In [225]:

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

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

import json # library to handle JSON files

!conda install -c conda-forge geopy --yes
from geopy.geocoders import Nominatim # convert an address into latitude and longitude values

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

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

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

!conda install -c conda-forge folium=0.5.0 --yes
import folium # map rendering library

print('Libraries imported.')
```

```
Collecting package metadata (current_repodata.json): done
Solving environment: done

# All requested packages already installed.

Collecting package metadata (current_repodata.json): done
Solving environment: done

# All requested packages already installed.

Libraries imported.
```

In [226]:

```python
!conda install -c conda-forge beautifulsoup4 --yes
print('Beautiful Soup library imported.')
```

```
Collecting package metadata (current_repodata.json): done
Solving environment: done

# All requested packages already installed.

Beautiful Soup library imported.
```

In [227]:

```python
from bs4 import BeautifulSoup
```

In [228]:

```python
!conda install -c conda-forge lxml --yes
print('lxml library imported.')
```

Collecting package metadata (current_repodata.json): done
Solving environment: done

All requested packages already installed.

lxml library imported.

In [229]:

```python
import urllib.request
print('urllib library imported.')
```

urllib library imported.

In [319]:

```python
url = 'https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M'
#Query the website and return the html to the variable 'page'
page = urllib.request.urlopen(url)
```

In [320]:

```python
#Parse the html in the 'page' variable, and store it in Beautiful Soup format
soup = BeautifulSoup(page)
```

In [232]:

```python
#Now to identify the right table, we will use attribute "class" of table and use it to fil
ter the right table.
#In chrome, the class name can be checked by right clicking on the required table of web p
age -> Inspect element
```

In [321]:

```python
right_table=soup.find('table', class_='wikitable sortable')
right_table_rows = right_table.tbody.find_all("tr")
#print(right_table_rows)
```

In [322]:

```python
#Generate lists
A=[]
B=[]
C=[]
for row in right_table.findAll("tr"):
    cells = row.findAll('td')
    if len(cells)==3:
        A.append(cells[0].find(text=True))
        B.append(cells[1].find(text=True))
        C.append(cells[2].find(text=True))
```

In [323]:

```python
#Extract the information to a DataFrame
mydf=pd.DataFrame(A,columns=['Postal Code'])
mydf['Borough']=B
mydf['Neighbourhood']=C
```

In [324]:

```python
mydf[0:5]
```

Out[324]:

	Postal Code	Borough	Neighbourhood
0	M1A\n	Not assigned\n	Not assigned\n
1	M2A\n	Not assigned\n	Not assigned\n
2	M3A\n	North York\n	Parkwoods\n
3	M4A\n	North York\n	Victoria Village\n
4	M5A\n	Downtown Toronto\n	Regent Park, Harbourfront\n

In [325]:

```python
#Get rid of \n symbol
mydf['Postal Code'] = mydf['Postal Code'].str.replace(r'\n', '')
mydf['Borough'] = mydf['Borough'].str.replace(r'\n', '')
mydf['Neighbourhood'] = mydf['Neighbourhood'].str.replace(r'\n', '')
mydf[0:5]
```

Out[325]:

	Postal Code	Borough	Neighbourhood
0	M1A	Not assigned	Not assigned
1	M2A	Not assigned	Not assigned
2	M3A	North York	Parkwoods
3	M4A	North York	Victoria Village
4	M5A	Downtown Toronto	Regent Park, Harbourfront

In [326]:

```python
mydf.shape
```

Out[326]:

```
(180, 3)
```

In [327]:

```python
#Ignore cells with either a Borough or a neighbourhood Not Assigned (although there are no
neighbourhoods 'Not Assigned')
mydf.drop(mydf.index[mydf['Borough'] == 'Not assigned'], inplace=True)
mydf.drop(mydf.index[mydf['Neighbourhood'] == 'Not assigned'], inplace=True)
mydf[0:5]
```

Out[327]:

	Postal Code	Borough	Neighbourhood
2	M3A	North York	Parkwoods
3	M4A	North York	Victoria Village
4	M5A	Downtown Toronto	Regent Park, Harbourfront
5	M6A	North York	Lawrence Manor, Lawrence Heights
6	M7A	Downtown Toronto	Queen's Park, Ontario Provincial Government

In [328]:

```python
# reset index after deleting rows
mydf = mydf.reset_index(drop=True)
mydf[0:5]
```

Out[328]:

	Postal Code	Borough	Neighbourhood
0	M3A	North York	Parkwoods
1	M4A	North York	Victoria Village
2	M5A	Downtown Toronto	Regent Park, Harbourfront
3	M6A	North York	Lawrence Manor, Lawrence Heights
4	M7A	Downtown Toronto	Queen's Park, Ontario Provincial Government

In [329]:

```python
#End of First Question
mydf.shape
#End of First Question
```

Out[329]:

(103, 3)

In [330]:

```python
#Second Question

# link to a csv file that has the geographical coordinates of each postal code: http://coc
l.us/Geospatial_data
csv_path = 'http://cocl.us/Geospatial_data'
df_coord = pd.read_csv(csv_path, header=0)
df_coord[0:5]
```

Out[330]:

	Postal Code	Latitude	Longitude
0	M1B	43.806686	-79.194353
1	M1C	43.784535	-79.160497
2	M1E	43.763573	-79.188711
3	M1G	43.770992	-79.216917
4	M1H	43.773136	-79.239476

In [331]:

```
df_coord.shape
```

Out[331]:

(103, 3)

In [332]:

```
#Create a new pandas that merges the Latitude and Longitude Information
mynewdf = mydf.merge(df_coord, on='Postal Code', how='left')
mynewdf[0:5]
```

Out[332]:

	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 [333]:

```
print('The dataframe has {} boroughs and {} neighbourhoods.'.format(
        len(mynewdf['Borough'].unique()),
        mynewdf.shape[0]
    )
)
mynewdf['Borough'].unique()
# End of Second Question
```

The dataframe has 10 boroughs and 103 neighbourhoods.

Out[333]:

```
array(['North York', 'Downtown Toronto', 'Etobicoke', 'Scarborough',
       'East York', 'York', 'East Toronto', 'West Toronto',
       'Central Toronto', 'Mississauga'], dtype=object)
```

In [334]:

```python
#Question 3 explore and Cluster the Neighbourhoods in Toronto

#Create a Map of Toronto with Neighbourhoods superimposed using latitude and longitude val
ues
#Passing Toronto coordinates manually
latitude=43.651070
longitude=-79.347015

map_toronto = folium.Map(location=[latitude, longitude], zoom_start=10)

# add markers to map
for lat, lng, borough, neighborhood in zip(mynewdf['Latitude'], mynewdf['Longitude'], myne
wdf['Borough'], mynewdf['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[334]:

Make this Notebook Trusted to load map: File -> Trust Notebook

In [335]:

```python
#Next, start utilizing the Foursquare API
CLIENT_ID = 'ET5MEYPN14RDTKJNHY4VVC0Q12R114CIOWGYVZ14FBSK1V32' # your Foursquare ID
CLIENT_SECRET = 'SUJMUIQO4X24ZKIPS31ZJFA12FJTFIC11SJQXSGZG4ZMRLSV' # your Foursquare Secre
t
VERSION = '20180605' # Foursquare API version
LIMIT = 100 # A default Foursquare API limit value

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

Your credentails:
CLIENT_ID: ET5MEYPN14RDTKJNHY4VVC0Q12R114CIOWGYVZ14FBSK1V32
CLIENT_SECRET:SUJMUIQO4X24ZKIPS31ZJFA12FJTFIC11SJQXSGZG4ZMRLSV

In [336]:

```python
#Let´s explore the first neighbourhood
mynewdf.loc[0, 'Neighbourhood']
```

Out[336]:

'Parkwoods'

In [337]:

```python
#Get the Neighbourhood's Latitude and Longitude
neighborhood_latitude = mynewdf.loc[0, 'Latitude'] # neighborhood latitude value
neighborhood_longitude = mynewdf.loc[0, 'Longitude'] # neighborhood longitude value

neighborhood_name = mynewdf.loc[0, 'Neighbourhood'] # neighborhood name

print('Latitude and longitude values of {} are {}, {}.'.format(neighborhood_name,
                                                               neighborhood_latitude,
                                                               neighborhood_longitude))
```

Latitude and longitude values of Parkwoods are 43.7532586, -79.3296565.

In [338]:

```python
#Now let´s get the top 100 venues in 500m distance
#Let´s create the GET request
#Import Latitude and Longitude Values
LIMIT = 100
radius = 500
url = 'https://api.foursquare.com/v2/venues/explore?client_id=ET5MEYPN14RDTKJNHY4VVC0Q12R1
14CIOWGYVZ14FBSK1V32&client_secret=SUJMUIQO4X24ZKIPS31ZJFA12FJTFIC11SJQXSGZG4ZMRLSV&ll=40.
8765,-73.9106&oauth_token=&v=20180605&radius=500&limit=100'
url
```

Out[338]:

```
'https://api.foursquare.com/v2/venues/explore?client_id=ET5MEYPN14RDTKJNHY4VV
C0Q12R114CIOWGYVZ14FBSK1V32&client_secret=SUJMUIQO4X24ZKIPS31ZJFA12FJTFIC11SJ
QXSGZG4ZMRLSV&ll=40.8765,-73.9106&oauth_token=&v=20180605&radius=500&limit=10
0'
```

In [339]:

```python
#Send the GET request ans examine the result
results = requests.get(url).json()
results
```

```
Out[339]:
{'meta': {'code': 200, 'requestId': '6004b321871ccd4778d277c3'},
 'response': {'suggestedFilters': {'header': 'Tap to show:',
   'filters': [{'name': 'Open now', 'key': 'openNow'}]},
  'headerLocation': 'Marble Hill',
  'headerFullLocation': 'Marble Hill, New York',
  'headerLocationGranularity': 'neighborhood',
  'totalResults': 26,
  'suggestedBounds': {'ne': {'lat': 40.8810000045, 'lng': -73.9046596851048
6},
   'sw': {'lat': 40.8719999955, 'lng': -73.91654031489514}},
  'groups': [{'type': 'Recommended Places',
    'name': 'recommended',
    'items': [{'reasons': {'count': 0,
       'items': [{'summary': 'This spot is popular',
         'type': 'general',
         'reasonName': 'globalInteractionReason'}]},
      'venue': {'id': '4b4429abf964a52037f225e3',
       'name': "Arturo's",
       'location': {'address': '5198 Broadway',
        'crossStreet': 'at 225th St.',
        'lat': 40.87441177110231,
        'lng': -73.91027100981574,
        'labeledLatLngs': [{'label': 'display',
          'lat': 40.87441177110231,
          'lng': -73.91027100981574},
         {'label': 'entrance', 'lat': 40.874401, 'lng': -73.910339}],
        'distance': 234,
        'postalCode': '10463',
        'cc': 'US',
        'city': 'New York',
        'state': 'NY',
        'country': 'United States',
        'formattedAddress': ['5198 Broadway (at 225th St.)',
         'New York, NY 10463',
         'United States']},
       'categories': [{'id': '4bf58dd8d48988d1ca941735',
         'name': 'Pizza Place',
         'pluralName': 'Pizza Places',
         'shortName': 'Pizza',
         'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/pizz
a_',
          'suffix': '.png'},
         'primary': True}],
       'delivery': {'id': '72548',
        'url': 'https://www.seamless.com/menu/arturos-pizza-5189-broadway-ave
-new-york/72548?affiliate=1131&utm_source=foursquare-affiliate-network&utm_me
dium=affiliate&utm_campaign=1131&utm_content=72548',
        'provider': {'name': 'seamless',
         'icon': {'prefix': 'https://fastly.4sqi.net/img/general/cap/',
          'sizes': [40, 50],
          'name': '/delivery_provider_seamless_20180129.png'}}},
       'photos': {'count': 0, 'groups': []}},
      'referralId': 'e-0-4b4429abf964a52037f225e3-0'},
     {'reasons': {'count': 0,
       'items': [{'summary': 'This spot is popular',
```

```
              'type': 'general',
              'reasonName': 'globalInteractionReason'}]},
       'venue': {'id': '4baf59e8f964a520a6f93be3',
        'name': 'Bikram Yoga',
        'location': {'address': '5500 Broadway',
         'crossStreet': '230th Street',
         'lat': 40.876843690797934,
         'lng': -73.90620384419528,
         'labeledLatLngs': [{'label': 'display',
           'lat': 40.876843690797934,
           'lng': -73.90620384419528}],
         'distance': 371,
         'postalCode': '10463',
         'cc': 'US',
         'city': 'Bronx',
         'state': 'NY',
         'country': 'United States',
         'formattedAddress': ['5500 Broadway (230th Street)',
          'Bronx, NY 10463',
          'United States']},
        'categories': [{'id': '4bf58dd8d48988d102941735',
          'name': 'Yoga Studio',
          'pluralName': 'Yoga Studios',
          'shortName': 'Yoga Studio',
          'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/shops/gym
    _yogastudio_',
           'suffix': '.png'},
          'primary': True}],
        'photos': {'count': 0, 'groups': []}},
       'referralId': 'e-0-4baf59e8f964a520a6f93be3-1'},
      {'reasons': {'count': 0,
        'items': [{'summary': 'This spot is popular',
          'type': 'general',
          'reasonName': 'globalInteractionReason'}]},
       'venue': {'id': '4b79cc46f964a520c5122fe3',
        'name': 'Tibbett Diner',
        'location': {'address': '3033 Tibbett Ave',
         'crossStreet': 'btwn 230th & 231st',
         'lat': 40.8804044222466,
         'lng': -73.90893738006402,
         'labeledLatLngs': [{'label': 'display',
           'lat': 40.8804044222466,
           'lng': -73.90893738006402},
          {'label': 'entrance', 'lat': 40.880388, 'lng': -73.90896}],
         'distance': 456,
         'postalCode': '10463',
         'cc': 'US',
         'city': 'Bronx',
         'state': 'NY',
         'country': 'United States',
         'formattedAddress': ['3033 Tibbett Ave (btwn 230th & 231st)',
          'Bronx, NY 10463',
          'United States']},
        'categories': [{'id': '4bf58dd8d48988d147941735',
          'name': 'Diner',
          'pluralName': 'Diners',
          'shortName': 'Diner',
```

```
            'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/dine
    r_',
              'suffix': '.png'},
             'primary': True}],
           'photos': {'count': 0, 'groups': []}},
          'referralId': 'e-0-4b79cc46f964a520c5122fe3-2'},
        {'reasons': {'count': 0,
          'items': [{'summary': 'This spot is popular',
             'type': 'general',
             'reasonName': 'globalInteractionReason'}]},
         'venue': {'id': '55f81cd2498ee903149fcc64',
          'name': 'Starbucks',
          'location': {'address': '171 W 230th St',
           'crossStreet': 'Kimberly Pl',
           'lat': 40.87753134921497,
           'lng': -73.90558216359267,
           'labeledLatLngs': [{'label': 'display',
             'lat': 40.87753134921497,
             'lng': -73.90558216359267}],
           'distance': 437,
           'postalCode': '10463',
           'cc': 'US',
           'city': 'Bronx',
           'state': 'NY',
           'country': 'United States',
           'formattedAddress': ['171 W 230th St (Kimberly Pl)',
            'Bronx, NY 10463',
            'United States']},
          'categories': [{'id': '4bf58dd8d48988d1e0931735',
            'name': 'Coffee Shop',
            'pluralName': 'Coffee Shops',
            'shortName': 'Coffee Shop',
            'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/coff
    eeshop_',
             'suffix': '.png'},
            'primary': True}],
          'photos': {'count': 0, 'groups': []}},
         'referralId': 'e-0-55f81cd2498ee903149fcc64-3'},
        {'reasons': {'count': 0,
          'items': [{'summary': 'This spot is popular',
             'type': 'general',
             'reasonName': 'globalInteractionReason'}]},
         'venue': {'id': '4b5357adf964a520319827e3',
          'name': "Dunkin'",
          'location': {'address': '5501 Broadway',
           'crossStreet': 'W 230th St',
           'lat': 40.87713584201589,
           'lng': -73.90666550701411,
           'labeledLatLngs': [{'label': 'display',
             'lat': 40.87713584201589,
             'lng': -73.90666550701411}],
           'distance': 338,
           'postalCode': '10463',
           'cc': 'US',
           'city': 'Bronx',
           'state': 'NY',
           'country': 'United States',
```

```
          'formattedAddress': ['5501 Broadway (W 230th St)',
           'Bronx, NY 10463',
           'United States']},
         'categories': [{'id': '4bf58dd8d48988d148941735',
           'name': 'Donut Shop',
           'pluralName': 'Donut Shops',
           'shortName': 'Donuts',
           'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/donu
   ts_',
           'suffix': '.png'},
           'primary': True}],
         'delivery': {'id': '2200464',
          'url': 'https://www.seamless.com/menu/dunkin-5501-broadway-bronx/2200
   464?affiliate=1131&utm_source=foursquare-affiliate-network&utm_medium=affilia
   te&utm_campaign=1131&utm_content=2200464',
          'provider': {'name': 'seamless',
           'icon': {'prefix': 'https://fastly.4sqi.net/img/general/cap/',
           'sizes': [40, 50],
           'name': '/delivery_provider_seamless_20180129.png'}}},
         'photos': {'count': 0, 'groups': []}},
        'referralId': 'e-0-4b5357adf964a520319827e3-4'},
      {'reasons': {'count': 0,
        'items': [{'summary': 'This spot is popular',
          'type': 'general',
          'reasonName': 'globalInteractionReason'}]},
       'venue': {'id': '4a725fa1f964a520f6da1fe3',
        'name': 'TCR The Club of Riverdale',
        'location': {'address': '2600 Netherland Ave',
         'lat': 40.8786283,
         'lng': -73.9145678,
         'labeledLatLngs': [{'label': 'display',
           'lat': 40.8786283,
           'lng': -73.9145678}],
         'distance': 409,
         'postalCode': '10463',
         'cc': 'US',
         'city': 'Bronx',
         'state': 'NY',
         'country': 'United States',
         'formattedAddress': ['2600 Netherland Ave',
          'Bronx, NY 10463',
          'United States']},
        'categories': [{'id': '4e39a891bd410d7aed40cbc2',
          'name': 'Tennis Stadium',
          'pluralName': 'Tennis Stadiums',
          'shortName': 'Tennis',
          'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/arts_ente
   rtainment/stadium_tennis_',
           'suffix': '.png'},
          'primary': True}],
        'photos': {'count': 0, 'groups': []},
        'venuePage': {'id': '40358759'}},
       'referralId': 'e-0-4a725fa1f964a520f6da1fe3-5'},
      {'reasons': {'count': 0,
        'items': [{'summary': 'This spot is popular',
          'type': 'general',
          'reasonName': 'globalInteractionReason'}]},
```

```
       'venue': {'id': '55f751ca498eacc0307d1cfe',
        'name': 'Blink Fitness',
        'location': {'address': '5520 Broadway',
         'crossStreet': 'at W 230th St',
         'lat': 40.877271495944626,
         'lng': -73.90559491338075,
         'labeledLatLngs': [{'label': 'display',
           'lat': 40.877271495944626,
           'lng': -73.90559491338075}],
         'distance': 429,
         'postalCode': '10463',
         'cc': 'US',
         'neighborhood': 'Kingsbridge',
         'city': 'Bronx',
         'state': 'NY',
         'country': 'United States',
         'formattedAddress': ['5520 Broadway (at W 230th St)',
          'Bronx, NY 10463',
          'United States']},
        'categories': [{'id': '4bf58dd8d48988d176941735',
          'name': 'Gym',
          'pluralName': 'Gyms',
          'shortName': 'Gym',
          'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/building/
  gym_',
           'suffix': '.png'},
          'primary': True}],
        'photos': {'count': 0, 'groups': []}},
       'referralId': 'e-0-55f751ca498eacc0307d1cfe-6'},
      {'reasons': {'count': 0,
        'items': [{'summary': 'This spot is popular',
          'type': 'general',
          'reasonName': 'globalInteractionReason'}]},
       'venue': {'id': '4cf6ae55d3a8a1cd71a9d243',
        'name': 'Astral Fitness & Wellness Center',
        'location': {'address': '5500 Broadway',
         'crossStreet': '230th St',
         'lat': 40.87670526507199,
         'lng': -73.90637207670373,
         'labeledLatLngs': [{'label': 'display',
           'lat': 40.87670526507199,
           'lng': -73.90637207670373},
          {'label': 'entrance', 'lat': 40.87685, 'lng': -73.906058}],
         'distance': 356,
         'postalCode': '10463',
         'cc': 'US',
         'city': 'Bronx',
         'state': 'NY',
         'country': 'United States',
         'formattedAddress': ['5500 Broadway (230th St)',
          'Bronx, NY 10463',
          'United States']},
        'categories': [{'id': '4bf58dd8d48988d176941735',
          'name': 'Gym',
          'pluralName': 'Gyms',
          'shortName': 'Gym',
          'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/building/
```

```
    gym_',
                'suffix': '.png'},
                'primary': True}],
            'photos': {'count': 0, 'groups': []},
            'venuePage': {'id': '75803748'}},
          'referralId': 'e-0-4cf6ae55d3a8a1cd71a9d243-7'},
        {'reasons': {'count': 0,
          'items': [{'summary': 'This spot is popular',
            'type': 'general',
            'reasonName': 'globalInteractionReason'}]},
          'venue': {'id': '57655be738faa66160da7527',
          'name': 'Starbucks',
          'location': {'address': '50 W 225th St',
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         'state': 'NY',
         'country': 'United States',
         'formattedAddress': ['135 Terrace View Ave.',
```

```
          'New York, NY 10034',
          'United States']},
        'categories': [{'id': '4bf58dd8d48988d146941735',
          'name': 'Deli / Bodega',
          'pluralName': 'Delis / Bodegas',
          'shortName': 'Deli / Bodega',
          'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/deli
_',
          'suffix': '.png'},
          'primary': True}],
        'photos': {'count': 0, 'groups': []}},
      'referralId': 'e-0-4ed7956b8b81b2bf28adc714-25'}]}]}}
```

In [340]:

```python
# function that extracts the category of the venue
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']
```

In [341]:

```python
#Clean the json and structure into a Pandas Dataframe
venues = results['response']['groups'][0]['items']

nearby_venues = pd.json_normalize(venues) # flatten JSON

# filter columns
filtered_columns = ['venue.name', 'venue.categories', 'venue.location.lat', 'venue.locatio
n.lng']
nearby_venues =nearby_venues.loc[:, filtered_columns]

# filter the category for each row
nearby_venues['venue.categories'] = nearby_venues.apply(get_category_type, axis=1)

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

nearby_venues.head()
```

Out[341]:

	name	categories	lat	lng
0	Arturo's	Pizza Place	40.874412	-73.910271
1	Bikram Yoga	Yoga Studio	40.876844	-73.906204
2	Tibbett Diner	Diner	40.880404	-73.908937
3	Starbucks	Coffee Shop	40.877531	-73.905582
4	Dunkin'	Donut Shop	40.877136	-73.906666

In [342]:

```python
#How many venues returned by FourSquare
print('{} venues were returned by Foursquare.'.format(nearby_venues.shape[0]))
```

26 venues were returned by Foursquare.

In [343]:

```python
## Next Explore Neighbourhoods in Toronto
```

In [344]:

```python
#Create a function to repeat the same process to all Neighbourhoods
def getNearbyVenues(names, latitudes, longitudes, radius=500):

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

        # create the API request URL
        url = 'https://api.foursquare.com/v2/venues/explore?&client_id={}&client_secret={}
&v={}&ll={},{}&radius={}&limit={}'.format(
            CLIENT_ID,
            CLIENT_SECRET,
            VERSION,
            lat,
            lng,
            radius,
            LIMIT)

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


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

    nearby_venues = pd.DataFrame([item for venue_list in venues_list for item in venue_lis
t])
    nearby_venues.columns = ['Neighborhood',
                  'Neighborhood Latitude',
                  'Neighborhood Longitude',
                  'Venue',
                  'Venue Latitude',
                  'Venue Longitude',
                  'Venue Category']

    return(nearby_venues)
```

In [345]:

```python
#Run the above function on each Neighbourhood and create the Dataframe toronto_venues
toronto_venues = getNearbyVenues(names=mynewdf['Neighbourhood'],
                                 latitudes=mynewdf['Latitude'],
                                 longitudes=mynewdf['Longitude'])
```

```
Parkwoods
Victoria Village
Regent Park, Harbourfront
Lawrence Manor, Lawrence Heights
Queen's Park, Ontario Provincial Government
Islington Avenue, Humber Valley Village
Malvern, Rouge
Don Mills
Parkview Hill, Woodbine Gardens
Garden District, Ryerson
Glencairn
West Deane Park, Princess Gardens, Martin Grove, Islington, Cloverdale
Rouge Hill, Port Union, Highland Creek
Don Mills
Woodbine Heights
St. James Town
Humewood-Cedarvale
Eringate, Bloordale Gardens, Old Burnhamthorpe, Markland Wood
Guildwood, Morningside, West Hill
The Beaches
Berczy Park
Caledonia-Fairbanks
Woburn
Leaside
Central Bay Street
Christie
Cedarbrae
Hillcrest Village
Bathurst Manor, Wilson Heights, Downsview North
Thorncliffe Park
Richmond, Adelaide, King
Dufferin, Dovercourt Village
Scarborough Village
Fairview, Henry Farm, Oriole
Northwood Park, York University
East Toronto, Broadview North (Old East York)
Harbourfront East, Union Station, Toronto Islands
Little Portugal, Trinity
Kennedy Park, Ionview, East Birchmount Park
Bayview Village
Downsview
The Danforth West, Riverdale
Toronto Dominion Centre, Design Exchange
Brockton, Parkdale Village, Exhibition Place
Golden Mile, Clairlea, Oakridge
York Mills, Silver Hills
Downsview
India Bazaar, The Beaches West
Commerce Court, Victoria Hotel
North Park, Maple Leaf Park, Upwood Park
Humber Summit
Cliffside, Cliffcrest, Scarborough Village West
Willowdale, Newtonbrook
Downsview
Studio District
Bedford Park, Lawrence Manor East
Del Ray, Mount Dennis, Keelsdale and Silverthorn
```

```
Humberlea, Emery
Birch Cliff, Cliffside West
Willowdale, Willowdale East
Downsview
Lawrence Park
Roselawn
Runnymede, The Junction North
Weston
Dorset Park, Wexford Heights, Scarborough Town Centre
York Mills West
Davisville North
Forest Hill North & West, Forest Hill Road Park
High Park, The Junction South
Westmount
Wexford, Maryvale
Willowdale, Willowdale West
North Toronto West,  Lawrence Park
The Annex, North Midtown, Yorkville
Parkdale, Roncesvalles
Canada Post Gateway Processing Centre
Kingsview Village, St. Phillips, Martin Grove Gardens, Richview Gardens
Agincourt
Davisville
University of Toronto, Harbord
Runnymede, Swansea
Clarks Corners, Tam O'Shanter, Sullivan
Moore Park, Summerhill East
Kensington Market, Chinatown, Grange Park
Milliken, Agincourt North, Steeles East, L'Amoreaux East
Summerhill West, Rathnelly, South Hill, Forest Hill SE, Deer Park
CN Tower, King and Spadina, Railway Lands, Harbourfront West, Bathurst Quay,
South Niagara, Island airport
New Toronto, Mimico South, Humber Bay Shores
South Steeles, Silverstone, Humbergate, Jamestown, Mount Olive, Beaumond Heig
hts, Thistletown, Albion Gardens
Steeles West, L'Amoreaux West
Rosedale
Stn A PO Boxes
Alderwood, Long Branch
Northwest, West Humber - Clairville
Upper Rouge
St. James Town, Cabbagetown
First Canadian Place, Underground city
The Kingsway, Montgomery Road, Old Mill North
Church and Wellesley
Business reply mail Processing Centre, South Central Letter Processing Plant
Toronto
Old Mill South, King's Mill Park, Sunnylea, Humber Bay, Mimico NE, The Queens
way East, Royal York South East, Kingsway Park South East
Mimico NW, The Queensway West, South of Bloor, Kingsway Park South West, Roya
l York South West
```

In [346]:

```python
#Size of the resulting Dataframe
print(toronto_venues.shape)
toronto_venues.head()
```

(2129, 7)

Out[346]:

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Parkwoods	43.753259	-79.329656	Brookbanks Park	43.751976	-79.332140	Park
1	Parkwoods	43.753259	-79.329656	Variety Store	43.751974	-79.333114	Food & Drink Shop
2	Victoria Village	43.725882	-79.315572	Victoria Village Arena	43.723481	-79.315635	Hockey Arena
3	Victoria Village	43.725882	-79.315572	Portugril	43.725819	-79.312785	Portuguese Restaurant
4	Victoria Village	43.725882	-79.315572	Tim Hortons	43.725517	-79.313103	Coffee Shop

In [347]:

```python
#Check how many venues were returned for each NeighBourhood
toronto_venues.groupby('Neighborhood').count()
```

Out[347]:

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Agincourt	5	5	5	5	5	5
Alderwood, Long Branch	7	7	7	7	7	7
Bathurst Manor, Wilson Heights, Downsview North	22	22	22	22	22	22
Bayview Village	4	4	4	4	4	4
Bedford Park, Lawrence Manor East	24	24	24	24	24	24
Berczy Park	58	58	58	58	58	58
Birch Cliff, Cliffside West	4	4	4	4	4	4
Brockton, Parkdale Village, Exhibition Place	24	24	24	24	24	24
Business reply mail Processing Centre, South Central Letter Processing Plant Toronto	16	16	16	16	16	16
CN Tower, King and Spadina, Railway Lands, Harbourfront West, Bathurst Quay, South Niagara, Island airport	14	14	14	14	14	14
Caledonia-Fairbanks	4	4	4	4	4	4
Canada Post Gateway Processing Centre	13	13	13	13	13	13
Cedarbrae	8	8	8	8	8	8
Central Bay Street	62	62	62	62	62	62
Christie	16	16	16	16	16	16
Church and Wellesley	77	77	77	77	77	77
Clarks Corners, Tam O'Shanter, Sullivan	13	13	13	13	13	13
Cliffside, Cliffcrest, Scarborough Village West	3	3	3	3	3	3
Commerce Court, Victoria Hotel	100	100	100	100	100	100
Davisville	35	35	35	35	35	35
Davisville North	8	8	8	8	8	8
Del Ray, Mount Dennis, Keelsdale and Silverthorn	5	5	5	5	5	5
Don Mills	24	24	24	24	24	24
Dorset Park, Wexford Heights, Scarborough Town Centre	7	7	7	7	7	7

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Downsview	14	14	14	14	14	14
Dufferin, Dovercourt Village	17	17	17	17	17	17
East Toronto, Broadview North (Old East York)	4	4	4	4	4	4
Eringate, Bloordale Gardens, Old Burnhamthorpe, Markland Wood	11	11	11	11	11	11
Fairview, Henry Farm, Oriole	73	73	73	73	73	73
First Canadian Place, Underground city	100	100	100	100	100	100
Forest Hill North & West, Forest Hill Road Park	4	4	4	4	4	4
Garden District, Ryerson	100	100	100	100	100	100
Glencairn	5	5	5	5	5	5
Golden Mile, Clairlea, Oakridge	9	9	9	9	9	9
Guildwood, Morningside, West Hill	8	8	8	8	8	8
Harbourfront East, Union Station, Toronto Islands	100	100	100	100	100	100
High Park, The Junction South	24	24	24	24	24	24
Hillcrest Village	5	5	5	5	5	5
Humber Summit	3	3	3	3	3	3
Humberlea, Emery	1	1	1	1	1	1
Humewood-Cedarvale	3	3	3	3	3	3
India Bazaar, The Beaches West	19	19	19	19	19	19
Kennedy Park, Ionview, East Birchmount Park	6	6	6	6	6	6
Kensington Market, Chinatown, Grange Park	64	64	64	64	64	64
Kingsview Village, St. Phillips, Martin Grove Gardens, Richview Gardens	3	3	3	3	3	3
Lawrence Manor, Lawrence Heights	12	12	12	12	12	12
Lawrence Park	5	5	5	5	5	5
Leaside	32	32	32	32	32	32

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Little Portugal, Trinity	43	43	43	43	43	43
Malvern, Rouge	1	1	1	1	1	1
Milliken, Agincourt North, Steeles East, L'Amoreaux East	3	3	3	3	3	3
Mimico NW, The Queensway West, South of Bloor, Kingsway Park South West, Royal York South West	15	15	15	15	15	15
Moore Park, Summerhill East	3	3	3	3	3	3
New Toronto, Mimico South, Humber Bay Shores	16	16	16	16	16	16
North Park, Maple Leaf Park, Upwood Park	5	5	5	5	5	5
North Toronto West, Lawrence Park	18	18	18	18	18	18
Northwest, West Humber - Clairville	4	4	4	4	4	4
Northwood Park, York University	6	6	6	6	6	6
Old Mill South, King's Mill Park, Sunnylea, Humber Bay, Mimico NE, The Queensway East, Royal York South East, Kingsway Park South East	2	2	2	2	2	2
Parkdale, Roncesvalles	14	14	14	14	14	14
Parkview Hill, Woodbine Gardens	11	11	11	11	11	11
Parkwoods	2	2	2	2	2	2
Queen's Park, Ontario Provincial Government	35	35	35	35	35	35
Regent Park, Harbourfront	47	47	47	47	47	47
Richmond, Adelaide, King	96	96	96	96	96	96
Rosedale	4	4	4	4	4	4
Roselawn	1	1	1	1	1	1
Rouge Hill, Port Union, Highland Creek	2	2	2	2	2	2
Runnymede, Swansea	36	36	36	36	36	36
Runnymede, The Junction North	4	4	4	4	4	4
Scarborough Village	2	2	2	2	2	2

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
South Steeles, Silverstone, Humbergate, Jamestown, Mount Olive, Beaumond Heights, Thistletown, Albion Gardens	8	8	8	8	8	8
St. James Town	80	80	80	80	80	80
St. James Town, Cabbagetown	46	46	46	46	46	46
Steeles West, L'Amoreaux West	11	11	11	11	11	11
Stn A PO Boxes	98	98	98	98	98	98
Studio District	37	37	37	37	37	37
Summerhill West, Rathnelly, South Hill, Forest Hill SE, Deer Park	14	14	14	14	14	14
The Annex, North Midtown, Yorkville	21	21	21	21	21	21
The Beaches	4	4	4	4	4	4
The Danforth West, Riverdale	42	42	42	42	42	42
The Kingsway, Montgomery Road, Old Mill North	2	2	2	2	2	2
Thorncliffe Park	18	18	18	18	18	18
Toronto Dominion Centre, Design Exchange	100	100	100	100	100	100
University of Toronto, Harbord	32	32	32	32	32	32
Victoria Village	5	5	5	5	5	5
Westmount	7	7	7	7	7	7
Weston	1	1	1	1	1	1
Wexford, Maryvale	6	6	6	6	6	6
Willowdale, Willowdale East	35	35	35	35	35	35
Willowdale, Willowdale West	4	4	4	4	4	4
Woburn	4	4	4	4	4	4
Woodbine Heights	7	7	7	7	7	7
York Mills West	2	2	2	2	2	2

In [348]:

```python
#Find how many unique categories can be curated from all the returned venues
print('There are {} unique categories.'.format(len(toronto_venues['Venue Category'].unique())))
```

There are 266 unique categories.

In [349]:

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

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

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

toronto_onehot.head()
```

Out[349]:

	Neighbourhood	Accessories Store	Airport	Airport Food Court	Airport Lounge	Airport Service	Airport Terminal	American Restaurant	Antique Shop
0	Parkwoods	0	0	0	0	0	0	0	C
1	Parkwoods	0	0	0	0	0	0	0	C
2	Victoria Village	0	0	0	0	0	0	0	C
3	Victoria Village	0	0	0	0	0	0	0	C
4	Victoria Village	0	0	0	0	0	0	0	C

In [350]:

```python
#New dataframe size
toronto_onehot.shape
```

Out[350]:

(2129, 267)

In [351]:

```python
##Let´s group rows by Neighbourhood and by taking the mean of the frequency of the ocurren
ce of each category
toronto_grouped = toronto_onehot.groupby('Neighbourhood').mean().reset_index()
toronto_grouped
```

Out[351]:

	Neighbourhood	Accessories Store	Airport	Airport Food Court	Airport Lounge	Airport Service	Airport Terminal	American Restaurant
0	Agincourt	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1	Alderwood, Long Branch	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	Bathurst Manor, Wilson Heights, Downsview North	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
3	Bayview Village	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
4	Bedford Park, Lawrence Manor East	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.041667
5	Berczy Park	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
6	Birch Cliff, Cliffside West	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
7	Brockton, Parkdale Village, Exhibition Place	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
8	Business reply mail Processing Centre, South C...	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
9	CN Tower, King and Spadina, Railway Lands, Har...	0.000000	0.071429	0.071429	0.071429	0.214286	0.142857	0.000000
10	Caledonia-Fairbanks	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
11	Canada Post Gateway Processing Centre	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.076923
12	Cedarbrae	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
13	Central Bay Street	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
14	Christie	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
15	Church and Wellesley	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.012987
16	Clarks Corners, Tam O'Shanter, Sullivan	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
17	Cliffside, Cliffcrest, Scarborough Village West	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.333333

	Neighbourhood	Accessories Store	Airport	Airport Food Court	Airport Lounge	Airport Service	Airport Terminal	American Restaurant
18	Commerce Court, Victoria Hotel	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.040000
19	Davisville	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
20	Davisville North	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
21	Del Ray, Mount Dennis, Keelsdale and Silverthorn	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
22	Don Mills	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
23	Dorset Park, Wexford Heights, Scarborough Town...	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
24	Downsview	0.000000	0.071429	0.000000	0.000000	0.000000	0.000000	0.000000
25	Dufferin, Dovercourt Village	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
26	East Toronto, Broadview North (Old East York)	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
27	Eringate, Bloordale Gardens, Old Burnhamthorpe...	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
28	Fairview, Henry Farm, Oriole	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.013699
29	First Canadian Place, Underground city	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.030000
30	Forest Hill North & West, Forest Hill Road Park	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
31	Garden District, Ryerson	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
32	Glencairn	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
33	Golden Mile, Clairlea, Oakridge	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
34	Guildwood, Morningside, West Hill	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
35	Harbourfront East, Union Station, Toronto Islands	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
36	High Park, The Junction South	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

	Neighbourhood	Accessories Store	Airport	Airport Food Court	Airport Lounge	Airport Service	Airport Terminal	American Restaurant
37	Hillcrest Village	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
38	Humber Summit	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
39	Humberlea, Emery	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
40	Humewood-Cedarvale	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
41	India Bazaar, The Beaches West	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
42	Kennedy Park, Ionview, East Birchmount Park	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
43	Kensington Market, Chinatown, Grange Park	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
44	Kingsview Village, St. Phillips, Martin Grove ...	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
45	Lawrence Manor, Lawrence Heights	0.083333	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
46	Lawrence Park	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
47	Leaside	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
48	Little Portugal, Trinity	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
49	Malvern, Rouge	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50	Milliken, Agincourt North, Steeles East, L'Amo...	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
51	Mimico NW, The Queensway West, South of Bloor,...	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
52	Moore Park, Summerhill East	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
53	New Toronto, Mimico South, Humber Bay Shores	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.062500
54	North Park, Maple Leaf Park, Upwood Park	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
55	North Toronto West, Lawrence Park	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

	Neighbourhood	Accessories Store	Airport	Airport Food Court	Airport Lounge	Airport Service	Airport Terminal	American Restaurant
56	Northwest, West Humber - Clairville	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
57	Northwood Park, York University	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
58	Old Mill South, King's Mill Park, Sunnylea, Hu...	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
59	Parkdale, Roncesvalles	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
60	Parkview Hill, Woodbine Gardens	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
61	Parkwoods	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
62	Queen's Park, Ontario Provincial Government	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
63	Regent Park, Harbourfront	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
64	Richmond, Adelaide, King	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.020833
65	Rosedale	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
66	Roselawn	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
67	Rouge Hill, Port Union, Highland Creek	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
68	Runnymede, Swansea	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
69	Runnymede, The Junction North	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
70	Scarborough Village	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
71	South Steeles, Silverstone, Humbergate, Jamest...	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
72	St. James Town	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.037500
73	St. James Town, Cabbagetown	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
74	Steeles West, L'Amoreaux West	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
75	Stn A PO Boxes	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.010204
76	Studio District	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.054054

	Neighbourhood	Accessories Store	Airport	Airport Food Court	Airport Lounge	Airport Service	Airport Terminal	American Restaurant
77	Summerhill West, Rathnelly, South Hill, Forest...	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.071429
78	The Annex, North Midtown, Yorkville	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
79	The Beaches	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
80	The Danforth West, Riverdale	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.023810
81	The Kingsway, Montgomery Road, Old Mill North	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
82	Thorncliffe Park	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
83	Toronto Dominion Centre, Design Exchange	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.030000
84	University of Toronto, Harbord	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
85	Victoria Village	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
86	Westmount	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
87	Weston	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
88	Wexford, Maryvale	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
89	Willowdale, Willowdale East	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
90	Willowdale, Willowdale West	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
91	Woburn	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
92	Woodbine Heights	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
93	York Mills West	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

In [352]:

```
#Confirm new size
toronto_grouped.shape
```

Out[352]:

(94, 267)

In [353]:

```python
#Let´s print each neighbourhood along with the top 5 most common venues
num_top_venues = 5

for hood in toronto_grouped['Neighbourhood']:
    print("----"+hood+"----")
    temp = toronto_grouped[toronto_grouped['Neighbourhood'] == hood].T.reset_index()
    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).head(num_top_ve
nues))
    print('\n')
```

```
----Agincourt----
                         venue  freq
0            Breakfast Spot   0.2
1                    Lounge   0.2
2            Clothing Store   0.2
3  Latin American Restaurant   0.2
4              Skating Rink   0.2


----Alderwood, Long Branch----
            venue  freq
0      Pizza Place  0.29
1              Gym  0.14
2  Sandwich Place  0.14
3     Coffee Shop  0.14
4    Skating Rink  0.14


----Bathurst Manor, Wilson Heights, Downsview North----
           venue  freq
0           Bank  0.09
1    Coffee Shop  0.09
2       Pharmacy  0.05
3   Intersection  0.05
4    Supermarket  0.05


----Bayview Village----
                  venue  freq
0   Japanese Restaurant  0.25
1                  Café  0.25
2    Chinese Restaurant  0.25
3                  Bank  0.25
4    Mexican Restaurant  0.00


----Bedford Park, Lawrence Manor East----
                venue  freq
0          Hobby Shop  0.08
1   Italian Restaurant  0.08
2         Coffee Shop  0.08
3      Sandwich Place  0.08
4          Pet Store  0.04


----Berczy Park----
                venue  freq
0         Coffee Shop  0.10
1        Cocktail Bar  0.05
2   Seafood Restaurant  0.03
3         Cheese Shop  0.03
4       Farmers Market  0.03


----Birch Cliff, Cliffside West----
                  venue   freq
0       College Stadium   0.25
```

```
1                   Café  0.25
2  General Entertainment  0.25
3          Skating Rink  0.25
4      Accessories Store  0.00
```

```
----Brockton, Parkdale Village, Exhibition Place----
            venue  freq
0            Café  0.12
1  Breakfast Spot  0.08
2     Coffee Shop  0.08
3          Bakery  0.08
4     Yoga Studio  0.04
```

```
----Business reply mail Processing Centre, South Central Letter Processing Pl
ant Toronto----
                 venue  freq
0    Light Rail Station  0.12
1           Yoga Studio  0.06
2               Brewery  0.06
3  Gym / Fitness Center  0.06
4         Garden Center  0.06
```

```
----CN Tower, King and Spadina, Railway Lands, Harbourfront West, Bathurst Qu
ay, South Niagara, Island airport----
                venue  freq
0      Airport Service  0.21
1     Airport Terminal  0.14
2     Sculpture Garden  0.07
3  Rental Car Location  0.07
4    Airport Food Court  0.07
```

```
----Caledonia-Fairbanks----
                   venue  freq
0                    Park  0.50
1           Women's Store  0.25
2                    Pool  0.25
3        Accessories Store  0.00
4  Middle Eastern Restaurant  0.00
```

```
----Canada Post Gateway Processing Centre----
                   venue  freq
0             Coffee Shop  0.23
1                   Hotel  0.15
2  Mediterranean Restaurant  0.08
3             Gas Station  0.08
4           Sandwich Place  0.08
```

```
----Cedarbrae----
               venue  freq
0               Bank  0.12
1             Bakery  0.12
```

```
2          Gas Station  0.12
3  Caribbean Restaurant  0.12
4      Hakka Restaurant  0.12
```

```
----Central Bay Street----
              venue  freq
0        Coffee Shop  0.19
1               Café  0.10
2     Sandwich Place  0.05
3  Italian Restaurant  0.05
4        Salad Place  0.03
```

```
----Christie----
              venue  freq
0      Grocery Store  0.25
1               Café  0.19
2               Park  0.12
3  Italian Restaurant  0.06
4        Coffee Shop  0.06
```

```
----Church and Wellesley----
               venue  freq
0        Coffee Shop  0.08
1    Sushi Restaurant  0.06
2  Japanese Restaurant  0.06
3            Gay Bar  0.04
4          Restaurant  0.04
```

```
----Clarks Corners, Tam O'Shanter, Sullivan----
               venue  freq
0           Pharmacy  0.15
1         Pizza Place  0.15
2        Noodle House  0.08
3       Shopping Mall  0.08
4  Fried Chicken Joint  0.08
```

```
----Cliffside, Cliffcrest, Scarborough Village West----
               venue  freq
0              Motel  0.33
1       Skating Rink  0.33
2  American Restaurant  0.33
3  Moroccan Restaurant  0.00
4  Monument / Landmark  0.00
```

```
----Commerce Court, Victoria Hotel----
              venue  freq
0        Coffee Shop  0.12
1          Restaurant  0.07
2              Hotel  0.06
3               Café  0.06
4  American Restaurant  0.04
```

```
   ----Davisville----
                 venue   freq
0        Pizza Place   0.11
1     Sandwich Place   0.09
2      Dessert Shop   0.09
3              Café   0.06
4   Sushi Restaurant   0.06


   ----Davisville North----
                    venue   freq
0        Sandwich Place   0.12
1     Department Store   0.12
2          Pizza Place   0.12
3                  Park   0.12
4   Gym / Fitness Center   0.12


   ----Del Ray, Mount Dennis, Keelsdale and Silverthorn----
                venue   freq
0       Discount Store   0.2
1          Coffee Shop   0.2
2       Sandwich Place   0.2
3   Turkish Restaurant   0.2
4                  Bar   0.2


   ----Don Mills----
                 venue   freq
0                  Gym   0.12
1          Coffee Shop   0.08
2           Beer Store   0.08
3           Restaurant   0.08
4   Japanese Restaurant   0.08


   ----Dorset Park, Wexford Heights, Scarborough Town Centre----
                    venue   freq
0       Indian Restaurant   0.29
1                Pet Store   0.14
2      Chinese Restaurant   0.14
3   Vietnamese Restaurant   0.14
4   Thrift / Vintage Store   0.14


   ----Downsview----
             venue   freq
0   Grocery Store   0.21
1            Park   0.14
2            Bank   0.07
3   Baseball Field   0.07
4   Discount Store   0.07


   ----Dufferin, Dovercourt Village----
```

```
            venue  freq
0          Bakery  0.12
1        Pharmacy  0.12
2            Bank  0.06
3     Music Venue  0.06
4            Café  0.06
```

----East Toronto, Broadview North (Old East York)----
```
                venue  freq
0         Pizza Place  0.25
1        Intersection  0.25
2   Convenience Store  0.25
3                Park  0.25
4    Mobile Phone Shop  0.00
```

----Eringate, Bloordale Gardens, Old Burnhamthorpe, Markland Wood----
```
                venue  freq
0                Park  0.18
1   Convenience Store  0.09
2      Shopping Plaza  0.09
3          Beer Store  0.09
4         Coffee Shop  0.09
```

----Fairview, Henry Farm, Oriole----
```
                  venue  freq
0         Clothing Store  0.11
1            Coffee Shop  0.07
2    Fast Food Restaurant  0.05
3         Cosmetics Shop  0.04
4             Restaurant  0.04
```

----First Canadian Place, Underground city----
```
         venue  freq
0  Coffee Shop  0.11
1         Café  0.07
2        Hotel  0.05
3          Gym  0.04
4   Restaurant  0.04
```

----Forest Hill North & West, Forest Hill Road Park----
```
                venue  freq
0     Sushi Restaurant  0.25
1        Jewelry Store  0.25
2                Trail  0.25
3   Mexican Restaurant  0.25
4    Accessories Store  0.00
```

----Garden District, Ryerson----
```
                  venue  freq
0            Coffee Shop  0.09
1         Clothing Store  0.09
```

```
2  Middle Eastern Restaurant  0.03
3                      Hotel  0.03
4                       Café  0.03
```

```
----Glencairn----
                venue  freq
0               Bakery   0.2
1                 Park   0.2
2                  Pub   0.2
3  Japanese Restaurant   0.2
4     Asian Restaurant   0.2
```

```
----Golden Mile, Clairlea, Oakridge----
               venue  freq
0             Bakery  0.22
1           Bus Line  0.22
2               Park  0.11
3       Intersection  0.11
4      Ice Cream Shop  0.11
```

```
----Guildwood, Morningside, West Hill----
                venue  freq
0       Medical Center  0.12
1    Electronics Store  0.12
2       Breakfast Spot  0.12
3         Intersection  0.12
4           Restaurant  0.12
```

```
----Harbourfront East, Union Station, Toronto Islands----
         venue  freq
0  Coffee Shop  0.13
1     Aquarium  0.05
2        Hotel  0.04
3         Café  0.04
4      Brewery  0.03
```

```
----High Park, The Junction South----
                venue  freq
0        Thai Restaurant  0.08
1     Mexican Restaurant  0.08
2                   Café  0.08
3            Flea Market  0.04
4    Fried Chicken Joint  0.04
```

```
----Hillcrest Village----
                   venue  freq
0            Golf Course   0.2
1     Fast Food Restaurant   0.2
2                Dog Run   0.2
3                   Pool   0.2
4  Mediterranean Restaurant   0.2
```

```
    ----Humber Summit----
          venue  freq
0    Pizza Place  0.33
1   Intersection  0.33
2     Restaurant  0.33
3         Museum  0.00
4          Motel  0.00


    ----Humberlea, Emery----
                 venue  freq
0       Baseball Field   1.0
1    Accessories Store   0.0
2    Mobile Phone Shop   0.0
3                Motel   0.0
4   Moroccan Restaurant   0.0


    ----Humewood-Cedarvale----
                 venue  freq
0                Field  0.33
1         Hockey Arena  0.33
2                Trail  0.33
3    Mobile Phone Shop  0.00
4                Motel  0.00


    ----India Bazaar, The Beaches West----
                     venue  freq
0    Fast Food Restaurant  0.11
1           Movie Theater  0.05
2       Italian Restaurant  0.05
3        Fish & Chips Shop  0.05
4                  Brewery  0.05


    ----Kennedy Park, Ionview, East Birchmount Park----
                 venue  freq
0      Discount Store  0.17
1         Bus Station  0.17
2    Department Store  0.17
3          Coffee Shop  0.17
4   Convenience Store  0.17


    ----Kensington Market, Chinatown, Grange Park----
                               venue  freq
0                              Café  0.08
1                        Coffee Shop  0.06
2    Vegetarian / Vegan Restaurant  0.06
3                      Dessert Shop  0.05
4               Mexican Restaurant  0.05


    ----Kingsview Village, St. Phillips, Martin Grove Gardens, Richview Gardens--
```

```
--
                venue  freq
0      Sandwich Place  0.33
1                Park  0.33
2   Mobile Phone Shop  0.33
3  Miscellaneous Shop  0.00
4               Motel  0.00
```

```
----Lawrence Manor, Lawrence Heights----
                  venue  freq
0        Clothing Store  0.33
1  Furniture / Home Store  0.17
2      Accessories Store  0.08
3           Coffee Shop  0.08
4              Boutique  0.08
```

```
----Lawrence Park----
                    venue  freq
0  Construction & Landscaping   0.2
1                 Bus Line   0.2
2         Business Service   0.2
3                     Park   0.2
4              Swim School   0.2
```

```
----Leaside----
                  venue  freq
0           Coffee Shop  0.09
1    Sporting Goods Shop  0.09
2                  Bank  0.06
3         Shopping Mall  0.06
4  Furniture / Home Store  0.06
```

```
----Little Portugal, Trinity----
             venue  freq
0              Bar  0.12
1      Coffee Shop  0.07
2             Café  0.05
3  Asian Restaurant  0.05
4       Men's Store  0.05
```

```
----Malvern, Rouge----
                venue  freq
0  Fast Food Restaurant   1.0
1     Accessories Store   0.0
2         Movie Theater   0.0
3         Massage Studio   0.0
4         Medical Center   0.0
```

```
----Milliken, Agincourt North, Steeles East, L'Amoreaux East----
                venue  freq
0           Playground  0.33
```

```
1                      Park  0.33
2              Intersection  0.33
3                 Pet Store  0.00
4     Performing Arts Venue  0.00
```

```
----Mimico NW, The Queensway West, South of Bloor, Kingsway Park South West,
Royal York South West----
                 venue  freq
0        Hardware Store  0.07
1                Bakery  0.07
2        Discount Store  0.07
3        Sandwich Place  0.07
4    Fast Food Restaurant  0.07
```

```
----Moore Park, Summerhill East----
                 venue  freq
0            Playground  0.33
1                  Park  0.33
2            Restaurant  0.33
3     Miscellaneous Shop  0.00
4     Moroccan Restaurant  0.00
```

```
----New Toronto, Mimico South, Humber Bay Shores----
         venue  freq
0          Café  0.12
1    Hobby Shop  0.06
2        Bakery  0.06
3      Pharmacy  0.06
4   Coffee Shop  0.06
```

```
----North Park, Maple Leaf Park, Upwood Park----
                     venue  freq
0  Construction & Landscaping   0.2
1                      Park   0.2
2          Basketball Court   0.2
3                     Trail   0.2
4                    Bakery   0.2
```

```
----North Toronto West,  Lawrence Park----
           venue  freq
0  Clothing Store  0.17
1     Coffee Shop  0.11
2     Yoga Studio  0.06
3           Diner  0.06
4             Spa  0.06
```

```
----Northwest, West Humber - Clairville----
               venue  freq
0                 Bar  0.25
1           Drugstore  0.25
2  Rental Car Location  0.25
```

```
3         Truck Stop  0.25
4             Motel  0.00
```

```
----Northwood Park, York University----
                   venue  freq
0    Caribbean Restaurant  0.17
1      Miscellaneous Shop  0.17
2                     Bar  0.17
3  Furniture / Home Store  0.17
4             Coffee Shop  0.17
```

```
----Old Mill South, King's Mill Park, Sunnylea, Humber Bay, Mimico NE, The Qu
eensway East, Royal York South East, Kingsway Park South East----
                   venue  freq
0        Breakfast Spot   0.5
1        Baseball Field   0.5
2     Mobile Phone Shop   0.0
3                Motel   0.0
4  Moroccan Restaurant   0.0
```

```
----Parkdale, Roncesvalles----
           venue  freq
0  Breakfast Spot  0.14
1      Gift Shop  0.14
2        Dog Run  0.07
3   Dessert Shop  0.07
4            Bar  0.07
```

```
----Parkview Hill, Woodbine Gardens----
              venue  freq
0       Pizza Place  0.18
1  Athletics & Sports  0.09
2    Breakfast Spot  0.09
3       Flea Market  0.09
4         Gastropub  0.09
```

```
----Parkwoods----
                 venue  freq
0                 Park   0.5
1     Food & Drink Shop   0.5
2    Accessories Store   0.0
3   Miscellaneous Shop   0.0
4  Moroccan Restaurant   0.0
```

```
----Queen's Park, Ontario Provincial Government----
            venue  freq
0       Coffee Shop  0.20
1  Sushi Restaurant  0.06
2      Yoga Studio  0.03
3   Sandwich Place  0.03
4             Bar  0.03
```

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


----Richmond, Adelaide, King----
            venue   freq
0     Coffee Shop   0.08
1            Café   0.05
2      Restaurant   0.04
3   Deli / Bodega   0.03
4  Clothing Store   0.03


----Rosedale----
                 venue   freq
0                 Park   0.50
1           Playground   0.25
2                Trail   0.25
3   Miscellaneous Shop   0.00
4  Moroccan Restaurant   0.00


----Roselawn----
               venue   freq
0             Garden    1.0
1  Accessories Store    0.0
2      Movie Theater    0.0
3     Massage Studio    0.0
4     Medical Center    0.0


----Rouge Hill, Port Union, Highland Creek----
                        venue   freq
0  Construction & Landscaping    0.5
1                         Bar    0.5
2           Accessories Store    0.0
3          Miscellaneous Shop    0.0
4         Moroccan Restaurant    0.0


----Runnymede, Swansea----
             venue   freq
0             Café   0.08
1      Pizza Place   0.08
2      Coffee Shop   0.08
3  Sushi Restaurant   0.06
4              Pub   0.06


----Runnymede, The Junction North----
```

```
                   venue  freq
0             Bus Line  0.25
1              Brewery  0.25
2        Grocery Store  0.25
3  Caribbean Restaurant  0.25
4  Modern European Restaurant  0.00
```

```
----Scarborough Village----
                 venue  freq
0          Playground   0.5
1         Pizza Place   0.5
2   Health Food Store   0.0
3        Historic Site   0.0
4       Massage Studio   0.0
```

```
----South Steeles, Silverstone, Humbergate, Jamestown, Mount Olive, Beaumond
Heights, Thistletown, Albion Gardens----
                 venue  freq
0        Grocery Store  0.25
1             Pharmacy  0.12
2  Fried Chicken Joint  0.12
3       Sandwich Place  0.12
4          Beer Store  0.12
```

```
----St. James Town----
                 venue  freq
0          Coffee Shop  0.06
1                 Café  0.05
2         Cocktail Bar  0.04
3  American Restaurant  0.04
4            Gastropub  0.04
```

```
----St. James Town, Cabbagetown----
                 venue  freq
0                 Café  0.07
1          Pizza Place  0.07
2          Coffee Shop  0.07
3               Bakery  0.04
4   Chinese Restaurant  0.04
```

```
----Steeles West, L'Amoreaux West----
                 venue  freq
0  Fast Food Restaurant  0.18
1          Pizza Place  0.09
2          Coffee Shop  0.09
3       Sandwich Place  0.09
4                 Bank  0.09
```

```
----Stn A PO Boxes----
                 venue   freq
0          Coffee Shop  0.11
```

```
1    Seafood Restaurant  0.04
2           Restaurant  0.03
3             Beer Bar  0.03
4                Hotel  0.03
```

```
----Studio District----
                 venue  freq
0          Coffee Shop  0.08
1              Brewery  0.05
2                 Café  0.05
3  American Restaurant  0.05
4            Gastropub  0.05
```

```
----Summerhill West, Rathnelly, South Hill, Forest Hill SE, Deer Park----
                 venue  freq
0          Coffee Shop  0.14
1         Liquor Store  0.07
2           Bagel Shop  0.07
3          Supermarket  0.07
4  Fried Chicken Joint  0.07
```

```
----The Annex, North Midtown, Yorkville----
            venue  freq
0  Sandwich Place  0.14
1            Café  0.14
2     Coffee Shop  0.10
3  History Museum  0.05
4       BBQ Joint  0.05
```

```
----The Beaches----
               venue  freq
0  Health Food Store  0.25
1       Neighborhood  0.25
2                Pub  0.25
3              Trail  0.25
4  Accessories Store  0.00
```

```
----The Danforth West, Riverdale----
                  venue  freq
0       Greek Restaurant  0.19
1            Coffee Shop  0.10
2      Italian Restaurant  0.07
3         Ice Cream Shop  0.05
4  Furniture / Home Store  0.05
```

```
----The Kingsway, Montgomery Road, Old Mill North----
                 venue  freq
0                River   0.5
1           Smoke Shop   0.5
2    Accessories Store   0.0
3  Miscellaneous Shop   0.0
```

```
4  Moroccan Restaurant    0.0
```

```
   ----Thorncliffe Park----
                   venue  freq
0  Indian Restaurant  0.11
1        Yoga Studio  0.06
2               Park  0.06
3        Coffee Shop  0.06
4         Restaurant  0.06
```

```
   ----Toronto Dominion Centre, Design Exchange----
                   venue  freq
0          Coffee Shop  0.10
1                Hotel  0.08
2                 Café  0.06
3  American Restaurant  0.03
4   Seafood Restaurant  0.03
```

```
   ----University of Toronto, Harbord----
                   venue  freq
0                 Café  0.16
1             Bookstore  0.09
2                   Bar  0.06
3  Japanese Restaurant  0.06
4               Bakery  0.06
```

```
   ----Victoria Village----
                       venue  freq
0            Pizza Place   0.2
1  Portuguese Restaurant   0.2
2          Hockey Arena   0.2
3          Intersection   0.2
4           Coffee Shop   0.2
```

```
   ----Westmount----
                   venue  freq
0          Pizza Place  0.14
1          Coffee Shop  0.14
2       Sandwich Place  0.14
3   Chinese Restaurant  0.14
4         Intersection  0.14
```

```
   ----Weston----
                   venue  freq
0     Convenience Store   1.0
1     Accessories Store   0.0
2   Miscellaneous Shop   0.0
3                Motel   0.0
4  Moroccan Restaurant   0.0
```

```
----Wexford, Maryvale----
                         venue  freq
0  Middle Eastern Restaurant   0.33
1             Shopping Mall   0.17
2            Sandwich Place   0.17
3              Auto Garage   0.17
4                   Bakery   0.17



----Willowdale, Willowdale East----
              venue  freq
0  Ramen Restaurant   0.09
1       Coffee Shop   0.06
2  Sushi Restaurant   0.06
3     Shopping Mall   0.06
4       Pizza Place   0.06



----Willowdale, Willowdale West----
                venue  freq
0         Pizza Place   0.25
1            Pharmacy   0.25
2       Grocery Store   0.25
3         Coffee Shop   0.25
4  Miscellaneous Shop   0.00



----Woburn----
                    venue  freq
0            Coffee Shop   0.50
1            Soccer Field   0.25
2  Korean BBQ Restaurant   0.25
3       Accessories Store   0.00
4       Mobile Phone Shop   0.00



----Woodbine Heights----
          venue  freq
0   Beer Store   0.14
1     Bus Stop   0.14
2         Park   0.14
3  Intersection   0.14
4   Curling Ice   0.14



----York Mills West----
                 venue  freq
0    Convenience Store    0.5
1                 Park    0.5
2    Accessories Store    0.0
3   Miscellaneous Shop    0.0
4  Moroccan Restaurant    0.0
```

In [354]:

```python
#Put into a Pandas Dataframe
#First use function to classify venues in descending order
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]
```

In [355]:

```python
#Now let´s create a dataframe and display the top 10 venues for each neighbourhood
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(toronto_grouped.
iloc[ind, :], num_top_venues)

neighborhoods_venues_sorted.head()
```

Out[355]:

	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	7th Most Common Venue
0	Agincourt	Lounge	Latin American Restaurant	Skating Rink	Clothing Store	Breakfast Spot	Event Space	Ethiopian Restaurant
1	Alderwood, Long Branch	Pizza Place	Skating Rink	Coffee Shop	Pub	Sandwich Place	Gym	Airport Terminal
2	Bathurst Manor, Wilson Heights, Downsview North	Bank	Coffee Shop	Ice Cream Shop	Fried Chicken Joint	Sandwich Place	Diner	Restaurant
3	Bayview Village	Café	Bank	Japanese Restaurant	Chinese Restaurant	Discount Store	Distribution Center	Dog Run
4	Bedford Park, Lawrence Manor East	Coffee Shop	Sandwich Place	Hobby Shop	Italian Restaurant	Liquor Store	Sushi Restaurant	Juice Bar

In [357]:

```python
## Cluster Neighbourhoods
# Run k-means to cluster the neighbourhoods into 10 clusters
# set number of clusters
kclusters = 10

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

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

# check cluster labels generated for each row in the dataframe
kmeans.labels_
```

Out[357]:

```
array([1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 4, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 6, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 5, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 3, 6, 1, 6, 1, 1, 1, 1, 1, 5, 1, 1, 4, 1, 1, 1, 6,
       9, 7, 1, 1, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 8,
       1, 1, 1, 0, 1, 4], dtype=int32)
```

In [358]:

```
#Let´s create a new dataframe that includes the cluster as well as the top 10 venues for each neighbourhood
# add clustering labels
neighborhoods_venues_sorted.insert(0, 'Cluster Labels', kmeans.labels_)

toronto_merged = mynewdf

# merge toronto_grouped with mynewdf to add latitude/longitude for each neighborhood
toronto_merged = toronto_merged.join(neighborhoods_venues_sorted.set_index('Neighbourhood'), on='Neighbourhood')

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

Out[358]:

	Postal Code	Borough	Neighbourhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Co
0	M3A	North York	Parkwoods	43.753259	-79.329656	4.0	Food & Drink Shop	Park	Du Res
1	M4A	North York	Victoria Village	43.725882	-79.315572	1.0	Pizza Place	Coffee Shop	Inters
2	M5A	Downtown Toronto	Regent Park, Harbourfront	43.654260	-79.360636	1.0	Coffee Shop	Pub	
3	M6A	North York	Lawrence Manor, Lawrence Heights	43.718518	-79.464763	1.0	Clothing Store	Furniture / Home Store	Acces
4	M7A	Downtown Toronto	Queen's Park, Ontario Provincial Government	43.662301	-79.389494	1.0	Coffee Shop	Sushi Restaurant	

In [359]:

```python
#Ignore cells with NaN
toronto_merged = toronto_merged.dropna()

# reset index after deleting rows
toronto_merged = toronto_merged.reset_index(drop=True)
toronto_merged
```

Out[359]:

	Postal Code	Borough	Neighbourhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd M Comm Ver
0	M3A	North York	Parkwoods	43.753259	-79.329656	4.0	Food & Drink Shop	P
1	M4A	North York	Victoria Village	43.725882	-79.315572	1.0	Pizza Place	Coffee Sl
2	M5A	Downtown Toronto	Regent Park, Harbourfront	43.654260	-79.360636	1.0	Coffee Shop	F
3	M6A	North York	Lawrence Manor, Lawrence Heights	43.718518	-79.464763	1.0	Clothing Store	Furnitu Home St
4	M7A	Downtown Toronto	Queen's Park, Ontario Provincial Government	43.662301	-79.389494	1.0	Coffee Shop	Su Restaur
5	M1B	Scarborough	Malvern, Rouge	43.806686	-79.194353	3.0	Fast Food Restaurant	Di
6	M3B	North York	Don Mills	43.745906	-79.352188	1.0	Gym	Japan Restau
7	M4B	East York	Parkview Hill, Woodbine Gardens	43.706397	-79.309937	1.0	Pizza Place	Gastro
8	M5B	Downtown Toronto	Garden District, Ryerson	43.657162	-79.378937	1.0	Coffee Shop	Clothing St
9	M6B	North York	Glencairn	43.709577	-79.445073	1.0	Pub	P
10	M1C	Scarborough	Rouge Hill, Port Union, Highland Creek	43.784535	-79.160497	7.0	Bar	Construct Landscap
11	M3C	North York	Don Mills	43.725900	-79.340923	1.0	Gym	Japan Restau
12	M4C	East York	Woodbine Heights	43.695344	-79.318389	1.0	Intersection	P
13	M5C	Downtown Toronto	St. James Town	43.651494	-79.375418	1.0	Coffee Shop	C
14	M6C	York	Humewood-Cedarvale	43.693781	-79.428191	1.0	Field	T
15	M9C	Etobicoke	Eringate, Bloordale Gardens, Old Burnhamthorpe...	43.643515	-79.577201	1.0	Park	Pharm
16	M1E	Scarborough	Guildwood, Morningside, West Hill	43.763573	-79.188711	1.0	Breakfast Spot	Med Cer

	Postal Code	Borough	Neighbourhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd M... Comm... Ve...
17	M4E	East Toronto	The Beaches	43.676357	-79.293031	1.0	Pub	Health F... St...
18	M5E	Downtown Toronto	Berczy Park	43.644771	-79.373306	1.0	Coffee Shop	Cocktail
19	M6E	York	Caledonia-Fairbanks	43.689026	-79.453512	4.0	Park	Wome... St...
20	M1G	Scarborough	Woburn	43.770992	-79.216917	0.0	Coffee Shop	Soccer F...
21	M4G	East York	Leaside	43.709060	-79.363452	1.0	Coffee Shop	Spor... Goods Sl...
22	M5G	Downtown Toronto	Central Bay Street	43.657952	-79.387383	1.0	Coffee Shop	C...
23	M6G	Downtown Toronto	Christie	43.669542	-79.422564	1.0	Grocery Store	C...
24	M1H	Scarborough	Cedarbrae	43.773136	-79.239476	1.0	Caribbean Restaurant	B...
25	M2H	North York	Hillcrest Village	43.803762	-79.363452	1.0	Fast Food Restaurant	Dog F...
26	M3H	North York	Bathurst Manor, Wilson Heights, Downsview North	43.754328	-79.442259	1.0	Bank	Coffee Sl...
27	M4H	East York	Thorncliffe Park	43.705369	-79.349372	1.0	Indian Restaurant	Yoga Stu...
28	M5H	Downtown Toronto	Richmond, Adelaide, King	43.650571	-79.384568	1.0	Coffee Shop	C...
29	M6H	West Toronto	Dufferin, Dovercourt Village	43.669005	-79.442259	1.0	Pharmacy	Bak...
30	M1J	Scarborough	Scarborough Village	43.744734	-79.239476	2.0	Pizza Place	Playgrou...
31	M2J	North York	Fairview, Henry Farm, Oriole	43.778517	-79.346556	1.0	Clothing Store	Coffee Sl...
32	M3J	North York	Northwood Park, York University	43.767980	-79.487262	1.0	Furniture / Home Store	Miscellane... Sl...
33	M4J	East York	East Toronto, Broadview North (Old East York)	43.685347	-79.338106	6.0	Pizza Place	P...
34	M5J	Downtown Toronto	Harbourfront East, Union Station, Toronto Islands	43.640816	-79.381752	1.0	Coffee Shop	Aquar...

	Postal Code	Borough	Neighbourhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd M Comm Ver
35	M6J	West Toronto	Little Portugal, Trinity	43.647927	-79.419750	1.0	Bar	Coffee Sl
36	M1K	Scarborough	Kennedy Park, Ionview, East Birchmount Park	43.727929	-79.262029	1.0	Convenience Store	Departm St
37	M2K	North York	Bayview Village	43.786947	-79.385975	1.0	Café	Bɛ
38	M3K	North York	Downsview	43.737473	-79.464763	1.0	Grocery Store	P
39	M4K	East Toronto	The Danforth West, Riverdale	43.679557	-79.352188	1.0	Greek Restaurant	Coffee Sl
40	M5K	Downtown Toronto	Toronto Dominion Centre, Design Exchange	43.647177	-79.381576	1.0	Coffee Shop	Hί
41	M6K	West Toronto	Brockton, Parkdale Village, Exhibition Place	43.636847	-79.428191	1.0	Café	Bak
42	M1L	Scarborough	Golden Mile, Clairlea, Oakridge	43.711112	-79.284577	1.0	Bus Line	Bak
43	M3L	North York	Downsview	43.739015	-79.506944	1.0	Grocery Store	P
44	M4L	East Toronto	India Bazaar, The Beaches West	43.668999	-79.315572	1.0	Fast Food Restaurant	Pet St
45	M5L	Downtown Toronto	Commerce Court, Victoria Hotel	43.648198	-79.379817	1.0	Coffee Shop	Restaur
46	M6L	North York	North Park, Maple Leaf Park, Upwood Park	43.713756	-79.490074	1.0	Bakery	T
47	M9L	North York	Humber Summit	43.756303	-79.565963	1.0	Pizza Place	Restaur
48	M1M	Scarborough	Cliffside, Cliffcrest, Scarborough Village West	43.716316	-79.239476	1.0	Motel	Skating F
49	M3M	North York	Downsview	43.728496	-79.495697	1.0	Grocery Store	P
50	M4M	East Toronto	Studio District	43.659526	-79.340923	1.0	Coffee Shop	Brew
51	M5M	North York	Bedford Park, Lawrence Manor East	43.733283	-79.419750	1.0	Coffee Shop	Sandw Pl
52	M6M	York	Del Ray, Mount Dennis, Keelsdale and Silverthorn	43.691116	-79.476013	1.0	Discount Store	

	Postal Code	Borough	Neighbourhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd M Comm Ver
53	M9M	North York	Humberlea, Emery	43.724766	-79.532242	5.0	Baseball Field	Yoga Stu
54	M1N	Scarborough	Birch Cliff, Cliffside West	43.692657	-79.264848	1.0	College Stadium	Skating F
55	M2N	North York	Willowdale, Willowdale East	43.770120	-79.408493	1.0	Ramen Restaurant	Restaur
56	M3N	North York	Downsview	43.761631	-79.520999	1.0	Grocery Store	P
57	M4N	Central Toronto	Lawrence Park	43.728020	-79.388790	1.0	Park	Busin Serv
58	M5N	Central Toronto	Roselawn	43.711695	-79.416936	9.0	Garden	Yoga Stu
59	M6N	York	Runnymede, The Junction North	43.673185	-79.487262	1.0	Bus Line	Caribbe Restaur
60	M9N	York	Weston	43.706876	-79.518188	8.0	Convenience Store	Yoga Stu
61	M1P	Scarborough	Dorset Park, Wexford Heights, Scarborough Town...	43.757410	-79.273304	1.0	Indian Restaurant	Vietnam Restaur
62	M2P	North York	York Mills West	43.752758	-79.400049	4.0	Park	Convenie St
63	M4P	Central Toronto	Davisville North	43.712751	-79.390197	1.0	Pizza Place	H
64	M5P	Central Toronto	Forest Hill North & West, Forest Hill Road Park	43.696948	-79.411307	1.0	Jewelry Store	Su Restaur
65	M6P	West Toronto	High Park, The Junction South	43.661608	-79.464763	1.0	Café	Mexi Restaur
66	M9P	Etobicoke	Westmount	43.696319	-79.532242	1.0	Pizza Place	Mid East Restaur
67	M1R	Scarborough	Wexford, Maryvale	43.750072	-79.295849	1.0	Middle Eastern Restaurant	Bak
68	M2R	North York	Willowdale, Willowdale West	43.782736	-79.442259	1.0	Pizza Place	Grocery St
69	M4R	Central Toronto	North Toronto West, Lawrence Park	43.715383	-79.405678	1.0	Clothing Store	Coffee Sl
70	M5R	Central Toronto	The Annex, North Midtown, Yorkville	43.672710	-79.405678	1.0	Café	Sandw Pl

	Postal Code	Borough	Neighbourhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd M Comm Ven
71	M6R	West Toronto	Parkdale, Roncesvalles	43.648960	-79.456325	1.0	Breakfast Spot	Gift Sł
72	M7R	Mississauga	Canada Post Gateway Processing Centre	43.636966	-79.615819	1.0	Coffee Shop	H
73	M9R	Etobicoke	Kingsview Village, St. Phillips, Martin Grove ...	43.688905	-79.554724	1.0	Sandwich Place	P
74	M1S	Scarborough	Agincourt	43.794200	-79.262029	1.0	Lounge	Lï Ameri Restaur
75	M4S	Central Toronto	Davisville	43.704324	-79.388790	1.0	Pizza Place	Sandw Pł
76	M5S	Downtown Toronto	University of Toronto, Harbord	43.662696	-79.400049	1.0	Café	Bookst
77	M6S	West Toronto	Runnymede, Swansea	43.651571	-79.484450	1.0	Pizza Place	C
78	M1T	Scarborough	Clarks Corners, Tam O'Shanter, Sullivan	43.781638	-79.304302	1.0	Pharmacy	Pizza Pł
79	M4T	Central Toronto	Moore Park, Summerhill East	43.689574	-79.383160	6.0	Playground	P
80	M5T	Downtown Toronto	Kensington Market, Chinatown, Grange Park	43.653206	-79.400049	1.0	Café	Coffee Sł
81	M1V	Scarborough	Milliken, Agincourt North, Steeles East, L'Amo...	43.815252	-79.284577	6.0	Playground	P
82	M4V	Central Toronto	Summerhill West, Rathnelly, South Hill, Forest...	43.686412	-79.400049	1.0	Coffee Shop	Su Restaur
83	M5V	Downtown Toronto	CN Tower, King and Spadina, Railway Lands, Har...	43.628947	-79.394420	1.0	Airport Service	Airp Term
84	M8V	Etobicoke	New Toronto, Mimico South, Humber Bay Shores	43.605647	-79.501321	1.0	Café	Pharm
85	M9V	Etobicoke	South Steeles, Silverstone, Humbergate, Jamest...	43.739416	-79.588437	1.0	Grocery Store	Pizza Pł
86	M1W	Scarborough	Steeles West, L'Amoreaux West	43.799525	-79.318389	1.0	Fast Food Restaurant	Pizza Pł

	Postal Code	Borough	Neighbourhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd M Comm Ver
87	M4W	Downtown Toronto	Rosedale	43.679563	-79.377529	6.0	Park	Playgrou
88	M5W	Downtown Toronto	Stn A PO Boxes	43.646435	-79.374846	1.0	Coffee Shop	Seafc Restaur
89	M8W	Etobicoke	Alderwood, Long Branch	43.602414	-79.543484	1.0	Pizza Place	Skating F
90	M9W	Etobicoke	Northwest, West Humber - Clairville	43.706748	-79.594054	1.0	Truck Stop	
91	M4X	Downtown Toronto	St. James Town, Cabbagetown	43.667967	-79.367675	1.0	Coffee Shop	C
92	M5X	Downtown Toronto	First Canadian Place, Underground city	43.648429	-79.382280	1.0	Coffee Shop	C
93	M8X	Etobicoke	The Kingsway, Montgomery Road, Old Mill North	43.653654	-79.506944	1.0	River	Smoke Sl
94	M4Y	Downtown Toronto	Church and Wellesley	43.665860	-79.383160	1.0	Coffee Shop	Japan Restaur
95	M7Y	East Toronto	Business reply mail Processing Centre, South C...	43.662744	-79.321558	1.0	Light Rail Station	Yoga Stu
96	M8Y	Etobicoke	Old Mill South, King's Mill Park, Sunnylea, Hu...	43.636258	-79.498509	5.0	Breakfast Spot	Baseball F
97	M8Z	Etobicoke	Mimico NW, The Queensway West, South of Bloor,...	43.628841	-79.520999	1.0	Grocery Store	Burger Jc
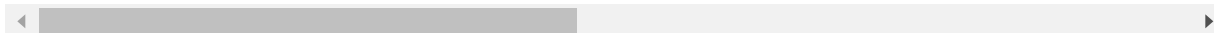
In [360]:

```python
#Let´s visualize the resulting clusters
# 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=True)

    folium.CircleMarker(
        [lat, lon],
        radius=5,
        popup=label,
        color=rainbow[int(cluster)],
        fill=True,
        fill_color=rainbow[int(cluster)],
        fill_opacity=0.7).add_to(map_clusters)

map_clusters
```

Out[360]:

Make this Notebook Trusted to load map: File -> Trust Notebook

In [361]:

```
#Examine Clusters
#The discriminating venue categories that distinguish each cluster can be determined.
#Depending on the defining categories, a specific name could be assigned to each cluster
```

In [362]:

```
#Cluster 1
toronto_merged.loc[toronto_merged['Cluster Labels'] == 0, toronto_merged.columns[[1] + lis
t(range(5, toronto_merged.shape[1]))]]
```

Out[362]:

	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 M Comn Ver
20	Scarborough	0.0	Coffee Shop	Soccer Field	Korean BBQ Restaurant	Event Space	Ethiopian Restaurant	Escape Room	Fal Restau

In [363]:

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

Out[363]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	
1	North York	1.0	Pizza Place	Coffee Shop	Intersection	Portuguese Restaurant	Hockey Arena	
2	Downtown Toronto	1.0	Coffee Shop	Pub	Bakery	Park	Café	
3	North York	1.0	Clothing Store	Furniture / Home Store	Accessories Store	Arts & Crafts Store	Vietnamese Restaurant	
4	Downtown Toronto	1.0	Coffee Shop	Sushi Restaurant	Café	Italian Restaurant	Beer Bar	
6	North York	1.0	Gym	Japanese Restaurant	Restaurant	Beer Store	Coffee Shop	S
7	East York	1.0	Pizza Place	Gastropub	Pharmacy	Gym / Fitness Center	Breakfast Spot	
8	Downtown Toronto	1.0	Coffee Shop	Clothing Store	Cosmetics Shop	Café	Japanese Restaurant	
9	North York	1.0	Pub	Park	Japanese Restaurant	Asian Restaurant	Bakery	
11	North York	1.0	Gym	Japanese Restaurant	Restaurant	Beer Store	Coffee Shop	S
12	East York	1.0	Intersection	Park	Skating Rink	Bus Stop	Beer Store	
13	Downtown Toronto	1.0	Coffee Shop	Café	Cocktail Bar	Gastropub	American Restaurant	
14	York	1.0	Field	Trail	Hockey Arena	Dumpling Restaurant	Distribution Center	
15	Etobicoke	1.0	Park	Pharmacy	Convenience Store	Shopping Plaza	Beer Store	
16	Scarborough	1.0	Breakfast Spot	Medical Center	Restaurant	Rental Car Location	Intersection	
17	East Toronto	1.0	Pub	Health Food Store	Neighborhood	Trail	Yoga Studio	
18	Downtown Toronto	1.0	Coffee Shop	Cocktail Bar	Seafood Restaurant	Bakery	Cheese Shop	
21	East York	1.0	Coffee Shop	Sporting Goods Shop	Bank	Burger Joint	Furniture / Home Store	
22	Downtown Toronto	1.0	Coffee Shop	Café	Italian Restaurant	Sandwich Place	Bubble Tea Shop	
23	Downtown Toronto	1.0	Grocery Store	Café	Park	Candy Store	Italian Restaurant	

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
24	Scarborough	1.0	Caribbean Restaurant	Bank	Thai Restaurant	Gas Station	Athletics & Sports
25	North York	1.0	Fast Food Restaurant	Dog Run	Pool	Golf Course	Mediterranean Restaurant
26	North York	1.0	Bank	Coffee Shop	Ice Cream Shop	Fried Chicken Joint	Sandwich Place
27	East York	1.0	Indian Restaurant	Yoga Studio	Bank	Gym	Gas Station
28	Downtown Toronto	1.0	Coffee Shop	Café	Restaurant	Thai Restaurant	Clothing Store
29	West Toronto	1.0	Pharmacy	Bakery	Bank	Coffee Shop	Café
31	North York	1.0	Clothing Store	Coffee Shop	Fast Food Restaurant	Cosmetics Shop	Japanese Restaurant
32	North York	1.0	Furniture / Home Store	Miscellaneous Shop	Bar	Massage Studio	Caribbean Restaurant
34	Downtown Toronto	1.0	Coffee Shop	Aquarium	Café	Hotel	Restaurant
35	West Toronto	1.0	Bar	Coffee Shop	Café	Restaurant	Vietnamese Restaurant
36	Scarborough	1.0	Convenience Store	Department Store	Hobby Shop	Coffee Shop	Bus Station
37	North York	1.0	Café	Bank	Japanese Restaurant	Chinese Restaurant	Discount Store
38	North York	1.0	Grocery Store	Park	Home Service	Food Truck	Discount Store
39	East Toronto	1.0	Greek Restaurant	Coffee Shop	Italian Restaurant	Furniture / Home Store	Ice Cream Shop
40	Downtown Toronto	1.0	Coffee Shop	Hotel	Café	American Restaurant	Seafood Restaurant
41	West Toronto	1.0	Café	Bakery	Breakfast Spot	Coffee Shop	Yoga Studio
42	Scarborough	1.0	Bus Line	Bakery	Intersection	Ice Cream Shop	Bus Station
43	North York	1.0	Grocery Store	Park	Home Service	Food Truck	Discount Store
44	East Toronto	1.0	Fast Food Restaurant	Pet Store	Pub	Brewery	Burrito Place
45	Downtown Toronto	1.0	Coffee Shop	Restaurant	Café	Hotel	American Restaurant

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	
46	North York	1.0	Bakery	Trail	Park	Construction & Landscaping	Basketball Court	
47	North York	1.0	Pizza Place	Restaurant	Intersection	Donut Shop	Diner	
48	Scarborough	1.0	Motel	Skating Rink	American Restaurant	Drugstore	Discount Store	
49	North York	1.0	Grocery Store	Park	Home Service	Food Truck	Discount Store	
50	East Toronto	1.0	Coffee Shop	Brewery	Gastropub	Café	American Restaurant	
51	North York	1.0	Coffee Shop	Sandwich Place	Hobby Shop	Italian Restaurant	Liquor Store	
52	York	1.0	Discount Store	Bar	Sandwich Place	Coffee Shop	Turkish Restaurant	
54	Scarborough	1.0	College Stadium	Skating Rink	General Entertainment	Café	Electronics Store	
55	North York	1.0	Ramen Restaurant	Restaurant	Sushi Restaurant	Café	Pizza Place	(
56	North York	1.0	Grocery Store	Park	Home Service	Food Truck	Discount Store	
57	Central Toronto	1.0	Park	Business Service	Construction & Landscaping	Swim School	Bus Line	
59	York	1.0	Bus Line	Caribbean Restaurant	Brewery	Grocery Store	Yoga Studio	
61	Scarborough	1.0	Indian Restaurant	Vietnamese Restaurant	Thrift / Vintage Store	Chinese Restaurant	Light Rail Station	
63	Central Toronto	1.0	Pizza Place	Hotel	Food & Drink Shop	Sandwich Place	Department Store	
64	Central Toronto	1.0	Jewelry Store	Sushi Restaurant	Trail	Mexican Restaurant	Diner	
65	West Toronto	1.0	Café	Mexican Restaurant	Thai Restaurant	Speakeasy	Bakery	
66	Etobicoke	1.0	Pizza Place	Middle Eastern Restaurant	Discount Store	Sandwich Place	Chinese Restaurant	(
67	Scarborough	1.0	Middle Eastern Restaurant	Bakery	Auto Garage	Sandwich Place	Shopping Mall	
68	North York	1.0	Pizza Place	Grocery Store	Coffee Shop	Pharmacy	Comic Shop	(

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	
69	Central Toronto	1.0	Clothing Store	Coffee Shop	Yoga Studio	Diner	Restaurant	
70	Central Toronto	1.0	Café	Sandwich Place	Coffee Shop	Pet Store	BBQ Joint	
71	West Toronto	1.0	Breakfast Spot	Gift Shop	Movie Theater	Eastern European Restaurant	Dog Run	
72	Mississauga	1.0	Coffee Shop	Hotel	Gym	American Restaurant	Fried Chicken Joint	
73	Etobicoke	1.0	Sandwich Place	Park	Mobile Phone Shop	Yoga Studio	Donut Shop	
74	Scarborough	1.0	Lounge	Latin American Restaurant	Skating Rink	Clothing Store	Breakfast Spot	E
75	Central Toronto	1.0	Pizza Place	Sandwich Place	Dessert Shop	Thai Restaurant	Gym	C
76	Downtown Toronto	1.0	Café	Bookstore	Bakery	Bar	Japanese Restaurant	
77	West Toronto	1.0	Pizza Place	Café	Coffee Shop	Italian Restaurant	Pub	
78	Scarborough	1.0	Pharmacy	Pizza Place	Shopping Mall	Fried Chicken Joint	Italian Restaurant	
80	Downtown Toronto	1.0	Café	Coffee Shop	Vegetarian / Vegan Restaurant	Vietnamese Restaurant	Mexican Restaurant	
82	Central Toronto	1.0	Coffee Shop	Sushi Restaurant	Pub	Liquor Store	Supermarket	
83	Downtown Toronto	1.0	Airport Service	Airport Terminal	Harbor / Marina	Sculpture Garden	Boat or Ferry	
84	Etobicoke	1.0	Café	Pharmacy	Bakery	Hobby Shop	Fried Chicken Joint	
85	Etobicoke	1.0	Grocery Store	Pizza Place	Beer Store	Sandwich Place	Fried Chicken Joint	
86	Scarborough	1.0	Fast Food Restaurant	Pizza Place	Coffee Shop	Sandwich Place	Discount Store	
88	Downtown Toronto	1.0	Coffee Shop	Seafood Restaurant	Restaurant	Beer Bar	Japanese Restaurant	
89	Etobicoke	1.0	Pizza Place	Skating Rink	Coffee Shop	Pub	Sandwich Place	
90	Etobicoke	1.0	Truck Stop	Bar	Rental Car Location	Drugstore	Diner	
91	Downtown Toronto	1.0	Coffee Shop	Café	Pizza Place	Convenience Store	Restaurant	

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
92	Downtown Toronto	1.0	Coffee Shop	Café	Hotel	Gym	Japanese Restaurant
93	Etobicoke	1.0	River	Smoke Shop	Yoga Studio	Drugstore	Discount Store
94	Downtown Toronto	1.0	Coffee Shop	Japanese Restaurant	Sushi Restaurant	Gay Bar	Restaurant
95	East Toronto	1.0	Light Rail Station	Yoga Studio	Brewery	Garden Center	Garden
97	Etobicoke	1.0	Grocery Store	Burger Joint	Bakery	Supplement Shop	Tanning Salon

In [364]:

```
#Cluster 3
toronto_merged.loc[toronto_merged['Cluster Labels'] == 2, toronto_merged.columns[[1] + lis
t(range(5, toronto_merged.shape[1]))]]
```

Out[364]:

	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 M Comm Ver
30	Scarborough	2.0	Pizza Place	Playground	Drugstore	Diner	Discount Store	Distribution Center	Dog F

In [365]:

```
#Cluster 4
toronto_merged.loc[toronto_merged['Cluster Labels'] == 3, toronto_merged.columns[[1] + lis
t(range(5, toronto_merged.shape[1]))]]
```

Out[365]:

	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 Mo Comm Venu
5	Scarborough	3.0	Fast Food Restaurant	Diner	Farmers Market	Falafel Restaurant	Event Space	Ethiopian Restaurant	Esca Roo

In [366]:

```
#Cluster 5
toronto_merged.loc[toronto_merged['Cluster Labels'] == 4, toronto_merged.columns[[1] + lis
t(range(5, toronto_merged.shape[1]))]]
```

Out[366]:

	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 Co
0	North York	4.0	Food & Drink Shop	Park	Dumpling Restaurant	Discount Store	Distribution Center	Dog Run	Res
19	York	4.0	Park	Women's Store	Pool	Drugstore	Discount Store	Distribution Center	D
62	North York	4.0	Park	Convenience Store	Yoga Studio	Dumpling Restaurant	Distribution Center	Dog Run	Res

In [367]:

```
#Cluster 6
toronto_merged.loc[toronto_merged['Cluster Labels'] == 5, toronto_merged.columns[[1] + lis
t(range(5, toronto_merged.shape[1]))]]
```

Out[367]:

	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 Mos Commoi Venu
53	North York	5.0	Baseball Field	Yoga Studio	Dumpling Restaurant	Distribution Center	Dog Run	Doner Restaurant	Donu Sho
96	Etobicoke	5.0	Breakfast Spot	Baseball Field	Yoga Studio	Eastern European Restaurant	Dog Run	Doner Restaurant	Donu Sho

In [368]:

```
#Cluster 7
toronto_merged.loc[toronto_merged['Cluster Labels'] == 6, toronto_merged.columns[[1] + lis
t(range(5, toronto_merged.shape[1]))]]
```

Out[368]:

	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	
33	East York	6.0	Pizza Place	Park	Convenience Store	Intersection	Donut Shop	Diner	
79	Central Toronto	6.0	Playground	Park	Restaurant	Yoga Studio	Donut Shop	Diner	
81	Scarborough	6.0	Playground	Park	Intersection	Yoga Studio	Donut Shop	Diner	
87	Downtown Toronto	6.0	Park	Playground	Trail	Yoga Studio	Donut Shop	Diner	

In [369]:

```
#Cluster 8
toronto_merged.loc[toronto_merged['Cluster Labels'] == 7, toronto_merged.columns[[1] + lis
t(range(5, toronto_merged.shape[1]))]]
```

Out[369]:

	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
10	Scarborough	7.0	Bar	Construction & Landscaping	Yoga Studio	Eastern European Restaurant	Dog Run	Doner Restaurant	

In [370]:

```python
#Cluster 9
toronto_merged.loc[toronto_merged['Cluster Labels'] == 8, toronto_merged.columns[[1] + lis
t(range(5, toronto_merged.shape[1]))]]
```

Out[370]:

	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 Most Common Venue
60	York	8.0	Convenience Store	Yoga Studio	Eastern European Restaurant	Distribution Center	Dog Run	Doner Restaurant	Do S

In [371]:

```python
#Cluster 10
toronto_merged.loc[toronto_merged['Cluster Labels'] == 9, toronto_merged.columns[[1] + lis
t(range(5, toronto_merged.shape[1]))]]
```

Out[371]:

	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 Most Common Venue
58	Central Toronto	9.0	Garden	Yoga Studio	Falafel Restaurant	Event Space	Ethiopian Restaurant	Escape Room	Electronics Store

In [ ]:

```python
#End
```