Introduction:

If you're like me, you love quality Asian food, more specifically Chinese dumplings. So, if you are traveling to a new city you are eager to find the best places to chow down. The problem that I will be solving for, is leveraging Chinese restaurant densities within neighborhoods of Toronto to determine where someone from out of town should go in order to fill their bellies on yummy food.

Data Solution Proposal:

I will use the FourSquare API to collect data about locations of Chinese restaurants in Toronto, ON neighborhoods. Given that Toronto is a burgeoning food city in the southern United States, I am confident that we will be able to glean the best areas within the city to fulfill one's craving for Chinese food.

In [1]:
```
!pip install folium
from sklearn.cluster import KMeans
import pandas as pd
import numpy as np
pd.set_option('display.max_columns', None)
pd.set_option('display.max_rows', None)
import requests
from bs4 import BeautifulSoup
#!pip install geocoder #uncomment if the module isn't installed
import os
#!pip install folium #uncomment if the module isn't installed
import folium # map rendering library
from geopy.geocoders import Nominatim # convert an address into latitude and longitude values
# Matplotlib and associated plotting modules
import matplotlib.pyplot as plt
import matplotlib.cm as cm
import matplotlib.colors as colors
%matplotlib inline


print('Libraries imported.')
```

```
Collecting folium
  Downloading folium-0.11.0-py2.py3-none-any.whl (93 kB)
     |████████████████████████████████| 93 kB 3.4 MB/s  eta 0:00:01
Requirement already satisfied: numpy in /opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from fol
ium) (1.18.5)
Requirement already satisfied: jinja2>=2.9 in /opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (fr
om folium) (2.11.2)
Requirement already satisfied: requests in /opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from
folium) (2.24.0)
Collecting branca>=0.3.0
  Downloading branca-0.4.1-py3-none-any.whl (24 kB)
Requirement already satisfied: MarkupSafe>=0.23 in /opt/conda/envs/Python-3.7-main/lib/python3.7/site-package
s (from jinja2>=2.9->folium) (1.1.1)
Requirement already satisfied: chardet<4,>=3.0.2 in /opt/conda/envs/Python-3.7-main/lib/python3.7/site-packag
es (from requests->folium) (3.0.4)
Requirement already satisfied: certifi>=2017.4.17 in /opt/conda/envs/Python-3.7-main/lib/python3.7/site-packa
ges (from requests->folium) (2020.6.20)
Requirement already satisfied: idna<3,>=2.5 in /opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (f
rom requests->folium) (2.9)
Requirement already satisfied: urllib3!=1.25.0,!=1.25.1,<1.26,>=1.21.1 in /opt/conda/envs/Python-3.7-main/li
b/python3.7/site-packages (from requests->folium) (1.25.9)
Installing collected packages: branca, folium
Successfully installed branca-0.4.1 folium-0.11.0
Libraries imported.
```

Cleaning Toronto Location Data

In [2]:
```
source = requests.get("https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M").text
soup = BeautifulSoup(source, 'lxml')

table = soup.find("table")
table_rows = table.tbody.find_all("tr")

res = []
for tr in table_rows:
    td = tr.find_all("td")
    row = [tr.text for tr in td]

    # Only process the cells that have an assigned borough. Ignore cells with a borough that is Not assigned.
    if row != [] and row[1] != "Not assigned\n":
        # If a cell has a borough but a "Not assigned" neighborhood, then the neighborhood will be the same a
s the borough.
        if "Not assigned" in row[2]:
            row[2] = row[1]
        res.append(row)

# Dataframe with 3 columns
df = pd.DataFrame(res, columns = ["PostalCode", "Borough", "Neighborhood"])

df["PostalCode"] = df["PostalCode"].str.replace("\n","")
df["Borough"] = df["Borough"].str.replace("\n","")
df["Neighborhood"] = df["Neighborhood"].str.replace("\n","")

df.head()
```

Out[2]:

	PostalCode	Borough	Neighborhood
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 [3]:
```
df_lat_lon = pd.read_csv('https://cocl.us/Geospatial_data')
df_lat_lon.head()
```

Out[3]:

	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 [4]:
```
df_toronto = pd.merge(df, df_lat_lon, how='left', left_on = 'PostalCode', right_on = 'Postal Code')
# remove the "Postal Code" column
df_toronto.drop("Postal Code", axis=1, inplace=True)
df_toronto.head()
```

Out[4]:

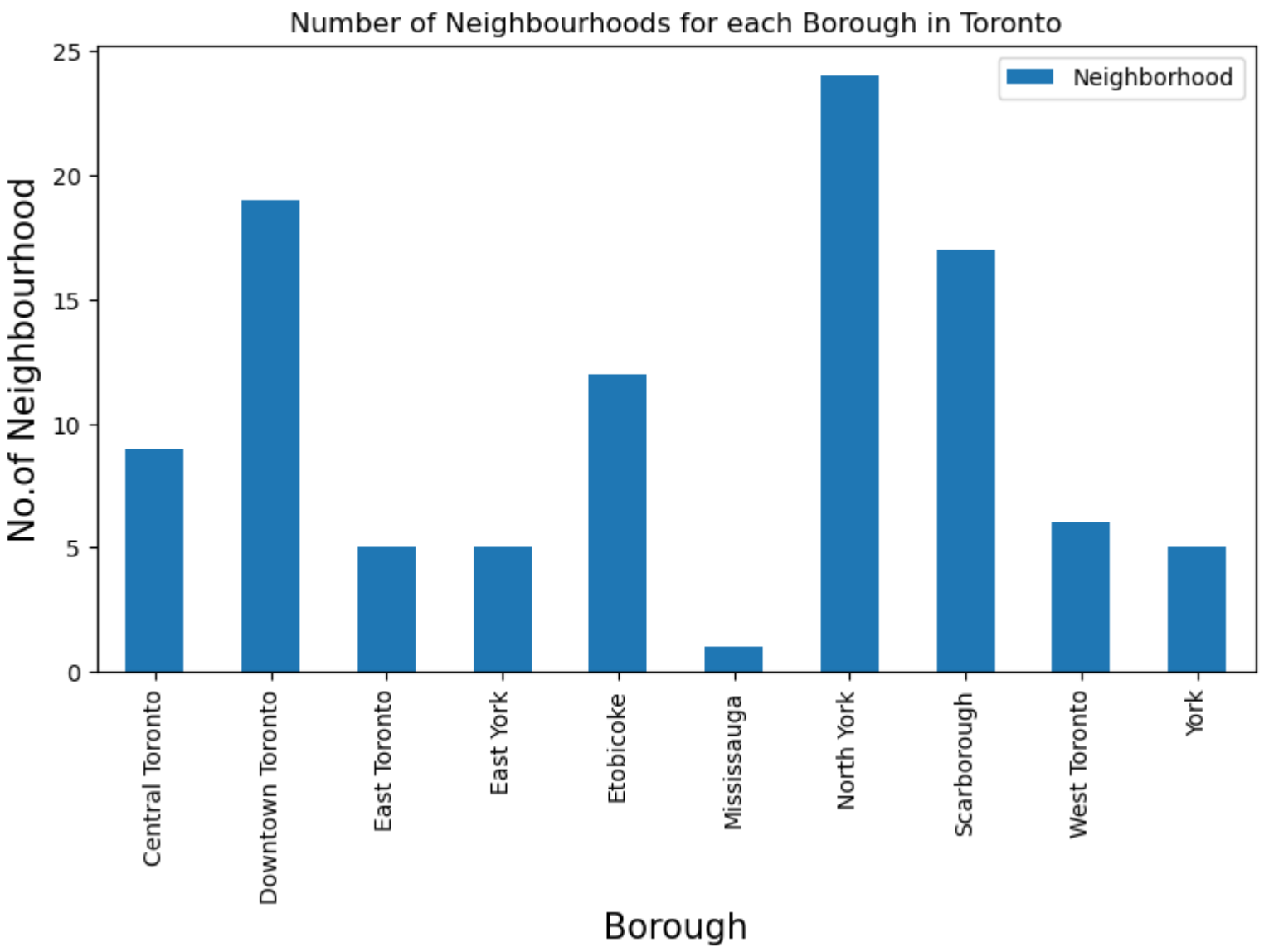
	PostalCode	Borough	Neighborhood	Latitude	Longitude
0	M3A	North York	Parkwoods	43.753259	-79.329656
1	M4A	North York	Victoria Village	43.725882	-79.315572
2	M5A	Downtown Toronto	Regent Park, Harbourfront	43.654260	-79.360636
3	M6A	North York	Lawrence Manor, Lawrence Heights	43.718518	-79.464763
4	M7A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

In [5]:
```
# How many  neighborhood are there in Toronto City?
print("Total number of Neighborhood is {}".format(df_toronto.shape[0]))
```

```
Total number of Neighborhood is 103
```

Count of Neighborhoods by Toronto Borough

In [6]:
```
plt.figure(figsize=(9,5), dpi = 100)
# title
plt.title('Number of Neighbourhoods for each Borough in Toronto')
#On x-axis
plt.xlabel('Borough', fontsize = 15)
#On y-axis
plt.ylabel('No.of Neighbourhood', fontsize=15)
#giving a bar plot
df_toronto.groupby('Borough')['Neighborhood'].count().plot(kind='bar')
#legend
plt.legend()
#displays the plot
plt.show()
```



In [7]:
```
print("Maximum number of Neighborhoods in a single borough is {}".format(max(df_toronto.groupby('Borough')['Neighborhood'].count())))
```

```
Maximum number of Neighborhoods in a single borough is 24
```

FourSquare API Setup

In [8]:
```
CLIENT_ID = 'xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx' # your Foursquare ID
CLIENT_SECRET = 'xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx' # your Foursquare Secret
VERSION = '20200518' # Foursquare API version

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

```
Your credentails:
CLIENT_ID: DC2Y3PMQFJNCKWYODIVEHWEW0PM42KYABAUWWQTLD4JPDKGT
```

Gathering FourSquare Chinese Restaurant Data in Toronto

In [9]:
```
def get_venues(lat,lng):

    #set variables
    radius=2000
    LIMIT=50

    #url to fetch data from foursquare api
    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)

    # get all the data
    results = requests.get(url).json()
    venue_data=results["response"]['groups'][0]['items']
    venue_details=[]
    for row in venue_data:
        try:
            venue_id=row['venue']['id']
            venue_name=row['venue']['name']
            venue_category=row['venue']['categories'][0]['name']
            venue_details.append([venue_id,venue_name,venue_category])
        except KeyError:
            pass

    column_names=['ID','Name','Category']
    df = pd.DataFrame(venue_details,columns=column_names)
    return df
```

In [10]:
```
def get_venue_details(venue_id):


    #url to fetch data from foursquare api
    url = 'https://api.foursquare.com/v2/venues/{}?&client_id={}&client_secret={}&v={}'.format(
            venue_id,
            CLIENT_ID,
            CLIENT_SECRET,
            VERSION)

    # get all the data
    results = requests.get(url).json()
    venue_data=results['response']['venue']
    venue_details=[]
    try:
        venue_id=venue_data['id']
        venue_name=venue_data['name']
        venue_likes=venue_data['likes']['count']
        venue_rating=venue_data['rating']
        venue_tips=venue_data['tips']['count']
        venue_details.append([venue_id,venue_name,venue_likes,venue_rating,venue_tips])
    except KeyError:
        pass

    column_names=['ID','Name','Likes','Rating','Tips']
    df = pd.DataFrame(venue_details,columns=column_names)
    return df
```

In [11]:
```
column_names=['Borough', 'Neighborhood', 'ID','Name']
chinrest_toronto = pd.DataFrame(columns=column_names)
count=1
for row in df_toronto.values.tolist():
    PostalCode, Borough, Neighborhood, Latitude, Longitude=row
    venues = get_venues(Latitude,Longitude)
    dumpling_resturants = venues[venues['Category']=='Chinese Restaurant']
    print('(',count,'/',len(df_toronto),')','Chinese Restaurant in '+Neighborhood+', '+Borough+':'+str(len(du
mpling_resturants)))
    for restaurant_detail in dumpling_resturants.values.tolist():
        id, name , category = restaurant_detail
        chinrest_toronto = chinrest_toronto.append({'Borough': Borough,
                                                    'Neighborhood': Neighborhood,
                                                    'ID': id,
                                                    'Name' : name
                                                   }, ignore_index=True)
    count+=1
```

```
( 1 / 103 ) Chinese Restaurant in Parkwoods, North York:2
( 2 / 103 ) Chinese Restaurant in Victoria Village, North York:1
( 3 / 103 ) Chinese Restaurant in Regent Park, Harbourfront, Downtown Toronto:0
( 4 / 103 ) Chinese Restaurant in Lawrence Manor, Lawrence Heights, North York:0
( 5 / 103 ) Chinese Restaurant in Queen's Park, Ontario Provincial Government, Downtown Toronto:0
( 6 / 103 ) Chinese Restaurant in Islington Avenue, Humber Valley Village, Etobicoke:0
( 7 / 103 ) Chinese Restaurant in Malvern, Rouge, Scarborough:0
( 8 / 103 ) Chinese Restaurant in Don Mills, North York:0
( 9 / 103 ) Chinese Restaurant in Parkview Hill, Woodbine Gardens, East York:0
( 10 / 103 ) Chinese Restaurant in Garden District, Ryerson, Downtown Toronto:0
( 11 / 103 ) Chinese Restaurant in Glencairn, North York:0
( 12 / 103 ) Chinese Restaurant in West Deane Park, Princess Gardens, Martin Grove, Islington, Cloverdale, Et
obicoke:0
( 13 / 103 ) Chinese Restaurant in Rouge Hill, Port Union, Highland Creek, Scarborough:0
( 14 / 103 ) Chinese Restaurant in Don Mills, North York:0
( 15 / 103 ) Chinese Restaurant in Woodbine Heights, East York:0
( 16 / 103 ) Chinese Restaurant in St. James Town, Downtown Toronto:0
( 17 / 103 ) Chinese Restaurant in Humewood-Cedarvale, York:1
( 18 / 103 ) Chinese Restaurant in Eringate, Bloordale Gardens, Old Burnhamthorpe, Markland Wood, Etobicoke:1
( 19 / 103 ) Chinese Restaurant in Guildwood, Morningside, West Hill, Scarborough:0
( 20 / 103 ) Chinese Restaurant in The Beaches, East Toronto:0
( 21 / 103 ) Chinese Restaurant in Berczy Park, Downtown Toronto:0
( 22 / 103 ) Chinese Restaurant in Caledonia-Fairbanks, York:1
( 23 / 103 ) Chinese Restaurant in Woburn, Scarborough:2
( 24 / 103 ) Chinese Restaurant in Leaside, East York:0
( 25 / 103 ) Chinese Restaurant in Central Bay Street, Downtown Toronto:0
( 26 / 103 ) Chinese Restaurant in Christie, Downtown Toronto:0
( 27 / 103 ) Chinese Restaurant in Cedarbrae, Scarborough:1
( 28 / 103 ) Chinese Restaurant in Hillcrest Village, North York:4
( 29 / 103 ) Chinese Restaurant in Bathurst Manor, Wilson Heights, Downsview North, North York:0
( 30 / 103 ) Chinese Restaurant in Thorncliffe Park, East York:0
( 31 / 103 ) Chinese Restaurant in Richmond, Adelaide, King, Downtown Toronto:0
( 32 / 103 ) Chinese Restaurant in Dufferin, Dovercourt Village, West Toronto:0
( 33 / 103 ) Chinese Restaurant in Scarborough Village, Scarborough:0
( 34 / 103 ) Chinese Restaurant in Fairview, Henry Farm, Oriole, North York:2
( 35 / 103 ) Chinese Restaurant in Northwood Park, York University, North York:0
( 36 / 103 ) Chinese Restaurant in East Toronto, Broadview North (Old East York), East York:0
( 37 / 103 ) Chinese Restaurant in Harbourfront East, Union Station, Toronto Islands, Downtown Toronto:1
( 38 / 103 ) Chinese Restaurant in Little Portugal, Trinity, West Toronto:0
( 39 / 103 ) Chinese Restaurant in Kennedy Park, Ionview, East Birchmount Park, Scarborough:3
( 40 / 103 ) Chinese Restaurant in Bayview Village, North York:5
( 41 / 103 ) Chinese Restaurant in Downsview, North York:0
( 42 / 103 ) Chinese Restaurant in The Danforth West, Riverdale, East Toronto:0
( 43 / 103 ) Chinese Restaurant in Toronto Dominion Centre, Design Exchange, Downtown Toronto:0
( 44 / 103 ) Chinese Restaurant in Brockton, Parkdale Village, Exhibition Place, West Toronto:0
( 45 / 103 ) Chinese Restaurant in Golden Mile, Clairlea, Oakridge, Scarborough:1
( 46 / 103 ) Chinese Restaurant in York Mills, Silver Hills, North York:2
( 47 / 103 ) Chinese Restaurant in Downsview, North York:0
( 48 / 103 ) Chinese Restaurant in India Bazaar, The Beaches West, East Toronto:0
( 49 / 103 ) Chinese Restaurant in Commerce Court, Victoria Hotel, Downtown Toronto:0
( 50 / 103 ) Chinese Restaurant in North Park, Maple Leaf Park, Upwood Park, North York:1
( 51 / 103 ) Chinese Restaurant in Humber Summit, North York:0
( 52 / 103 ) Chinese Restaurant in Cliffside, Cliffcrest, Scarborough Village West, Scarborough:1
( 53 / 103 ) Chinese Restaurant in Willowdale, Newtonbrook, North York:0
( 54 / 103 ) Chinese Restaurant in Downsview, North York:0
( 55 / 103 ) Chinese Restaurant in Studio District, East Toronto:0
( 56 / 103 ) Chinese Restaurant in Bedford Park, Lawrence Manor East, North York:0
( 57 / 103 ) Chinese Restaurant in Del Ray, Mount Dennis, Keelsdale and Silverthorn, York:1
( 58 / 103 ) Chinese Restaurant in Humberlea, Emery, North York:0
( 59 / 103 ) Chinese Restaurant in Birch Cliff, Cliffside West, Scarborough:0
( 60 / 103 ) Chinese Restaurant in Willowdale, Willowdale East, North York:0
( 61 / 103 ) Chinese Restaurant in Downsview, North York:0
( 62 / 103 ) Chinese Restaurant in Lawrence Park, Central Toronto:0
( 63 / 103 ) Chinese Restaurant in Roselawn, Central Toronto:0
( 64 / 103 ) Chinese Restaurant in Runnymede, The Junction North, York:0
( 65 / 103 ) Chinese Restaurant in Weston, York:1
( 66 / 103 ) Chinese Restaurant in Dorset Park, Wexford Heights, Scarborough Town Centre, Scarborough:2
( 67 / 103 ) Chinese Restaurant in York Mills West, North York:0
( 68 / 103 ) Chinese Restaurant in Davisville North, Central Toronto:0
( 69 / 103 ) Chinese Restaurant in Forest Hill North & West, Forest Hill Road Park, Central Toronto:0
( 70 / 103 ) Chinese Restaurant in High Park, The Junction South, West Toronto:0
( 71 / 103 ) Chinese Restaurant in Westmount, Etobicoke:1
( 72 / 103 ) Chinese Restaurant in Wexford, Maryvale, Scarborough:3
( 73 / 103 ) Chinese Restaurant in Willowdale, Willowdale West, North York:1
( 74 / 103 ) Chinese Restaurant in North Toronto West,  Lawrence Park, Central Toronto:0
( 75 / 103 ) Chinese Restaurant in The Annex, North Midtown, Yorkville, Central Toronto:0
( 76 / 103 ) Chinese Restaurant in Parkdale, Roncesvalles, West Toronto:0
( 77 / 103 ) Chinese Restaurant in Canada Post Gateway Processing Centre, Mississauga:0
( 78 / 103 ) Chinese Restaurant in Kingsview Village, St. Phillips, Martin Grove Gardens, Richview Gardens, E
tobicoke:2
( 79 / 103 ) Chinese Restaurant in Agincourt, Scarborough:6
( 80 / 103 ) Chinese Restaurant in Davisville, Central Toronto:0
( 81 / 103 ) Chinese Restaurant in University of Toronto, Harbord, Downtown Toronto:0
( 82 / 103 ) Chinese Restaurant in Runnymede, Swansea, West Toronto:0
( 83 / 103 ) Chinese Restaurant in Clarks Corners, Tam O'Shanter, Sullivan, Scarborough:2
( 84 / 103 ) Chinese Restaurant in Moore Park, Summerhill East, Central Toronto:0
( 85 / 103 ) Chinese Restaurant in Kensington Market, Chinatown, Grange Park, Downtown Toronto:0
( 86 / 103 ) Chinese Restaurant in Milliken, Agincourt North, Steeles East, L'Amoreaux East, Scarborough:5
( 87 / 103 ) Chinese Restaurant in Summerhill West, Rathnelly, South Hill, Forest Hill SE, Deer Park, Central
Toronto:0
( 88 / 103 ) Chinese Restaurant in CN Tower, King and Spadina, Railway Lands, Harbourfront West, Bathurst Qua
```

```
y, South Niagara, Island airport, Downtown Toronto:0
( 89 / 103 ) Chinese Restaurant in New Toronto, Mimico South, Humber Bay Shores, Etobicoke:0
( 90 / 103 ) Chinese Restaurant in South Steeles, Silverstone, Humbergate, Jamestown, Mount Olive, Beaumond H
eights, Thistletown, Albion Gardens, Etobicoke:1
( 91 / 103 ) Chinese Restaurant in Steeles West, L'Amoreaux West, Scarborough:5
( 92 / 103 ) Chinese Restaurant in Rosedale, Downtown Toronto:0
( 93 / 103 ) Chinese Restaurant in Stn A PO Boxes, Downtown Toronto:0
( 94 / 103 ) Chinese Restaurant in Alderwood, Long Branch, Etobicoke:0
( 95 / 103 ) Chinese Restaurant in Northwest, West Humber - Clairville, Etobicoke:1
( 96 / 103 ) Chinese Restaurant in Upper Rouge, Scarborough:0
( 97 / 103 ) Chinese Restaurant in St. James Town, Cabbagetown, Downtown Toronto:0
( 98 / 103 ) Chinese Restaurant in First Canadian Place, Underground city, Downtown Toronto:0
( 99 / 103 ) Chinese Restaurant in The Kingsway, Montgomery Road, Old Mill North, Etobicoke:0
( 100 / 103 ) Chinese Restaurant in Church and Wellesley, Downtown Toronto:0
( 101 / 103 ) Chinese Restaurant in Business reply mail Processing Centre, South Central Letter Processing Pl
ant Toronto, East Toronto:0
( 102 / 103 ) Chinese Restaurant in Old Mill South, King's Mill Park, Sunnylea, Humber Bay, Mimico NE, The Qu
eensway East, Royal York South East, Kingsway Park South East, Etobicoke:0
( 103 / 103 ) Chinese Restaurant in Mimico NW, The Queensway West, South of Bloor, Kingsway Park South West,
Royal York South West, Etobicoke:0
```

In [12]:
```
# lets see total number of indian restaurants in Toronto
print("Total number of Chinese Restaurants in Toronto City is {}".format(chinrest_toronto.shape[0]))
```

```
Total number of Chinese Restaurants in Toronto City is 60
```

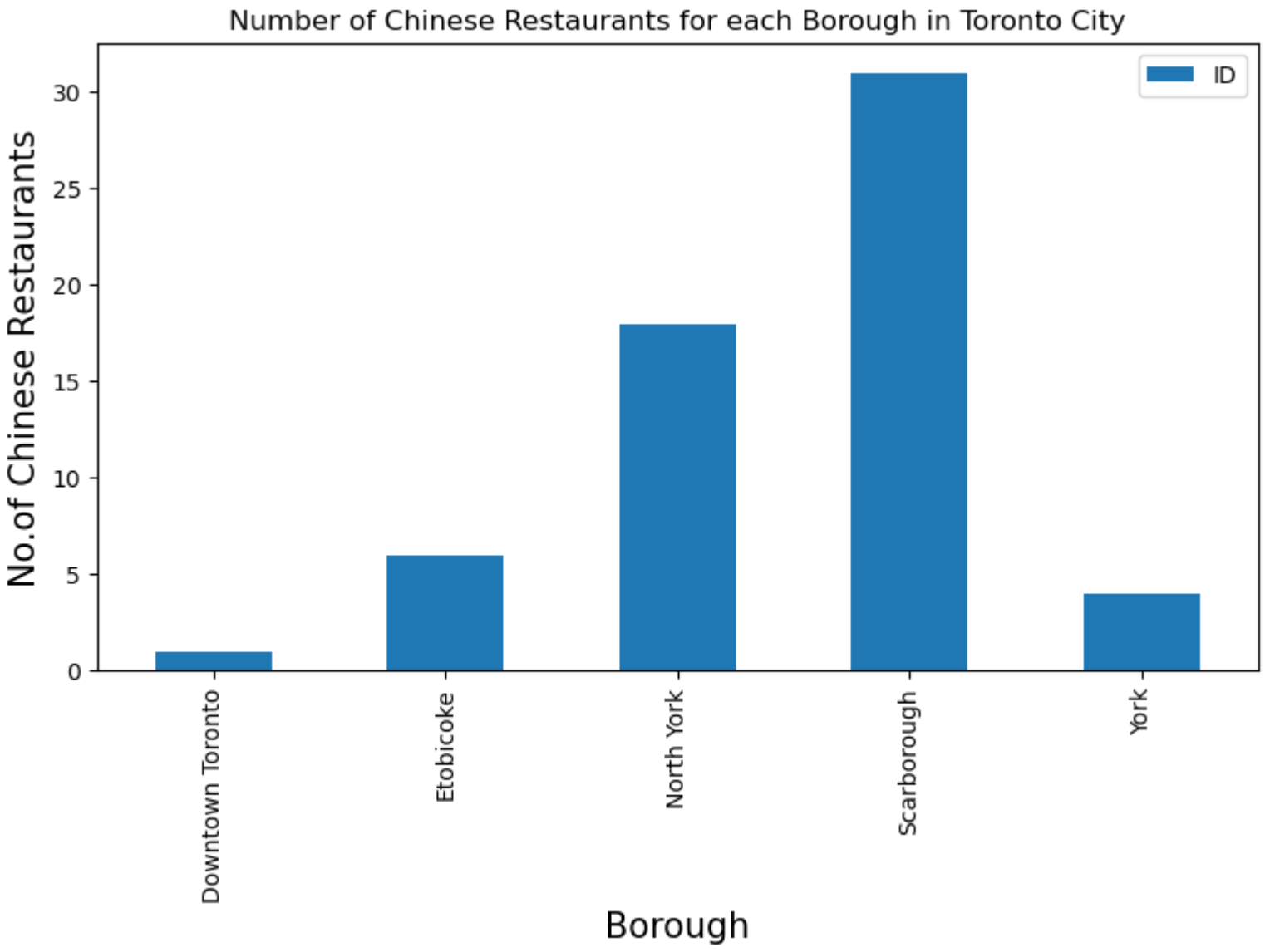
In [13]:
```
chinrest_toronto.head()
```

Out[13]:

	Borough	Neighborhood	ID	Name
0	North York	Parkwoods	5b6a321d340a58002cc0d9db	Omni Palace Noodle House
1	North York	Parkwoods	4c9f77980e9bb1f7659bf05f	The Bean Sprout
2	North York	Victoria Village	4c9f77980e9bb1f7659bf05f	The Bean Sprout
3	York	Humewood-Cedarvale	4ce588455fce5481cd1e5caa	Cho Cho Cho
4	Etobicoke	Eringate, Bloordale Gardens, Old Burnhamthorpe...	4bfefc3b68c7a593dc004044	Golden Wok Chinese Restaurant

Chinese Restaurants by Borough in Toronto

In [14]:
```
plt.figure(figsize=(9,5), dpi = 100)
# title
plt.title('Number of Chinese Restaurants for each Borough in Toronto City')
#On x-axis
plt.xlabel('Borough', fontsize = 15)
#On y-axis
plt.ylabel('No.of Chinese Restaurants', fontsize=15)
#giving a bar plot
chinrest_toronto.groupby('Borough')['ID'].count().plot(kind='bar')
#legend
plt.legend()
#displays the plot
plt.show()
```

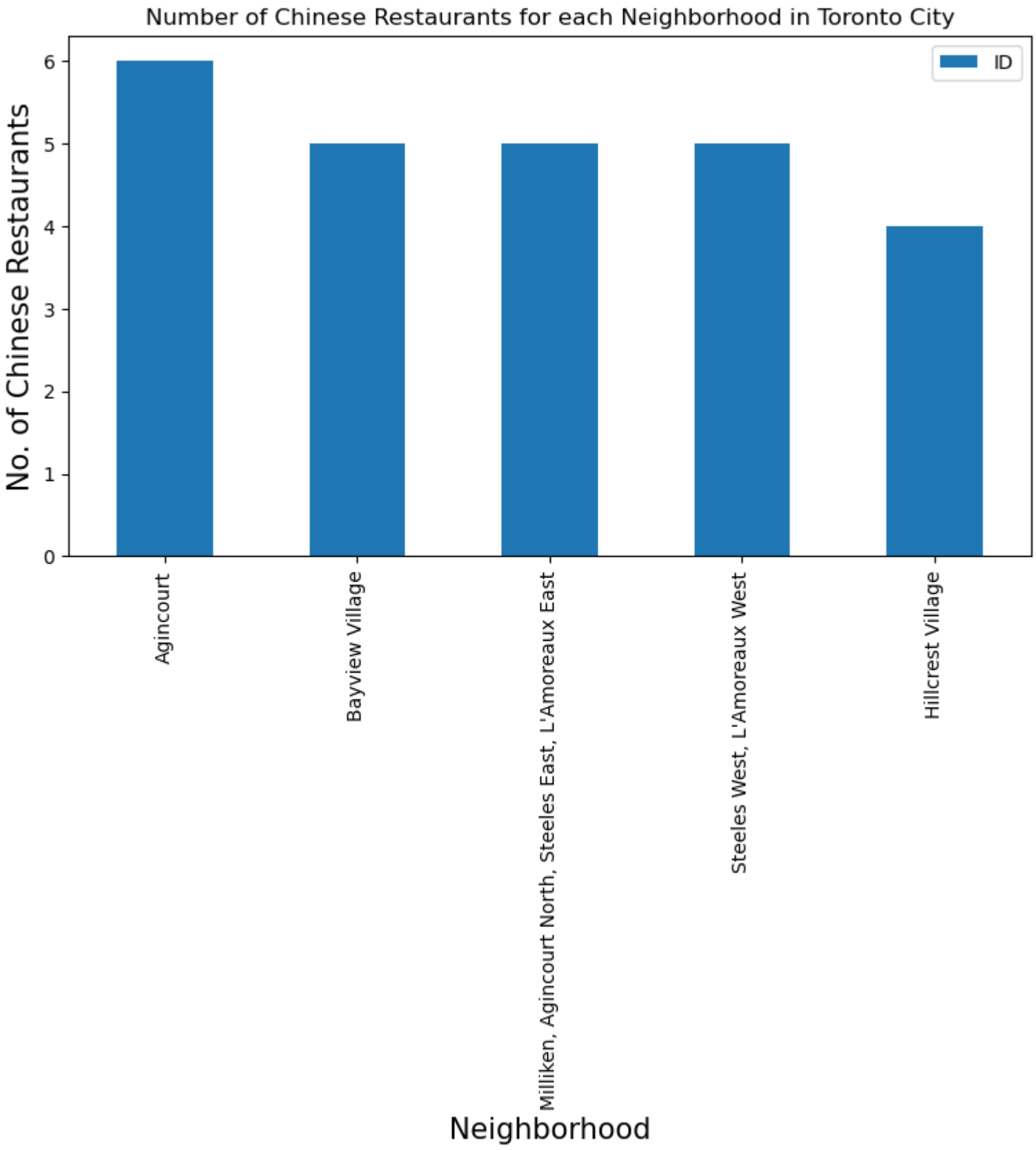


In [15]:
```
print("Maximum number of Chinese restaurants in a single Borough is {}".format(max(chinrest_toronto.groupby(
'Borough')['ID'].count())))
```

```
Maximum number of Chinese restaurants in a single Borough is 31
```

Chinese Restaurants by Neigbhorhood in Toronto

In [16]:
```
plt.figure(figsize=(9,5), dpi = 100)
# title
plt.title('Number of Chinese Restaurants for each Neighborhood in Toronto City')
#On x-axis
plt.xlabel('Neighborhood', fontsize = 15)
#On y-axis
plt.ylabel('No. of Chinese Restaurants', fontsize=15)
#giving a bar plot
chinrest_toronto.groupby('Neighborhood')['ID'].count().nlargest(5).plot(kind='bar')
#Legend
plt.legend()
#displays the plot
plt.show()
```



In [17]:
```
print("Maximum number of Chinese restaurants in a single Neighborhood is {}".format(max(chinrest_toronto.grou
pby('Neighborhood')['ID'].count())))
```

```
Maximum number of Chinese restaurants in a single Neighborhood is 6
```

In [19]:
```
# prepare neighborhood list that contains chinese resturants
column_names=['Borough', 'Neighborhood', 'ID','Name','Likes','Rating','Tips']
chinese_rest_stats = pd.DataFrame(columns = column_names)
count=1


for row in chinrest_toronto.values.tolist():
    Borough, Neighborhood, ID, Name = row
    try:
        venue_details = get_venue_details(ID)
        print(venue_details)
        id1, name, likes, rating, tips = venue_details.values.tolist()[0]
    except IndexError:
        print('No data available for id=',ID)
        # we will assign 0 value for these resturants as they may have been
        #recently opened or details does not exist in FourSquare Database
        id1, name, likes, rating, tips = [0]*5
    print('(',count,'/',len(chinrest_toronto),')','processed')
    chinese_rest_stats = chinese_rest_stats.append({'Borough': Borough,
                                                    'Neighborhood': Neighborhood,
                                                    'ID': id1,
                                                    'Name' : name,
                                                    'Likes' : likes,
                                                    'Rating' : rating,
                                                    'Tips' : tips
                                                   }, ignore_index=True)
    count+=1
```

```
                          ID                      Name  Likes  Rating  Tips
0  5b6a321d340a58002cc0d9db  Omni Palace Noodle House      7     7.2     3
( 1 / 60 ) processed
                          ID             Name  Likes  Rating  Tips
0  4c9f77980e9bb1f7659bf05f  The Bean Sprout      4     7.0     5
( 2 / 60 ) processed
                          ID             Name  Likes  Rating  Tips
0  4c9f77980e9bb1f7659bf05f  The Bean Sprout      4     7.0     5
( 3 / 60 ) processed
                          ID         Name  Likes  Rating  Tips
0  4ce588455fce5481cd1e5caa  Cho Cho Cho      3     7.4     5
( 4 / 60 ) processed
Empty DataFrame
Columns: [ID, Name, Likes, Rating, Tips]
Index: []
No data available for id= 4bfefc3b68c7a593dc004044
( 5 / 60 ) processed
                          ID         Name  Likes  Rating  Tips
0  4ce588455fce5481cd1e5caa  Cho Cho Cho      3     7.4     5
( 6 / 60 ) processed
                          ID          Name  Likes  Rating  Tips
0  54a6ea76498ebc906c8c3652  Hakka Legend     15     6.6     8
( 7 / 60 ) processed
                          ID         Name  Likes  Rating  Tips
0  4b64765ff964a52028b52ae3  Lucky Hakka      3     6.1     9
( 8 / 60 ) processed
                          ID          Name  Likes  Rating  Tips
0  54a6ea76498ebc906c8c3652  Hakka Legend     15     6.6     8
( 9 / 60 ) processed
                          ID              Name  Likes  Rating  Tips
0  4ae66ccbf964a520eba621e3  Congee Wong 天皇名粥     60     8.0    41
( 10 / 60 ) processed
                          ID                            Name  Likes  Rating  \
0  4ceea52a7db3224b4ddb282e  Chinese Halal Restaurant 中華牛羊館     24     7.7

   Tips
0    22
( 11 / 60 ) processed
                          ID              Name  Likes  Rating  Tips
0  4aebd5a7f964a520f0c421e3  Asian Legend 味香村     39     6.9    18
( 12 / 60 ) processed
                          ID                Name  Likes  Rating  Tips
0  59a850ce3d4791044a41300e  QJD Peking Duck 全聚德      7     6.8     4
( 13 / 60 ) processed
                          ID                 Name  Likes  Rating  Tips
0  584e235102b60e2d40263821  天天渔港 Captain's Catch      7     7.0     3
( 14 / 60 ) processed
                          ID                      Name  Likes  Rating  Tips
0  5b6a321d340a58002cc0d9db  Omni Palace Noodle House      7     7.2     3
( 15 / 60 ) processed
                          ID               Name  Likes  Rating  Tips
0  4ae33054f964a520759121e3  Pearl Harbourfront    119     7.7    34
( 16 / 60 ) processed
                          ID          Name  Likes  Rating  Tips
0  55dded07498eecf46ed3e0d9  Hakka Legend      7     7.3     0
( 17 / 60 ) processed
                          ID       Name  Likes  Rating  Tips
0  4b6475def964a520f9b42ae3  Chung Moi      7     6.4    13
( 18 / 60 ) processed
                          ID             Name  Likes  Rating  Tips
0  4b119598f964a520ec7f23e3  Mandarin Buffet     43     6.3    19
( 19 / 60 ) processed
                          ID              Name  Likes  Rating  Tips
0  4ae66ccbf964a520eba621e3  Congee Wong 天皇名粥     60     8.0    41
( 20 / 60 ) processed
                          ID                             Name  Likes  Rating  \
0  4ceea52a7db3224b4ddb282e  Chinese Halal Restaurant 中華牛羊館     24     7.7

   Tips
0    22
( 21 / 60 ) processed
                          ID                            Name  Likes  Rating  \
0  4bd396d041b9ef3b799c00e6  Sun Star Chinese Cuisine 翠景小炒      7     6.6

   Tips
0     0
( 22 / 60 ) processed
                          ID              Name  Likes  Rating  Tips
0  4aebd5a7f964a520f0c421e3  Asian Legend 味香村     39     6.9    18
( 23 / 60 ) processed
                          ID                                        Name  Likes  \
0  4ad9f43bf964a5204e1c21e3  Paradise Fine Chinese Dining 世外桃園新派優雅食府     22

   Rating  Tips
0     6.0    12
( 24 / 60 ) processed
                          ID          Name  Likes  Rating  Tips
0  55dded07498eecf46ed3e0d9  Hakka Legend      7     7.3     0
( 25 / 60 ) processed
                          ID            Name  Likes  Rating  Tips
0  4b3e8e54f964a520e19e25e3  Peking Man 牛家莊     18     6.7    13
```

```
( 26 / 60 ) processed
                          ID   Name  Likes  Rating  Tips
0  4e8367a2f5b907135ece792f  Pearl     16     6.6    14
( 27 / 60 ) processed
                          ID         Name  Likes  Rating  Tips
0  4e11fd03b61c637b97b2386e  Hakka No. 1     10     7.5     3
( 28 / 60 ) processed
Empty DataFrame
Columns: [ID, Name, Likes, Rating, Tips]
Index: []
No data available for id= 571400ac498e7956dba7a960
( 29 / 60 ) processed
                          ID         Name  Likes  Rating  Tips
0  4e11fd03b61c637b97b2386e  Hakka No. 1     10     7.5     3
( 30 / 60 ) processed
                          ID                    Name  Likes  Rating  Tips
0  4c0bf5f5ffb8c9b6010b6e61  Mayflower Chinese Food      7     7.2     5
( 31 / 60 ) processed
                          ID                Name  Likes  Rating  Tips
0  4b6475aef964a520eab42ae3  Kim Kim restaurant     14     7.1    29
( 32 / 60 ) processed
                          ID                              Name  Likes  Rating  \
0  4bafb9cbf964a520691b3ce3  Lucky Chinese (Haka) Restaurant      6     6.8

   Tips
0     5
( 33 / 60 ) processed
                          ID                    Name  Likes  Rating  Tips
0  4c0bf5f5ffb8c9b6010b6e61  Mayflower Chinese Food      7     7.2     5
( 34 / 60 ) processed
                          ID                    Name  Likes  Rating  Tips
0  5269be82498e1cf7de5d5dd4  Super Hakka Restaurant      4     7.2     5
( 35 / 60 ) processed
                          ID                Name  Likes  Rating  Tips
0  4b6475aef964a520eab42ae3  Kim Kim restaurant     14     7.1    29
( 36 / 60 ) processed
                          ID             Name  Likes  Rating  Tips
0  4c9f77980e9bb1f7659bf05f  The Bean Sprout      4     7.0     5
( 37 / 60 ) processed
                          ID                         Name  Likes  Rating  Tips
0  4b637f5cf964a5207f7e2ae3  Szechuan Gourmet Restaurant      4     7.4     8
( 38 / 60 ) processed
                          ID             Name  Likes  Rating  Tips
0  4b97d2fcf964a5200d1835e3  Gourmet Express      6     7.3     1
( 39 / 60 ) processed
                          ID                    Name  Likes  Rating  Tips
0  4c0bf5f5ffb8c9b6010b6e61  Mayflower Chinese Food      7     7.2     5
( 40 / 60 ) processed
                          ID                                       Name  Likes  \
0  58388814809a776da0e00646  Grandeur Palace 華丽宮 (Grandeur Palace 華麗宮)     13

   Rating  Tips
0     7.1     0
( 41 / 60 ) processed
                          ID            Name  Likes  Rating  Tips
0  5377a256498ea252667e0f7b  Congee Me 小米粥鋪      8     7.0     2
( 42 / 60 ) processed
                          ID              Name  Likes  Rating  Tips
0  4aedbb5df964a52069ce21e3  Asian Legend 味香村     33     6.7    21
( 43 / 60 ) processed
                          ID                                Name  Likes  Rating  \
0  4bf025afc8d920a1bd799430  Fairview Seafood Chinese Cuisine      6     6.9

   Tips
0     2
( 44 / 60 ) processed
                          ID                                     Name  Likes  Rating  \
0  4b29e021f964a520d4a324e3  Perfect Chinese Restaurant 雅瓊海鮮酒家     62     6.4

   Tips
0    46
( 45 / 60 ) processed
                          ID                             Name  Likes  Rating  Tips
0  4be303c52fc7d13ae879083a  Beef Noodle Restaurant 老李牛肉麵     12     6.6     5
( 46 / 60 ) processed
                          ID                                    Name  Likes  \
0  4cdc8e53d4ecb1f7843c8048  The Royal Chinese Restaurant 避風塘小炒     22

   Rating  Tips
0     7.7    11
( 47 / 60 ) processed
                          ID            Name  Likes  Rating  Tips
0  4ae71b0cf964a52078a821e3  Noodle Delight     10     6.9    12
( 48 / 60 ) processed
                          ID                                         Name  Likes  \
0  5aa5a8c85f68b930df32dc53  Fishman Lobster Clubhouse Restaurant 魚樂軒     33

   Rating  Tips
0     8.4    11
( 49 / 60 ) processed
```

```
---------------------------------------------------------------------------
KeyError                                  Traceback (most recent call last)
<ipython-input-19-234ff52d28b1> in <module>
      8     Borough, Neighborhood, ID, Name = row
      9     try:
---> 10         venue_details = get_venue_details(ID)
     11         print(venue_details)
     12         id1, name, likes, rating, tips = venue_details.values.tolist()[0]

<ipython-input-10-6a45fae537ff> in get_venue_details(venue_id)
     11     # get all the data
     12     results = requests.get(url).json()
---> 13     venue_data=results['response']['venue']
     14     venue_details=[]
     15     try:

KeyError: 'venue'
```

In [20]:
```
# print first five elements of chinese_rest_stats
print(chinese_rest_stats.columns)
```

```
Index(['Borough', 'Neighborhood', 'ID', 'Name', 'Likes', 'Rating', 'Tips'], dtype='object')
```

Rating Restaurants

In [21]:
```
toronto_neighborhood_stat = chinese_rest_stats.groupby('Neighborhood',as_index=False).mean()[['Neighborhood',
'Rating']]
toronto_neighborhood_stat.columns = ['Neighborhood','Average Rating']
toronto_neighborhood_stat.sort_values(by = 'Average Rating', ascending = False, inplace = True)

toronto_neighborhood_stat.head()
```

Out[21]:

	Neighborhood	Average Rating
16	Milliken, Agincourt North, Steeles East, L'Amo...	8.4
11	Harbourfront East, Union Station, Toronto Islands	7.7
6	Del Ray, Mount Dennis, Keelsdale and Silverthorn	7.5
17	North Park, Maple Leaf Park, Upwood Park	7.5
13	Humewood-Cedarvale	7.4

In [22]:
```
# print the neighborhood with maximum rating
print("Neighborhood : {}, Average Rating : {}".format(toronto_neighborhood_stat.iloc[0][0] ,toronto_neighborh
ood_stat.iloc[0][1]))
```

```
Neighborhood : Milliken, Agincourt North, Steeles East, L'Amoreaux East, Average Rating : 8.4
```

In [23]:
```
toronto_neighborhood_stat = pd.merge(toronto_neighborhood_stat,df_toronto, on='Neighborhood')
toronto_neighborhood_stat.reset_index()
toronto_neighborhood_stat
```

Out[23]:

	Neighborhood	Average Rating	PostalCode	Borough	Latitude	Longitude
0	Milliken, Agincourt North, Steeles East, L'Amo...	8.400000	M1V	Scarborough	43.815252	-79.284577
1	Harbourfront East, Union Station, Toronto Islands	7.700000	M5J	Downtown Toronto	43.640816	-79.381752
2	Del Ray, Mount Dennis, Keelsdale and Silverthorn	7.500000	M6M	York	43.691116	-79.476013
3	North Park, Maple Leaf Park, Upwood Park	7.500000	M6L	North York	43.713756	-79.490074
4	Humewood-Cedarvale	7.400000	M6C	York	43.693781	-79.428191
5	Caledonia-Fairbanks	7.400000	M6E	York	43.689026	-79.453512
6	Willowdale, Willowdale West	7.400000	M2R	North York	43.782736	-79.442259
7	Hillcrest Village	7.350000	M2H	North York	43.803762	-79.363452
8	Clarks Corners, Tam O'Shanter, Sullivan	7.300000	M1T	Scarborough	43.781638	-79.304302
9	Golden Mile, Clairlea, Oakridge	7.300000	M1L	Scarborough	43.711112	-79.284577
10	Kingsview Village, St. Phillips, Martin Grove ...	7.250000	M9R	Etobicoke	43.688905	-79.554724
11	Westmount	7.200000	M9P	Etobicoke	43.696319	-79.532242
12	Weston	7.200000	M9N	York	43.706876	-79.518188
13	Wexford, Maryvale	7.100000	M1R	Scarborough	43.750072	-79.295849
14	Fairview, Henry Farm, Oriole	7.100000	M2J	North York	43.778517	-79.346556
15	Parkwoods	7.100000	M3A	North York	43.753259	-79.329656
16	Bayview Village	7.040000	M2K	North York	43.786947	-79.385975
17	Victoria Village	7.000000	M4A	North York	43.725882	-79.315572
18	Dorset Park, Wexford Heights, Scarborough Town...	6.950000	M1P	Scarborough	43.757410	-79.273304
19	Agincourt	6.783333	M1S	Scarborough	43.794200	-79.262029
20	Kennedy Park, Ionview, East Birchmount Park	6.666667	M1K	Scarborough	43.727929	-79.262029
21	York Mills, Silver Hills	6.650000	M2L	North York	43.757490	-79.374714
22	Cedarbrae	6.600000	M1H	Scarborough	43.773136	-79.239476
23	Woburn	6.350000	M1G	Scarborough	43.770992	-79.216917
24	Eringate, Bloordale Gardens, Old Burnhamthorpe...	0.000000	M9C	Etobicoke	43.643515	-79.577201
25	Cliffside, Cliffcrest, Scarborough Village West	0.000000	M1M	Scarborough	43.716316	-79.239476

In [25]:
```
toronto_map = folium.Map(location = [43.653963, -79.387207 ], zoom_start=12)
# instantiate a feature group for the incidents in the dataframe
incidents = folium.map.FeatureGroup()

for lat, lng, in toronto_neighborhood_stat[['Latitude','Longitude']].values:
    incidents.add_child(
        folium.CircleMarker(
            [lat, lng],
            radius=10, # define how big you want the circle markers to be
            color='red',
            fill=True,
            fill_color='blue',
            fill_opacity=0.6
        )
    )

toronto_map
```

Out[25]: Make this Notebook Trusted to load map: File -> Trust Notebook

In [26]:
```
# create map of Toronto using latitude and longitude values
map_toronto = folium.Map(location = [43.653963, -79.387207 ], zoom_start=10)

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

map_toronto
```

Out[26]: Make this Notebook Trusted to load map: File -> Trust Notebook

Conclusion

Milliken, Agincourt North, Steeles East, L'Amoreaux East in the Scarborough borough has the highest average rating for Chinese restaurants in the city of Toronto at: 8.4 according to FourSquare API data. However, the neighborhood with the most Chinese restaurants was Agincourt which is also located in the Scarborough borough. It makes sense that the neighborhood with the highest average rating for restaurant would be in close proximity to the neighborhood with the highest density of Chinese restaurants, considering that Toronto's "Chinatown" is located in the northeast portion of the city. All that said, it sounds like there are bound to be some great dumplings in the Northeastern Scarborough district if you ever find yourself visiting Toronto.

*It is worth noting that FourSquare data is crowdsourced and based off of user experience. So, please keep in mind that there can be inherent biases when using such a data collection method.

In [ ]: