Post Gateway Processing Centre
Business Reply Mail Processing Centre 969 Eastern
Humber Bay Shores, Mimico South, New Toronto
Alderwood, Long Branch
The Kingsway, Montgomery Road, Old Mill North Humber
Bay, King's Mill Park, Kingsway Park South Ea st,
Mimico NE, Old Mill South, The Queensway East, R oyal
York South East, Sunnylea
Kingsway Park South West, Mimico NW, The Queensway W
est, Royal York South West, South of Bloor
Islington Avenue
Cloverdale, Islington, Martin Grove, Princess Garden
s, West Deane Park
Bloordale Gardens, Eringate, Markland Wood, Old Burn
hamthorpe Humber
Summit
Emery, Humberlea
Weston
Westmount
Kingsview Village, Martin Grove Gardens, Richview Ga
rdens, St. Phillips

```
Albion Gardens, Beaumond Heights, Humbergate, Jamest
own, Mount Olive, Silverstone, South Steeles, Thistl
etown
Northwest
```

In [30]:

```
print('There are {} Uniques Categories.'.format(len(
Scarborough_venues.groupby('Neighborhood').count().h
```

```
There are 299 Uniques Categories.
```

Out[30]:

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude
Adelaide, King, Richmond	100	100	100	100
Agincourt	29	29	29	29
Agincourt North, L'Amoreaux East, Milliken, Steeles East	4	4	4	4
Albion Gardens, Beaumond Heights, Humbergate, Jamestown, Mount Olive Mount Olive, Silverstone, South Steeles, Thistletown	12	12	12	12
Alderwood, Long Branch	9	9	9	9

One Hot Encoding of Features

In [31]:

```
# one hot encoding
Scarborough_onehot = pd.get_dummies(Scarborough_venu

# add neighborhood column back to dataframe
Scarborough_onehot['Neighborhood'] = Scarborough_ven

# move neighborhood column to the first column
fixed_columns = [Scarborough_onehot.columns[-1]] + l
Scarborough_onehot = Scarborough_onehot[fixed_column
```

```
Scarborough_grouped = Scarborough_onehot.groupby('Ne
Scarborough_onehot.head(5)
```

Out[31]:

	Zoo Exhibit	Accessories Store	Afghan Restaurant	African Restaurant	Airport	Ame Resta
0	0	0	0	0	0	
1	0	0	0	0	0	
2	1	0	0	0	0	
3	0	0	0	0	0	
4	0	0	0	0	0	

In [32]:

```
num_top_venues = 5 for hood in
Scarborough_grouped['Neighborhood']:
    print("---- "+hood+" ----")
    temp =Scarborough_grouped[Scarborough_grouped['N
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).
    print('\n')
```

```
---- Adelaide, King, Richmond ---
venue  freq
0           Coffee Shop  0.09
1           Café  0.07
2           Hotel  0.06
3           Burger Joint  0.03
4           B    0 03
4           Bar  0.03


----      Agincourt      ----
venue  freq 0         Shopping
Mall  0.07
1    Chinese Restaurant  0.07
2    Hong Kong Restaurant  0.03 3   Filipino
     Restaurant  0.03
4   Shanghai Restaurant  0.03


---- Agincourt North, L'Amoreaux East, Milliken, Ste
eles East ----               venue  freq 0
Pharmacy  0.50 1    Sandwich Place  0.25
2       Sushi Restaurant  0.25
3       Zoo Exhibit  0.00
4       Movie Theater  0.00
```

```
---- Albion Gardens, Beaumond Heights, Humbergate, J
amestown, Mount Olive, Silverstone, South Steeles, T
histletown ----                          venue   freq 0
Grocery Store  0.17
1        Hardware Store  0.08 2
Fried Chicken Joint  0.08
3       Sandwich Place  0.08
4       Discount Store  0.08


---- Alderwood, Long Branch ----
venue  freq
0                Convenience Store  0.11
1                Coffee Shop  0.11
2                Sandwich Place  0.11
3                Dance Studio  0.11
4                Pub  0.11


---- Bathurst Manor, Downsview North, Wilson Heights
----
                       venue  freq 0
Pizza Place  0.18
1                Coffee Shop  0.09
2                Mediterranean    Restaurant
                 0.09 3               Deli /
                 Bodega  0.09
4  Middle Eastern Restaurant  0.09


---- Bayview Village ----
venue    freq  0    Asian
Restaurant  0.25
1       Flower Shop  0.25 2
Park  0.25
3             Trail  0.25
4             Zoo Exhibit  0.00
---- Bedford Park, Lawrence Manor East ----
venue  freq 0    Sushi Restaurant  0.07
1                Coffee Shop  0.07
2                Italian Restaurant  0.07
3                Café  0.04
4                Juice Bar  0.04


---- Berczy Park ----
venue  freq 0  Coffee
Shop  0.09
1         Restaurant  0.05
2         Café  0.05
3         Hotel  0.05
4         Beer Bar  0.04


---- Birch Cliff, Cliffside West ----
venue  freq 0                  Park
0.22
1         Baseball Field  0.11
2         Skating  Rink   0.11  3   General
          Entertainment  0.11
```

```
4                   Gym  0.11


---- Bloordale Gardens, Eringate, Markland Wood, Old
Burnhamthorpe ----                    venue   freq 0
Baseball Field  0.09 1  Fish & Chips Shop  0.09
2      Sandwich Place  0.09
3      Shopping Mall  0.09
4      Grocery Store  0.09


---- Brockton, Exhibition Place, Parkdale Village --
--
                    venue   freq 0
Coffee Shop  0.08
1                    Café  0.07
2                    Bar         0.06     3
                     Restaurant  0.04
4  Furniture / Home Store  0.04


---- Business Reply Mail Processing Centre 969 Easte
rn ----               venue  freq 0       Coffee Shop
0.10 1              Café  0.06
2               Hotel  0.04
3               Bar  0.04
4               Sushi Restaurant  0.03


---- CFB Toronto, Downsview East ----
venue  freq 0  Soccer Field   0.2
1          Food Court   0.2
2          Airport   0.2
3          Park   0.2
4          Coffee Shop   0.2


---- CN Tower, Bathurst Quay, Island airport, Harbou
rfront West, King and Spadina, Railway Lands, South
Niagara ----                 venue  freq 0
Coffee Shop  0.10 1          Restaurant  0.05
2                 Café  0.05
3                 Italian Restaurant  0.05
4                 Gym  0.04


---- Cabbagetown, St. James Town ----
venue  freq 0           Restaurant
0.06
1               Coffee Shop  0.06
2               Pizza Place  0.05
3               Japanese Restaurant  0.03
4               Bakery  0.03


---- Caledonia-Fairbanks ----
venue  freq 0
Park  0.17
1  Sporting Goods Shop  0.08
2  Bus Stop  0.08 3                  Café
   0.08
```

```
4              Market  0.08


---- Canada Post Gateway Processing Centre ----
venue  freq 0       Coffee Shop  0.10
1              Café  0.06 2
Hotel  0.04
3               Bar  0.04
4               Sushi Restaurant  0.03


----      Cedarbrae      ----
venue    freq  0    Caribbean
Restaurant          0.12     1
Flower Shop  0.12
2                  Indian Restaurant  0.12
3                  Bank  0.12
4                  Bakery  0.12


---- Central Bay Street ----
venue  freq 0         Coffee
Shop  0.06
1      Clothing Store  0.04
2      Cosmetics Shop  0.04
3      Ice Cream Shop  0.03
4      Italian Restaurant  0.03
---- Chinatown, Grange Park, Kensington Market ----
venue  freq 0                          Café  0.06
1             Chinese Restaurant  0.05
2             Bar  0.05 3           Vietnamese
              Restaurant  0.04
4  Vegetarian / Vegan Restaurant  0.04


----     Christie     ----
venue    freq  0    Korean
Restaurant  0.18
1      Grocery Store  0.10 2
Diner  0.04
3               Indian Restaurant  0.04
4               Café  0.04


---- Church and Wellesley ----
venue  freq 0           Coffee
Shop     0.09   1     Japanese
Restaurant  0.04
2                 Café  0.03
3                 Sushi Restaurant  0.03
4                 Restaurant  0.03


---- Clairlea, Golden Mile, Oakridge ----
venue  freq 0  Intersection  0.17
1         Bus Line  0.11
2         Coffee Shop  0.11
3         Diner  0.11
4         Bakery  0.11
```

```
---- Clarks Corners, Sullivan, Tam O'Shanter ----
venue  freq
0            Fast Food Restaurant  0.10
1            Pizza Place  0.10
2            Vietnamese   Restaurant      0.07   3
             Golf Course  0.03
4                 Market  0.03


---- Cliffcrest, Cliffside, Scarborough Village West
----
                  venue  freq 0
Fast Food Restaurant  0.17
1                  Park  0.08
2                  Flower Shop  0.08
3                  Liquor Store  0.08
4                  Pizza Place  0.08


---- Cloverdale, Islington, Martin Grove, Princess G
ardens, West Deane Park ----                    venue
freq
0          Pizza Place 0 25
0         Pizza Place  0.25
1         Convenience Store  0.12
2         Mexican Restaurant  0.12 3              Bank
          0.12
4                 Gym  0.12


---- Commerce Court, Victoria Hotel ----
venue  freq 0  Coffee Shop  0.10
1         Hotel  0.06
2         Café  0.05
3         Restaurant  0.04
4         Gastropub  0.04


----   Davisville   ----
venue  freq 0    Dessert
Shop  0.10 1      Pizza
Place  0.10
2             Coffee Shop  0.07
3             Sandwich Place  0.07
4             Gym  0.05


---- Davisville North ----
venue  freq 0
Gym  0.09
1         Yoga Studio  0.04
2         Pharmacy  0.04
3         Breakfast Spot  0.04
4         Brewery  0.04


---- Deer Park, Forest Hill SE, Rathnelly, South Hil
l, Summerhill West ----               venue  freq 0
Pub  0.10
1        Coffee Shop  0.10 2
Skating Rink  0.10
```

```
3       Sushi Restaurant  0.10
4       Yoga Studio  0.05


---- Del Ray, Keelesdale, Mount Dennis, Silverthorn
----
                       venue   freq 0
Construction & Landscaping   0.2
1                  Playground   0.2
2                  Storage Facility   0.2
3                  Coffee Shop   0.2
4                  Fast Food Restaurant   0.2


---- Design Exchange, Toronto Dominion Centre ----
venue  freq 0  Coffee Shop  0.13
1         Café  0.08
2         Hotel   0.07  3    Restaurant
          0.04
4    Gastropub  0.03
           p


----  Don  Mills  North  ----
venue  freq 0         Coffee
Shop  0.11
1         Burger Joint  0.05 2
Italian Restaurant  0.05
3        Soccer Field  0.05
4        Smoothie Shop  0.05


---- Dorset Park, Scarborough Town Centre, Wexford H
eights ----          venue  freq 0       Bakery  0.33
1         Park  0.33
2         Wine Shop  0.17
3         Coffee Shop  0.17
4         Zoo Exhibit  0.00


---- Dovercourt Village, Dufferin ----
venue  freq 0           Bar  0.10
1   Coffee Shop  0.10
2   Bakery  0.08 3          Café  0.06
4  Cocktail Bar  0.04


---- Downsview Central ----
venue   freq 0         Home
Service  0.29
1      Moving Target  0.14 2
Mobile Phone Shop  0.14
3               Park  0.14
4               Baseball Field  0.14


----  Downsview  Northwest  ----
venue  freq 0          Grocery
Store  0.07 1            Pizza
Place  0.07
```

```
2          Fast Food Restaurant  0.07
3          Vietnamese Restaurant  0.07
4          Shopping Mall  0.07


---- Downsview West ----
venue  freq 0     Coffee
Shop  0.10
1   Grocery Store  0.05
2   Discount Store  0.05
3   Sandwich Place  0.05
4   Big Box Store  0.05


---- Downsview, North Park, Upwood Park ----
venue  freq 0           Convenience Store
0.2
1  Construction & Landscaping   0.2
2  Home Service   0.2 3                  Bakery
   0.2
4                       Park   0.2


---- East Birchmount Park, Ionview, Kennedy Park ---
-
               venue  freq
0  Convenience Store  0.25 1
Discount Store  0.25
2        Coffee Shop  0.25
3        Department Store  0.25
4        Music Venue  0.00


----   East   Toronto   ----
venue  freq
0               Sandwich Place  0.14
1               Italian Restaurant  0.14
2               Coffee Shop  0.14
3               Park  0.14
4               Athletics & Sports  0.14


---- Emery, Humberlea ----
venue   freq 0      Coffee
Shop  0.29
1            Park  0.14
2            Discount  Store    0.14  3
             Café  0.14
4       Nightclub  0.14


---- Fairview, Henry Farm, Oriole ----
venue  freq 0       Clothing Store  0.16
1  Fast Food Restaurant  0.10
2               Coffee Shop  0.07
3               Women's Store  0.04
4               Bakery  0.03


---- First Canadian Place, Underground city ----
venue  freq 0          Coffee Shop  0.14
```

```
1                 Hotel  0.08
2                 Café  0.07
3                 Gastropub  0.03
4                 American Restaurant  0.03


---- Flemingdon Park, Don Mills South ----
venue  freq 0  Japanese Restaurant  0.08
1                  Science Museum  0.08
2                  Asian Restaurant  0.08
3                  Beer Store  0.08
4                  Gym  0.08
---- Forest Hill North, Forest Hill West ----
venue  freq 0            Café   0.2
1     Coffee Shop   0.1
2     Bookstore   0.1 3    Burger Joint
      0.1
4  Ice Cream Shop   0.1


----         Glencairn         ----
venue  freq
0      Fast Food Restaurant  0.18
1      Grocery   Store     0.18   2
       Metro Station  0.09
3       Japanese Restaurant  0.09
4       Mediterranean Restaurant  0.09


---- Guildwood, Morningside, West Hill ----
venue  freq 0                  Park  0.29
1                  Pool  0.14
2                  Indian Restaurant  0.14
3                  Fried Chicken Joint  0.14
4                  Gym / Fitness Center  0.14


---- Harbord, University of Toronto ----
venue  freq 0         Café  0.07
1          Restaurant  0.06
2          Coffee Shop  0.05
3          Pizza Place  0.04
4          Bar  0.04


---- Harbourfront East, Toronto Islands, Union Stati
on ----              venue  freq 0             Café
0.29
1  Harbor / Marina  0.14 2
Park  0.14
3             Pier  0.14
4             Beach  0.14


---- Harbourfront, Regent Park ----
venue  freq 0  Coffee Shop  0.12 1
Theater  0.06
2         Bakery  0.06
3         Café  0.04
4         Restaurant  0.04
```

```
---- High Park, The Junction South ----
venue  freq 0  Convenience Store  0.09
1                Park  0.07
2                Café  0.07
                Ca é 0.0
3                Bar  0.07
4                Thai Restaurant  0.04


---- Highland Creek, Rouge Hill, Port Union ----
venue  freq 0           Bar   1.0
1        Museum   0.0
2        Opera   House         0.0   3
         Office   0.0
4  Noodle House   0.0


---- Hillcrest Village ----
venue  freq 0
Park  0.29
1                                    Fast       Food
                                     Restaurant
                                     0.14
2                                    Bakery  0.14
3                                    Residential
                                     Building
                                     (Apartment    /
                                     Condo)  0.14
4                                    Pharmacy  0.14


---- Humber Bay Shores, Mimico South, New Toronto --
--
               venue   freq 0
Park  0.14
1       Grocery Store  0.10
2       Convenience Store  0.10
3       Skating Rink  0.05
4       Breakfast Spot  0.05


---- Humber Bay, King's Mill Park, Kingsway Park Sou
th East, Mimico NE, Old Mill South, The Queensway Ea
st,   Royal   York   South   East,   Sunnylea   ----
venue  freq
0                Coffee Shop  0.19
1                Sandwich Place  0.06
2                Italian Restaurant  0.06
3                Liquor Store  0.06
4                Bank  0.06


----  Humber  Summit  ----
venue  freq 0  Electronics
Store   1.0
1          Zoo Exhibit   0.0
2          Opera House   0.0
3          Noodle House   0.0
4          Nightclub   0.0
```

```
---- Humewood-Cedarvale ----
venue   freq  0   Convenience
Store  0.14
1              Trail  0.14
2              Hockey   Arena     0.14   3
               Grocery Store  0.14
4      Deli / Bodega  0.14
---- Islington Avenue ----
venue  freq 0
Pharmacy  0.25
1  Convenience Store  0.08 2
Shopping Mall  0.08
3               Grocery Store  0.08
4               Bank  0.08


---- Kingsview Village, Martin Grove Gardens, Richvi
ew Gardens, St. Phillips ----                   venue
freq 0             Pharmacy   0.2
1             Mobile Phone Shop   0.2
2             Bus Line   0.2
3             American Restaurant   0.2
4             Coffee Shop   0.2


---- Kingsway Park South West, Mimico NW, The Queens
way West, Royal York South West, South of Bloor ----
venue  freq 0    Burrito Place  0.12
1              Gym  0.08 2
Bank  0.04
3    Grocery Store  0.04
4    Thai Restaurant  0.04


---- L'Amoreaux West ----                  venue  freq
0              Pharmacy  0.13 1  Fast Food Restaurant
0.................................................23
2   Chinese Restaurant  03  Other Great Outdoors  0.07
4         Grocery Store  0.07 ---- Lawrence Heights,
Lawrence Manor ----               venue  freq  ..Error!
Bookmark not defined.
0    Clothing Store  01      Dessert Shop  0.05  Error!
Bookmark not defined.

2        Toy / Game Store  0.03
3        Restaurant  0.03
4        Greek Restaurant  0.03


---- Lawrence Park ----
venue   freq  0      Bus
Line  0.14
1         Park  0.14
2         Café   0.14  3   Coffee  Shop
          0.14
4   Restaurant  0.14


----        Leaside        ----
venue  freq 0             Coffee
Shop  0.10 1 Electronics Store 0
```

```
06 1     Electronics Store  0.06
2     Sporting Goods Shop  0.06
3                 Furniture / Home Store  0.06
4                 Brewery  0.04


---- Little Portugal, Trinity ---
venue  freq 0                Bar
0.08 1         Coffee Shop  0.05
2                Restaurant  0.05
3                Café  0.04
4                Italian Restaurant  0.04


---- Maryvale, Wexford ----
venue  freq 0
Hookah Bar   0.2
1                Pizza Place   0.2
2                Middle Eastern Restaurant   0.2
3                Gas Station   0.2
4                Burger Joint   0.2


---- Moore Park, Summerhill East ----
venue  freq 0             Park   0.4
1    Grocery Store   0.2
2    Gym   0.2 3  Thai Restaurant   0.2
4      Zoo Exhibit   0.0


----  Newtonbrook,  Willowdale  ----
venue   freq  0              Korean
Restaurant  0.12
1  Middle Eastern Restaurant  0.12 2
Café  0.09
3                Coffee Shop  0.09
4                Fried Chicken Joint  0.03


---- North Toronto West ----
venue  freq 0          Coffee
Shop  0.09 1  Sporting Goods
Shop  0.09
2                 Café  0.09
3                 Clothing Store  0.09
4                 Restaurant  0.06


----    Northwest    ----
venue  freq
0               Sandwich Place  0.17
1               Coffee Shop  0.17
2               Storage Facility  0.17
3               Burger Joint  0.17
4               Gym  0.17


----  Northwood  Park,  York  University  ---  Northwood
Park, York University                   venue  freq 0
Japanese Restaurant  0.12
1                  Bar  0.12
```

```
2                  Bank         0.12     3
                   Pizza Place  0.12
4       Massage Studio  0.12


----   Parkdale,   Roncesvalles   ----
venue  freq 0                 Coffee
Shop  0.09
1                       Bakery  0.06 2
Eastern European Restaurant  0.04
3              Sushi Restaurant  0.04
4              Thai Restaurant  0.04


---- Parkwoods ----
venue  freq 0          Food &
Drink Shop  0.33 1
Park  0.33
2                  Pet Store  0.33
3                  Middle Eastern Restaurant  0.00
4                  Miscellaneous Shop  0.00


----   Queen's   Park   ----
venue  freq 0          Coffee
Shop  0.20
1                 Café  0.08
2                 Sandwich Place  0.05
3                 Italian Restaurant  0.04
4                 Japanese Restaurant  0.04


---- Rosedale ----
venue  freq 0
Park   0.4
1     Playground   0.2
2     Grocery  Store    0.2  3     Candy
      Store   0.2
4    Zoo Exhibit   0.0


---- Roselawn ----
venue  freq 0
Playground   0.4
1             Garden   0.2 2
Business Service   0.2
3         Pet Store   0.2
4         Zoo Exhibit   0.0


----     Rouge,     Malvern     ----
venue  freq 0                   Zoo
Exhibit  0.25 1  Financial or Legal
Service  0.25
2           Fast Food Restaurant  0.25
3           Construction & Landscaping  0.25
4           Hotpot Restaurant  0.00
---- Runnymede, Swansea ----
venue  freq 0
Café  0.10
1            Coffee Shop  0.08
```

```
2            Bakery  0.05
3            Pizza Place  0.05
4            Sushi Restaurant  0.03


----  Ryerson,  Garden  District  ---
venue  freq 0               Coffee
Shop  0.07
1             Clothing Store  0.05
2             Cosmetics Shop  0.04 3  Middle
              Eastern Restaurant  0.04
4                 Restaurant  0.03


---- Scarborough Village ----
venue  freq
0  Fast Food Restaurant  0.33
1  Sandwich   Place     0.22   2
   Train Station  0.11
3         Big Box Store  0.11
4         Indian Restaurant  0.11


---- Silver Hills, York Mills ---
venue  freq 0           Park   1.0
1    Zoo Exhibit   0.0
2      Moving Target   0.0
3      Noodle House   0.0
4      Nightclub   0.0


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


---- Stn A PO Boxes 25 The Esplanade ----
venue  freq 0       Coffee Shop  0.10
1              Café  0.06
2              Hotel          0.04     3
               Bar  0.04
4  Sushi Restaurant  0.03


----  Studio  District  ----
venue  freq 0         Coffee
Shop  0.07
1               Café  0.05
2               It li R t     t 0 05
2              Italian Restaurant  0.05
3              Diner  0.05
4              Bakery  0.05


---- The Annex, North Midtown, Yorkville ----
venue  freq 0  Italian Restaurant  0.08 1
Café  0.08
```

```
2         Coffee Shop  0.08
3         Sandwich Place  0.08
4         History Museum  0.05


---- The Beaches ----
venue  freq 0
Pub  0.06
1                 Pizza Place  0.06
2                 Japanese Restaurant  0.06
3                 Bar  0.06
4                 Café  0.03


---- The Beaches West, India Bazaar ----
venue  freq 0               Park  0.08
1               Café  0.05
2               Bakery  0.05 3  Italian
                Restaurant  0.05
4            Brewery  0.05


---- The Danforth West, Riverdale ----
venue  freq 0  Greek Restaurant  0.13
1    Ice Cream Shop  0.07 2
Café  0.07
3       Yoga Studio  0.03
4       Bubble Tea Shop  0.03


---- The Junction North, Runnymede ----
venue  freq 0                Brewery
0.38 1                    Park  0.25
2             Athletics & Sports  0.12
3             Coffee Shop  0.12
4             Furniture / Home Store  0.12


---- The Kingsway, Montgomery Road, Old Mill North -
---               venue
freq 0   Sushi Restaurant
0.07
1     Breakfast Spot  0.07
2     French   Restaurant       0.07    3
      Burger Joint  0.07
4   Toy / Game Store  0.04


---- Thorncliffe Park ----
---- Thorncliffe Park ----
venue  freq 0       Burger
Joint  0.11
1  Indian Restaurant  0.11 2
Yoga Studio  0.06
3             Discount Store  0.06
4             Bridge  0.06


----    Victoria    Village    ----
venue    freq  0    Middle  Eastern
```

```
Restaurant  0.14 1      Portuguese
Restaurant  0.14
2                       Pizza Place  0.14
3                       French Restaurant  0.14
4                       Park  0.14


----     Westmount     ----
venue  freq
0         Pizza Place  0.18
1         Golf Driving Range  0.09
2         Discount Store  0.09
3         Supermarket  0.09
4         Chinese Restaurant  0.09


----          Weston          ----
venue   freq 0                Train
Station  0.15
1                Coffee Shop  0.15
2                Sandwich  Place     0.08  3
                 Middle  Eastern  Restaurant
                 0.08
4                Pizza Place  0.08


---- Willowdale South ----
venue  freq 0       Coffee
Shop  0.07
1  Ramen Restaurant  0.05 2
Pizza Place  0.05
3              Café  0.05
4              Sandwich Place  0.05


---- Willowdale West ----
venue  freq 0
Coffee Shop  0.15 1
Park  0.08
2                       Eastern  European  Restaurant
                        0.08
3                       Grocery Store  0.08
4                       Bakery  0.08


---- Woburn ----
venue  freq 0
Coffee Shop   0.4
1                  Park   0.2
2                  Business Service   0.2
3                  Fast Food Restaurant   0.2
4                  Zoo Exhibit   0.0
---- Woodbine Gardens, Parkview Hill ----
venue  freq 0  Fast Food Restaurant  0.10
1               Brewery  0.10
2               Pizza Place  0.10
3               Home Service  0.10
4               Restaurant  0.05
```

```
---- Woodbine Heights ----
venue   freq 0          Bus
Line  0.06
1            Pizza Place  0.06 2     Coffee Shop  0.06
3   Grocery Store  0.06
4   Sandwich Place  0.06


---- York Mills West ----
venue  freq 0    Coffee
Shop  0.16 1
Restaurant  0.12
2            Gym  0.12
3            Burrito Place  0.04
4            Bank  0.04
```

In [33]:

```
def return_most_common_venues(row, num_top_venues):
row_categories = row.iloc[1:]
     row_categories_sorted = row_categories.sort_valu
        return
row_categories_sorted.index.values[0:num_
```

Most Common venues near neighborhood

In [34]:

```
import numpy as np num_top_venues
= 10

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

columns = ['Neighborhood'] for ind in
np.arange(num_top_venues):     try:
        columns.append('{}{} Most Common Venue'.for
except:
        columns.append('{}th Most Common Venue'.for
neighborhoods_venues_sorted = pd.DataFrame(columns= m
neighborhoods_venues_sorted['Neighborhood'] = Scarb
 for ind in np.arange(Scarborough_grouped.shape[0]):m
neighborhoods_venues_sorted.iloc[ind, 1:] = ret
                                                    c
                                                    o




                                                    u

neighborhoods venues sorted.head()
neighborhoods_venues_sorted.head()
```

Out[34]:

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th M Comm Ven
0	Adelaide, King, Richmond	Coffee Shop	Café	Hotel	Gastrop
1	Agincourt	Chinese Restaurant	Shopping Supermar Mall	Pizza Place	
2	Agincourt North, L'Amoreaux East, Milliken, St...		Sandwich Pharmacy Place	Sushi Restaurant	Do Restaur
3	Albion Gardens, Beaumond Heights, Humbergate, ...	Grocery Park	Store	Sandwich Place	Disco St
4	Alderwood, Long Branch	Convenience Pub	Coffee Sh	Sandwich Store	Place

K-Means Clustering Approach

In [35]:
```
# Using K-Means to cluster neighborhood into 3 clust
Scarborough_grouped_clustering = Scarborough_grouped
kmeans = KMeans(n_clusters=3, random_state=0).fit(Sc
kmeans.labels_
```

Out[35]:
```
array([0, 0, 0, 0, 0, 0, 2, 0, 0, 2, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 2, 0, 0, 0,
0, 2, 0, 0, 0, 0,
       0, 0, 0, 0, 2, 0, 0, 0, 0, 0, 2, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0,
       0, 0, 2, 0, 0, 0, 0, 0, 2, 0, 2, 0, 0, 0, 0, 0,
1, 0, 0, 0, 0, 0,
       0, 0, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], dt
ype=int32)
```

In [36]:
```
neighborhoods_venues_sorted.insert(0, 'Cluster Label

Scarborough_merged =df_2.iloc[:16,:]
# merge toronto_grouped with toronto_data to add lat
Scarborough_merged = Scarborough_merged.join(neighbo

Scarborough_merged.head()# check the last columns!
```

Out[36]:

	Postalcode	Borough	Neighborhood	Latitude	Longitu
0	M1B	Scarborough	Rouge, Malvern	43.811525	-79.195
1	M1C	Scarborough	Highland Creek, Rouge Hill, Port Union	43.785665	-79.158
2	M1E	Scarborough	Guildwood, Morningside, West Hill	43.765815	-79.175
3	M1G	Scarborough	Woburn	43.768369	-79.217
4	M1H	Scarborough	Cedarbrae	43.769688	-79.239

Map of Clusters

In [37]:
```
kclusters = 10
```

In [38]:
```
# create map
map_clusters = folium.Map(location=[latitude_x, long

# set color scheme for the clusters x
= np.arange(kclusters)
colors_array = cm.rainbow(np.linspace(0, 1, kcluster
rainbow = [colors.rgb2hex(i) for i in colors_array]
print(rainbow)
# add markers to the map

    markers_colors = [] for lat, lon, nei , cluster in
                                    zip(Scarborough_merge
                                        Scarborough_merge
                                      Scarborough_merge
Scarborough_merge      label = folium.Popup(str(nei) +
' Cluster ' + st     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
```

```
['#8000ff', '#4856fb', '#10a2f0', '#2adddd', '#62fbc
4', '#9cfba4', '#d4dd80', '#ffa256', '#ff562c', '#ff
0000'] Out[38]:
```

Out[38]:

In [39]:
```
      df1=Scarborough_merged.loc[Scarborough_merged['Clust
      df2=Scarborough_merged.loc[Scarborough_merged['Clust
      df3=Scarborough_merged.loc[Scarborough_merged['Clust
```

In [40]:
```
            Scarborough_Avg_HousingPrice=pd.DataFrame({"Neighbor
                                                  "Average_Housi
```

In [41]:

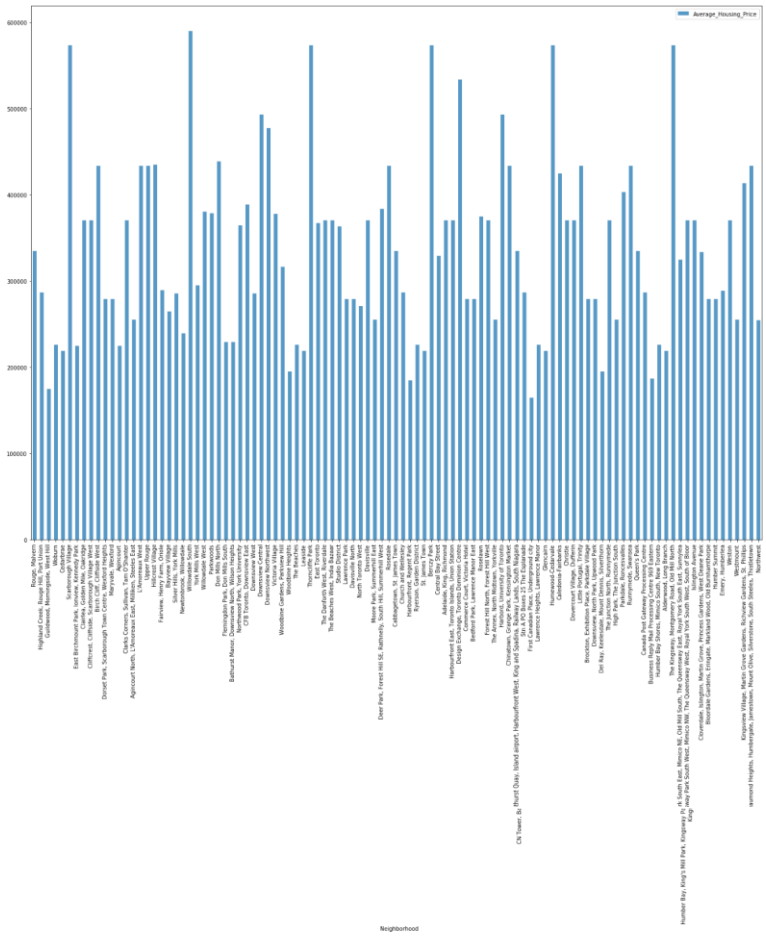
```
Scarborough_Avg_HousingPrice.set_index('Neighborhood
```

In [42]:

```
Scarborough_Avg_HousingPrice.plot(kind='bar',figsize
```

Out[42]:

```
<matplotlib.axes._subplots.AxesSubplot  at  0x7f24243f
3320>
```



S h l R ti b Cl t