Coursera Capstone Projects - The Battle of Neighborhoods

Child Care in Toronto

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1. Introduction/Business Problem

The Approach I used to begin this Project is by searching through the web to takle major issues facing residence of Toronto, especially families which having working parents. As I research through this problem, The Canadian daycare market has a well-established surplus of demand, resulting in anxiety-inducing waitlists — joined as early as the day a couple learns they're

expecting — and monthly fees that can amount to more than a mortgage payment. "It's worse than finding a house or looking for an apartment.

A. Daycare fees continue to rise across Canada

In the study, child care is divided into three categories – infant, toddler,preschooler, Kindergarten, and Gradelevel. The researchers define these categories as birth to two years for infants, 18 months to three years for toddlers, and two-and-a-half years to kindergarten age for preschoolers, which is age four or five, depending on the province.

These categories often see wildly different prices for full-time care, as a result of the smaller number of facilities available for infants, as well as the higher ratio of caregivers to children required by law. This means that while preschool age child care tends to be a lower figure overall, it gives the best idea of what the average family pays, since half of children in child care centres in Canada fall into this category.

B. The waitlist problem

But costs can be only half the battle for families when it comes to child care. The demand for child care greatly surpasses availability in most cases.

Researchers found that in almost three-quarters of the cities covered in the study, centres maintained lengthy waitlists of children waiting to enter care programs. Bigger cities see 80 to 90 per cent of centres maintaining a waitlist, while even smaller cities like St. John's are in the 79 per cent range.

Wait lists are one of the major hurdles keeping parents from accessing quality child care, with families having to start the process early if they want to get their child enrolled. "You have to apply basically while you're pregnant !!!

Source: https://www.ctvnews.ca/features/analysis-daycare-fees-continue-to-rise-across-canada-1.3940099

2. Approach to Solve The Issue

1. Help Individual (Parents) to find best Daycare Center for their child that match thier criteria.
2. Encourage Business owners to invest in such high demand business by leveraging them with the best location.
3. Benefits of growth of this business can be highly apprecaited by individuals and business owners. some are listed below:

   A. by relieving parents from lengthy wait list.

   B. cost reduction.

   C. Good investment for Business owners as the subject is in High demand.

3. Description of the data

I. Data Collection

1. Licensed Day Care Centres (https://github.com/mkorogluNYC/NYC_Data_ScienceAcademy/blob/master/Shiny_project/tor
2. The venues in each neighborhood. (FourSquare API)
3. Postal codes in Toronto (https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M)
4. Toronto geospatial data (https://cocl.us/Geospatial_data)

```python
%matplotlib inline
import numpy as np # library to handle data in a vectorized manner
from bs4 import BeautifulSoup
import geocoder # import geocoder
import pandas as pd # library for data analsysis
pd.set_option('display.max_columns', None)
pd.set_option('display.max_rows', None)

import json # library to handle JSON files
```

```python
import random
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
from sklearn import preprocessing
from sklearn.datasets.samples_generator import make_blobs
import folium # map rendering library

print('Libraries imported.')
```

```
Libraries imported.
```

II. Data Importing

In [2]:
```python
#reading table from wikipedia page
Toronto_df = pd.read_html("https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M", header=0,
                attrs={"class":"wikitable sortable"})[0]
Toronto_df.head()
```

Out[2]:

	Postcode	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	Harbourfront

In [3]:
```python
#lets drop Borough that has cells with 'Not assigned' values
Not_assigned = Toronto_df[Toronto_df['Borough'] == 'Not assigned'].inde
x

# Delete these row indexes from dataFrame
Toronto_df.drop(Not_assigned , inplace=True)
Toronto_df.head()
```

Out[3]:

	Postcode	Borough	Neighbourhood
2	M3A	North York	Parkwoods
3	M4A	North York	Victoria Village
4	M5A	Downtown Toronto	Harbourfront
5	M5A	Downtown Toronto	Regent Park
6	M6A	North York	Lawrence Heights

In [4]:
```python
#lets change cells that are having 'Not assigned' values in Neighborhoo
d coloumn to match its corresponding Borough index
Toronto_df.loc[Toronto_df['Neighbourhood'] == 'Not assigned', ['Neighbo
urhood']] = Toronto_df['Borough']
Toronto_df.head()
```

Out[4]:

	Postcode	Borough	Neighbourhood
2	M3A	North York	Parkwoods
3	M4A	North York	Victoria Village
4	M5A	Downtown Toronto	Harbourfront
5	M5A	Downtown Toronto	Regent Park
6	M6A	North York	Lawrence Heights

In [5]:
```python
#lets group Neighborhoods having the same postalcode
Toronto_df = Toronto_df.groupby(['Postcode','Borough'])['Neighbourhood'
```

```
].apply(', '.join).reset_index()
Toronto_df.head()
```

Out[5]:

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

In [6]:
```
Toronto_df.rename_axis("Postal Code", axis='index', inplace=True)
Toronto_df.head()
```

Out[6]:

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

In [7]:
```
# lets now import all Licensed child care centers in Toronto
child_center = pd.read_html('https://github.com/mkorogluNYC/NYC_Data_Sc
ienceAcademy/blob/master/Shiny_project/toronto_cc.csv#L1008',header=0)[
0]
child_center.head()
```

Out[7]:

Unnamed: 0	Unnamed: 1	loc_id	name	type	str_no	street	postal_code	ward	pho

	Unnamed: 0	Unnamed: 1	loc_id	name	type	str_no	street	postal_code	ward	pho
0	NaN	1	1013	Lakeshore Community Child Care Centre	Non-Profit	101	seventh st	M8V 3B5	6	416-3 7(
1	NaN	2	1014	Alternative Primary School Parent Group	Non-Profit	1100	spadina rd	M5N 2M6	16	416-3 5:
2	NaN	3	1015	Cardinal Leger Child Care Centre (Scarborough)	Non-Profit	600	morrish rd	M1C 4Y1	44	416-2 0!
3	NaN	4	1016	George Brown - Richmond Adelaide Childcare Centre	Non-Profit	130	adelaide st w	M5H 3P5	28	416-4 2
4	NaN	5	1017	Woodland Nursery School	Non-Profit	1	firvalley crt	M1L 1N8	35	416-6 1138x

III. Data Cleaning & Processing

In [8]:
```
# lets see how many child care centers in Toronto
child_center.shape
```

Out[8]: (1007, 24)

In [9]:
```
#lets examine total number of childern enrolled on those centers
child_center['Total'].sum()
```

Out[9]: 68763

```
In [10]: child_center.drop(['Unnamed: 0', 'Unnamed: 1'], axis=1, inplace=True)
         child_center.rename(columns={'district':'Borough'}, inplace=True)
         child_center.head(5)
```

Out[10]:

	loc_id	name	type	str_no	street	postal_code	ward	phone	building.type	bld
0	1013	Lakeshore Community Child Care Centre	Non-Profit	101	seventh st	M8V 3B5	6	416-394-7601	Public Elementary School	S
1	1014	Alternative Primary School Parent Group	Non-Profit	1100	spadina rd	M5N 2M6	16	416-322-5385	Public Elementary School	Prep
2	1015	Cardinal Leger Child Care Centre (Scarborough)	Non-Profit	600	morrish rd	M1C 4Y1	44	416-287-0578	Catholic Elementary School	C C
3	1016	George Brown - Richmond Adelaide Childcare Centre	Non-Profit	130	adelaide st w	M5H 3P5	28	416-415-2453	Other	
4	1017	Woodland Nursery School	Non-Profit	1	firvalley crt	M1L 1N8	35	416-694-1138x151	High Rise Apartment	

4. Methodology

Child care cost is one of the key component of expenses of a family. It becomes more crucial for families, where each parent is not available to take care of their child and cannot afford to pay the full amount of the child care tuition. Child care fee subsidy in Canada is the main child care financing of each province introduced in the Canada Assistance Plan in 1972. Eligible families pay the child care cost depending on the income level. Certain conditions in terms of unavailability of each parent are listed in City of Toronto's website as the following.

Each parent is either:

- employed,
- looking for work,
- in school or planning to go to school, or
- if their child has a special need.

Eligible income range for child care fee subsidy in the City of Toronto is up to $73,000. Families with lower income ranges are eligible for larger amount of fee subsidy. This project aims to visualize the effectiveness of child care fee subsidy using dataset from the City of Toronto open data catalogue. The project has three purposes. First, the user can find the child care centre depending on his or her preferences on the location, subsidy choice, and the type of child care centre. Second, child care centres can be listed through the data clustering map, where the user can filter the results based on the location, subsidy, and type of child care centre choice. Finally, key insights from the dataset are provided to make the decision on how effective the fee subsidy program in the City of Toronto is at policy level.

5. Analysis

```
In [11]: subsidy_center = child_center['subsidy'].value_counts()
         subsidy_center = child_center.groupby(['name', 'subsidy','type','Boroug
         h'], as_index = False).sum()
         subsidy_center.head(5)
```

Out[11]:

	name	subsidy	type	Borough	loc_id	ward	Infant	Toddler	Preschooler	Kind
0	A & A Child Care Centre	Yes	Non-Profit	Scarborough	1288	41	20	25	48	
1	A B C Day Nursery	Yes	Commercial	North York	1036	15	10	15	16	

	name	subsidy	type	Borough	loc_id	ward	Infant	Toddler	Preschooler	Kind
2	A Place To Play Nursery School Of Bloor West V...	No	Non-Profit	Etobicoke York	6632	13	0	0	16	
3	Abacus Day Care Centre (629735 Ontario Inc.)	Yes	Commercial	Scarborough	1301	40	0	10	24	
4	Abacus Montessori Learning Centre	No	Commercial	North York	9995	34	0	15	48	

In [12]:
```python
#lets see how many centers provide fee_subsidy in Toronto
subsidy_center = child_center['subsidy'].value_counts()
subsidy_center.rename(columns={'subsidy':'fee_subsidy'},inplace = True)
subsidy_center.index.name = 'fee_subsidy'
subsidy_center
```

Out[12]:
```
fee_subsidy
Yes    677
No     330
dtype: int64
```

In [13]:
```python
child_center.describe()
```

Out[13]:

	loc_id	ward	Infant	Toddler	Preschooler	Kindergarten	Gradel
count	1007.000000	1007.000000	1007.000000	1007.000000	1007.000000	1007.000000	1007.000
mean	6878.050645	22.650447	3.464747	9.788481	22.910626	12.385303	19.735
std	4719.244161	12.133328	5.967315	9.937576	17.022788	17.797639	26.052

	loc_id	ward	Infant	Toddler	Preschooler	Kindergarten	Gradek
min	1013.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000
25%	1775.500000	13.000000	0.000000	0.000000	16.000000	0.000000	0.000
50%	6551.000000	23.000000	0.000000	10.000000	24.000000	0.000000	0.000
75%	12064.000000	32.000000	10.000000	15.000000	32.000000	26.000000	30.000
max	13564.000000	44.000000	30.000000	56.000000	204.000000	100.000000	144.000

In [14]:
```python
#lets see how many categories of child care centers and how many center
 in each category
center_type = child_center['type'].value_counts()
center_type.rename(columns={'type':'center_type'},inplace = True)
center_type.index.name = 'center_type'
center_type
```

Out[14]:
```
center_type
Non-Profit       668
Commercial       286
City-Operated     53
dtype: int64
```

According to our data for the Liscensed child care center in Toronto, we found that:

- Non-Profit centers = 668
- Commercial Centers = 286
- City operated centers = 53

In [15]:
```python
import matplotlib.pyplot as plt
ax = center_type.plot(kind='bar',figsize=(15, 8),width = 0.4,color = [
'#5cb85c','#5bc0de','#d9534f'],edgecolor=None)
plt.title("No. of Child Care Centers in each Category in Toronto",fonts
ize= 16)
plt.xticks(fontsize=14)
ax.spines['top'].set_visible(False)
```

```
ax.spines['right'].set_visible(False)
ax.spines['left'].set_visible(False)
plt.yticks([])
# Add this loop to add the annotations
for p in ax.patches:
    width, height = p.get_width(), p.get_height()
    x, y = p.get_xy()
    ax.annotate("{:}".format(height), (p.get_x()+ .45*width, p.get_y()
+ height + 4) ,fontsize= 14)
```


No. of Child Care Centers in each Category in Toronto
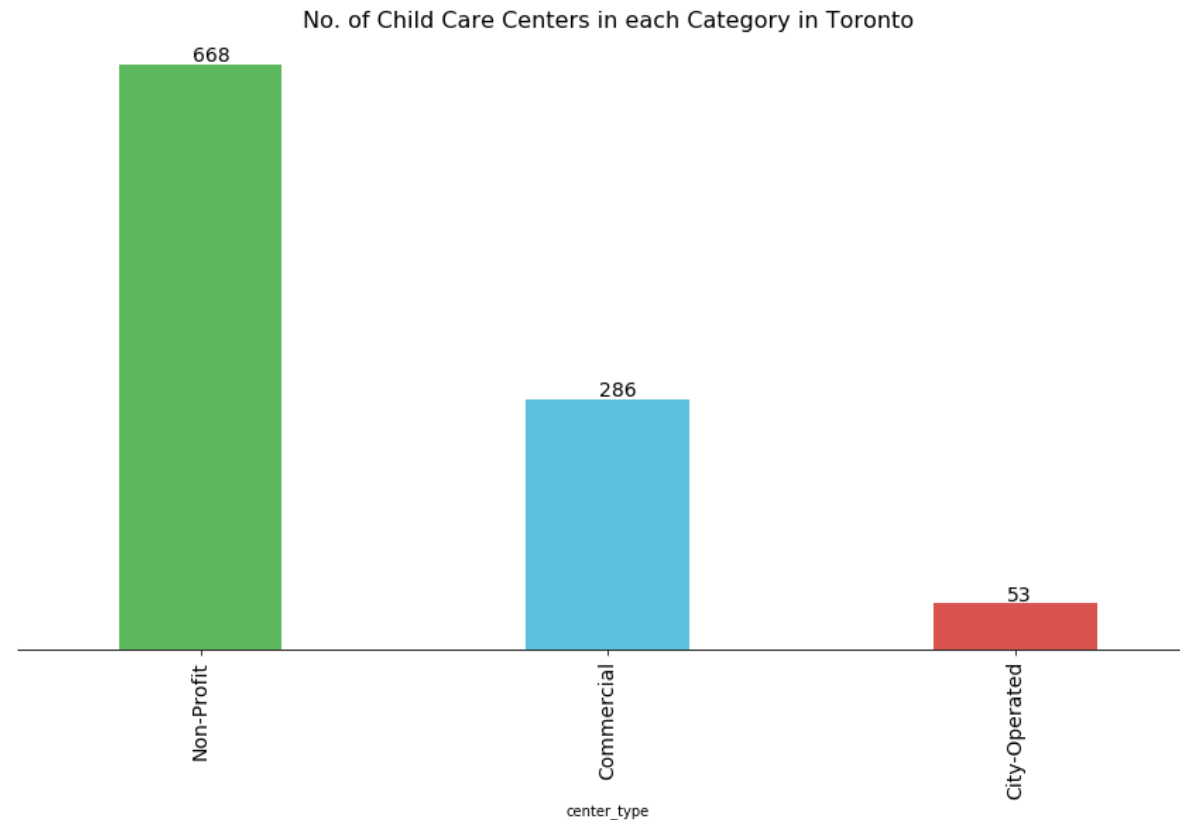
In [16]:
```
#lets see how many child care centers in each Borough
center_loc = child_center['Borough'].value_counts()
center_loc.index.name = 'Borough'
center_loc
```

```
Out[16]: Borough
         Toronto East York     318
         North York            266
         Etobicoke York        226
         Scarborough           197
         Name: Borough, dtype: int64
```

According to our data for the Liscensed child care center in Toronto again, we found that:

- child care centers in Toronto East York = 318
- child care centers in North York = 266
- child care centers in Etobicoke York = 226
- child care centers in Scarborough = 197

In [17]:
```python
ax1 = center_loc.plot(kind='bar',figsize=(15, 8),width = 0.4 ,edgecolor
=None)
plt.title("No. of Child Care Centers in Each Borough",fontsize= 16)

plt.xticks(fontsize=14)
ax1.spines['top'].set_visible(False)
ax1.spines['right'].set_visible(False)
ax1.spines['left'].set_visible(False)
plt.yticks([])
# Add this loop to add the annotations
for p in ax1.patches:
    width, height = p.get_width(), p.get_height()
    x, y = p.get_xy()
    ax1.annotate("{:}".format(height), (p.get_x()+ .45*width, p.get_y()
 + height + 4) ,fontsize= 14)
```

No. of Child Care Centers in Each Borough
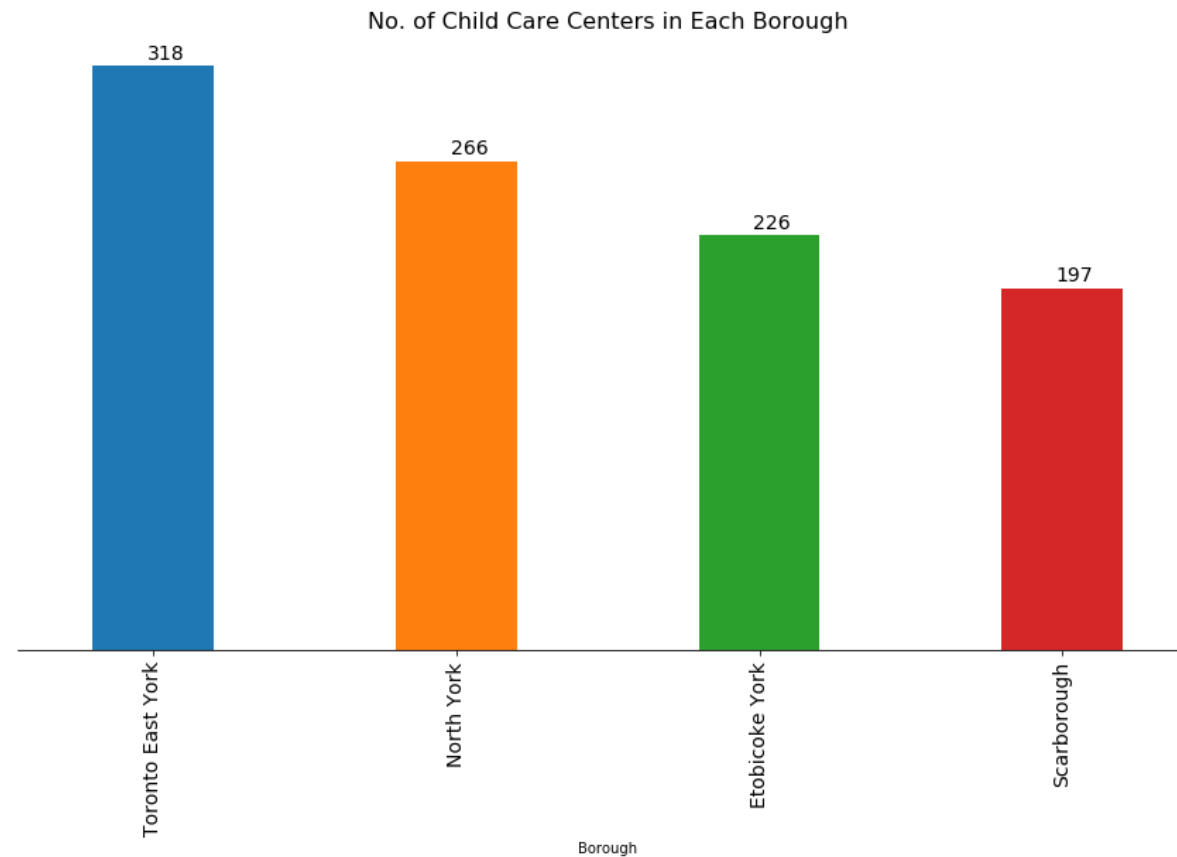
In [18]:
```python
# lets see child distribution among each categories in each Bourough
df_test = child_center[['type','Borough', 'subsidy','Infant','Toddler',
'Preschooler','Kindergarten','Gradelevel','Total']]
df_grp = df_test.groupby(['Borough','subsidy', 'type'], as_index = False).sum()
df_grp.head()
```

Out[18]:

	Borough	subsidy	type	Infant	Toddler	Preschooler	Kindergarten	Gradelevel	Total
0	Etobicoke York	No	Commercial	165	539	1327	209	402	2642

	Borough	subsidy	type	Infant	Toddler	Preschooler	Kindergarten	Gradelevel	Total
1	Etobicoke York	No	Non-Profit	20	109	556	15	208	908
2	Etobicoke York	Yes	City-Operated	126	205	312	62	74	779
3	Etobicoke York	Yes	Commercial	116	275	633	248	459	1731
4	Etobicoke York	Yes	Non-Profit	306	770	1562	2334	3909	8881

In [20]:
```python
df_grp1 = df_grp.groupby(['type','subsidy','Borough'])['Total'].sum(normalize=True)
df_grp1
```

Out[20]:
```
type            subsidy  Borough
City-Operated   Yes      Etobicoke York        779
                         North York            471
                         Scarborough           597
                         Toronto East York     815
Commercial      No       Etobicoke York       2642
                         North York           2866
                         Scarborough          1009
                         Toronto East York    3652
                Yes      Etobicoke York       1731
                         North York           2218
                         Scarborough          2559
                         Toronto East York     553
Non-Profit      No       Etobicoke York        908
                         North York           1995
                         Scarborough           933
                         Toronto East York    2004
                Yes      Etobicoke York       8881
                         North York          11795
                         Scarborough          6644
                         Toronto East York   15711
Name: Total, dtype: int64
```

From above dataframe, we noticed that all city operated centers are eligible for fee subsidy. In contrast, commercial & Non-profit centers are eligible for both. Now, lets visualize number of children enrolled in each categories in each Borough

In [28]:
```python
df_grp1.plot(kind='barh', figsize=(25, 20), color='steelblue', edgecolor=None, fontsize= 20)
plt.xlabel('Number of enrolled children',fontsize= 16)
plt.title('Child Distribution Among Each Categories in each Bourough',fontsize= 20)

for index, value in enumerate(df_grp1):
    label = format(int(value), ',')
    plt.annotate(label, xy=(value - 4, index - 0.10), color='black',fontsize= 20)
plt.show()
```

Child Distribution Among Each Categories in each Bourough

Category	Value
(Non-Profit, Yes, Toronto East York)	15,711
(Non-Profit, Yes, Scarborough)	6,644
(Non-Profit, Yes, North York)	11,795
(Non-Profit, Yes, Etobicoke York)	8,881
(Non-Profit, No, Toronto East York)	2,004
(Non-Profit, No, Scarborough)	933
(Non-Profit, No, North York)	1,995
(Non-Profit, No, Etobicoke York)	908
(Commercial, Yes, Toronto East York)	553
(Commercial, Yes, Scarborough)	2,559
(Commercial, Yes, North York)	2,218
(Commercial, Yes, Etobicoke York)	1,731
(Commercial, No, Toronto East York)	3,652
(Commercial, No, Scarborough)	1,009
(Commercial, No, North York)	2,866
(Commercial, No, Etobicoke York)	2,642
(City-Operated, Yes, Toronto East York)	815
(City-Operated, Yes, Scarborough)	597
(City-Operated, Yes, North York)	471
(City-Operated, Yes, Etobicoke York)	779

```
In [29]: df_test1 = child_center[['type','Borough', 'subsidy','Infant','Toddler'
         ,'Preschooler','Kindergarten','Gradelevel','Total']]
         #df_test
         df_grp2 = df_test.groupby(['Borough', 'type'], as_index = False).sum()
         df_grp2
```

Out[29]:

	Borough	type	Infant	Toddler	Preschooler	Kindergarten	Gradelevel	Total
0	Etobicoke York	City-Operated	126	205	312	62	74	779
1	Etobicoke York	Commercial	281	814	1960	457	861	4373
2	Etobicoke York	Non-Profit	326	879	2118	2349	4117	9789
3	North York	City-Operated	46	75	152	80	118	471
4	North York	Commercial	371	1206	2646	305	556	5084
5	North York	Non-Profit	422	1588	4034	2895	4851	13790
6	Scarborough	City-Operated	76	145	224	98	54	597
7	Scarborough	Commercial	251	658	1669	227	763	3568
8	Scarborough	Non-Profit	371	938	2118	1644	2506	7577
9	Toronto East York	City-Operated	110	180	280	100	145	815
10	Toronto East York	Commercial	434	1074	2226	272	199	4205
11	Toronto East York	Non-Profit	675	2095	5332	3983	5630	17715

```
In [30]: df_grp2.columns.values
```

Out[30]: array(['Borough', 'type', 'Infant', 'Toddler', 'Preschooler',
               'Kindergarten', 'Gradelevel', 'Total'], dtype=object)

```
In [31]: df_grp2.index.values
```

```
Out[31]: array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11], dtype=int64)

In [32]: print(type(df_grp2.columns))
         print(type(df_grp2.index))

         <class 'pandas.core.indexes.base.Index'>
         <class 'pandas.core.indexes.numeric.Int64Index'>

In [33]: df_grp2.columns.tolist()
         df_grp2.index.tolist()

         print (type(df_grp2.columns.tolist()))
         print (type(df_grp2.index.tolist()))

         <class 'list'>
         <class 'list'>

In [34]: df_grp2.type # returns a series

Out[34]: 0      City-Operated
         1         Commercial
         2         Non-Profit
         3      City-Operated
         4         Commercial
         5         Non-Profit
         6      City-Operated
         7         Commercial
         8         Non-Profit
         9      City-Operated
         10        Commercial
         11        Non-Profit
         Name: type, dtype: object

In [35]: df_grp2.set_index('type', inplace=True)
         df_grp2

Out[35]:
```

Borough	Infant	Toddler	Preschooler	Kindergarten	Gradelevel	Total

type	Borough	Infant	Toddler	Preschooler	Kindergarten	Gradelevel	Total
type							
City-Operated	Etobicoke York	126	205	312	62	74	779
Commercial	Etobicoke York	281	814	1960	457	861	4373
Non-Profit	Etobicoke York	326	879	2118	2349	4117	9789
City-Operated	North York	46	75	152	80	118	471
Commercial	North York	371	1206	2646	305	556	5084
Non-Profit	North York	422	1588	4034	2895	4851	13790
City-Operated	Scarborough	76	145	224	98	54	597
Commercial	Scarborough	251	658	1669	227	763	3568
Non-Profit	Scarborough	371	938	2118	1644	2506	7577
City-Operated	Toronto East York	110	180	280	100	145	815
Commercial	Toronto East York	434	1074	2226	272	199	4205
Non-Profit	Toronto East York	675	2095	5332	3983	5630	17715

city operated centers

lets see what is the total number of children in city_operated centers in Toronto

```
In [36]:
# city operated centers
city_op = df_grp2.loc['City-Operated', ['Borough','Infant', 'Toddler',
'Preschooler', 'Kindergarten', 'Gradelevel', 'Total']]
city_op.set_index('Borough', inplace=True)
city_op
```

Out[36]:

	Infant	Toddler	Preschooler	Kindergarten	Gradelevel	Total
Borough						

	Infant	Toddler	Preschooler	Kindergarten	Gradelevel	Total
Borough						
Etobicoke York	126	205	312	62	74	779
North York	46	75	152	80	118	471
Scarborough	76	145	224	98	54	597
Toronto East York	110	180	280	100	145	815

In [37]:
```python
# lets see what is the total number of children in city_operated centers in Toronto
child_num = city_op['Total'].sum()
child_num
```

Out[37]: 2662

In [45]:
```python
ax4 = city_op.plot(kind='bar',figsize=(20, 10),width = 0.8,edgecolor=None)
plt.legend(city_op.columns,fontsize= 14)
plt.title("Distribution of children by Age enrolled in City_Operated centers in each Borough ",fontsize= 16)

plt.xticks(fontsize=14)
ax4.spines['top'].set_visible(False)
ax4.spines['right'].set_visible(False)
ax4.spines['left'].set_visible(False)
plt.yticks([])
# Add this loop to add the annotations
for p in ax4.patches:
    width, height = p.get_width(), p.get_height()
    x, y = p.get_xy()
    ax4.annotate("{:}".format(height), (p.get_x()+.057 *width, p.get_y() + height + 2) ,fontsize= 13)
```

Distribution of children by Age enrolled in City_Operated centers in each Borough
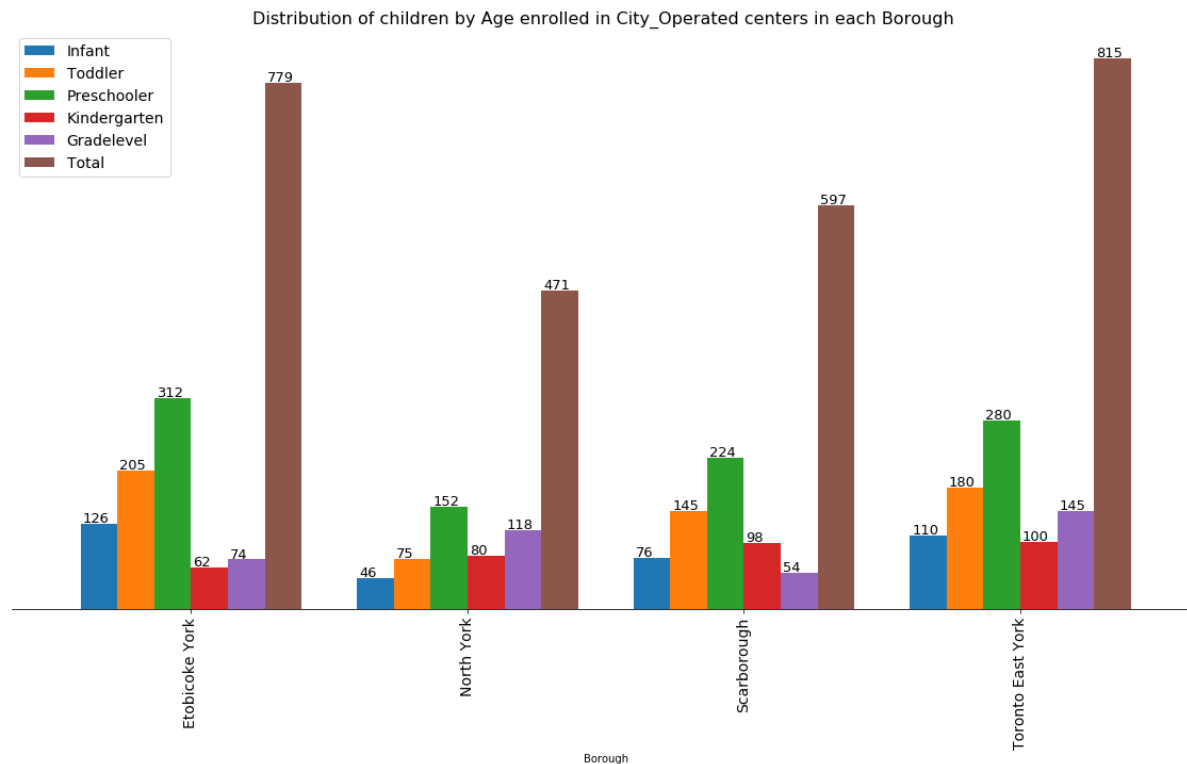
Commercial centers

lets see what is the total number of children in Commercial centers in Toronto

In [40]:
```python
Commer_cent = df_grp2.loc['Commercial', ['Borough','Infant',  'Toddler'
, 'Preschooler', 'Kindergarten', 'Gradelevel', 'Total']]
Commer_cent.set_index('Borough', inplace=True)
Commer_cent
```

Out[40]:

Borough	Infant	Toddler	Preschooler	Kindergarten	Gradelevel	Total
Etobicoke York	281	814	1960	457	861	4373

	Infant	Toddler	Preschooler	Kindergarten	Gradelevel	Total
Borough						
North York	371	1206	2646	305	556	5084
Scarborough	251	658	1669	227	763	3568
Toronto East York	434	1074	2226	272	199	4205

In [41]:
```python
# lets see what is the total number of children in commercial centers i
n Toronto
child_num1 = Commer_cent['Total'].sum()
child_num1
```

Out[41]: 17230

In [44]:
```python
ax5 = Commer_cent.plot(kind='bar',figsize=(20, 10),width = 0.8,edgecolo
r=None)
plt.legend(Commer_cent.columns,fontsize= 14)
plt.title("Distribution of children by Age enrolled in Commercial cente
rs in each Borough ",fontsize= 16)

plt.xticks(fontsize=14)
ax5.spines['top'].set_visible(False)
ax5.spines['right'].set_visible(False)
ax5.spines['left'].set_visible(False)
plt.yticks([])
# Add this loop to add the annotations
for p in ax5.patches:
    width, height = p.get_width(), p.get_height()
    x, y = p.get_xy()
    ax5.annotate("{:}".format(height), (p.get_x()+.059 *width, p.get_y
() + height + 3) ,fontsize= 14)
```

Distribution of children by Age enrolled in Commercial centers in each Borough
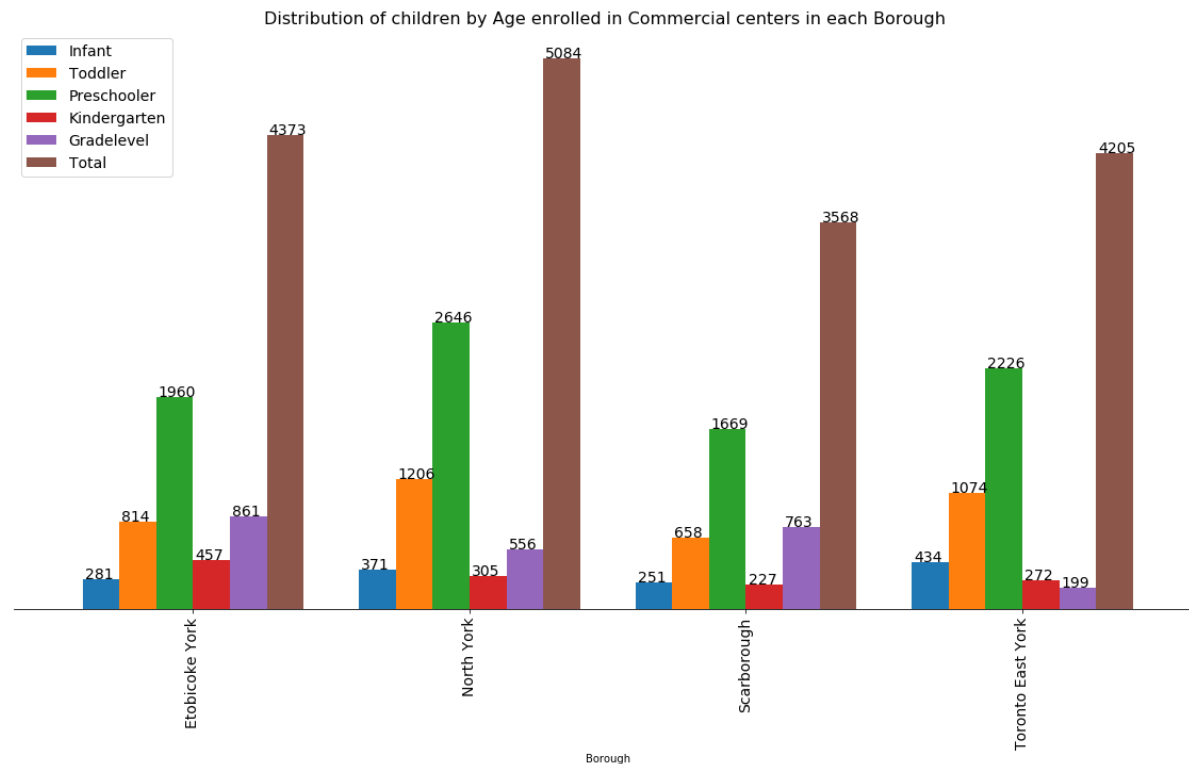
Non-profit centers

lets see what is the total number of children in Non-profit centers in Toronto

In [46]:
```python
non_profit = df_grp2.loc['Non-Profit', ['Borough','Infant', 'Toddler',
    'Preschooler', 'Kindergarten', 'Gradelevel', 'Total']]
non_profit.set_index('Borough', inplace=True)
non_profit
```

Out[46]:

Borough	Infant	Toddler	Preschooler	Kindergarten	Gradelevel	Total
Etobicoke York	326	879	2118	2349	4117	9789

	Infant	Toddler	Preschooler	Kindergarten	Gradelevel	Total
Borough						
North York	422	1588	4034	2895	4851	13790
Scarborough	371	938	2118	1644	2506	7577
Toronto East York	675	2095	5332	3983	5630	17715

In [47]:
```python
# lets see what is the total number of children in Non-Profit centers in Toronto
child_num2 = non_profit['Total'].sum()
child_num2
```

Out[47]: 48871

In [48]:
```python
ax6 = non_profit.plot(kind='bar',figsize=(20, 10),width = 0.8,edgecolor=None)
plt.legend(non_profit.columns,fontsize= 14)
plt.title("Distribution of children by Age enrolled in Non_Profit Centers in each Borough ",fontsize= 16)

plt.xticks(fontsize=14)
ax6.spines['top'].set_visible(False)
ax6.spines['right'].set_visible(False)
ax6.spines['left'].set_visible(False)
plt.yticks([])
# Add this loop to add the annotations
for p in ax6.patches:
    width, height = p.get_width(), p.get_height()
    x, y = p.get_xy()
    ax6.annotate("{:}".format(height), (p.get_x()+.006 *width, p.get_y() + height + 7) ,fontsize= 14)
```

Distribution of children by Age enrolled in Non_Profit Centers in each Borough
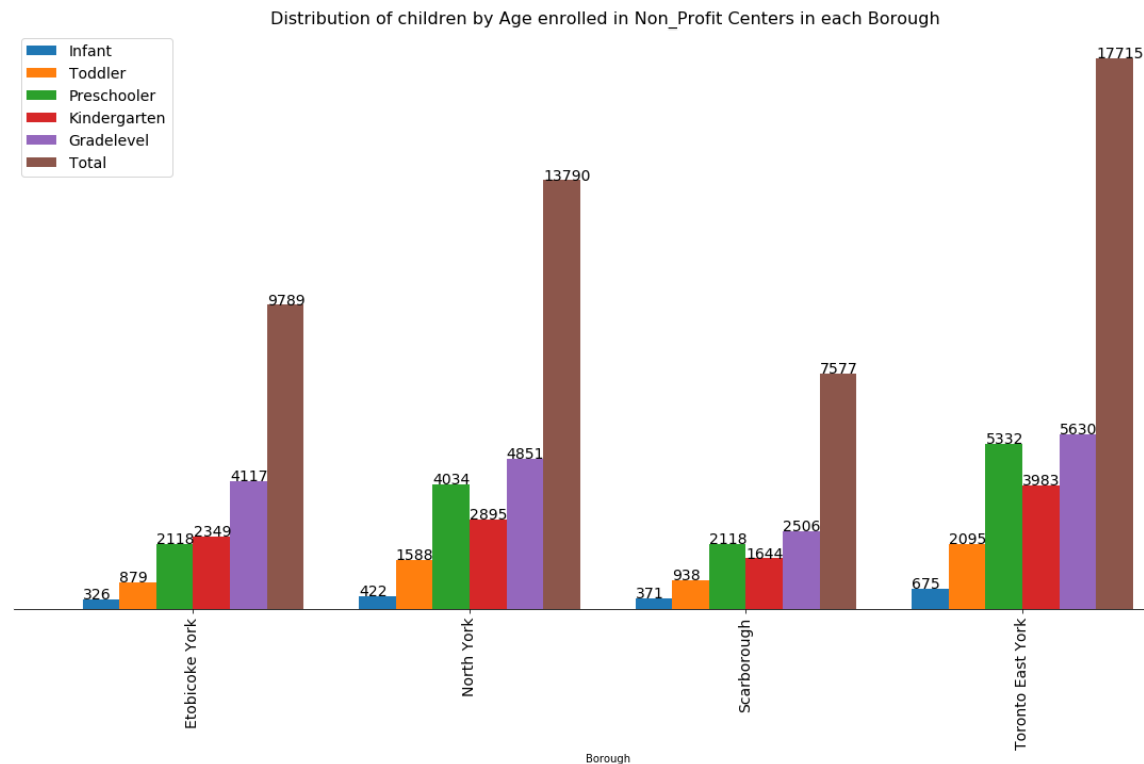
```
In [49]:  print('Percentage of child enrolled in Non-profit centers = {:}%'.forma
          t(child_num2/68763* 100))
          print('Percentage of child enrolled in Commercial centers = {:}%'.forma
          t(child_num1/68763* 100))
          print('Percentage of child enrolled in City-Operated centers = {:}%'.fo
          rmat(child_num/68763* 100))
```

```
Percentage of child enrolled in Non-profit centers = 71.07165190582144%
Percentage of child enrolled in Commercial centers = 25.05708011575992
7%
Percentage of child enrolled in City-Operated centers = 3.8712679784186
266%
```

```
In [51]:  child_center.columns = list(map(str, child_center.columns))
          child_center.head()
```

Out[51]:

	loc_id	name	type	str_no	street	postal_code	ward	phone	building.type	bld
0	1013	Lakeshore Community Child Care Centre	Non-Profit	101	seventh st	M8V 3B5	6	416-394-7601	Public Elementary School	S
1	1014	Alternative Primary School Parent Group	Non-Profit	1100	spadina rd	M5N 2M6	16	416-322-5385	Public Elementary School	Prep
2	1015	Cardinal Leger Child Care Centre (Scarborough)	Non-Profit	600	morrish rd	M1C 4Y1	44	416-287-0578	Catholic Elementary School	C C
3	1016	George Brown - Richmond Adelaide Childcare Centre	Non-Profit	130	adelaide st w	M5H 3P5	28	416-415-2453	Other	
4	1017	Woodland Nursery School	Non-Profit	1	firvalley crt	M1L 1N8	35	416-694-1138x151	High Rise Apartment	

Exploring and clustering neighborhoods in Toronto.

In [52]:
```python
#!conda install -c conda-forge geopy --yes
from geopy.geocoders import Nominatim # convert an address into latitude and longitude values
```

In [53]:
```python
#!conda install -c conda-forge folium=0.5.0 --yes
import folium

print('Folium installed and imported!')
```

Folium installed and imported!

```python
In [54]:  # Use geopy library to get the latitude and longitude values of Toronto
          address = 'Toronto, Ontario Canada'

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

```
C:\Users\adnan-\Anaconda3\lib\site-packages\ipykernel_launcher.py:4: De
precationWarning: Using Nominatim with the default "geopy/1.19.0" `user
_agent` is strongly discouraged, as it violates Nominatim's ToS http
s://operations.osmfoundation.org/policies/nominatim/ and may possibly c
ause 403 and 429 HTTP errors. Please specify a custom `user_agent` with
`Nominatim(user_agent="my-application")` or by overriding the default `
user_agent`: `geopy.geocoders.options.default_user_agent = "my-applicat
ion"`. In geopy 2.0 this will become an exception.
  after removing the cwd from sys.path.
```

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

```python
In [55]:  # create map of Toronto using latitude and longitude values
          toronto_map = folium.Map(location=[latitude, longitude], zoom_start=11)

          # add markers to map
          for lat, lng, name, type, Borough in zip(child_center['latitude'], chil
          d_center['longitude'], child_center['name'],
              child_center['type'] , child_center['Borough'] ):
              label = '{},{},{}'.format(name,type,Borough)
              label = folium.Popup(label, parse_html=True)
              folium.CircleMarker(
                  [lat, lng],
                  radius=4,
                  popup=label,
                  color='blue',
                  fill=True,
                  fill_color='#87cefa',
                  fill_opacity=0.5,
```

```
                     parse_html=False).add_to(toronto_map)
```

In [56]: `toronto_map`

Out[56]:
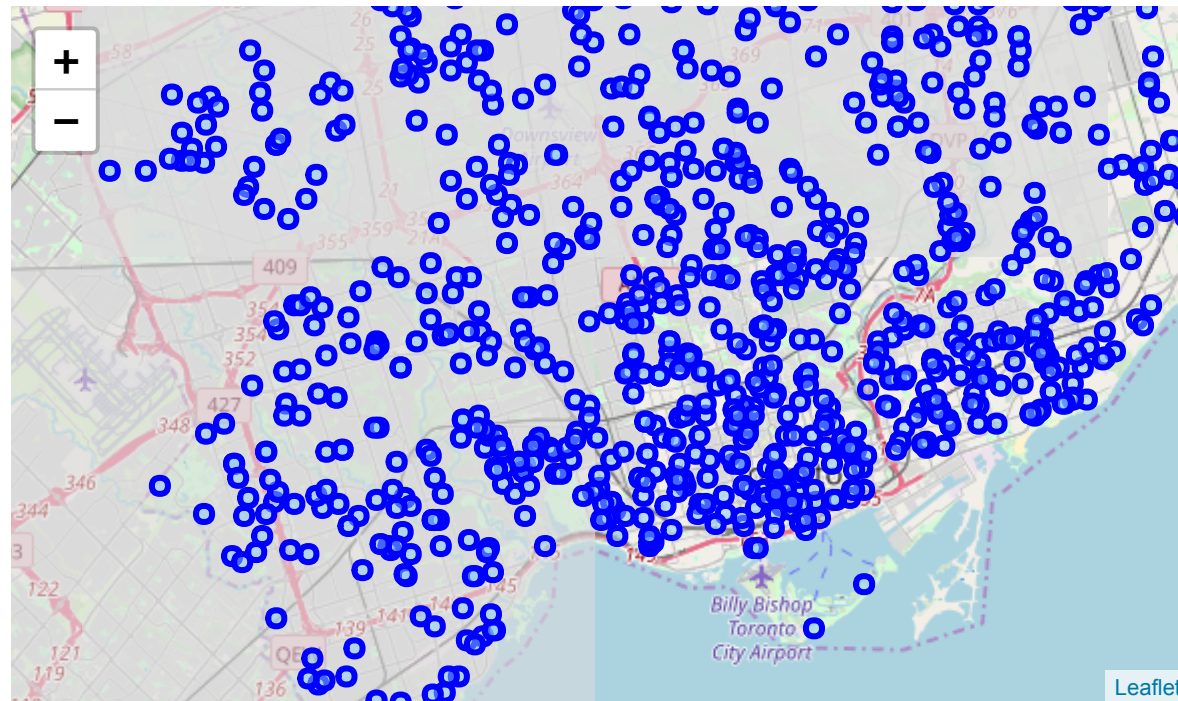
Using the Foursquare API to explore and segmented neighborhoods

In [100]: `# Credentials to be Omitted!!!`

In [58]:
```
# lets explore first child care center in our dataframe
child_center.loc[0]
```

Out[58]:
```
loc_id                                         1013
name               Lakeshore Community Child Care Centre
```

```
type                                          Non-Profit
str_no                                               101
street                                        seventh st
postal_code                                      M8V 3B5
ward                                                   6
phone                                       416-394-7601
building.type                  Public Elementary School
bldgname                  Seventh Street Public School
Infant                                                 0
Toddler                                               20
Preschooler                                           32
Kindergarten                                          40
Gradelevel                                            60
Total                                                152
subsidy                                              Yes
gc_geoid                                         1031242
longitude                                       -79.5046
latitude                                         43.5999
run_date                                       15-Jun-17
Borough                                   Etobicoke York
Name: 0, dtype: object
```

In [59]:
```python
# Get the child care center's latitude and longitude values.
childcare_center_latitude = child_center.loc[0, 'latitude'] # Center latitude value
childcare_center_longitude = child_center.loc[0, 'longitude'] # Center longitude value
childcare_center_name = child_center.loc[0, 'name'] # Center name
childcare_center_loc = child_center.loc[0, 'Borough']# Borough name
childcare_center_type = child_center.loc[0, 'type']# Center type
print('Latitude and longitude values of {} are {}, {}.'.format(childcare_center_name,
                                                               childcare_center_latitude,
                                                               childcare_center_longitude))
print('This child care center is in {} and it is {}.'.format(childcare_center_loc,childcare_center_type))
```

Latitude and longitude values of Lakeshore Community Child Care Centre

are 43.59991069, -79.50463054.
This child care center is in Etobicoke York and it is Non-Profit.

```
In [60]: toronto_onehot = pd.get_dummies(child_center[['subsidy','type']], prefi
         x="", prefix_sep="")

         # add care center column back to dataframe
         toronto_onehot['name'] = child_center['name']

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

         toronto_onehot.head()
```

Out[60]:

	name	No	Yes	City-Operated	Commercial	Non-Profit
0	Lakeshore Community Child Care Centre	0	1	0	0	1
1	Alternative Primary School Parent Group	0	1	0	0	1
2	Cardinal Leger Child Care Centre (Scarborough)	0	1	0	0	1
3	George Brown - Richmond Adelaide Childcare Centre	0	1	0	0	1
4	Woodland Nursery School	1	0	0	0	1

```
In [61]: toronto_onehot.shape
```

Out[61]: (1007, 6)

Clustering Neighborhoods

Run k-means to cluster the neighborhood into 5 clusters.

In [62]:
```python
kclusters = 5

toronto_grouped_clustering = toronto_onehot.drop('name', 1)
# run k-means clustering
kmeans = KMeans(n_clusters=kclusters, random_state=1).fit(toronto_group
ed_clustering)

# check cluster labels generated for each row in the dataframe
kmeans.labels_[0:5]
```

Out[62]:
```
array([1, 1, 1, 1, 3])
```

In [63]:
```python
toronto_merged = child_center

# add clustering labels
toronto_merged['Cluster Labels'] = kmeans.labels_

# merge toronto_grouped with toronto_data to add latitude/longitude for
 each neighborhood
toronto_merged = toronto_merged.join(toronto_onehot.set_index('name'),
on='name')

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

Out[63]:

	loc_id	name	type	str_no	street	postal_code	ward	phone	building.type	bld
0	1013	Lakeshore Community Child Care Centre	Non-Profit	101	seventh st	M8V 3B5	6	416-394-7601	Public Elementary School	S
1	1014	Alternative Primary School Parent Group	Non-Profit	1100	spadina rd	M5N 2M6	16	416-322-5385	Public Elementary School	Prep
2	1015	Cardinal Leger Child Care Centre (Scarborough)	Non-Profit	600	morrish rd	M1C 4Y1	44	416-287-0578	Catholic Elementary School	C C

	loc_id	name	type	str_no	street	postal_code	ward	phone	building.type	bld
3	1016	George Brown - Richmond Adelaide Childcare Centre	Non-Profit	130	adelaide st w	M5H 3P5	28	416-415-2453	Other	
4	1017	Woodland Nursery School	Non-Profit	1	firvalley crt	M1L 1N8	35	416-694-1138x151	High Rise Apartment	

In [64]:
```python
toronto_merged.groupby('Cluster Labels').mean()
```

Out[64]:

Cluster Labels	loc_id	ward	Infant	Toddler	Preschooler	Kindergarten	Gradelevel	
0	3634.436170	24.425532	6.585106	14.776596	30.457447	6.510638	16.787234	75.
1	5619.293233	22.939850	3.240602	8.624060	19.552632	19.746241	30.009398	81.
2	10873.601036	22.222798	3.720207	12.321244	29.419689	3.362694	4.150259	52.
3	9816.553957	21.338129	0.503597	6.705036	23.482014	2.913669	8.618705	42.
4	3204.660377	22.603774	6.754717	11.415094	18.264151	6.415094	7.377358	50.

In [65]:
```python
# 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_m
erged['longitude'], toronto_merged['name'],kmeans.labels_):
    label = folium.Popup(str(poi) + ' Cluster ' + str(cluster), parse_h
tml=True)
    folium.CircleMarker(
        [lat, lon],
        radius=5,
        popup=label,
        color=rainbow[cluster-1],
        fill=True,
        fill_color=rainbow[cluster-1],
        fill_opacity=0.7).add_to(map_clusters)

map_clusters
```

Out[65]:
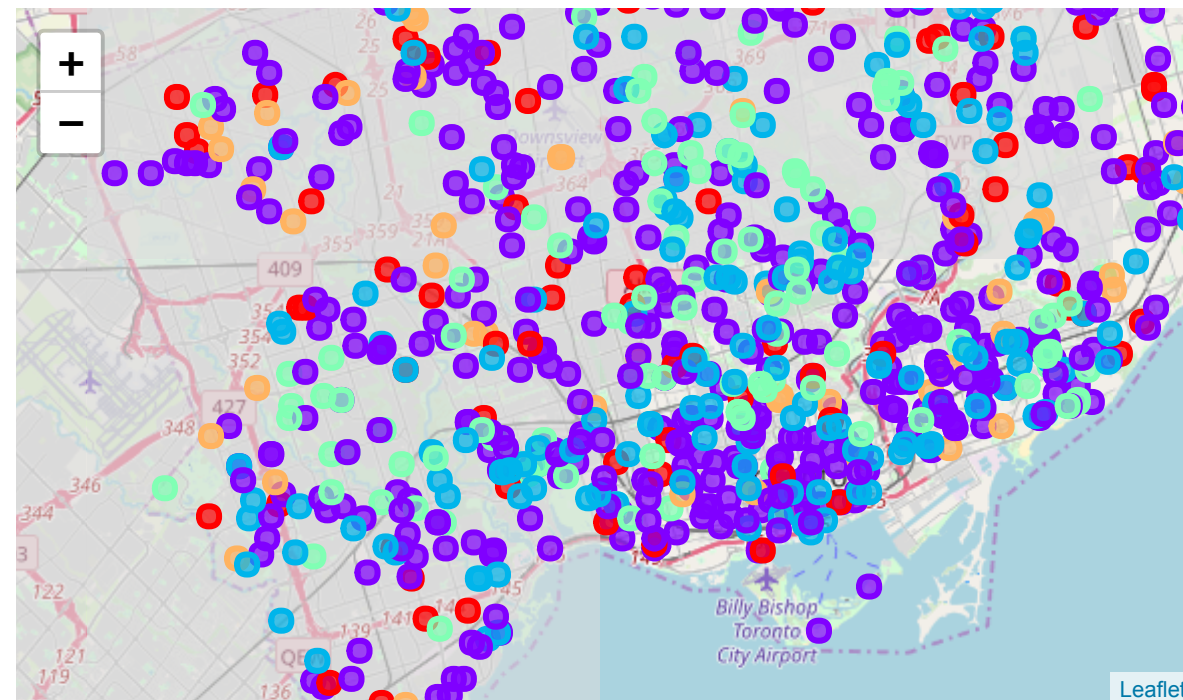
```
In [75]:  # Lets just take portion of dataframe where Boroughs is having least nu
          mber of care centers (197) that is Scarborough.
          toronto_scarborough = toronto_merged[toronto_merged['Borough'].str.cont
          ains("Scarborough")].reset_index(drop=True)
          print(toronto_scarborough.shape)
          toronto_scarborough.head()
```

(199, 28)

Out[75]:

	loc_id	name	type	str_no	street	postal_code	ward	phone	buildir
0	1015	Cardinal Leger Child Care Centre (Scarborough)	Non-Profit	600	morrish rd	M1C 4Y1	44	416-287-0578	C Elen
1	1017	Woodland Nursery School	Non-Profit	1	firvalley crt	M1L 1N8	35	416-694-1138x151	Hig Apa
2	1021	Centennial College Progress Campus Child Care ...	Non-Profit	941	progress ave	M1G 3T8	38	416-289-5000x2110	Con College/Un
3	1031	Cedarbrae Day Nurseries (20 Greencrest)	Commercial	20	greencrest circt	M1G 1B8	43	416-431-2504	Hig Apa
4	1045	Children's Village #1 Day Care Centre	Commercial	1050	markham rd	M1H 2Y7	38	416-438-3355	Hig Apa

```
In [76]:  # Re-create the map with new markers for scarborough Neighborhoods.
          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_scarborough['latitude'], toro
nto_scarborough['longitude'], toronto_scarborough['name'],kmeans.labels
_):
    label = folium.Popup(str(poi) + ' Cluster ' + str(cluster), parse_h
tml=True)
    folium.CircleMarker(
        [lat, lon],
        radius=5,
        popup=label,
        color=rainbow[cluster-1],
        fill=True,
        fill_color=rainbow[cluster-1],
        fill_opacity=0.7).add_to(map_clusters)

map_clusters
```

Out[76]:
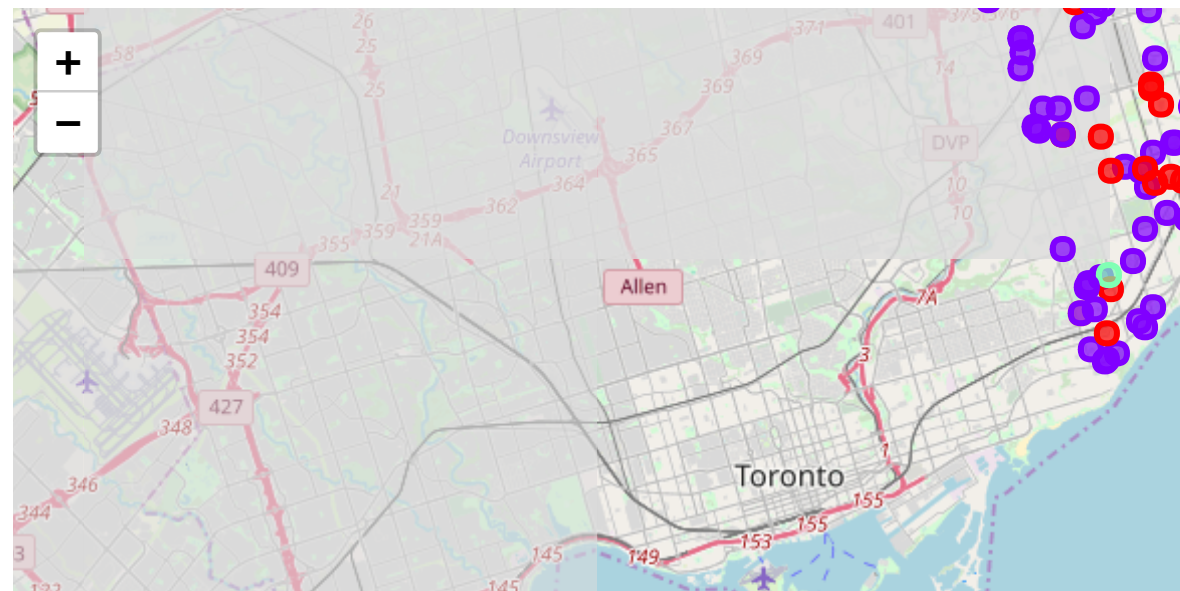
Now, let's use foursquare api query url, search child care center on all boroughs

In [77]:
```python
# The following function retrieves the care center given the names and
 coordinates and stores it into dataframe.
LIMIT=100
def getNearbyCenters(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]['it
ems']

        # 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 fo
r item in venue_list])
    nearby_venues.columns = ['care_center',
                             'care_center Latitude',
                             'care_center Longitude',
                             'Venue',
                             'Venue Latitude',
                             'Venue Longitude',
                             'Venue Category']

    return(nearby_venues)
```

Retrieve all centers and nearby venues given the Addresses

In [78]:
```
toronto_child_care = getNearbyCenters(names=toronto_scarborough['name'
],
                                      latitudes=toronto_scarborough['latit
ude'],
                                      longitudes=toronto_scarborough['long
itude']
                                      )
```

```
Cardinal Leger Child Care Centre (Scarborough)
Woodland Nursery School
Centennial College Progress Campus Child Care Centre(941 Progress)
Cedarbrae Day Nurseries (20 Greencrest)
Children's Village #1 Day Care Centre
Discovery Place Child Care Centre Ltd.
East Scarb. Boys' & Girls' Club(Eastside Child Care Centre 20 Waldock)
Eastside Club
Guildwood Child Care
Golf Road School Child Care Centre
Morningside Children's Centre
N.Y.A.D. Guildwood
```

N'Sheemaehn
Rosalie Hall Child Development Centre
Sandbox Day Care Centre
Sheppard Square Day Nursery
A & A Child Care Centre
West Hill Centre For Early Learning (Centres For Early Learning Inc.)
Abacus Day Care Centre (629735 Ontario Inc.)
Cedarbrae Day Nursery (1375 Midland)
Cedarbrae Day Nurseries (1385 Midland)
Children Of Tomorrow - John McCrae
Birchmount Place Centre For Early Learning
Immanuel Day Care Centre
Kiddies Lodge Day Care Centre
Kimbercroft Day Nursery (30 Kimbercroft Court)
Knob Hill Day Nursery
Kimbercroft Day Nursery 2
Progress Childcare (Scarborough Inc. #1 (3 Glamorgan)
Tamarack Day Care Centre (765566 Ontario Inc)
Mother Of Compassion Child Care
Vradenburg Community Child Care Centre
N.Y.A.D. Donwood
Wexford Community Childcare Centre
Rainbow Village Childcare Centre (Mid-Scarborough Child Care)
Cambridge Place Centre For Early Learning
Children's Village Day Care Centre #3
Cliffcrest Day Care Centre
Scarborough Village Day Nursery 1
Cougar Court Child Care Centre 25
Scarborough Village Day Nursery 2
Birds And Bees Day Care Centre
Hilltop Daycare Centre
Today's Child Tomorrow's Future Children's Centre (290 Blantyre)
John A. Leslie Childcare - Scarborough
Kenlinton Child Care Centre (Operator: Stonehill) Facility #16008
Kennedy Road Kiddy Kare
Today's Child Tomorrow's Future Children's Centre (725 Danforth)
Play Care Program/ West Scarborough Neighbourhood Com. Centre.
Berner Trail Early Learning & Child Care Centre
Bay Mills Early Learning & Child Care Centre

Lawrence Avenue East Early Learning & Child Care Centre
Gilder Early Learning & Child Care Centre
Warden Woods Satellite Early Learning & Child Care Centre
Galloway Early Learning & Child Care Centre
Warden Woods Early Learning & Child Care Centre
Canadiana Court Early Learning & Child Care Centre
Centenary Seven Oaks Early Learning & Child Care Centre
Cougar Court Child Care Centre 15
Lynngate Jr Ymca
Bridlewood Jr Ymca
Maryvale Jr Ymca
David Lewis Jr Ymca
Holy Spirit Jr Ymca
Pauline Johnson School Age Ymca
Glamorgan School Age Ymca
William G. Miller School Age Ymca
Knob Hill School Age Ymca
Hunter's Glen School Age Ymca
Brimwood School Age Ymca
Scarborough Jr Ymca
Morrish Jr Ymca
Lucy Maud Montgomery Jr Ymca
Timothy Eaton Infant & Toddler Centre
Isabella Walton Child Care
Fleming Jr Ymca
Nyad - Scarborough Village (15 Luella Street)
Mary Ward Child Care Centre
Rouge Valley Jr Ymca
St. Bede Child Care Centre
Port Royal Jr Ymca
N.Y.A.D. Corvette
N.Y.A.D. Progress
The Squirrel's Nest Child Care Centre
Garderie Chez Tante Laure
Garderie Chez Tante Laure
Malvern Early Learning & Child Care Centre
Guildwood Childcare Centre Satellite (Evans Corp 85 Livingstone)
Tic Toc Day Care Centre Inc
Growing Tykes Learning Centre 910

Gilder Satellite Early Learning & Child Care Centre
Scarborough Day Nursery School
Agincourt Montessori School Inc.
Agincourt Temple Day Care(Governing Council Of The Salvation Army)
Baylawn Co-Operative Preschool
Bridlegrove Daycare Centre
Beechgrove Sunshine Child Care
Fairmount Sunshine Child Care
Simcoe Sunshine Child Care
Mackie Sunshine Child Care Centre
Holland-Bloorview Kids Rehab. (Scarborough Site)
After Four Children's Enrichment Program
Banting And Best Child Care Centre
Charlottetown Blvd. Childcare Centre
Chartland Child Care Inc
Cheer Day Care Centre
Good Shepherd Day Care Centre
Meadowvale Daycare Centre
Port Union Panthers
St. Crispins Day Care Centre
Dearham Wood Daycare
Banting And Best Schoolage Satellite
Kids Love Day Care
Friendly Little Campus Daycare 2
Scarborough Citadel Child Care
Antrim Child Care
Future Stars Child Care Centre
Growing Tykes Learning Centre (4105 Lawrence Avenue East)
Avalon Children's Montessori School
Apple Day Care Centre
Birchmount Bluffs Neighbourhood Centre
N.Y.A.D. Midland
Garderie Mon Petit Jardin
Highland Creek Montessori Pre-School
Midland Child Care Centre
Angel Child Care Learning Centre (2042806 Ontario Inc.)
Broad View French Montessori School II Limited
Saint Nicholas Child Care Centre - Network
Denton Place Centre For Early Learning

Friendly Little Campus (2037711 Ontario Ltd)
Absorbent Minds
St. Sylvester Child Care Centre
The Divine Infant Child Care Centre
C.D.Farquharson Jr Ymca
Chester Le Early Learning & Child Care Centre
Epiphany Of Our Lord Jr Ymca
Sir Samuel B Steele Jr Ymca
St. Aidan Early Learning Centre Network
St. Boniface Jr Ymca
East Scarb. Child Care Centre(East Scarb. Boys & Girls Club
St. Rose Of Lima Ymca Child Care
Our Lady Of Grace Jr Ymca
Dian Childcare Centre Inc.
St. Gabriel Lalemant
Heritage Child Care & Early Learning Centre
Kreative Kids Child Care Centre
All My Children Child Care
Brookside Child Care Centre
Enjoy Learning Centre
Native Child & Family Life Centre - 156 Galloway
Big Bears Daycare
Gateway Montessori School
Jingbao Bilingual Children's Centre - Scarborough
Archway Montessori School
Better Beginnings Nursery School
Follow The Child
Heart Beatz Child Care - Solaris Site
Creative Minds Montessori Academy
Agape Christian Montessori School (2236800 Ontario Inc.)
Learning Jungle School - Kennedy Campus
Teach Me To Fly Preschool
Learn With Me Children Centre Inc.
Precious Blood Jr Ymca Elp
Smart Start Montessori School (1416786 Ontario Limited)
Kingston Road East Early Learning And Child Care Centre
N.Y.A.D. Cedar Drive
N.Y.A.D. Mason Road
Heritage Child Care & Early Learning - Milliken Site

```
Top Mandarin Day Care Centre
St. Maria Goretti - Network Childcare Services
St. Brendan Kindergarten Before & After School Program
William Tredway Jr. - Growing Tykes Learning Centre
Absorbent Minds 2
Centre Educatif A Petits Pas
Oakridge Junior Playcare
Kreative Kids Terry Fox
Beverly Glen Ymca
Heart Beatz - Halbert Child Care Site
Alvin Curling Ymca
Percy Williams Ymca
Plasp North Bridlewood Junior Public School
Plasp Inglewood Heights Junior Public School
Circles In The Sun Montessori Academy
Blaisdale Montessori School
Sunshine Montessori School - North York
Ellington Montessori School
Montessori Village Day Nursery
Mandarin Child Care Centre
Ellesmere Montessori School
Enquiring Minds Montessori
Blessed Pier Giorgio Frassati Extended Day Program
Wexford Extended Day And School Age Program
Children Of Tomorrow
Our Lady Of Fatima Ymca
Garderie Chez Tante Laure
Garderie Chez Tante Laure
Our Lady Of Wisdom Ymca
Nobi Montessori School & Daycare
Jacob Tree Preschool
```

In [79]:
```python
# lets Check size of resulting dataframe
print(toronto_child_care.shape)
toronto_child_care.head()
```

```
(1777, 7)
```

Out[79]:

	care_center	care_center Latitude	care_center Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Cardinal Leger Child Care Centre (Scarborough)	43.793104	-79.175711	Highland Creek	43.790281	-79.173703	Neighborhood
1	Cardinal Leger Child Care Centre (Scarborough)	43.793104	-79.175711	Sunshine Variety & Video	43.794723	-79.174988	Convenience Store
2	Cardinal Leger Child Care Centre (Scarborough)	43.793104	-79.175711	Kraftsman Kabinets Inc.	43.793929	-79.179604	Home Service
3	Cardinal Leger Child Care Centre (Scarborough)	43.793104	-79.175711	Morrish Pharmacy	43.790225	-79.174382	Pharmacy
4	Woodland Nursery School	43.702952	-79.281029	Starbucks	43.703634	-79.277661	Coffee Shop

In [80]:
```python
#Count of venues were returned for each Borough
toronto_child_care.groupby('care_center').count().head()
```

Out[80]:

	care_center Latitude	care_center Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
care_center						
A & A Child Care Centre	19	19	19	19	19	19
Abacus Day Care Centre (629735 Ontario Inc.)	32	32	32	32	32	32
Absorbent Minds	15	15	15	15	15	15
Absorbent Minds 2	12	12	12	12	12	12
After Four Children's Enrichment Program	4	4	4	4	4	4

In [81]:
```python
#lets see how many venues were returned by Foursquare?
print('There are {} uniques categories.'.format(len(toronto_child_care[
'Venue Category'].unique())))
```

There are 162 uniques categories.

Analyze Each Center

In [82]:
```python
# one hot encoding
toronto_onehot = pd.get_dummies(toronto_child_care[['Venue Category']],
 prefix="", prefix_sep="")

# add neighborhood column back to dataframe
toronto_onehot['care_center'] = toronto_child_care['care_center']

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

toronto_onehot.head()
```

Out[82]:

	care_center	African Restaurant	American Restaurant	Arts & Crafts Store	Asian Restaurant	Athletics & Sports	Auto Dealership	Auto Garage	Auton
0	Cardinal Leger Child Care Centre (Scarborough)	0	0	0	0	0	0	0	
1	Cardinal Leger Child Care Centre (Scarborough)	0	0	0	0	0	0	0	
2	Cardinal Leger Child Care Centre (Scarborough)	0	0	0	0	0	0	0	

	care_center	African Restaurant	American Restaurant	Arts & Crafts Store	Asian Restaurant	Athletics & Sports	Auto Dealership	Auto Garage	Autom
3	Cardinal Leger Child Care Centre (Scarborough)	0	0	0	0	0	0	0	
4	Woodland Nursery School	0	0	0	0	0	0	0	

In [83]: `toronto_onehot.shape`

Out[83]: (1777, 163)

In [84]:
```
toronto_grouped = toronto_onehot.groupby('care_center').mean().reset_index()
toronto_grouped.head()
```

Out[84]:

	care_center	African Restaurant	American Restaurant	Arts & Crafts Store	Asian Restaurant	Athletics & Sports	Auto Dealership	Auto Garage	Automo S
0	A & A Child Care Centre	0.0	0.00000	0.0	0.000000	0.0	0.0	0.0	0.000
1	Abacus Day Care Centre (629735 Ontario Inc.)	0.0	0.03125	0.0	0.000000	0.0	0.0	0.0	0.000
2	Absorbent Minds	0.0	0.00000	0.0	0.066667	0.0	0.0	0.0	0.066
3	Absorbent Minds 2	0.0	0.00000	0.0	0.083333	0.0	0.0	0.0	0.083

	care_center	African Restaurant	American Restaurant	Arts & Crafts Store	Asian Restaurant	Athletics & Sports	Auto Dealership	Auto Garage	Automo S
4	After Four Children's Enrichment Program	0.0	0.00000	0.0	0.000000	0.0	0.0	0.0	0.000

In [85]:
```python
# Check new size:
toronto_grouped.shape
```

Out[85]: (193, 163)

In [86]:
```python
# Let's print each care_center along with the top 5 most common venues
num_top_venues = 5
for neigh in toronto_grouped['care_center']:
    print("----"+neigh+"----")
    temp = toronto_grouped[toronto_grouped['care_center'] == neigh].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_venues))
    print('\n')
```

```
----A & A Child Care Centre----
                venue  freq
0   Chinese Restaurant  0.16
1             Tea Room  0.11
2        Shopping Mall  0.11
3    Korean Restaurant  0.11
4          Coffee Shop  0.05


----Abacus Day Care Centre (629735 Ontario Inc.)----
```

```
                 venue  freq
0  Fast Food Restaurant   0.06
1     Falafel Restaurant   0.06
2            Pizza Place   0.06
3     Seafood Restaurant   0.03
4          Grocery Store   0.03


----Absorbent Minds----
              venue  freq
0          Pizza Place   0.13
1       Breakfast Spot   0.13
2       Sandwich Place   0.07
3         Liquor Store   0.07
4  Food & Drink Shop   0.07


----Absorbent Minds 2----
              venue  freq
0       Breakfast Spot   0.17
1          Pizza Place   0.17
2  Indian Restaurant   0.08
3      Automotive Shop   0.08
4         Burger Joint   0.08


----After Four Children's Enrichment Program----
                     venue  freq
0               Hakka Restaurant   0.25
1  Paper / Office Supplies Store   0.25
2              Sushi Restaurant   0.25
3                  Pizza Place   0.25
4                  Music Store   0.00


----Agape Christian Montessori School (2236800 Ontario Inc.)----
               venue  freq
0  Chinese Restaurant   0.20
1              Bakery   0.13
```

```
2     Korean Restaurant  0.13
3          Dessert Shop  0.07
4          Noodle House  0.07


----Agincourt Montessori School Inc.----
                 venue  freq
0     Chinese Restaurant  0.33
1       Asian Restaurant  0.11
2  Vietnamese Restaurant  0.11
3       Korean Restaurant  0.11
4   Hong Kong Restaurant  0.11


----Agincourt Temple Day Care(Governing Council Of The Salvation Army)-
---
              venue  freq
0              Park  0.17
1              Pool  0.17
2  Athletics & Sports  0.17
3        Coffee Shop  0.17
4       Tennis Court  0.17


----All My Children Child Care----
                 venue  freq
0              Bakery  0.07
1   Chinese Restaurant  0.07
2  Japanese Restaurant  0.03
3        Movie Theater  0.03
4  Sporting Goods Shop  0.03


----Alvin Curling Ymca----
                        venue  freq
0                        Trail  1.0
1             African Restaurant  0.0
2  Paper / Office Supplies Store  0.0
3               Moving Target  0.0
```

```
4             Music Store    0.0


----Angel Child Care Learning Centre (2042806 Ontario Inc.)----
                venue  freq
0  Chinese Restaurant  0.06
1      Ice Cream Shop  0.06
2              Bakery  0.06
3         Pizza Place  0.03
4       Shopping Mall  0.03


----Antrim Child Care----
                    venue  freq
0  Furniture / Home Store  0.08
1          Sandwich Place  0.06
2             Men's Store  0.06
3             Coffee Shop  0.06
4           Burrito Place  0.06


----Apple Day Care Centre----
                 venue  freq
0           Coffee Shop  0.25
1                   Pub  0.12
2        Discount Store  0.12
3  Fast Food Restaurant  0.12
4    Chinese Restaurant  0.12


----Archway Montessori School----
                 venue  freq
0  Fast Food Restaurant  0.15
1                 Diner  0.10
2         Grocery Store  0.10
3                   Pub  0.05
4     Toy / Game Store  0.05
```

```
                 ----Avalon Children's Montessori School----
                             venue  freq
0              Playground   0.5
1             Golf Course   0.5
2      African Restaurant   0.0
3            Optical Shop   0.0
4             Music Store   0.0


                 ----Banting And Best Child Care Centre----
                             venue  freq
0   Chinese Restaurant  0.23
1         Discount Store  0.08
2              Restaurant  0.08
3   Dim Sum Restaurant  0.08
4           Grocery Store  0.08


                 ----Banting And Best Schoolage Satellite----
                             venue  freq
0   Chinese Restaurant  0.25
1         Discount Store  0.08
2              Restaurant  0.08
3   Dim Sum Restaurant  0.08
4               BBQ Joint  0.08


                 ----Bay Mills Early Learning & Child Care Centre----
                             venue  freq
0              Pizza Place   0.2
1                Pharmacy   0.2
2     Chinese Restaurant   0.1
3         Thai Restaurant   0.1
4   Fried Chicken Joint   0.1


                 ----Baylawn Co-Operative Preschool----
                             venue  freq
0     Chinese Restaurant  0.20
```

```
1    Japanese Restaurant   0.07
2   Gym / Fitness Center   0.07
3    Filipino Restaurant   0.07
4            Coffee Shop   0.07


----Beechgrove Sunshine Child Care----
               venue   freq
0              Hotel    0.4
1                Bar    0.2
2     Breakfast Spot    0.2
3        Pizza Place    0.2
4  African Restaurant    0.0


----Berner Trail Early Learning & Child Care Centre----
                            venue   freq
0                            Pool    0.5
1                        Bus Stop    0.5
2              African Restaurant    0.0
3  Paper / Office Supplies Store    0.0
4                    Music Venue    0.0


----Better Beginnings Nursery School----
           venue   freq
0    Pizza Place   0.29
1    Coffee Shop   0.29
2   Burger Joint   0.14
3    Beer Store   0.14
4           Pub   0.14


----Beverly Glen Ymca----
                    venue   freq
0     Fast Food Restaurant   0.17
1        Chinese Restaurant   0.17
2   Thrift / Vintage Store   0.08
3            Grocery Store   0.08
```

```
4        Sandwich Place  0.08


----Big Bears Daycare----
                 venue  freq
0          Coffee Shop  0.19
1       Sandwich Place  0.12
2       Discount Store  0.06
3               Bakery  0.06
4  Fried Chicken Joint  0.06


----Birchmount Bluffs Neighbourhood Centre----
                   venue  freq
0          Skating Rink  0.25
1  General Entertainment  0.25
2        College Stadium  0.25
3                  Café  0.25
4      African Restaurant  0.00


----Birchmount Place Centre For Early Learning----
                 venue  freq
0          Pizza Place   0.2
1             Pharmacy   0.2
2          Golf Course   0.1
3   Fried Chicken Joint   0.1
4  Fast Food Restaurant   0.1


----Birds And Bees Day Care Centre----
                 venue  freq
0       Discount Store  0.12
1          Coffee Shop  0.12
2   Chinese Restaurant  0.12
3       Sandwich Place  0.06
4                 Bank  0.06
```

```
           ----Blaisdale Montessori School----
                      venue  freq
0                      Diner  0.14
1           Sandwich Place  0.14
2        Mobile Phone Shop  0.14
3                        Gym  0.14
4       Chinese Restaurant  0.14


           ----Blessed Pier Giorgio Frassati Extended Day Program----
                   venue  freq
0   Shopping Mall    1.0
1   Movie Theater    0.0
2     Music Store    0.0
3     Music Venue    0.0
4      Nail Salon    0.0


           ----Bridlegrove Daycare Centre----
                         venue  freq
0              Pizza Place  0.17
1              Coffee Shop  0.08
2      Fast Food Restaurant  0.08
3        Chinese Restaurant  0.08
4                Beer Store  0.08


           ----Bridlewood Jr Ymca----
                        venue  freq
0                        Park  0.50
1    Cantonese Restaurant  0.25
2      Seafood Restaurant  0.25
3              Music Venue  0.00
4                Nail Salon  0.00


           ----Brimwood School Age Ymca----
                     venue   freq
0                   Bakery  0.14
```

```
              1   Indian Restaurant  0.07
              2       Movie Theater  0.07
              3           Gift Shop  0.07
              4          Taco Place  0.07


----Broad View French Montessori School II Limited----
                                venue  freq
0                         Pizza Place  0.50
1                         Coffee Shop  0.25
2                          Beer Store  0.25
3                   African Restaurant  0.00
4   Paper / Office Supplies Store  0.00


----C.D.Farquharson Jr Ymca----
                    venue  freq
0    Chinese Restaurant  0.31
1         Shopping Mall  0.19
2            Restaurant  0.06
3  Cantonese Restaurant  0.06
4       Malay Restaurant  0.06


----Cambridge Place Centre For Early Learning----
                    venue  freq
0        Baseball Field  0.08
1                Bakery  0.08
2           Golf Course  0.08
3   Gym / Fitness Center  0.08
4           Coffee Shop  0.08


----Canadiana Court Early Learning & Child Care Centre----
                    venue  freq
0  Fast Food Restaurant   0.4
1       Asian Restaurant   0.2
2   Sporting Goods Shop   0.2
3          Grocery Store   0.2
```

```
4     African Restaurant   0.0


----Cardinal Leger Child Care Centre (Scarborough)----
                venue   freq
0   Convenience Store   0.25
1        Home Service   0.25
2        Neighborhood   0.25
3            Pharmacy   0.25
4   African Restaurant   0.00


----Cedarbrae Day Nurseries (1385 Midland)----
                venue   freq
0   Fast Food Restaurant   0.17
1          Grocery Store   0.17
2             Coffee Shop   0.08
3   Caribbean Restaurant   0.08
4       Indian Restaurant   0.08


----Cedarbrae Day Nurseries (20 Greencrest)----
                  venue   freq
0     Fast Food Restaurant   0.12
1           Discount Store   0.08
2              Coffee Shop   0.08
3               Beer Store   0.04
4   Thrift / Vintage Store   0.04


----Cedarbrae Day Nursery (1375 Midland)----
                venue   freq
0   Fast Food Restaurant   0.17
1          Grocery Store   0.17
2             Coffee Shop   0.08
3   Caribbean Restaurant   0.08
4       Indian Restaurant   0.08
```

```
                    ----Centenary Seven Oaks Early Learning & Child Care Centre----
                         venue  freq
0        Sandwich Place  0.22
1           Coffee Shop  0.22
2            Beer Store  0.11
3     Convenience Store  0.11
4     Electronics Store  0.11


                    ----Centennial College Progress Campus Child Care Centre(941 Progress)-
                    ---
                                  venue  freq
0                          Coffee Shop  0.50
1                               Bistro  0.25
2                                  Spa  0.25
3                   African Restaurant  0.00
4     Paper / Office Supplies Store  0.00


                    ----Charlottetown Blvd. Childcare Centre----
                         venue  freq
0           Yoga Studio  0.25
1     Convenience Store  0.25
2         Grocery Store  0.25
3                   Pub  0.25
4                  Pool  0.00


                    ----Chartland Child Care Inc----
                         venue  freq
0           Pizza Place  0.25
1           Coffee Shop  0.25
2              Pharmacy  0.25
3           Gas Station  0.25
4     African Restaurant  0.00


                    ----Cheer Day Care Centre----
                                  venue  freq
```

```
0   Paper / Office Supplies Store   0.09
1               Food & Drink Shop   0.09
2                   Grocery Store   0.09
3                     Pizza Place   0.09
4             Hong Kong Restaurant   0.09


----Chester Le Early Learning & Child Care Centre----
                 venue   freq
0       Sandwich Place   0.12
1    Convenience Store   0.12
2           Beer Store   0.12
3  Caribbean Restaurant   0.12
4             Pharmacy   0.12


----Children Of Tomorrow----
                         venue   freq
0           Fast Food Restaurant   0.50
1      Middle Eastern Restaurant   0.25
2                     Playground   0.25
3  Paper / Office Supplies Store   0.00
4                    Music Venue   0.00


----Children Of Tomorrow - John McCrae----
                         venue   freq
0                     Playground   0.50
1                    Pizza Place   0.25
2           Caribbean Restaurant   0.25
3              African Restaurant   0.00
4  Paper / Office Supplies Store   0.00


----Children's Village #1 Day Care Centre----
                 venue   freq
0               Bakery   0.15
1          Coffee Shop   0.15
2             Bus Line   0.08
```

```
             3   Indian Restaurant  0.08
             4    Asian Restaurant  0.08


----Children's Village Day Care Centre #3----
                     venue  freq
0  Fast Food Restaurant  0.25
1           Coffee Shop  0.25
2            Beer Store  0.25
3              Pharmacy  0.25
4                  Park  0.00


----Circles In The Sun Montessori Academy----
                     venue  freq
0            Steakhouse  0.12
1                 Hotel  0.12
2        Sandwich Place  0.12
3           Pizza Place  0.12
4  Fast Food Restaurant  0.12


----Cliffcrest Day Care Centre----
                     venue  freq
0  Fast Food Restaurant  0.38
1            Restaurant  0.12
2     Convenience Store  0.12
3        Sandwich Place  0.12
4         Train Station  0.12


----Cougar Court Child Care Centre 15----
                     venue  freq
0           Coffee Shop  0.25
1         Shopping Mall  0.12
2            Beer Store  0.12
3              Pharmacy  0.12
4  Fast Food Restaurant  0.12
```

```
            ----Cougar Court Child Care Centre 25----
                          venue  freq
0                    Coffee Shop  0.25
1                  Shopping Mall  0.12
2                     Beer Store  0.12
3                       Pharmacy  0.12
4             Fast Food Restaurant  0.12


            ----Creative Minds Montessori Academy----
                                  venue  freq
0                                  Park  0.5
1                                   Bar  0.5
2        Paper / Office Supplies Store  0.0
3                           Music Store  0.0
4                           Music Venue  0.0


            ----David Lewis Jr Ymca----
                          venue  freq
0                    Pizza Place  1.0
1             African Restaurant  0.0
2                   Optical Shop  0.0
3                  Moving Target  0.0
4                    Music Store  0.0


            ----Dearham Wood Daycare----
                          venue  freq
0             Convenience Store  0.5
1                 Baseball Field  0.5
2             African Restaurant  0.0
3                           Park  0.0
4                    Music Venue  0.0


            ----Denton Place Centre For Early Learning----
                          venue   freq
```

```
0         Baseball Field  0.08
1                 Bakery  0.08
2            Golf Course  0.08
3  Gym / Fitness Center  0.08
4            Coffee Shop  0.08


----Dian Childcare Centre Inc.----
                            venue  freq
0                          Dog Run   0.5
1                            Trail   0.5
2              African Restaurant   0.0
3  Paper / Office Supplies Store   0.0
4                     Music Store   0.0


----Discovery Place Child Care Centre Ltd.----
                 venue  freq
0           Steakhouse  0.14
1       Sandwich Place  0.14
2          Pizza Place  0.14
3  Fast Food Restaurant  0.14
4          Coffee Shop  0.14


----East Scarb. Boys' & Girls' Club(Eastside Child Care Centre 20 Waldo
ck)----
              venue  freq
0  Moving Target  0.25
1           Park  0.25
2    Auto Garage  0.25
3         Bakery  0.25
4    Music Store  0.00


----East Scarb. Child Care Centre(East Scarb. Boys & Girls Club----
                 venue  freq
0          Pizza Place  0.14
1  Fast Food Restaurant  0.10
```

```
2          Grocery Store   0.07
3           Coffee Shop   0.07
4            Beer Store   0.03


----Eastside Club----
                venue   freq
0       Train Station    0.4
1       Moving Target    0.2
2       Baseball Field    0.2
3     Storage Facility    0.2
4   African Restaurant    0.0


----Ellesmere Montessori School----
                              venue   freq
0                     Coffee Shop   0.17
1                  Discount Store   0.08
2                Sushi Restaurant   0.08
3   Paper / Office Supplies Store   0.08
4                       Pet Store   0.08


----Ellington Montessori School----
                 venue   freq
0        Burrito Place   0.17
1           Restaurant   0.17
2                Hotel   0.17
3   Vietnamese Restaurant   0.17
4          Pizza Place   0.17


----Enjoy Learning Centre----
                 venue   freq
0            Pet Store   0.09
1   Cantonese Restaurant   0.09
2   Dumpling Restaurant   0.09
3          Noodle House   0.09
4           Pizza Place   0.09
```

```
            ----Enquiring Minds Montessori----
                         venue   freq
0   Furniture / Home Store   0.07
1           Sandwich Place   0.05
2              Men's Store   0.05
3               Pet Store   0.05
4              Coffee Shop   0.05


            ----Epiphany Of Our Lord Jr Ymca----
                         venue   freq
0          Deli / Bodega   0.25
1         Sandwich Place   0.25
2                 Bakery   0.25
3   Caribbean Restaurant   0.25
4     African Restaurant   0.00


            ----Fairmount Sunshine Child Care----
                         venue   freq
0                   Park   0.25
1            Pizza Place   0.25
2   Fast Food Restaurant   0.25
3           Burger Joint   0.25
4            Optical Shop   0.00


            ----Fleming Jr Ymca----
                              venue   freq
0                  Pizza Place    0.5
1                          Bar    0.5
2            African Restaurant    0.0
3   Paper / Office Supplies Store    0.0
4                  Music Store    0.0


            ----Follow The Child----
```

```
                   venue  freq
0      Pizza Place  0.25
1            Park  0.12
2     Burger Joint  0.12
3  Sandwich Place  0.12
4      Coffee Shop  0.12


----Friendly Little Campus (2037711 Ontario Ltd)----
                   venue  freq
0                  Bank  0.12
1                 Diner  0.12
2        Grocery Store  0.12
3          Pizza Place  0.12
4  Fast Food Restaurant  0.12


----Friendly Little Campus Daycare 2----
                venue  freq
0     Breakfast Spot  0.33
1                Bar  0.17
2    Asian Restaurant  0.17
3   Indian Restaurant  0.17
4     Automotive Shop  0.17


----Future Stars Child Care Centre----
                         venue  freq
0                  Pizza Place  0.50
1                 Home Service  0.25
2                    Juice Bar  0.25
3            African Restaurant  0.00
4  Paper / Office Supplies Store  0.00


----Galloway Early Learning & Child Care Centre----
                  venue  freq
0   Rental Car Location  0.17
1     Electronics Store  0.17
```

```
2                 Spa   0.17
3   Mexican Restaurant   0.17
4       Medical Center   0.17


----Garderie Chez Tante Laure----
               venue   freq
0  Chinese Restaurant   0.17
1   Convenience Store   0.11
2          Restaurant   0.11
3                Park   0.11
4      Discount Store   0.06


----Garderie Mon Petit Jardin----
                            venue   freq
0             Fast Food Restaurant    0.5
1                             Park    0.5
2  Paper / Office Supplies Store    0.0
3                      Music Store    0.0
4                      Music Venue    0.0


----Gateway Montessori School----
                      venue   freq
0  Middle Eastern Restaurant   0.19
1                Pizza Place   0.15
2               Burger Joint   0.07
3              Grocery Store   0.07
4               Intersection   0.07


----Gilder Early Learning & Child Care Centre----
                 venue   freq
0   Rental Car Location   0.11
1        Discount Store   0.11
2           Wings Joint   0.11
3          Burger Joint   0.11
4           Pizza Place   0.11
```

```
----Gilder Satellite Early Learning & Child Care Centre----
                 venue  freq
0             Pharmacy  0.18
1   Rental Car Location  0.09
2  Fast Food Restaurant  0.09
3        Discount Store  0.09
4          Burger Joint  0.09


----Glamorgan School Age Ymca----
                venue  freq
0               Park   0.33
1         Music Venue  0.17
2      Sandwich Place  0.17
3   Electronics Store  0.17
4        Moving Target  0.17


----Golf Road School Child Care Centre----
                 venue  freq
0       Department Store  0.12
1  Fast Food Restaurant  0.12
2            Supermarket  0.12
3                   Park  0.12
4    Chinese Restaurant  0.12


----Good Shepherd Day Care Centre----
                 venue  freq
0            Pizza Place  0.29
1  Fast Food Restaurant  0.14
2    Fried Chicken Joint  0.14
3               Pharmacy  0.14
4    Chinese Restaurant  0.14


----Growing Tykes Learning Centre (4105 Lawrence Avenue East)----
```

```
                      venue  freq
0    Thrift / Vintage Store  0.14
1            Medical Center  0.14
2               Pizza Place  0.14
3         Mexican Restaurant  0.14
4          Electronics Store  0.14
```

----Growing Tykes Learning Centre 910----

```
                        venue  freq
0          Indian Restaurant   0.4
1              Cosmetics Shop   0.2
2    Construction & Landscaping   0.2
3             Fish & Chips Shop   0.2
4                         Park   0.0
```

----Guildwood Child Care----

```
          venue  freq
0          Park   0.5
1      Bus Line   0.5
2  Moving Target   0.0
3   Music Venue   0.0
4    Nail Salon   0.0
```

----Guildwood Childcare Centre Satellite (Evans Corp 85 Livingstone)----

```
          venue  freq
0  Grocery Store  0.25
1          Park  0.12
2   Pizza Place  0.12
3    Sports Bar  0.12
4   Coffee Shop  0.12
```

----Heart Beatz - Halbert Child Care Site----

```
         venue  freq
0         Bank  0.17
```

```
1    Sandwich Place  0.17
2           Bistro  0.17
3      Coffee Shop  0.17
4         Pharmacy  0.17


----Heart Beatz Child Care - Solaris Site----
                    venue   freq
0           Discount Store   0.1
1      Arts & Crafts Store   0.1
2               Restaurant   0.1
3  Furniture / Home Store   0.1
4                    Hotel   0.1


----Heritage Child Care & Early Learning - Milliken Site----
                   venue   freq
0    Chinese Restaurant   0.19
1             BBQ Joint   0.12
2   Fast Food Restaurant   0.12
3        Hardware Store   0.06
4                  Park   0.06


----Heritage Child Care & Early Learning Centre----
                  venue   freq
0           Pharmacy   0.4
1               Park   0.2
2  Chinese Restaurant   0.2
3                Gym   0.2
4        Optical Shop   0.0


----Highland Creek Montessori Pre-School----
                       venue   freq
0             Breakfast Spot   0.50
1               Burger Joint   0.25
2           Italian Restaurant   0.25
3  Paper / Office Supplies Store   0.00
```

```
4              Music Store  0.00


----Hilltop Daycare Centre----
                venue  freq
0  Fast Food Restaurant  0.33
1          Intersection  0.33
2            Restaurant  0.33
3     African Restaurant  0.00
4           Music Venue  0.00


----Holland-Bloorview Kids Rehab. (Scarborough Site)----
                venue  freq
0         Moving Target  0.25
1            Playground  0.25
2                  Park  0.25
3  Gym / Fitness Center  0.25
4           Optical Shop  0.00


----Holy Spirit Jr Ymca----
                venue  freq
0              Pharmacy  0.22
1           Pizza Place  0.22
2   Rental Car Location  0.11
3   Fried Chicken Joint  0.11
4        Thai Restaurant  0.11


----Hunter's Glen School Age Ymca----
                venue  freq
0           Bus Station  0.5
1                   Spa  0.5
2    African Restaurant  0.0
3         Moving Target  0.0
4           Music Venue  0.0
```

```
                ----Immanuel Day Care Centre----
                           venue   freq
0    Gym / Fitness Center   0.14
1              Restaurant   0.14
2     Japanese Restaurant   0.07
3                    Road   0.07
4             Salad Place   0.07


                ----Isabella Walton Child Care----
                           venue   freq
0     Rental Car Location   0.17
1               Pet Store   0.08
2     Sporting Goods Shop   0.08
3               Cafeteria   0.08
4         Greek Restaurant   0.08


                ----Jacob Tree Preschool----
                            venue   freq
0    Vietnamese Restaurant   0.29
1       Chinese Restaurant   0.14
2     Caribbean Restaurant   0.14
3         Greek Restaurant   0.14
4     Taiwanese Restaurant   0.14


                ----Jingbao Bilingual Children's Centre - Scarborough----
                          venue   freq
0                    Park   1.0
1      African Restaurant   0.0
2            Optical Shop   0.0
3           Moving Target   0.0
4             Music Store   0.0


                ----John A. Leslie Childcare - Scarborough----
                         venue   freq
0          Breakfast Spot   0.25
```

```
1      Sandwich Place  0.25
2        Pizza Place  0.25
3     Harbor / Marina  0.25
4  African Restaurant  0.00


----Kenlinton Child Care Centre (Operator: Stonehill) Facility #16008--
--
                 venue  freq
0                 Bank  0.25
1       Sandwich Place  0.25
2          Coffee Shop  0.25
3   Chinese Restaurant  0.25
4            Pet Store  0.00


----Kennedy Road Kiddy Kare----
                venue  freq
0      Discount Store  0.33
1    Department Store  0.17
2         Coffee Shop  0.17
3          Hobby Shop  0.17
4  Chinese Restaurant  0.17


----Kiddies Lodge Day Care Centre----
                      venue  freq
0        Fast Food Restaurant  0.20
1                Intersection  0.07
2               Grocery Store  0.07
3                         Gym  0.07
4  Middle Eastern Restaurant  0.07


----Kids Love Day Care----
                venue  freq
0       Train Station   0.4
1       Moving Target   0.2
2       Baseball Field   0.2
```

```
3       Storage Facility    0.2
4      African Restaurant    0.0


----Kimbercroft Day Nursery (30 Kimbercroft Court)----
                 venue  freq
0              Pharmacy  0.17
1    Chinese Restaurant  0.08
2                  Park  0.08
3                 Diner  0.08
4   American Restaurant  0.08


----Kimbercroft Day Nursery 2----
                venue  freq
0            Pharmacy  0.18
1                Park  0.09
2               Diner  0.09
3      Sandwich Place  0.09
4    Mobile Phone Shop  0.09


----Kingston Road East Early Learning And Child Care Centre----
                 venue  freq
0               Butcher  0.12
1                 Hotel  0.12
2   Fried Chicken Joint  0.12
3           Pizza Place  0.12
4                  Café  0.12


----Knob Hill Day Nursery----
                 venue  freq
0      Asian Restaurant   1.0
1    African Restaurant   0.0
2                  Park   0.0
3           Music Store   0.0
4           Music Venue   0.0
```

```
----Knob Hill School Age Ymca----
                venue  freq
0                Pool  0.25
1          Playground  0.25
2         Pizza Place  0.25
3  Caribbean Restaurant  0.25
4    African Restaurant  0.00


----Kreative Kids Child Care Centre----
                venue  freq
0    Chinese Restaurant  0.23
1                Park  0.15
2         Supermarket  0.08
3  Vietnamese Restaurant  0.08
4         Pizza Place  0.08


----Kreative Kids Terry Fox----
                venue  freq
0    Chinese Restaurant  0.25
1         Supermarket  0.12
2     Sushi Restaurant  0.12
3  Vietnamese Restaurant  0.12
4         Pizza Place  0.12


----Lawrence Avenue East Early Learning & Child Care Centre----
                venue  freq
0         Pizza Place  0.33
1    Department Store  0.17
2      Sandwich Place  0.17
3   Chinese Restaurant  0.17
4  Fast Food Restaurant  0.17


----Learn With Me Children Centre Inc.----
                venue   freq
```

```
                  venue  freq
0              Diner   0.2
1  Thai Restaurant    0.2
2               Café   0.2
3               Bank   0.2
4     Discount Store   0.2


----Learning Jungle School - Kennedy Campus----
                            venue  freq
0  Paper / Office Supplies Store  0.09
1              Food & Drink Shop  0.09
2                  Grocery Store  0.09
3                    Pizza Place  0.09
4            Hong Kong Restaurant  0.09


----Lucy Maud Montgomery Jr Ymca----
                 venue  freq
0        Home Service  0.25
1         Pizza Place  0.25
2       Movie Theater  0.25
3        Liquor Store  0.25
4  African Restaurant  0.00


----Lynngate Jr Ymca----
                  venue  freq
0  Fast Food Restaurant  0.17
1    Fried Chicken Joint  0.17
2            Pizza Place  0.17
3              Pharmacy  0.17
4    Chinese Restaurant  0.17


----Mackie Sunshine Child Care Centre----
              venue  freq
0            Theater  0.18
1   Discount Store  0.09
2      Skating Rink  0.09
```

```
3         Butcher   0.09
4     Pizza Place   0.09


----Malvern Early Learning & Child Care Centre----
                 venue   freq
0         Pizza Place   0.22
1           Pharmacy   0.22
2     Bubble Tea Shop   0.11
3   Convenience Store   0.11
4       Sandwich Place   0.11


----Mandarin Child Care Centre----
              venue   freq
0             Park   0.25
1    Skating Rink   0.25
2      Restaurant   0.25
3      Hookah Bar   0.25
4     Music Store   0.00


----Mary Ward Child Care Centre----
                           venue   freq
0             Chinese Restaurant   0.18
1   Paper / Office Supplies Store   0.09
2            Japanese Restaurant   0.09
3              Athletics & Sports   0.09
4                    Pizza Place   0.09


----Maryvale Jr Ymca----
                           venue   freq
0                     Pharmacy    0.2
1                Discount Store    0.2
2                Bowling Alley    0.2
3                   Coffee Shop    0.2
4   Paper / Office Supplies Store    0.2
```

```
                    ----Meadowvale Daycare Centre----
                                venue  freq
0  Middle Eastern Restaurant    1.0
1          African Restaurant    0.0
2               Movie Theater    0.0
3                 Music Store    0.0
4                 Music Venue    0.0


                    ----Midland Child Care Centre----
                              venue  freq
0     Chinese Restaurant  0.24
1    Japanese Restaurant  0.12
2                    Gym  0.06
3   Fast Food Restaurant  0.06
4      Seafood Restaurant  0.06


                    ----Montessori Village Day Nursery----
                                venue  freq
0                Breakfast Spot  0.50
1                  Burger Joint  0.25
2              Italian Restaurant  0.25
3   Paper / Office Supplies Store  0.00
4                   Music Store  0.00


                    ----Morningside Children's Centre----
                              venue  freq
0            Pizza Place  0.16
1   Fast Food Restaurant  0.09
2            Coffee Shop  0.06
3         Sandwich Place  0.03
4             Supermarket  0.03


                    ----Morrish Jr Ymca----
                                venue   freq
```

```
0                         Park  0.33
1          Convenience Store  0.33
2               Tennis Court  0.33
3  Paper / Office Supplies Store  0.00
4                Music Store  0.00


----Mother Of Compassion Child Care----
                        venue  freq
0          Convenience Store  0.33
1                 Playground  0.33
2                 Pizza Place  0.33
3          African Restaurant  0.00
4  Paper / Office Supplies Store  0.00


----N'Sheemaehn----
                 venue  freq
0         Burger Joint  0.29
1          Coffee Shop  0.29
2                  Gym  0.14
3    Fish & Chips Shop  0.14
4           Restaurant  0.14


----N.Y.A.D. Cedar Drive----
                  venue  freq
0         Shopping Mall  0.12
1            Beer Store  0.12
2                   Pub  0.12
3   Fast Food Restaurant  0.12
4           Coffee Shop  0.12


----N.Y.A.D. Corvette----
                  venue  freq
0         Discount Store  0.33
1       Department Store  0.17
2            Coffee Shop  0.17
```

```
3         Hobby Shop  0.17
4  Chinese Restaurant  0.17


----N.Y.A.D. Donwood----
            venue  freq
0        Gay Bar  0.25
1      Gift Shop  0.25
2           Park  0.25
3         Bakery  0.25
4   Optical Shop  0.00


----N.Y.A.D. Guildwood----
            venue  freq
0   Train Station  0.25
1            Park  0.12
2  Sandwich Place  0.12
3   Grocery Store  0.12
4     Coffee Shop  0.12


----N.Y.A.D. Mason Road----
                venue  freq
0    Indian Restaurant  0.25
1       Sandwich Place  0.25
2        Big Box Store  0.25
3  Fast Food Restaurant  0.25
4           Playground  0.00


----N.Y.A.D. Midland----
                venue  freq
0        Grocery Store  0.25
1  Fast Food Restaurant  0.25
2   Chinese Restaurant  0.25
3               Bakery  0.25
4    African Restaurant  0.00
```

```
            ----N.Y.A.D. Progress----
                         venue   freq
0                        Hotel    0.2
1                  Coffee Shop    0.2
2                   Steakhouse    0.1
3          American Restaurant    0.1
4                          Spa    0.1


            ----Native Child & Family Life Centre - 156 Galloway----
                         venue   freq
0          Rental Car Location   0.12
1                  Auto Garage   0.12
2                         Park   0.12
3           Chinese Restaurant   0.12
4          Thrift / Vintage Store   0.12


            ----Nobi Montessori School & Daycare----
                         venue   freq
0           Chinese Restaurant   0.14
1                  Auto Garage   0.14
2               Baseball Field   0.14
3        Thrift / Vintage Store   0.14
4             Storage Facility   0.14


            ----Nyad - Scarborough Village (15 Luella Street)----
                         venue   freq
0                     Pharmacy   0.14
1                   Beer Store   0.14
2            Indian Restaurant   0.14
3               Sandwich Place   0.14
4                  Coffee Shop   0.14


            ----Oakridge Junior Playcare----
                         venue   freq
```

```
0     Filipino Restaurant    0.2
1           Metro Station    0.2
2              Beer Store    0.2
3            Liquor Store    0.2
4  Fast Food Restaurant    0.2


----Our Lady Of Fatima Ymca----
                  venue   freq
0           Intersection   0.22
1      Convenience Store   0.22
2   Fast Food Restaurant   0.22
3                   Park   0.11
4         Sandwich Place   0.11


----Our Lady Of Grace Jr Ymca----
                  venue   freq
0         Shop & Service   0.25
1            Pizza Place   0.25
2             Hobby Shop   0.25
3   Caribbean Restaurant   0.25
4                   Park   0.00


----Our Lady Of Wisdom Ymca----
                       venue   freq
0            Hakka Restaurant   0.25
1  Paper / Office Supplies Store   0.25
2             Sushi Restaurant   0.25
3                  Pizza Place   0.25
4                  Music Store   0.00


----Pauline Johnson School Age Ymca----
                venue   freq
0         Intersection   0.25
1          Pizza Place   0.25
2          Golf Course   0.25
```

```
3       Shopping Mall  0.25
4  African Restaurant  0.00


----Percy Williams Ymca----
                 venue  freq
0        Movie Theater  0.04
1       Discount Store  0.04
2   Chinese Restaurant  0.04
3                  Spa  0.04
4  Sporting Goods Shop  0.04


----Plasp Inglewood Heights Junior Public School----
                 venue  freq
0             Pharmacy   0.1
1  Fast Food Restaurant   0.1
2         Grocery Store   0.1
3  Cantonese Restaurant   0.1
4         Shopping Mall   0.1


----Plasp North Bridlewood Junior Public School----
                 venue  freq
0  African Restaurant   0.5
1                Park   0.5
2        Optical Shop   0.0
3        Moving Target   0.0
4         Music Store   0.0


----Play Care Program/ West Scarborough Neighbourhood Com. Centre.----
                 venue  freq
0             Dog Run  0.33
1               Trail  0.33
2          Smoke Shop  0.33
3  African Restaurant  0.00
4        Optical Shop  0.00
```

```
               ----Port Royal Jr Ymca----
                           venue  freq
0   Chinese Restaurant  0.29
1     Convenience Store  0.14
2                Bakery  0.14
3   Seafood Restaurant  0.14
4           Pizza Place  0.14


               ----Port Union Panthers----
                           venue  freq
0                     Gym   0.1
1   Japanese Restaurant   0.1
2         Sandwich Place   0.1
3      Convenience Store   0.1
4           Liquor Store   0.1


            ----Precious Blood Jr Ymca Elp----
                             venue  freq
0   Middle Eastern Restaurant  0.27
1          Chinese Restaurant  0.18
2           Indian Restaurant  0.09
3            Asian Restaurant  0.09
4                Wings Joint  0.09


       ----Progress Childcare (Scarborough Inc. #1 (3 Glamorgan)----
                           venue  freq
0            Supermarket  0.08
1              Bookstore  0.08
2   Fast Food Restaurant  0.08
3         Sandwich Place  0.08
4              Pet Store  0.08


   ----Rainbow Village Childcare Centre (Mid-Scarborough Child Care)----
                  venue   freq
```

```
0       Discount Store  0.13
1         Coffee Shop   0.13
2                Bank   0.07
3          Pizza Place  0.07
4  Convenience Store    0.07


----Rosalie Hall Child Development Centre----
             venue   freq
0           Dog Run  0.11
1    Sandwich Place  0.11
2    Breakfast Spot  0.11
3         Bookstore  0.11
4  Fish & Chips Shop  0.11


----Rouge Valley Jr Ymca----
               venue   freq
0         Coffee Shop  0.14
1      Discount Store  0.07
2              Bakery  0.07
3  Fried Chicken Joint  0.07
4    Mobile Phone Shop  0.07


----Saint Nicholas Child Care Centre - Network----
                venue   freq
0  Chinese Restaurant  0.33
1       Shopping Mall  0.11
2            Bus Stop  0.11
3   Athletics & Sports  0.11
4         Pizza Place  0.11


----Sandbox Day Care Centre----
               venue   freq
0         Pizza Place  0.4
1    Indian Restaurant  0.2
2        Jewelry Store  0.2
```

```
3            Juice Bar   0.2
4  African Restaurant    0.0


----Scarborough Citadel Child Care----
                      venue  freq
0               Pizza Place  0.11
1              Burger Joint  0.11
2  Middle Eastern Restaurant  0.11
3              Intersection  0.05
4                       Bar  0.05


----Scarborough Day Nursery School----
                   venue  freq
0                  Diner  0.25
1         Discount Store  0.25
2                   Café  0.25
3        Thai Restaurant  0.25
4      African Restaurant  0.00


----Scarborough Jr Ymca----
                 venue  freq
0       Clothing Store  0.11
1          Coffee Shop  0.07
2           Restaurant  0.05
3   Light Rail Station  0.04
4             Tea Room  0.04


----Scarborough Village Day Nursery 1----
                  venue  freq
0   Fast Food Restaurant  0.25
1            Beer Store  0.12
2                   Gym  0.12
3           Coffee Shop  0.12
4              Pharmacy  0.12
```

```
        ----Scarborough Village Day Nursery 2----
                     venue  freq
0           Coffee Shop  0.14
1   Fast Food Restaurant  0.14
2               Theater  0.07
3                   Gym  0.07
4    Fried Chicken Joint  0.07


        ----Sheppard Square Day Nursery----
                 venue  freq
0           Pharmacy   0.2
1               Park   0.1
2              Diner   0.1
3      Sandwich Place   0.1
4   Mobile Phone Shop   0.1


        ----Simcoe Sunshine Child Care----
                             venue  freq
0                             Park  0.67
1                            Trail  0.33
2   Paper / Office Supplies Store  0.00
3                   Moving Target  0.00
4                     Music Store  0.00


        ----Sir Samuel B Steele Jr Ymca----
                             venue  freq
0            Chinese Restaurant  0.50
1             Hotpot Restaurant  0.25
2            Miscellaneous Shop  0.25
3             African Restaurant  0.00
4   Paper / Office Supplies Store  0.00


        ----Smart Start Montessori School (1416786 Ontario Limited)----
                     venue   freq
```

```
0                   Park   0.4
1   Caribbean Restaurant   0.2
2      Convenience Store   0.2
3  North Indian Restaurant   0.2
4              Pet Store   0.0


----St. Aidan Early Learning Centre Network----
                venue  freq
0  Chinese Restaurant  0.50
1      Shopping Mall  0.25
2           Bus Stop  0.25
3               Park  0.00
4        Music Venue  0.00


----St. Bede Child Care Centre----
               venue  freq
0  Indian Restaurant   0.2
1                Bar   0.2
2        Pizza Place   0.2
3   Sculpture Garden   0.2
4      Grocery Store   0.2


----St. Boniface Jr Ymca----
                 venue  freq
0  Fast Food Restaurant  0.15
1          Coffee Shop  0.15
2             Theater  0.08
3             Butcher  0.08
4         Pizza Place  0.08


----St. Brendan Kindergarten Before & After School Program----
                venue  freq
0               Park   1.0
1  African Restaurant   0.0
2        Optical Shop   0.0
```

```
3          Moving Target   0.0
4           Music Store    0.0


----St. Crispins Day Care Centre----
                         venue   freq
0                   Sports Bar   0.25
1                  Pizza Place   0.25
2                Train Station   0.25
3  Cajun / Creole Restaurant   0.25
4           African Restaurant   0.00


----St. Gabriel Lalemant----
               venue   freq
0      IT Services   0.33
1         Pharmacy   0.33
2             Park   0.33
3    Optical Shop   0.00
4   Moving Target   0.00


----St. Maria Goretti - Network Childcare Services----
                  venue   freq
0            Coffee Shop   0.15
1         Discount Store   0.10
2     Chinese Restaurant   0.10
3            Bus Station   0.05
4                   Bank   0.05


----St. Rose Of Lima Ymca Child Care----
                  venue   freq
0     Chinese Restaurant   0.11
1            Pizza Place   0.11
2                  Diner   0.11
3          Grocery Store   0.11
4              Bookstore   0.11
```

```
                    ----St. Sylvester Child Care Centre----
                            venue  freq
0   Athletics & Sports    0.2
1          Pizza Place    0.2
2         Tennis Court    0.2
3                 Park    0.2
4          Flower Shop    0.2


                    ----Sunshine Montessori School - North York----
                            venue  freq
0             Coffee Shop  0.13
1   Fast Food Restaurant  0.09
2          Sandwich Place  0.04
3        Hakka Restaurant  0.04
4              Restaurant  0.04


                    ----Tamarack Day Care Centre (765566 Ontario Inc)----
                            venue  freq
0   Chinese Restaurant  0.20
1    Korean Restaurant  0.12
2         Dessert Shop  0.08
3               Bakery  0.08
4          Coffee Shop  0.08


                    ----Teach Me To Fly Preschool----
                             venue  freq
0   Furniture / Home Store    0.2
1               Playground    0.2
2              Pizza Place    0.2
3       Chinese Restaurant    0.2
4      Filipino Restaurant    0.2


                    ----The Divine Infant Child Care Centre----
                            venue   freq
```

```
0                    Park  0.25
1         Sandwich Place  0.25
2                  Trail  0.25
3     Mobile Phone Shop  0.25
4          Optical Shop  0.00


----The Squirrel's Nest Child Care Centre----
              venue  freq
0        Pizza Place  0.33
1   Storage Facility  0.17
2        Wings Joint  0.17
3        Coffee Shop  0.17
4             Bakery  0.17


----Tic Toc Day Care Centre Inc----
               venue  freq
0               Park  0.25
1       Deli / Bodega  0.25
2       Bowling Alley  0.25
3     Badminton Court  0.25
4   African Restaurant  0.00


----Timothy Eaton Infant & Toddler Centre----
                        venue  freq
0                        Park   0.5
1        Vietnamese Restaurant   0.5
2   Paper / Office Supplies Store   0.0
3                Moving Target   0.0
4                 Music Store   0.0


----Today's Child Tomorrow's Future Children's Centre (290 Blantyre)----
              venue  freq
0        Coffee Shop   0.3
1        Pizza Place   0.2
```

```
2           Grocery Store   0.2
3            Burger Joint   0.1
4   Fast Food Restaurant   0.1


----Today's Child Tomorrow's Future Children's Centre (725 Danforth)----
                     venue  freq
0            Soccer Field  0.25
1          Sandwich Place  0.25
2           Train Station  0.25
3   Fast Food Restaurant  0.25
4      African Restaurant  0.00


----Top Mandarin Day Care Centre----
                     venue  freq
0     Falafel Restaurant  0.18
1   Fast Food Restaurant  0.18
2                   Park  0.09
3          Deli / Bodega  0.09
4      Korean Restaurant  0.09


----Vradenburg Community Child Care Centre----
                   venue  freq
0                  Park  0.14
1          Intersection  0.14
2    Italian Restaurant  0.14
3        Discount Store  0.14
4        Sandwich Place  0.14


----Warden Woods Early Learning & Child Care Centre----
            venue  freq
0           Bank   0.2
1       Bus Stop   0.2
2    Coffee Shop   0.2
3          Trail   0.2
```

```
4          Park   0.2


----Warden Woods Satellite Early Learning & Child Care Centre----
                venue   freq
0          Dog Run   0.25
1          Bus Stop   0.25
2       Coffee Shop   0.25
3            Trail   0.25
4  African Restaurant   0.00


----Wexford Community Childcare Centre----
                venue   freq
0     Moving Target   0.25
1        Playground   0.25
2             Park   0.25
3  Gym / Fitness Center   0.25
4       Optical Shop   0.00


----Wexford Extended Day And School Age Program----
                    venue   freq
0  Middle Eastern Restaurant   0.20
1          Asian Restaurant   0.13
2            Grocery Store   0.13
3   Mediterranean Restaurant   0.13
4             Supermarket   0.07


----William G. Miller School Age Ymca----
                venue   freq
0            Garden   0.25
1  Athletics & Sports   0.25
2       Grocery Store   0.25
3              Gym   0.25
4        Optical Shop   0.00
```

```
              ----William Tredway Jr. - Growing Tykes Learning Centre----
                               venue  freq
0               American Restaurant  0.33
1             Construction & Landscaping  0.33
2                              Park  0.33
3                              Pool  0.00
4                      Optical Shop  0.00


              ----Woodland Nursery School----
                       venue  freq
0                       Bank   0.2
1                    Dog Run   0.2
2                   Bus Stop   0.2
3                 Coffee Shop   0.2
4                      Trail   0.2
```

Let's assume that you are staying at the 5600 Sheppard Ave E, Scarborough, Canada. So let's start by converting the address to its latitude and longitude coordinates.

```
In [87]: address = '5600 Sheppard Ave E, Scarborough, Canada'

         geolocator = Nominatim(user_agent="foursquare_agent")
         location = geolocator.geocode(address)
         latitude = location.latitude
         longitude = location.longitude
         print(latitude, longitude)
```

```
43.794924 -79.2364314148795
```

Now, let's assume that you are searching for Day care centers for you children around your address. So, let's define a query to search for Day care centers that is within 20000 metres from your address.

```
In [88]: search_query = 'child care center'
```

```
radius = 2500
print(search_query + ' .... OK!')
```

child care center .... OK!

Define the corresponding URL

In [89]:
```
url = 'https://api.foursquare.com/v2/venues/search?client_id={}&client_
secret={}&ll={},{}&v={}&query={}&radius={}&limit={}'.format(CLIENT_ID,
CLIENT_SECRET, latitude, longitude, VERSION, search_query, radius, LIMI
T)
url
```

Out[89]:
```
'https://api.foursquare.com/v2/venues/search?client_id=LA4BGJCCVELUQ02L
D33A0JONKW0GBN5TYC4PDW0JXYUN5OMO&client_secret=VZZEJ0RJMXENI2VG0HFQP13X
FTR3U4MITOAA0MMH4TZG0LV5&ll=43.794924,-79.2364314148795&v=20180605&quer
y=child care center&radius=2500&limit=100'
```

Send the GET Request and examine the results

In [90]:
```
results = requests.get(url).json()
results
```

Out[90]:
```
{'meta': {'code': 200, 'requestId': '5cb31faff594df78c14939c9'},
 'response': {'venues': [{'id': '57c8d67bcd1043c5b04493dc',
    'name': 'Sheppard Square Child Care',
    'location': {'address': '5600 Sheppard Ave E',
     'lat': 43.794412,
     'lng': -79.236126,
     'labeledLatLngs': [{'label': 'display',
       'lat': 43.794412,
       'lng': -79.236126}],
     'distance': 62,
     'postalCode': 'M1B 2L4',
     'cc': 'CA',
     'city': 'Scarborough',
     'state': 'ON',
```

                      'country': 'Canada',
                      'formattedAddress': ['5600 Sheppard Ave E',
                       'Scarborough ON M1B 2L4',
                       'Canada']},
                    'categories': [{'id': '4f4532974b9074f6e4fb0104',
                      'name': 'Daycare',
                      'pluralName': 'Daycares',
                      'shortName': 'Daycare',
                      'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/shops/
daycare_',
                       'suffix': '.png'},
                      'primary': True}],
                    'referralId': 'v-1555242927',
                    'hasPerk': False},
                   {'id': '4d937f857ac3a35d2958d825',
                    'name': 'Centennial College Child Care Centre',
                    'location': {'lat': 43.786091,
                     'lng': -79.225181,
                     'labeledLatLngs': [{'label': 'display',
                       'lat': 43.786091,
                       'lng': -79.225181}],
                     'distance': 1335,
                     'cc': 'CA',
                     'country': 'Canada',
                     'formattedAddress': ['Canada']},
                    'categories': [{'id': '4bf58dd8d48988d198941735',
                      'name': 'College Academic Building',
                      'pluralName': 'College Academic Buildings',
                      'shortName': 'Academic Building',
                      'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/educat
ion/academicbuilding_',
                       'suffix': '.png'},
                      'primary': True}],
                    'referralId': 'v-1555242927',
                    'hasPerk': False},
                   {'id': '5841b68aaf5c144c4edaffa9',
                    'name': 'Precious Gems Christian Home Child Care',
                    'location': {'address': '96 Dunsfold Dr',
                     'lat': 43.814607,

```
                        'lng': -79.228787,
                        'labeledLatLngs': [{'label': 'display',
                          'lat': 43.814607,
                          'lng': -79.228787}],
                        'distance': 2275,
                        'postalCode': 'M1B 1T6',
                        'cc': 'CA',
                        'city': 'Scarborough',
                        'state': 'ON',
                        'country': 'Canada',
                        'formattedAddress': ['96 Dunsfold Dr',
                         'Scarborough ON M1B 1T6',
                         'Canada']},
                       'categories': [{'id': '4f4532974b9074f6e4fb0104',
                         'name': 'Daycare',
                         'pluralName': 'Daycares',
                         'shortName': 'Daycare',
                         'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/shops/
              daycare_',
                          'suffix': '.png'},
                         'primary': True}],
                       'referralId': 'v-1555242927',
                       'hasPerk': False},
                      {'id': '5bc82090cf72a0002cb19198',
                       'name': 'Scarborough Morrish YMCA Child Care Centre',
                       'location': {'address': '61 Canmore Blvd',
                        'lat': 43.79792960255199,
                        'lng': -79.26281207786815,
                        'labeledLatLngs': [{'label': 'display',
                          'lat': 43.79792960255199,
                          'lng': -79.26281207786815}],
                        'distance': 2145,
                        'postalCode': 'M1C 4B2',
                        'cc': 'CA',
                        'city': 'Scarborough',
                        'state': 'ON',
                        'country': 'Canada',
                        'formattedAddress': ['61 Canmore Blvd',
                         'Scarborough ON M1C 4B2',
```

                    'Canada']},
                'categories': [{'id': '4f4532974b9074f6e4fb0104',
                  'name': 'Daycare',
                  'pluralName': 'Daycares',
                  'shortName': 'Daycare',
                  'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/shops/
daycare_',
                    'suffix': '.png'},
                  'primary': True}],
                'referralId': 'v-1555242927',
                'hasPerk': False},
              {'id': '5bc71981d807ee002ce1ecc6',
                'name': 'Scarborough CD Farquharson YMCA Child Care Centre',
                'location': {'address': '1965 Brimley Road',
                  'lat': 43.78459599857809,
                  'lng': -79.26616430282593,
                  'labeledLatLngs': [{'label': 'display',
                    'lat': 43.78459599857809,
                    'lng': -79.26616430282593}],
                  'distance': 2651,
                  'postalCode': 'M1S 2B1',
                  'cc': 'CA',
                  'city': 'Scarborough',
                  'state': 'ON',
                  'country': 'Canada',
                  'formattedAddress': ['1965 Brimley Road',
                    'Scarborough ON M1S 2B1',
                    'Canada']},
                'categories': [{'id': '4f4532974b9074f6e4fb0104',
                  'name': 'Daycare',
                  'pluralName': 'Daycares',
                  'shortName': 'Daycare',
                  'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/shops/
daycare_',
                    'suffix': '.png'},
                  'primary': True}],
                'referralId': 'v-1555242927',
                'hasPerk': False},
              {'id': '5bfd072b2b9844002c184de3',

```
        'name': 'Toronto Scarborough Town Centre Ct YMCA Child Care Centr
e',
        'location': {'address': '230 Town Center Court',
         'lat': 43.774795235650785,
         'lng': -79.25438404083252,
         'labeledLatLngs': [{'label': 'display',
           'lat': 43.774795235650785,
           'lng': -79.25438404083252}],
         'distance': 2665,
         'postalCode': 'M1P 4Y7',
         'cc': 'CA',
         'city': 'Scarborough',
         'state': 'ON',
         'country': 'Canada',
         'formattedAddress': ['230 Town Center Court',
          'Scarborough ON M1P 4Y7',
          'Canada']},
        'categories': [{'id': '5744ccdfe4b0c0459246b4c7',
          'name': 'Child Care Service',
          'pluralName': 'Child Care Services',
          'shortName': 'Child Care',
          'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/shops/
daycare_',
           'suffix': '.png'},
          'primary': True}],
        'referralId': 'v-1555242927',
        'hasPerk': False}]}}
```

Get relevant part of JSON and transform it into a _pandas_ dataframe

In [92]:
```python
# assign relevant part of JSON to venues
venues = results['response']['venues']

# tranform venues into a dataframe
dataframe = json_normalize(venues)
dataframe.head()
```

Out[92]:

categories	hasPerk		id	location.address	location.cc

0	[{'id': '4f4532974b9074f6e4fb0104', 'name': 'D...	False	57c8d67bcd1043c5b04493dc	5600 Sheppard Ave E	CA
1	[{'id': '4bf58dd8d48988d198941735', 'name': 'C...	False	4d937f857ac3a35d2958d825	NaN	CA
2	[{'id': '4f4532974b9074f6e4fb0104', 'name': 'D...	False	5841b68aaf5c144c4edaffa9	96 Dunsfold Dr	CA
3	[{'id': '4f4532974b9074f6e4fb0104', 'name': 'D...	False	5bc82090cf72a0002cb19198	61 Canmore Blvd	CA
4	[{'id': '4f4532974b9074f6e4fb0104', 'name': 'D...	False	5bc71981d807ee002ce1ecc6	1965 Brimley Road	CA

Define information of interest and filter dataframe

In [94]:
```python
# keep only columns that include venue name, and anything that is associated with location
filtered_columns = ['name', 'categories'] + [col for col in dataframe.columns if col.startswith('location.')] + ['id']
dataframe_filtered = dataframe.loc[:, filtered_columns]

# 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']

# filter the category for each row
dataframe_filtered['categories'] = dataframe_filtered.apply(get_categor
y_type, axis=1)

# clean column names by keeping only last term
dataframe_filtered.columns = [column.split('.')[-1] for column in dataf
rame_filtered.columns]

dataframe_filtered
```

Out[94]:

	name	categories	address	cc	city	country	distance	formattedAddress	
0	Sheppard Square Child Care	Daycare	5600 Sheppard Ave E	CA	Scarborough	Canada	62	[5600 Sheppard Ave E, Scarborough ON M1B 2L4, ...	[{'l...
1	Centennial College Child Care Centre	College Academic Building	NaN	CA	NaN	Canada	1335	[Canada]	[{'l...
2	Precious Gems Christian Home Child Care	Daycare	96 Dunsfold Dr	CA	Scarborough	Canada	2275	[96 Dunsfold Dr, Scarborough ON M1B 1T6, Canada]	[{'l...
3	Scarborough Morrish YMCA Child Care Centre	Daycare	61 Canmore Blvd	CA	Scarborough	Canada	2145	[61 Canmore Blvd, Scarborough ON M1C 4B2, Canada]	[{'l... 43.7
4	Scarborough CD Farquharson YMCA Child Care Centre	Daycare	1965 Brimley Road	CA	Scarborough	Canada	2651	[1965 Brimley Road, Scarborough ON M1S 2B1, Ca...	[{'l... 43.7

	name	categories	address	cc	city	country	distance	formattedAddress
5	Toronto Scarborough Town Centre Ct YMCA Child ...	Child Care Service	230 Town Center Court	CA	Scarborough	Canada	2665	[230 Town Center Court, Scarborough ON M1P 4Y7...

Let's visualize child care centers that are nearby

```
In [95]: dataframe_filtered.name
```

```
Out[95]: 0                          Sheppard Square Child Care
         1                  Centennial College Child Care Centre
         2                  Precious Gems Christian Home Child Care
         3                  Scarborough Morrish YMCA Child Care Centre
         4        Scarborough CD Farquharson YMCA Child Care Centre
         5        Toronto Scarborough Town Centre Ct YMCA Child ...
         Name: name, dtype: object
```

```
In [96]: center_map = folium.Map(location=[latitude, longitude], zoom_start=13)
         # generate map centred around your location

         # add a red circle marker to represent your location
         folium.features.CircleMarker(
             [latitude, longitude],
             radius=10,
             color='red',
             popup= address,
             fill = True,
             fill_color = 'red',
             fill_opacity = 0.6
         ).add_to(center_map)

         # add child care centers  as blue circle markers
         for lat, lng, label in zip(dataframe_filtered.lat, dataframe_filtered.l
         ng, dataframe_filtered.categories):
             folium.features.CircleMarker(
```

```
        [lat, lng],
        radius=5,
        color='blue',
        popup=label,
        fill = True,
        fill_color='blue',
        fill_opacity=0.6
    ).add_to(center_map)

# display map
center_map
```

Out[96]:
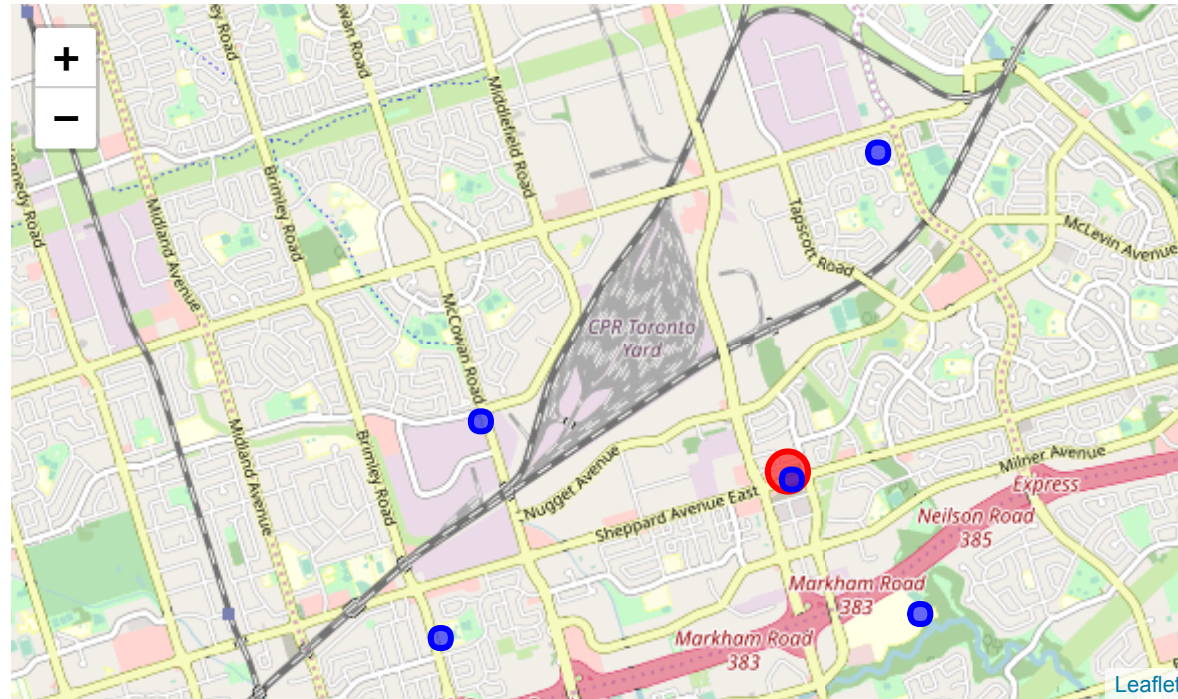
Now you can explore each child center around your address.

In [97]:
```
venue_id = '5841b68aaf5c144c4edaffa9' # ID of Harry's Italian Pizza Bar
url = 'https://api.foursquare.com/v2/venues/{}?client_id={}&client_secr
```

```
           et={}&v={}'.format(venue_id, CLIENT_ID, CLIENT_SECRET, VERSION)
           url
```

Out[97]: `'https://api.foursquare.com/v2/venues/5841b68aaf5c144c4edaffa9?client_i d=LA4BGJCCVELUQ02LD33A0JONKW0GBN5TYC4PDW0JXYUN5OMO&client_secret=VZZEJ0 RJMXENI2VG0HFQP13XFTR3U4MITOAA0MMH4TZG0LV5&v=20180605'`

In [98]:
```
result = requests.get(url).json()
print(result['response']['venue'].keys())
result['response']['venue']
```

```
dict_keys(['id', 'name', 'contact', 'location', 'canonicalUrl', 'catego
ries', 'verified', 'stats', 'url', 'likes', 'dislike', 'ok', 'venueRati
ngBlacklisted', 'allowMenuUrlEdit', 'beenHere', 'specials', 'photos',
'reasons', 'description', 'hereNow', 'createdAt', 'tips', 'shortUrl',
'timeZone', 'listed', 'hours', 'pageUpdates', 'inbox', 'attributes', 'b
estPhoto'])
```

Out[98]:
```
{'id': '5841b68aaf5c144c4edaffa9',
 'name': 'Precious Gems Christian Home Child Care',
 'contact': {'phone': '4163350469', 'formattedPhone': '(416) 335-046
9'},
 'location': {'address': '96 Dunsfold Dr',
  'lat': 43.814607,
  'lng': -79.228787,
  'labeledLatLngs': [{'label': 'display',
    'lat': 43.814607,
    'lng': -79.228787}],
  'postalCode': 'M1B 1T6',
  'cc': 'CA',
  'city': 'Scarborough',
  'state': 'ON',
  'country': 'Canada',
  'formattedAddress': ['96 Dunsfold Dr', 'Scarborough ON M1B 1T6', 'Can
ada']},
 'canonicalUrl': 'https://foursquare.com/v/precious-gems-christian-home
-child-care/5841b68aaf5c144c4edaffa9',
 'categories': [{'id': '4f4532974b9074f6e4fb0104',
   'name': 'Daycare',
   'pluralName': 'Daycares',
```

```
        'shortName': 'Daycare',
        'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/shops/day
care_',
          'suffix': '.png'},
        'primary': True}],
    'verified': False,
    'stats': {'tipCount': 0},
    'url': 'http://www.preciousgemschristiandaycare.com',
    'likes': {'count': 0, 'groups': []},
    'dislike': False,
    'ok': False,
    'venueRatingBlacklisted': True,
    'allowMenuUrlEdit': True,
    'beenHere': {'count': 0,
     'unconfirmedCount': 0,
     'marked': False,
     'lastCheckinExpiredAt': 0},
    'specials': {'count': 0, 'items': []},
    'photos': {'count': 20,
     'groups': [{'type': 'checkin',
       'name': "Friends' check-in photos",
       'count': 0,
       'items': []},
      {'type': 'venue',
       'name': 'Venue photos',
       'count': 20,
       'items': [{'id': '59b6ff73029a552f8558b07b',
         'createdAt': 1505165171,
         'source': {'name': 'Yext Yext', 'url': 'http://yext.com'},
         'prefix': 'https://fastly.4sqi.net/img/general/',
         'suffix': '/87388367_IPX4JZLB_T_nHMtWX3w6ZkqkSB9p4PCM2vcG592T7b0.
jpg',
         'width': 800,
         'height': 589,
         'user': {'id': '87388367',
          'firstName': 'Yext',
          'lastName': 'Yext',
          'gender': 'none',
          'photo': {'prefix': 'https://fastly.4sqi.net/img/user/',
```

```
                 'suffix': '/blank_boy.png',
                 'default': True}},
               'visibility': 'public'},
              {'id': '59b6ff72ee71203bd8339ecd',
               'createdAt': 1505165170,
               'source': {'name': 'Yext Yext', 'url': 'http://yext.com'},
               'prefix': 'https://fastly.4sqi.net/img/general/',
               'suffix': '/87388367_Cpssd7_IkOBgW3FpVRaqGX-ObgRryEIWF8OkSiRUxpY.
jpg',
               'width': 619,
               'height': 413,
               'user': {'id': '87388367',
                'firstName': 'Yext',
                'lastName': 'Yext',
                'gender': 'none',
                'photo': {'prefix': 'https://fastly.4sqi.net/img/user/',
                 'suffix': '/blank_boy.png',
                 'default': True}},
               'visibility': 'public'}]}],
            'summary': '0 photos'},
           'reasons': {'count': 0, 'items': []},
           'description': 'Precious Gems Christian Home Daycare is a fun filled l
earning and Godly environment! We offer programs for children ages 10 m
onths to 7 years at our facility in Scarborough.',
           'hereNow': {'count': 0, 'summary': 'Nobody here', 'groups': []},
           'createdAt': 1480701578,
           'tips': {'count': 0,
            'groups': [{'type': 'others', 'name': 'All tips', 'count': 0, 'item
s': []}]},
           'shortUrl': 'http://4sq.com/2gVrDau',
           'timeZone': 'America/Toronto',
           'listed': {'count': 0,
            'groups': [{'type': 'others',
              'name': 'Lists from other people',
              'count': 0,
              'items': []}]},
           'hours': {'status': 'Closed until 7:30 AM tomorrow',
            'richStatus': {'entities': [], 'text': 'Closed until 7:30 AM tomorro
w'},
```

```
    'isOpen': False,
    'isLocalHoliday': False,
    'dayData': [],
    'timeframes': [{'days': 'Mon—Fri',
      'open': [{'renderedTime': '7:30 AM—6:00 PM'}],
      'segments': []}]},
   'pageUpdates': {'count': 0, 'items': []},
   'inbox': {'count': 0, 'items': []},
   'attributes': {'groups': []},
   'bestPhoto': {'id': '59b6ff73029a552f8558b07b',
    'createdAt': 1505165171,
    'source': {'name': 'Yext Yext', 'url': 'http://yext.com'},
    'prefix': 'https://fastly.4sqi.net/img/general/',
    'suffix': '/87388367_IPX4JZLB_T_nHMtWX3w6ZkqkSB9p4PCM2vcG592T7b0.jp
  g',
    'width': 800,
    'height': 589,
    'visibility': 'public'}}
```

In [99]:
```python
try:
    print(result['response']['venue']['rating'])
except:
    print('This venue has not been rated yet.')
```

This venue has not been rated yet.

In [ ]:

6. Results and Discussion

This section provides some insights on how the effectiveness of the fee subsidy program is related to the number of child care centres across districts and centre types. First, I aim to visualize the aspects of child care centres for the City of Toronto. I use bar charts to visualize the data.

From the bar chart, we see that the dataset can be briefly analyzed as the following:

- This report analyzes 1007 child care centres in Toronto as follows:
  - Based on center type we have the following;
    - 668 centers are Non-Profit. **(530 have Fee-Subsidy)**
    - 286 centers are Commercial. **(Only 94 have Fee-Subsidy)**
    - 53 centers are city operated. **(All have Fee-Subsidy)**
  - Based on Fee-Subsidy program we have:
    - 677 centers are accepting Fee-subsidy.
    - 330 centers are not having Fee-subsidy program.
  - Based on center Location:
    - 318 centers are located in Toronto East York.
    - 266 centers are located in North York.
    - 226 centers are located in Etobicoke York.
    - 197 cenetrs are located in Scarborough.
  - Total number of enrolled children in this report is = 68763 ranged from Infant-Toddler-Preschooler-Kindergarten-Gradelevel
  - Childern are distributed based on the type of the care centers as follows:
    - 48871 **(71% from total children)** are enrolled in *Non-Profit* centers.
    - 17230 **(25% from total children)** are enrolled in *Commercial* centers.
    - 2662 **(4% from total children)** are enrolled in *city-operated* centers.

clustering was applied to the data set based on the above categories. 5 clusters labels were in the range [0,1,2,3,4] as follows:

- **0: color = Red, commercial centers with fee-subsidy.**
- **1: color = Purple, Non-Profit centers with fee-subsidy.**
- **2: color = Blue, commercial centers with no fee-subsidy.**
- **3: color = Green, Non-Profit centers with no fee-subsidy.**
- **4: color = Yellow, City operated centers with fee-subsidy.**

7. Conclusion

Investigating the effectiveness of fee subsidy program is multidimensional. It is related to the data on the details of fee subsidy applications in the City of Toronto as well as the fee subsidy policy of child care centres and how many spaces are reserved for children with fee subsidy in

these centres. Furthermore, Census 2016 can be used to uncover some demographic features in each district and their wards. This may help us to see which wards need more child care centres with fee subsidy contract.