

In [83]:

```
import numpy as np # Library to handle data in a vectorized manner
import pandas as pd # Library for data analysis
```

In [84]:

```
csv_path = 'https://raw.githubusercontent.com/jpvegah/Report/main/Mexico.txt'
```

In [85]:

```
mynewdf = pd.read_csv(csv_path, header=0)
```

In [86]:

```
mynewdf[0:5]
```

Out[86]:

	Postal Code	Borough	Neighborhood	Latitude	Longitude
0	1020	Alvaro Obregon	Col. San Jose Insurgentes	19.366522	-99.185193
1	1110	Alvaro Obregon	Col. Las Palmas	19.398938	-99.211254
2	1210	Alvaro Obregon	Col. Centro de Ciudad Santa Fe	19.382992	-99.241860
3	1790	Alvaro Obregon	Col. Lomas de San Angel Inn	19.345009	-99.205693
4	2300	Azcapotzalco	Fracc. Industrial de Vallejo	19.496314	-99.163649

In [87]:

```
mynewdf.columns
```

Out[87]:

```
Index(['Postal Code', 'Borough', 'Neighborhood', 'Latitude', 'Longitude'], dt
type='object')
```

In [88]:

```
mynewdf.dtypes
```

Out[88]:

```
Postal Code    int64
Borough        object
Neighborhood   object
Latitude       float64
Longitude      float64
dtype: object
```

In [90]:

```
print('The dataframe has {} Boroughs and {} Neighborhoods.'.format(
    len(mynewdf['Borough'].unique()),
    mynewdf.shape[0]
))
mynewdf['Borough'].unique()
```

The dataframe has 15 Boroughs and 76 Neighborhoods.

Out[90]:

```
array(['Alvaro Obregon', 'Azcapotzalco', 'Benito Juarez', 'Coyoacan',
      'Cuajimalpa', 'Cuauhtemoc', 'Gustavo A. Madero', 'Iztacalco',
      'Delegacion Iztapalapa', 'Magdalena Contreras', 'Miguel Hidalgo',
      'Tlahuac', 'Tlalpan', 'Venustiano Carranza', 'Xochimilco'],
      dtype=object)
```

In [69]:

```
#import json # library to handle JSON files

!conda install -c conda-forge geopy --yes # uncomment this line if you haven't completed the Foursquare API lab
from geopy.geocoders import Nominatim # convert an address into latitude and longitude values

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

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

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

#!conda install -c conda-forge folium=0.5.0 --yes # uncomment this line if you haven't completed the Foursquare API Lab
import folium # map rendering library

#print('Libraries imported.')
```

Collecting package metadata (current\_repodata.json): done

Solving environment: done

# All requested packages already installed.

In [91]:

```
#Create a Map of Mexico City with Neighbourhoods superimposed using Latitude and Longitude values
#Passing Mexico City coordinates manually
latitude=19.42847
longitude=-99.12766

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

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

map_mexico
```

Out[91]:

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

In [92]:

```
#Next, start utilizing the Foursquare API
CLIENT_ID = 'ET5MEYPN14RDTKJNHY4VVC0Q12R114CIOWGYVZ14FBSK1V32' # your Foursquare ID
CLIENT_SECRET = 'SUJMUIQ04X24ZKIPS31ZJFA12FJTFC11SJQXSGZG4ZMRLSV' # your Foursquare Secret
VERSION = '20180605' # Foursquare API version
LIMIT = 100 # A default Foursquare API limit value

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

Your credentials:

```
CLIENT_ID: ET5MEYPN14RDTKJNHY4VVC0Q12R114CIOWGYVZ14FBSK1V32
CLIENT_SECRET: SUJMUIQ04X24ZKIPS31ZJFA12FJTFC11SJQXSGZG4ZMRLSV
```

In [93]:

```
#Let's explore the first neighborhood
mynewdf.loc[0, 'Neighborhood']
#Get the Neighborhood's Latitude and Longitude
neighborhood_latitude = mynewdf.loc[0, 'Latitude'] # neighborhood latitude value
neighborhood_longitude = mynewdf.loc[0, 'Longitude'] # neighborhood longitude value

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

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

Latitude and longitude values of Col. San Jose Insurgentes are 19.366522099703925, -99.18519338197996.

In [96]:

```
#Now let's get the top 100 venues in 500m distance
#Let's create the GET request
#Import Latitude and Longitude Values
LIMIT = 100
radius = 500
url = 'https://api.foursquare.com/v2/venues/explore?client_id=ET5MEYPN14RDTKJNHY4VVC0Q12R114CIOWGYVZ14FBSK1V32&client_secret=SUJMUIQ04X24ZKIPS31ZJFA12FJTFC11SJQXSGZG4ZMRLSV&ll=19.366522099703925,-99.18519338197996&oauth_token=&v=20180605&radius=500&limit=100'
url
```

Out[96]:

```
'https://api.foursquare.com/v2/venues/explore?client_id=ET5MEYPN14RDTKJNHY4VVC0Q12R114CIOWGYVZ14FBSK1V32&client_secret=SUJMUIQ04X24ZKIPS31ZJFA12FJTFC11SJQXSGZG4ZMRLSV&ll=19.366522099703925,-99.18519338197996&oauth_token=&v=20180605&radius=500&limit=100'
```

In [97]:

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

Out[97]:

```

{'meta': {'code': 200, 'requestId': '6010afc7d60cca30f68c438a'},
 'response': {'suggestedFilters': {'header': 'Tap to show:',
   'filters': [{'name': 'Open now', 'key': 'openNow'}]},
 'headerLocation': 'San José Insurgentes',
 'headerFullLocation': 'San José Insurgentes, Mexico City',
 'headerLocationGranularity': 'neighborhood',
 'totalResults': 38,
 'suggestedBounds': {'ne': {'lat': 19.37102210420393,
   'lng': -99.18043238606482},
 'sw': {'lat': 19.36202209520392, 'lng': -99.18995437789509}},
 'groups': [{'type': 'Recommended Places',
   'name': 'recommended',
   'items': [{'reasons': {'count': 0,
     'items': [{'summary': 'This spot is popular',
       'type': 'general',
       'reasonName': 'globalInteractionReason'}]}],
   'venue': {'id': '4d7d435e8f89224b6d86b326',
     'name': 'Parque de los Insurgentes',
     'location': {'address': 'Av. Plateros',
       'crossStreet': 'Mercaderes',
       'lat': 19.36615254318577,
       'lng': -99.18336993467477,
       'labeledLatLngs': [{'label': 'display',
         'lat': 19.36615254318577,
         'lng': -99.18336993467477}]},
     'distance': 195,
     'cc': 'MX',
     'city': 'Ciudad de México',
     'state': 'Distrito Federal',
     'country': 'México',
     'formattedAddress': ['Av. Plateros (Mercaderes)',
       'Benito Juárez, Distrito Federal',
       'México']},
   'categories': [{'id': '4bf58dd8d48988d163941735',
     'name': 'Park',
     'pluralName': 'Parks',
     'shortName': 'Park',
     'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/parks_out
doors/park_',
       'suffix': '.png'},
     'primary': True}],
   'photos': {'count': 0, 'groups': []}},
 'referralId': 'e-0-4d7d435e8f89224b6d86b326-0'},
 {'reasons': {'count': 0,
   'items': [{'summary': 'This spot is popular',
     'type': 'general',
     'reasonName': 'globalInteractionReason'}]}],
   'venue': {'id': '500cc695e4b0f6804f82b3cc',
     'name': 'Central Onceveintitres',
     'location': {'address': 'Factor 54',
       'crossStreet': 'Parque del Conde',
       'lat': 19.36568069001868,
       'lng': -99.18389789844025,
       'labeledLatLngs': [{'label': 'display',
         'lat': 19.36568069001868,

```

```

    'lng': -99.18389789844025}],
    'distance': 165,
    'postalCode': '03900',
    'cc': 'MX',
    'city': 'Delegación Benito Juárez',
    'state': 'Distrito Federal',
    'country': 'México',
    'formattedAddress': ['Factor 54 (Parque del Conde)',
    '03900 Delegación Benito Juárez, Distrito Federal',
    'México']],
    'categories': [{ 'id': '4bf58dd8d48988d116951735',
    'name': 'Antique Shop',
    'pluralName': 'Antique Shops',
    'shortName': 'Antiques',
    'icon': { 'prefix': 'https://ss3.4sqi.net/img/categories_v2/shops/ant
ique_',
    'suffix': '.png'},
    'primary': True}],
    'photos': { 'count': 0, 'groups': []},
    'venuePage': { 'id': '59368258' },
    'referralId': 'e-0-500cc695e4b0f6804f82b3cc-1'},
    { 'reasons': { 'count': 0,
    'items': [{ 'summary': 'This spot is popular',
    'type': 'general',
    'reasonName': 'globalInteractionReason' } ] },
    'venue': { 'id': '5cb13ea7345cbe0039cfeab4',
    'name': 'La Taperia',
    'location': { 'lat': 19.365214,
    'lng': -99.184934,
    'labeledLatLngs': [{ 'label': 'display',
    'lat': 19.365214,
    'lng': -99.184934 } ],
    'distance': 148,
    'postalCode': '03900',
    'cc': 'MX',
    'city': 'Ciudad de México',
    'state': 'CDMX',
    'country': 'México',
    'formattedAddress': ['03900 Ciudad de México, CDMX', 'México'] },
    'categories': [{ 'id': '4bf58dd8d48988d1db931735',
    'name': 'Tapas Restaurant',
    'pluralName': 'Tapas Restaurants',
    'shortName': 'Tapas',
    'icon': { 'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/tapa
s_',
    'suffix': '.png'},
    'primary': True}],
    'photos': { 'count': 0, 'groups': [] },
    'referralId': 'e-0-5cb13ea7345cbe0039cfeab4-2'},
    { 'reasons': { 'count': 0,
    'items': [{ 'summary': 'This spot is popular',
    'type': 'general',
    'reasonName': 'globalInteractionReason' } ] },
    'venue': { 'id': '4dd814e2d4c05d5096fa5a44',
    'name': 'Santa Clara',
    'location': { 'address': 'Felix Parra',
    'crossStreet': 'Col. Guadalupe Inn',

```

```

'lat': 19.36376887060199,
'lng': -99.1851290659533,
'labeledLatLngs': [{'label': 'display',
  'lat': 19.36376887060199,
  'lng': -99.1851290659533}],
'distance': 306,
'cc': 'MX',
'city': 'Ciudad de México',
'state': 'Distrito Federal',
'country': 'México',
'formattedAddress': ['Felix Parra (Col. Guadalupe Inn)',
  'Ciudad de México, Distrito Federal',
  'México']],
'categories': [{'id': '4bf58dd8d48988d1c9941735',
  'name': 'Ice Cream Shop',
  'pluralName': 'Ice Cream Shops',
  'shortName': 'Ice Cream',
  'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/icecream_',
    'suffix': '.png'},
    'primary': True}],
'photos': {'count': 0, 'groups': []},
'referralId': 'e-0-4dd814e2d4c05d5096fa5a44-3'},
{'reasons': {'count': 0,
  'items': [{'summary': 'This spot is popular',
    'type': 'general',
    'reasonName': 'globalInteractionReason'}]},
'venue': {'id': '4d5c31e6775f8cfa6ff5b2e0',
  'name': 'Jardin Interior',
  'location': {'address': 'José Ma. Velasco',
    'crossStreet': 'Plateros',
    'lat': 19.36407340312368,
    'lng': -99.18596209688718,
    'labeledLatLngs': [{'label': 'display',
      'lat': 19.36407340312368,
      'lng': -99.18596209688718}],
    'distance': 284,
    'cc': 'MX',
    'city': 'Ciudad de México',
    'state': 'Distrito Federal',
    'country': 'México',
    'formattedAddress': ['José Ma. Velasco (Plateros)',
      'Ciudad de México, Distrito Federal',
      'México']],
  'categories': [{'id': '4bf58dd8d48988d1d3941735',
    'name': 'Vegetarian / Vegan Restaurant',
    'pluralName': 'Vegetarian / Vegan Restaurants',
    'shortName': 'Vegetarian / Vegan',
    'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/vegetarian_',
      'suffix': '.png'},
      'primary': True}],
    'photos': {'count': 0, 'groups': []},
    'referralId': 'e-0-4d5c31e6775f8cfa6ff5b2e0-4'},
    {'reasons': {'count': 0,
      'items': [{'summary': 'This spot is popular',
        'type': 'general',

```



```

    'reasonName': 'globalInteractionReason']]],
'venue': {'id': '5339dd69498ef32d98e72b06',
'name': 'Carnitas Y Ensaladas "Pebra"',
'location': {'lat': 19.367374180668282,
'lng': -99.18751464398676,
'labeledLatLngs': [{'label': 'display',
'lat': 19.367374180668282,
'lng': -99.18751464398676}]},
'distance': 261,
'cc': 'MX',
'country': 'México',
'formattedAddress': ['México']},
'categories': [{'id': '52e81612bcbc57f1066b79f4',
'name': 'Buffet',
'pluralName': 'Buffets',
'shortName': 'Buffet',
'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/defa
ult_',
'suffix': '.png'},
'primary': True}],
'photos': {'count': 0, 'groups': []}},
'referralId': 'e-0-5339dd69498ef32d98e72b06-5'},
{'reasons': {'count': 0,
'items': [{'summary': 'This spot is popular',
'type': 'general',
'reasonName': 'globalInteractionReason']]],
'venue': {'id': '4cffdd0975d3236a6d80e7f7',
'name': 'El Gran Leon De Oro',
'location': {'address': 'Mercaderes',
'lat': 19.365111419072843,
'lng': -99.18282859825136,
'labeledLatLngs': [{'label': 'display',
'lat': 19.365111419072843,
'lng': -99.18282859825136}]},
'distance': 293,
'cc': 'MX',
'city': 'Ciudad de México',
'state': 'Distrito Federal',
'country': 'México',
'formattedAddress': ['Mercaderes',
'Ciudad de México, Distrito Federal',
'México']},
'categories': [{'id': '4bf58dd8d48988d1c1941735',
'name': 'Mexican Restaurant',
'pluralName': 'Mexican Restaurants',
'shortName': 'Mexican',
'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/mexi
can_',
'suffix': '.png'},
'primary': True}],
'photos': {'count': 0, 'groups': []}},
'referralId': 'e-0-4cffdd0975d3236a6d80e7f7-6'},
{'reasons': {'count': 0,
'items': [{'summary': 'This spot is popular',
'type': 'general',
'reasonName': 'globalInteractionReason']]],
'venue': {'id': '4bf9940b5ec320a1267f8ad3',

```

```

'name': 'Paletería Y Nevería La Michoacana',
'location': {'address': 'Sagredo Col. San José Insurgentes',
'crossStreet': 'José Ma. Velasco',
'lat': 19.364508234793036,
'lng': -99.18797381473163,
'labeledLatLngs': [{'label': 'display',
'lat': 19.364508234793036,
'lng': -99.18797381473163}],
'distance': 368,
'cc': 'MX',
'city': 'Alvaro Obregon',
'state': 'Distrito Federal',
'country': 'México',
'formattedAddress': ['Sagredo Col. San José Insurgentes (José Ma. Vel
asco)',
'Alvaro Obregon, Distrito Federal',
'México']},
'categories': [{'id': '4bf58dd8d48988d1c9941735',
'name': 'Ice Cream Shop',
'pluralName': 'Ice Cream Shops',
'shortName': 'Ice Cream',
'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/icec
ream_',
'suffix': '.png'},
'primary': True}],
'photos': {'count': 0, 'groups': []},
'referralId': 'e-0-4bf9940b5ec320a1267f8ad3-7'},
{'reasons': {'count': 0,
'items': [{'summary': 'This spot is popular',
'type': 'general',
'reasonName': 'globalInteractionReason'}]},
'venue': {'id': '56db97a9498e714be10674bc',
'name': 'Tamale Mio',
'location': {'address': 'Parque de Tlacoquemécatl',
'crossStreet': 'Adolfo Prieto',
'lat': 19.36397072886133,
'lng': -99.18445685764426,
'labeledLatLngs': [{'label': 'display',
'lat': 19.36397072886133,
'lng': -99.18445685764426}],
'distance': 294,
'cc': 'MX',
'city': 'Ciudad de México',
'state': 'Distrito Federal',
'country': 'México',
'formattedAddress': ['Parque de Tlacoquemécatl (Adolfo Prieto)',
'Ciudad de México, Distrito Federal',
'México']},
'categories': [{'id': '4bf58dd8d48988d1cb941735',
'name': 'Food Truck',
'pluralName': 'Food Trucks',
'shortName': 'Food Truck',
'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/stre
etfood_',
'suffix': '.png'},
'primary': True}],
'photos': {'count': 0, 'groups': []},

```

```

'referralId': 'e-0-56db97a9498e714be10674bc-8'},
{'reasons': {'count': 0,
  'items': [{'summary': 'This spot is popular',
    'type': 'general',
    'reasonName': 'globalInteractionReason'}]}],
'venue': {'id': '523df5d5498e735e766ee4bc',
  'name': 'Buen Camino (pastelería y cafetería)',
  'location': {'address': 'José María Velasco #73-B',
    'crossStreet': 'Félix Parra',
    'lat': 19.363753956588837,
    'lng': -99.18488318103192,
    'labeledLatLngs': [{'label': 'display',
      'lat': 19.363753956588837,
      'lng': -99.18488318103192}]},
    'distance': 309,
    'postalCode': '03900',
    'cc': 'MX',
    'country': 'México',
    'formattedAddress': ['José María Velasco #73-B (Félix Parra)',
      '03900',
      'México']},
  'categories': [{'id': '4bf58dd8d48988d1e0931735',
    'name': 'Coffee Shop',
    'pluralName': 'Coffee Shops',
    'shortName': 'Coffee Shop',
    'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/coffee_shop_',
      'suffix': '.png'},
    'primary': True}]},
  'photos': {'count': 0, 'groups': []},
  'venuePage': {'id': '94679449'}},
'referralId': 'e-0-523df5d5498e735e766ee4bc-9'},
{'reasons': {'count': 0,
  'items': [{'summary': 'This spot is popular',
    'type': 'general',
    'reasonName': 'globalInteractionReason'}]}],
'venue': {'id': '4db4cd370f2cc52c210cf39b',
  'name': 'La Michoacana',
  'location': {'address': 'Sagredo',
    'crossStreet': 'Mercaderes',
    'lat': 19.364576953435915,
    'lng': -99.18784513696617,
    'labeledLatLngs': [{'label': 'display',
      'lat': 19.364576953435915,
      'lng': -99.18784513696617}]},
    'distance': 352,
    'cc': 'MX',
    'city': 'Ciudad de México',
    'state': 'Distrito Federal',
    'country': 'México',
    'formattedAddress': ['Sagredo (Mercaderes)',
      'D.F., Distrito Federal',
      'México']},
  'categories': [{'id': '4bf58dd8d48988d1c9941735',
    'name': 'Ice Cream Shop',
    'pluralName': 'Ice Cream Shops',
    'shortName': 'Ice Cream',

```

```

    'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/icecream_',
            'suffix': '.png'},
            'primary': True}},
    'photos': {'count': 0, 'groups': []},
    'referralId': 'e-0-4db4cd370f2cc52c210cf39b-10'},
    {'reasons': {'count': 0,
    'items': [{'summary': 'This spot is popular',
    'type': 'general',
    'reasonName': 'globalInteractionReason'}]},
    'venue': {'id': '5424a762498eeaa5e624ee08',
    'name': 'Kusii Café',
    'location': {'address': 'Insurgentes Sur 1517 (dentro de la Comercial Mexicana)',
    'crossStreet': 'Perpeutua',
    'lat': 19.366215135397432,
    'lng': -99.1821241378784,
    'labeledLatLngs': [{'label': 'display',
    'lat': 19.366215135397432,
    'lng': -99.1821241378784}],
    'distance': 324,
    'postalCode': '03900',
    'cc': 'MX',
    'city': 'San José Insurgentes',
    'state': 'Distrito Federal',
    'country': 'México',
    'formattedAddress': ['Insurgentes Sur 1517 (dentro de la Comercial Mexicana) (Perpeutua)',
    '03900 San José Insurgentes, Distrito Federal',
    'México']}},
    'categories': [{'id': '4bf58dd8d48988d16d941735',
    'name': 'Café',
    'pluralName': 'Cafés',
    'shortName': 'Café',
    'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/cafe_',
            'suffix': '.png'},
            'primary': True}},
    'photos': {'count': 0, 'groups': []},
    'venuePage': {'id': '95726071'}},
    'referralId': 'e-0-5424a762498eeaa5e624ee08-11'},
    {'reasons': {'count': 0,
    'items': [{'summary': 'This spot is popular',
    'type': 'general',
    'reasonName': 'globalInteractionReason'}]},
    'venue': {'id': '54cc1e04498ea248921099a8',
    'name': 'El Peladito - Damas',
    'location': {'address': 'Damas 130',
    'lat': 19.363792159358013,
    'lng': -99.18332213778004,
    'labeledLatLngs': [{'label': 'display',
    'lat': 19.363792159358013,
    'lng': -99.18332213778004}],
    'distance': 361,
    'postalCode': '03900',
    'cc': 'MX',
    'neighborhood': 'San José Insurgentes',

```

```

'city': 'Ciudad de México',
'state': 'Distrito Federal',
'country': 'México',
'formattedAddress': ['Damas 130',
'03900 Ciudad de México, Distrito Federal',
'México']],
'categories': [{'id': '4bf58dd8d48988d1ce941735',
'name': 'Seafood Restaurant',
'pluralName': 'Seafood Restaurants',
'shortName': 'Seafood',
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    'state': 'Distrito Federal',
    'country': 'México',
    'formattedAddress': ['Insurgentes Sur #1630, Col. Insurgentes Mixcoac

```

```

(Barranca del Muerto)',
  '03490 Benito Juárez, Distrito Federal',
  'México']]],
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  'icon': { 'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/fren
ch_',
    'suffix': '.png'},
    'primary': True}],
'photos': { 'count': 0, 'groups': []}],
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  'items': [{ 'summary': 'This spot is popular',
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    'reasonName': 'globalInteractionReason'} ]}],
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    'city': 'Ciudad de México',
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      'México'] ]}],
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rmacy_',
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    'lng': -99.18280047597979,
    'labeledLatLngs': [{ 'label': 'display',
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```



```

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'03900 , Distrito Federal',
'México']],
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eeshop_',
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'primary': True}],
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'crossStreet': 'Damas',
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'lng': -99.182671,
'labeledLatLngs': [{ 'label': 'display',
'lat': 19.362868,
```

```

    'lng': -99.182671}],
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    'cc': 'MX',
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    'city': 'Ciudad de México',
    'state': 'Distrito Federal',
    'country': 'México',
    'formattedAddress': ['Av. Insurgentes Sur 1641 (Damas)',
    '03900 Ciudad de México, Distrito Federal',
    'México']],
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    'pluralName': 'Mexican Restaurants',
    'shortName': 'Mexican',
    'icon': { 'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/mexi
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    'suffix': '.png'},
    'primary': True}],
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    'items': [{ 'summary': 'This spot is popular',
    'type': 'general',
    'reasonName': 'globalInteractionReason' } ]},
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    'location': { 'lat': 19.370451134342698,
    'lng': -99.18602991215553,
    'labeledLatLngs': [{ 'label': 'display',
    'lat': 19.370451134342698,
    'lng': -99.18602991215553 } ]},
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    'city': 'Ciudad de México',
    'state': 'Distrito Federal',
    'country': 'México',
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o'] },
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    'pluralName': 'Bakeries',
    'shortName': 'Bakery',
    'icon': { 'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/bake
ry_',
    'suffix': '.png'},
    'primary': True}],
    'photos': { 'count': 0, 'groups': []},
    'referralId': 'e-0-4d0559dedc45a09377dbeec6-37' } ] ] ] ] }
```

In [98]:

```
# function that extracts the category of the venue
def get_category_type(row):
    try:
        categories_list = row['categories']
    except:
        categories_list = row['venue.categories']

    if len(categories_list) == 0:
        return None
    else:
        return categories_list[0]['name']
```

In [99]:

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

nearby_venues = pd.json_normalize(venues) # flatten JSON

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

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

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

nearby_venues.head()
```

Out[99]:

	name	categories	lat	lng
0	Parque de los Insurgentes	Park	19.366153	-99.183370
1	Central Onceveintitres	Antique Shop	19.365681	-99.183898
2	La Taperia	Tapas Restaurant	19.365214	-99.184934
3	Santa Clara	Ice Cream Shop	19.363769	-99.185129
4	Jardin Interior	Vegetarian / Vegan Restaurant	19.364073	-99.185962

In [100]:

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

38 venues were returned by Foursquare.

In [ ]:

```
## Next Explore Neighbourhoods in Mexico City
```

In [103]:

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

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

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

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

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

    nearby_venues = pd.DataFrame([item for venue_list in venues_list for item in venue_list])
    nearby_venues.columns = ['Neighborhood',
                            'Neighborhood Latitude',
                            'Neighborhood Longitude',
                            'Venue',
                            'Venue Latitude',
                            'Venue Longitude',
                            'Venue Category']

    return(nearby_venues)
```

In [106]:

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

Col. San Jose Insurgentes  
Col. Las Palmas  
Col. Centro de Ciudad Santa Fe  
Col. Lomas de San Angel Inn  
Fracc. Industrial de Vallejo  
Col. La Preciosa  
Col. Coltongo  
Col. Santa Cruz Acayucan  
Col. Nueva Santa Maria  
Col. San Salvador Xochimanca  
Col. Narvarte Poniente  
Col. Narvarte Oriente  
Col. Alamos  
Col. Del Valle  
Col. Napoles  
Col. Nonoalco  
Col. Moderna  
Col. San Jose Insurgentes  
Col. Credito Constructor  
Col. del Carmen  
Col. San Pablo Tepetlapa  
Col. Pueblo de Santa Ursula Coapa  
Col. Santa Ursula Coapa  
Col. Lomas de Vista Hermosa  
Col. Bosques de las Lomas  
Col. Centro  
Col. Juarez  
Col. Roma  
Col. Doctores  
Col. Obrera  
Col. Nonoalco Tlatelolco  
Col. Maximimo Avila Camacho  
Col. Heroe de Nacozari  
Col. Industrial  
Col. Tres Estrellas  
Col. San Juan de Aragon  
Col. Pantitlan  
Col. Viaducto Piedad  
Col. Santa Anita  
Col. Granjas Mexico  
Col. Agricola Oriental  
Col. Central de Abastos  
Col. Sector Popular  
Col. Granjas San Antonio  
Col. Ejercito de Oriente  
Col. Santa Martha Acatitla  
Col. Lomas de Zaragoza  
Col. Xalpa  
Col. Granjas Esmeralda  
Col. San Juan Xalpa  
Col. Las Palmas  
Col. San Bernabe Ocotepec  
Col. Lomas de Chapultepec  
Col. Argentina Poniente  
Col. Pensil  
Col. Irrigacion  
Col. Los Morales Polanco

Col. Granada  
 Col. Polanco II Seccion  
 Col. Palmitas Polanco  
 Col. Polanco  
 Col. Anzures  
 Col. Reforma Social  
 Col. Bosques de las Lomas  
 Col. Escandon  
 Col. America  
 San Miguel Chapultepec  
 Col. del Mar  
 Col. Tlalpan  
 Col. La Joya  
 Col. Romero Rubio  
 Col. Merced Centro  
 Col. Lorenzo Boturini  
 Col. Magdalena Mixhuca  
 Col. Jardin Balbuena  
 Col. San Bernardino

In [107]:

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

(2867, 7)

Out[107]:

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Col. San Jose Insurgentes	19.366522	-99.185193	Parque de los Insurgentes	19.366153	-99.183370	Park
1	Col. San Jose Insurgentes	19.366522	-99.185193	Central Onceveintitres	19.365681	-99.183898	Antique Shop
2	Col. San Jose Insurgentes	19.366522	-99.185193	La Taperia	19.365214	-99.184934	Tapas Restaurant
3	Col. San Jose Insurgentes	19.366522	-99.185193	Santa Clara	19.363769	-99.185129	Ice Cream Shop
4	Col. San Jose Insurgentes	19.366522	-99.185193	Jardin Interior	19.364073	-99.185962	Vegetarian / Vegan Restaurant

In [108]:

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

There are 280 unique categories.

In [110]:

```

##Analyze each Neighborhood
# one hot encoding
mexico_onehot = pd.get_dummies(mexico_venues[['Venue Category']], prefix="", prefix_sep=""
)

# add neighborhood column back to dataframe
mexico_onehot['Neighborhood'] = mexico_venues['Neighborhood']

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

mexico_onehot.head()

```

Out[110]:

	Yoga Studio	ATM	Accessories Store	African Restaurant	American Restaurant	Antique Shop	Arcade	Arepa Restaurant	Argentinian Restaurant
0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	1	0	0	0
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0

In [111]:

```

#New dataframe size
mexico_onehot.shape

```

Out[111]:

(2867, 280)



In [112]:

```
##Let's group rows by Neighborhood and by taking the mean of the frequency of the occurrence of each category  
mexico_grouped = mexico_onehot.groupby('Neighborhood').mean().reset_index()  
mexico_grouped
```

Out[112]:

	Neighborhood	Yoga Studio	ATM	Accessories Store	African Restaurant	American Restaurant	Antique Shop	Arcade
0	Col. Agricola Oriental	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
1	Col. Alamos	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
2	Col. America	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
3	Col. Anzures	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.012500
4	Col. Argentina Poniente	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
5	Col. Bosques de las Lomas	0.041667	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
6	Col. Central de Abastos	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
7	Col. Centro	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
8	Col. Centro de Ciudad Santa Fe	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
9	Col. Coltongo	0.000000	0.000000	0.00000	0.000000	0.026316	0.000000	0.000000
10	Col. Credito Constructor	0.000000	0.000000	0.00000	0.000000	0.000000	0.019608	0.000000
11	Col. Del Valle	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
12	Col. Doctores	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
13	Col. Ejercito de Oriente	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
14	Col. Escandon	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
15	Col. Granada	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
16	Col. Granjas Esmeralda	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
17	Col. Granjas Mexico	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
18	Col. Granjas San Antonio	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
19	Col. Heroe de Nacozari	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
20	Col. Industrial	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
21	Col. Irrigacion	0.018519	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
22	Col. Jardin Balbuena	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
23	Col. Juarez	0.017544	0.000000	0.00000	0.000000	0.017544	0.000000	0.000000
24	Col. La Joya	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000

	Neighborhood	Yoga Studio	ATM	Accessories Store	African Restaurant	American Restaurant	Antique Shop	Arcade
25	Col. La Preciosa	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
26	Col. Las Palmas	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
27	Col. Lomas de Chapultepec	0.032787	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
28	Col. Lomas de San Angel Inn	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
29	Col. Lomas de Vista Hermosa	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
30	Col. Lomas de Zaragoza	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
31	Col. Lorenzo Boturini	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
32	Col. Los Morales Polanco	0.000000	0.000000	0.03125	0.000000	0.000000	0.000000	0.000000
33	Col. Magdalena Mixhuca	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
34	Col. Maximimo Avila Camacho	0.000000	0.052632	0.00000	0.052632	0.000000	0.000000	0.000000
35	Col. Merced Centro	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
36	Col. Moderna	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
37	Col. Napoles	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
38	Col. Narvarte Oriente	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
39	Col. Narvarte Poniente	0.000000	0.000000	0.00000	0.000000	0.010000	0.000000	0.000000
40	Col. Nonoalco	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
41	Col. Nonoalco Tlatelolco	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
42	Col. Nueva Santa Maria	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
43	Col. Obrera	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
44	Col. Palmitas Polanco	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
45	Col. Pantitlan	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
46	Col. Pensil	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
47	Col. Polanco	0.000000	0.000000	0.00000	0.000000	0.030303	0.000000	0.000000
48	Col. Polanco II Seccion	0.000000	0.000000	0.00000	0.000000	0.010309	0.000000	0.010309

	Neighborhood	Yoga Studio	ATM	Accessories Store	African Restaurant	American Restaurant	Antique Shop	Arcade
49	Col. Pueblo de Santa Ursula Coapa	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
50	Col. Reforma Social	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
51	Col. Roma	0.010000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
52	Col. Romero Rubio	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
53	Col. San Bernabe Ocoatepec	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
54	Col. San Bernardino	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
55	Col. San Jose Insurgentes	0.000000	0.000000	0.00000	0.000000	0.000000	0.027397	0.000000
56	Col. San Juan Xalpa	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
57	Col. San Juan de Aragon	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
58	Col. San Pablo Tepetlapa	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
59	Col. San Salvador Xochimanca	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
60	Col. Santa Anita	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
61	Col. Santa Cruz Acayucan	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
62	Col. Santa Martha Acatitla	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
63	Col. Santa Ursula Coapa	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
64	Col. Sector Popular	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
65	Col. Tlalpan	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.015625
66	Col. Tres Estrellas	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
67	Col. Viaducto Piedad	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
68	Col. Xalpa	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.333333
69	Col. del Carmen	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
70	Col. del Mar	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000

	Neighborhood	Yoga Studio	ATM	Accessories Store	African Restaurant	American Restaurant	Antique Shop	Arcade
71	Fracc. Industrial de Vallejo	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
72	San Miguel Chapultepec	0.021505	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000

In [113]:

```
#Confirm new size
mexico_grouped.shape
```

Out[113]:

(73, 280)

In [114]:

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

for hood in mexico_grouped['Neighborhood']:
    print("-----"+hood+"-----")
    temp = mexico_grouped[mexico_grouped['Neighborhood'] == hood].T.reset_index()
    temp.columns = ['venue', 'freq']
    temp = temp.iloc[1:]
    temp['freq'] = temp['freq'].astype(float)
    temp = temp.round({'freq': 2})
    print(temp.sort_values('freq', ascending=False).reset_index(drop=True).head(num_top_venues))
    print('\n')
```

## ----Col. Agricola Oriental----

	venue	freq
0	Mexican Restaurant	0.21
1	Taco Place	0.12
2	Restaurant	0.08
3	Clothing Store	0.04
4	Seafood Restaurant	0.04

## ----Col. Alamos----

	venue	freq
0	Mexican Restaurant	0.13
1	Taco Place	0.07
2	Ice Cream Shop	0.05
3	Bakery	0.05
4	Seafood Restaurant	0.05

## ----Col. America----

	venue	freq
0	Taco Place	0.17
1	Furniture / Home Store	0.08
2	Mexican Restaurant	0.08
3	Restaurant	0.08
4	Coffee Shop	0.08

## ----Col. Anzures----

	venue	freq
0	Coffee Shop	0.06
1	Restaurant	0.06
2	Mexican Restaurant	0.05
3	Liquor Store	0.04
4	Steakhouse	0.04

## ----Col. Argentina Poniente----

	venue	freq
0	Mexican Restaurant	0.2
1	Farmers Market	0.2
2	Pharmacy	0.1
3	Bakery	0.1
4	Shop & Service	0.1

## ----Col. Bosques de las Lomas----

	venue	freq
0	Pizza Place	0.10
1	Taco Place	0.06
2	Mexican Restaurant	0.06
3	Hotel	0.04
4	Coffee Shop	0.04

## ----Col. Central de Abastos----

	venue	freq
0	Taco Place	0.13

1	Convenience Store	0.10
2	Mexican Restaurant	0.10
3	Pet Store	0.06
4	Pharmacy	0.06

## ----Col. Centro----

	venue	freq
0	Mexican Restaurant	0.14
1	Coffee Shop	0.08
2	Bakery	0.08
3	Pizza Place	0.08
4	Ice Cream Shop	0.06

## ----Col. Centro de Ciudad Santa Fe----

	venue	freq
0	Burger Joint	0.20
1	Mexican Restaurant	0.20
2	Taco Place	0.13
3	Flea Market	0.07
4	Record Shop	0.07

## ----Col. Coltongo----

	venue	freq
0	Clothing Store	0.16
1	Seafood Restaurant	0.08
2	Hotel	0.05
3	Fast Food Restaurant	0.05
4	Ice Cream Shop	0.05

## ----Col. Credito Constructor----

	venue	freq
0	Coffee Shop	0.08
1	Mexican Restaurant	0.08
2	Park	0.06
3	Café	0.06
4	Restaurant	0.06

## ----Col. Del Valle----

	venue	freq
0	Mexican Restaurant	0.13
1	Spa	0.07
2	Pharmacy	0.07
3	Grocery Store	0.07
4	Convenience Store	0.04

## ----Col. Doctores----

	venue	freq
0	Bar	0.12
1	Mexican Restaurant	0.12
2	Taco Place	0.08
3	Hotel	0.08



4 Restaurant 0.04

----Col. Ejercito de Oriente----

	venue	freq
0	Mexican Restaurant	0.2
1	Wings Joint	0.2
2	Flea Market	0.2
3	Ice Cream Shop	0.2
4	Fast Food Restaurant	0.2

----Col. Escandon----

	venue	freq
0	Taco Place	0.15
1	Bakery	0.09
2	Motel	0.06
3	Burger Joint	0.06
4	Restaurant	0.06

----Col. Granada----

	venue	freq
0	Restaurant	0.13
1	Café	0.07
2	Convenience Store	0.07
3	Bakery	0.05
4	Coffee Shop	0.03

----Col. Granjas Esmeralda----

	venue	freq
0	Taco Place	0.21
1	Food Truck	0.12
2	Mexican Restaurant	0.12
3	Department Store	0.08
4	Asian Restaurant	0.04

----Col. Granjas Mexico----

	venue	freq
0	Sports Club	0.17
1	Stadium	0.17
2	Lounge	0.08
3	Music Venue	0.08
4	Gym	0.08

----Col. Granjas San Antonio----

	venue	freq
0	Mexican Restaurant	0.18
1	Taco Place	0.18
2	Coffee Shop	0.07
3	Park	0.07
4	Buffet	0.04

## ----Col. Heroe de Nacozari----

	venue	freq
0	Coffee Shop	0.10
1	Taco Place	0.08
2	Mexican Restaurant	0.08
3	Restaurant	0.06
4	Gym / Fitness Center	0.06

## ----Col. Industrial----

	venue	freq
0	Mexican Restaurant	0.15
1	Taco Place	0.11
2	Wings Joint	0.06
3	Park	0.06
4	Restaurant	0.06

## ----Col. Irrigacion----

	venue	freq
0	Mexican Restaurant	0.09
1	Deli / Bodega	0.07
2	Park	0.07
3	Restaurant	0.06
4	Convenience Store	0.06

## ----Col. Jardin Balbuena----

	venue	freq
0	Burger Joint	0.12
1	Mexican Restaurant	0.12
2	Bakery	0.12
3	Café	0.08
4	Taco Place	0.08

## ----Col. Juarez----

	venue	freq
0	Coffee Shop	0.16
1	Bakery	0.07
2	Hotel	0.05
3	Pizza Place	0.05
4	Chinese Restaurant	0.04

## ----Col. La Joya----

	venue	freq
0	Convenience Store	0.10
1	Mexican Restaurant	0.10
2	Pharmacy	0.10
3	Taco Place	0.08
4	Bakery	0.06

## ----Col. La Preciosa----

	venue	freq
0	Mexican Restaurant	0.29

1	Taco Place	0.12
2	Bakery	0.12
3	BBQ Joint	0.12
4	Burger Joint	0.06

----Col. Las Palmas----

	venue	freq
0	Mexican Restaurant	0.17
1	Taco Place	0.13
2	Cafeteria	0.09
3	Convenience Store	0.09
4	Gym	0.04

----Col. Lomas de Chapultepec----

	venue	freq
0	Taco Place	0.08
1	Bakery	0.05
2	Spa	0.05
3	Coffee Shop	0.05
4	Seafood Restaurant	0.05

----Col. Lomas de San Angel Inn----

	venue	freq
0	Taco Place	0.22
1	Café	0.11
2	Seafood Restaurant	0.06
3	Bakery	0.06
4	General Entertainment	0.06

----Col. Lomas de Vista Hermosa----

	venue	freq
0	Gym	0.15
1	Coffee Shop	0.12
2	Restaurant	0.08
3	Deli / Bodega	0.04
4	Salon / Barbershop	0.04

----Col. Lomas de Zaragoza----

	venue	freq
0	Mexican Restaurant	0.25
1	Taco Place	0.25
2	Pizza Place	0.25
3	Lounge	0.25
4	Pharmacy	0.00

----Col. Lorenzo Boturini----

	venue	freq
0	Taco Place	0.27
1	Mexican Restaurant	0.23
2	Seafood Restaurant	0.23
3	Convenience Store	0.05

4 Restaurant 0.05

----Col. Los Morales Polanco----

	venue	freq
0	Mexican Restaurant	0.12
1	Spanish Restaurant	0.06
2	Café	0.06
3	Coffee Shop	0.06
4	Bakery	0.06

----Col. Magdalena Mixhuca----

	venue	freq
0	Mexican Restaurant	0.41
1	Seafood Restaurant	0.04
2	Restaurant	0.04
3	Market	0.04
4	Convenience Store	0.04

----Col. Maximimo Avila Camacho----

	venue	freq
0	Taco Place	0.11
1	Mexican Restaurant	0.11
2	Brewery	0.05
3	Ice Cream Shop	0.05
4	Sandwich Place	0.05

----Col. Merced Centro----

	venue	freq
0	Mexican Restaurant	0.12
1	Clothing Store	0.08
2	Cosmetics Shop	0.08
3	Convenience Store	0.05
4	Taco Place	0.05

----Col. Moderna----

	venue	freq
0	Mexican Restaurant	0.16
1	Taco Place	0.13
2	Bar	0.05
3	Sushi Restaurant	0.05
4	Bakery	0.04

----Col. Napoles----

	venue	freq
0	Coffee Shop	0.10
1	Mexican Restaurant	0.06
2	Seafood Restaurant	0.04
3	Pizza Place	0.04
4	BBQ Joint	0.03

## ----Col. Narvarte Oriente----

	venue	freq
0	Taco Place	0.11
1	Mexican Restaurant	0.09
2	Coffee Shop	0.09
3	Burger Joint	0.07
4	Café	0.07

## ----Col. Narvarte Poniente----

	venue	freq
0	Mexican Restaurant	0.13
1	Taco Place	0.11
2	Coffee Shop	0.09
3	Café	0.06
4	Bakery	0.05

## ----Col. Nonoalco----

	venue	freq
0	Mexican Restaurant	0.11
1	Taco Place	0.09
2	Coffee Shop	0.06
3	Gym / Fitness Center	0.05
4	Café	0.03

## ----Col. Nonoalco Tlatelolco----

	venue	freq
0	Mexican Restaurant	0.13
1	Movie Theater	0.09
2	Burger Joint	0.09
3	Paper / Office Supplies Store	0.04
4	Gym / Fitness Center	0.04

## ----Col. Nueva Santa Maria----

	venue	freq
0	Mexican Restaurant	0.11
1	Ice Cream Shop	0.08
2	Taco Place	0.07
3	Bakery	0.06
4	Café	0.06

## ----Col. Obrera----

	venue	freq
0	Taco Place	0.25
1	Bar	0.14
2	Mexican Restaurant	0.07
3	Seafood Restaurant	0.07
4	Bakery	0.07

## ----Col. Palmitas Polanco----

	venue	freq
0	Mexican Restaurant	0.09

1	Restaurant	0.07
2	Bakery	0.06
3	Café	0.05
4	Ice Cream Shop	0.05

## ----Col. Pantitlan----

	venue	freq
0	Food Truck	0.12
1	Pizza Place	0.08
2	Convenience Store	0.08
3	Drugstore	0.04
4	Pool	0.04

## ----Col. Pensil----

	venue	freq
0	Mexican Restaurant	0.21
1	Burger Joint	0.16
2	Taco Place	0.16
3	Sandwich Place	0.11
4	Dog Run	0.05

## ----Col. Polanco----

	venue	freq
0	Coffee Shop	0.09
1	Seafood Restaurant	0.08
2	Bakery	0.05
3	Gym / Fitness Center	0.05
4	Pharmacy	0.05

## ----Col. Polanco II Seccion----

	venue	freq
0	Coffee Shop	0.06
1	Seafood Restaurant	0.06
2	Italian Restaurant	0.04
3	Café	0.04
4	Bakery	0.04

## ----Col. Pueblo de Santa Ursula Coapa----

	venue	freq
0	Taco Place	0.18
1	Campground	0.09
2	Convenience Store	0.09
3	Mexican Restaurant	0.09
4	Auto Garage	0.09

## ----Col. Reforma Social----

	venue	freq
0	Restaurant	0.14
1	Taco Place	0.11
2	Mexican Restaurant	0.07
3	Pizza Place	0.05

4                   BBQ Joint   0.05

----Col. Roma----

	venue	freq
0	Coffee Shop	0.07
1	Boutique	0.04
2	Cocktail Bar	0.04
3	Restaurant	0.04
4	Seafood Restaurant	0.03

----Col. Romero Rubio----

	venue	freq
0	Mexican Restaurant	0.27
1	Taco Place	0.19
2	Seafood Restaurant	0.08
3	Breakfast Spot	0.04
4	Pizza Place	0.04

----Col. San Bernabe Ocotepec----

	venue	freq
0	Mexican Restaurant	0.17
1	Pizza Place	0.17
2	Bakery	0.17
3	Deli / Bodega	0.08
4	Candy Store	0.08

----Col. San Bernardino----

	venue	freq
0	Convenience Store	0.11
1	Taco Place	0.09
2	Pharmacy	0.09
3	Lounge	0.06
4	Diner	0.06

----Col. San Jose Insurgentes----

	venue	freq
0	Mexican Restaurant	0.11
1	Ice Cream Shop	0.11
2	Coffee Shop	0.10
3	Bakery	0.05
4	Tapas Restaurant	0.05

----Col. San Juan Xalpa----

	venue	freq
0	Food Truck	0.11
1	Snack Place	0.11
2	Dessert Shop	0.11
3	Deli / Bodega	0.11
4	Gym	0.11

## ----Col. San Juan de Aragon----

	venue	freq
0	Taco Place	0.22
1	Mexican Restaurant	0.22
2	Pharmacy	0.09
3	Lounge	0.09
4	Other Great Outdoors	0.04

## ----Col. San Pablo Tepetlapa----

	venue	freq
0	Taco Place	0.18
1	Sports Club	0.09
2	Burrito Place	0.09
3	Mexican Restaurant	0.09
4	Restaurant	0.09

## ----Col. San Salvador Xochimanca----

	venue	freq
0	Mexican Restaurant	0.2
1	Tennis Court	0.1
2	Pet Store	0.1
3	Diner	0.1
4	Gym / Fitness Center	0.1

## ----Col. Santa Anita----

	venue	freq
0	Mexican Restaurant	0.20
1	Taco Place	0.20
2	Food Truck	0.07
3	Restaurant	0.07
4	Coffee Shop	0.03

## ----Col. Santa Cruz Acayucan----

	venue	freq
0	Mexican Restaurant	0.19
1	Taco Place	0.14
2	BBQ Joint	0.10
3	Seafood Restaurant	0.05
4	Baseball Field	0.05

## ----Col. Santa Martha Acatitla----

	venue	freq
0	Recreation Center	0.12
1	Plaza	0.12
2	Food Service	0.12
3	Taco Place	0.12
4	Mobile Phone Shop	0.12

## ----Col. Santa Ursula Coapa----

	venue	freq
0	Campground	0.1



1	Convenience Store	0.1
2	Mexican Restaurant	0.1
3	Taco Place	0.1
4	Auto Garage	0.1

----Col. Sector Popular----

	venue	freq
0	Taco Place	0.24
1	Mexican Restaurant	0.15
2	Coffee Shop	0.07
3	Ice Cream Shop	0.07
4	Burger Joint	0.04

----Col. Tlalpan----

	venue	freq
0	Mexican Restaurant	0.14
1	Café	0.08
2	Pizza Place	0.06
3	Bar	0.06
4	Italian Restaurant	0.05

----Col. Tres Estrellas----

	venue	freq
0	Mexican Restaurant	0.09
1	Taco Place	0.09
2	Convenience Store	0.09
3	Beer Store	0.04
4	Vegetarian / Vegan Restaurant	0.04

----Col. Viaducto Piedad----

	venue	freq
0	Mexican Restaurant	0.21
1	Taco Place	0.07
2	Juice Bar	0.07
3	Seafood Restaurant	0.04
4	Convenience Store	0.04

----Col. Xalpa----

	venue	freq
0	Bakery	0.33
1	Coffee Shop	0.33
2	Arcade	0.33
3	Yoga Studio	0.00
4	Performing Arts Venue	0.00

----Col. del Carmen----

	venue	freq
0	Mexican Restaurant	0.12
1	Ice Cream Shop	0.11
2	Café	0.08
3	Coffee Shop	0.05

4 Bar 0.05

----Col. del Mar----

	venue	freq
0	Flea Market	0.25
1	Martial Arts School	0.25
2	Pool Hall	0.25
3	Taco Place	0.25
4	Pastry Shop	0.00

----Fracc. Industrial de Vallejo----

	venue	freq
0	Rental Car Location	0.5
1	Food Truck	0.5
2	Park	0.0
3	Pet Store	0.0
4	Pet Café	0.0

----San Miguel Chapultepec----

	venue	freq
0	Mexican Restaurant	0.13
1	Taco Place	0.11
2	Pizza Place	0.05
3	Restaurant	0.05
4	Seafood Restaurant	0.05

In [115]:

```
#Put into a Pandas Dataframe
#First use function to classify venues in descending order
def return_most_common_venues(row, num_top_venues):
    row_categories = row.iloc[1:]
    row_categories_sorted = row_categories.sort_values(ascending=False)

    return row_categories_sorted.index.values[0:num_top_venues]
```

In [116]:

```
#Now let's create a dataframe and display the top 10 venues for each neighbourhood
num_top_venues = 10

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

# create columns according to number of top venues
columns = ['Neighborhood']
for ind in np.arange(num_top_venues):
    try:
        columns.append('{}{} Most Common Venue'.format(ind+1, indicators[ind]))
    except:
        columns.append('{}th Most Common Venue'.format(ind+1))

# create a new dataframe
neighborhoods_venues_sorted = pd.DataFrame(columns=columns)
neighborhoods_venues_sorted['Neighborhood'] = mexico_grouped['Neighborhood']

for ind in np.arange(mexico_grouped.shape[0]):
    neighborhoods_venues_sorted.iloc[ind, 1:] = return_most_common_venues(mexico_grouped.i
loc[ind, :], num_top_venues)

neighborhoods_venues_sorted.head()
```

Out[116]:

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue
0	Col. Agricola Oriental	Mexican Restaurant	Taco Place	Restaurant	Clothing Store	Gym Pool	Snack Place	Food
1	Col. Alamos	Mexican Restaurant	Taco Place	Bakery	Coffee Shop	Ice Cream Shop	Seafood Restaurant	Restaurant
2	Col. America	Taco Place	Restaurant	Furniture / Home Store	Coffee Shop	Mexican Restaurant	Pharmacy	Bakery
3	Col. Anzures	Coffee Shop	Restaurant	Mexican Restaurant	Café	Spa	Liquor Store	Steakhouse
4	Col. Argentina Poniente	Mexican Restaurant	Farmers Market	History Museum	Bakery	Shop & Service	Shopping Mall	Pharmacy

In [118]:

```
## Cluster Neighbourhoods
# Run k-means to cluster the neighbourhoods into 7 clusters
# set number of clusters
kclusters = 12

mexico_grouped_clustering = mexico_grouped.drop('Neighborhood', 1)

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

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

Out[118]:

```
array([ 0, 10, 10,  3,  8,  3, 10, 10,  0,  3, 10, 10, 10,  4, 10,  3,  0,
        3,  0, 10, 10, 10, 10,  3, 10,  0,  0, 10, 10,  3,  0,  6, 10,  0,
       10, 10,  0,  3, 10, 10, 10, 10, 10,  0, 10, 10,  0,  3,  3, 11, 10,
        3,  0,  0, 10, 10,  3,  0,  0,  9,  0,  0,  7, 11,  0, 10, 10,  0,
        2, 10,  5,  1, 10], dtype=int32)
```

In [119]:

```

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

mexico_merged = mynewdf

# merge mexico_grouped with mynewdf to add Latitude/Longitude for each neighborhood
mexico_merged = mexico_merged.join(neighborhoods_venues_sorted.set_index('Neighborhood'),
on='Neighborhood')

mexico_merged.head() # check the last columns!

```

Out[119]:

	Postal Code	Borough	Neighborhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	
0	1020	Alvaro Obregon	Col. San Jose Insurgentes	19.366522	-99.185193	10	Ice Cream Shop	Mexican Restaurant	Ci
1	1110	Alvaro Obregon	Col. Las Palmas	19.398938	-99.211254	0	Mexican Restaurant	Taco Place	Cc
2	1210	Alvaro Obregon	Col. Centro de Ciudad Santa Fe	19.382992	-99.241860	0	Mexican Restaurant	Burger Joint	-
3	1790	Alvaro Obregon	Col. Lomas de San Angel Inn	19.345009	-99.205693	10	Taco Place	Café	
4	2300	Azcapotzalco	Fracc. Industrial de Vallejo	19.496314	-99.163649	1	Rental Car Location	Food Truck	

In [120]:

```
#Ignore cells with NaN
mexico_merged = mexico_merged.dropna()

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

Out[120]:

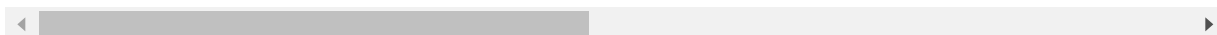
	Postal Code	Borough	Neighborhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue
0	1020	Alvaro Obregon	Col. San Jose Insurgentes	19.366522	-99.185193	10	Ice Cream Shop	Mexican Restaurant
1	1110	Alvaro Obregon	Col. Las Palmas	19.398938	-99.211254	0	Mexican Restaurant	Taco Place
2	1210	Alvaro Obregon	Col. Centro de Ciudad Santa Fe	19.382992	-99.241860	0	Mexican Restaurant	Burger Joint
3	1790	Alvaro Obregon	Col. Lomas de San Angel Inn	19.345009	-99.205693	10	Taco Place	Café
4	2300	Azcapotzalco	Fracc. Industrial de Vallejo	19.496314	-99.163649	1	Rental Car Location	Food Truck
5	2460	Azcapotzalco	Col. La Preciosa	19.486791	-99.193973	0	Mexican Restaurant	Taco Place
6	2630	Azcapotzalco	Col. Coltongo	19.483454	-99.152090	3	Clothing Store	Seafood Restaurant
7	2770	Azcapotzalco	Col. Santa Cruz Acayucan	19.475747	-99.194386	0	Mexican Restaurant	Taco Place
8	2800	Azcapotzalco	Col. Nueva Santa Maria	19.462959	-99.168442	10	Mexican Restaurant	Ice Cream Shop
9	2870	Azcapotzalco	Col. San Salvador Xochimanca	19.459971	-99.173995	9	Mexican Restaurant	Gastropub
10	3020	Benito Juarez	Col. Narvarte Poniente	19.392591	-99.157874	10	Mexican Restaurant	Taco Place
11	3020	Benito Juarez	Col. Narvarte Oriente	19.393671	-99.150117	10	Taco Place	Mexican Restaurant
12	3400	Benito Juarez	Col. Alamos	19.398254	-99.141941	10	Mexican Restaurant	Taco Place
13	3100	Benito Juarez	Col. Del Valle	19.383940	-99.166232	10	Mexican Restaurant	Spa
14	3810	Benito Juarez	Col. Napoles	19.393537	-99.176969	3	Coffee Shop	Mexican Restaurant
15	3700	Benito Juarez	Col. Nonoalco	19.381846	-99.188594	10	Mexican Restaurant	Taco Place
16	3510	Benito Juarez	Col. Moderna	19.395118	-99.134925	0	Mexican Restaurant	Taco Place
17	3900	Benito Juarez	Col. San Jose Insurgentes	19.366016	-99.184979	10	Ice Cream Shop	Mexican Restaurant
18	3940	Benito Juarez	Col. Credito Constructor	19.365081	-99.180220	10	Mexican Restaurant	Coffee Shop

	Postal Code	Borough	Neighborhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue
19	4100	Coyoacan	Col. del Carmen	19.351789	-99.161156	10	Mexican Restaurant	Ice Cream Shop
20	4620	Coyoacan	Col. San Pablo Tepetlapa	19.322617	-99.141392	0	Taco Place	Museum
21	4650	Coyoacan	Col. Pueblo de Santa Ursula Coapa	19.310157	-99.144110	11	Taco Place	Office
22	4910	Coyoacan	Col. Santa Ursula Coapa	19.309712	-99.143895	11	Office	Motel
23	5100	Cuajimalpa	Col. Lomas de Vista Hermosa	19.382421	-99.270314	3	Gym	Coffee Shop
24	5120	Cuajimalpa	Col. Bosques de las Lomas	19.387078	-99.257282	3	Pizza Place	Taco Place
25	6400	Cuauhtemoc	Col. Centro	19.447028	-99.159431	10	Mexican Restaurant	Bakery
26	6600	Cuauhtemoc	Col. Juarez	19.426629	-99.163081	3	Coffee Shop	Bakery
27	6700	Cuauhtemoc	Col. Roma	19.418638	-99.163699	3	Coffee Shop	Boutique
28	6720	Cuauhtemoc	Col. Doctores	19.418269	-99.148593	10	Mexican Restaurant	Bar
29	6800	Cuauhtemoc	Col. Obrera	19.414033	-99.138717	0	Taco Place	Bar
30	6900	Cuauhtemoc	Col. Nonoalco Tlatelolco	19.453539	-99.142025	10	Mexican Restaurant	Movie Theater
31	7770	Gustavo A. Madero	Col. Maximimo Avila Camacho	19.476820	-99.137844	10	Mexican Restaurant	Taco Place
32	7780	Gustavo A. Madero	Col. Heroe de Nacozari	19.471130	-99.145137	10	Coffee Shop	Mexican Restaurant
33	7800	Gustavo A. Madero	Col. Industrial	19.474482	-99.125960	10	Mexican Restaurant	Taco Place
34	7820	Gustavo A. Madero	Col. Tres Estrellas	19.472214	-99.110365	10	Convenience Store	Taco Place
35	7920	Gustavo A. Madero	Col. San Juan de Aragon	19.473190	-99.082357	0	Mexican Restaurant	Taco Place
36	8100	Iztacalco	Col. Pantitlan	19.413143	-99.065335	10	Food Truck	Pizza Place
37	8200	Iztacalco	Col. Viaducto Piedad	19.400403	-99.131035	0	Mexican Restaurant	Juice Bar



	Postal Code	Borough	Neighborhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue
38	8300	Iztacalco	Col. Santa Anita	19.401527	-99.121512	0	Mexican Restaurant	Taco Place
39	8400	Iztacalco	Col. Granjas Mexico	19.402872	-99.098646	3	Sports Club	Stadium
40	8500	Iztacalco	Col. Agricola Oriental	19.392389	-99.071059	0	Mexican Restaurant	Taco Place
41	9040	Delegacion Iztapalapa	Col. Central de Abastos	19.381476	-99.090861	10	Taco Place	Mexican Restaurant
42	9060	Delegacion Iztapalapa	Col. Sector Popular	19.365170	-99.116609	0	Taco Place	Mexican Restaurant
43	9070	Delegacion Iztapalapa	Col. Granjas San Antonio	19.362586	-99.108295	0	Mexican Restaurant	Taco Place
44	9230	Delegacion Iztapalapa	Col. Ejercito de Oriente	19.376631	-99.032177	4	Wings Joint	Ice Cream Shop
45	9510	Delegacion Iztapalapa	Col. Santa Martha Acatitla	19.362831	-99.023620	7	Mobile Phone Shop	Recreation Center
46	9620	Delegacion Iztapalapa	Col. Lomas de Zaragoza	19.353271	-98.997732	0	Mexican Restaurant	Lounge
47	9640	Delegacion Iztapalapa	Col. Xalpa	19.336401	-99.010431	2	Bakery	Coffee Shop
48	9810	Delegacion Iztapalapa	Col. Granjas Esmeralda	19.353391	-99.113817	0	Taco Place	Mexican Restaurant
49	9850	Delegacion Iztapalapa	Col. San Juan Xalpa	19.335676	-99.076411	3	Gym	Food Truck
50	10370	Magdalena Contreras	Col. Las Palmas	19.313792	-99.250455	0	Mexican Restaurant	Taco Place
51	10300	Magdalena Contreras	Col. San Bernabe Ocotepec	19.313989	-99.258015	0	Bakery	Mexican Restaurant
52	11000	Miguel Hidalgo	Col. Lomas de Chapultepec	19.424503	-99.212055	10	Taco Place	Spa
53	11230	Miguel Hidalgo	Col. Argentina Poniente	19.458377	-99.209957	8	Mexican Restaurant	Farmers Market
54	11400	Miguel Hidalgo	Col. Pensil	19.450319	-99.196923	0	Mexican Restaurant	Burger Joint
55	11500	Miguel Hidalgo	Col. Irrigacion	19.439955	-99.211434	10	Mexican Restaurant	Deli / Bodega
56	11510	Miguel Hidalgo	Col. Los Morales Polanco	19.436571	-99.209982	10	Mexican Restaurant	Spanish Restaurant
57	11520	Miguel Hidalgo	Col. Granada	19.440319	-99.191992	3	Restaurant	Café
58	11530	Miguel Hidalgo	Col. Polanco II Seccion	19.432266	-99.185218	3	Seafood Restaurant	Coffee Shop

	Postal Code	Borough	Neighborhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue
59	11560	Miguel Hidalgo	Col. Palmitas Polanco	19.432439	-99.193753	10	Mexican Restaurant	Restaurant
60	11580	Miguel Hidalgo	Col. Polanco	19.433070	-99.186731	3	Coffee Shop	Seafood Restaurant
61	11590	Miguel Hidalgo	Col. Anzures	19.431314	-99.177445	3	Coffee Shop	Restaurant
62	11650	Miguel Hidalgo	Col. Reforma Social	19.431325	-99.217938	10	Restaurant	Taco Place
63	11700	Miguel Hidalgo	Col. Bosques de las Lomas	19.405448	-99.229481	3	Pizza Place	Taco Place
64	11800	Miguel Hidalgo	Col. Escandon	19.402082	-99.182316	10	Taco Place	Bakery
65	11820	Miguel Hidalgo	Col. America	19.403729	-99.202983	10	Taco Place	Restaurant
66	11850	Miguel Hidalgo	San Miguel Chapultepec	19.408392	-99.187236	10	Mexican Restaurant	Taco Place
67	13270	Tlahuac	Col. del Mar	19.287343	-99.060642	5	Martial Arts School	Flea Market
68	14020	Tlalpan	Col. Tlalpan	19.290501	-99.169507	10	Mexican Restaurant	Café
69	14090	Tlalpan	Col. La Joya	19.279668	-99.165354	10	Convenience Store	Pharmacy
70	15400	Venustiano Carranza	Col. Romero Rubio	19.442177	-99.097417	0	Mexican Restaurant	Taco Place
71	15810	Venustiano Carranza	Col. Merced Centro	19.431274	-99.124204	10	Mexican Restaurant	Clothing Store
72	15820	Venustiano Carranza	Col. Lorenzo Boturini	19.415926	-99.124645	6	Taco Place	Mexican Restaurant
73	15850	Venustiano Carranza	Col. Magdalena Mixhuca	19.410515	-99.119806	0	Mexican Restaurant	Seafood Restaurant
74	15900	Venustiano Carranza	Col. Jardin Balbuena	19.417174	-99.106889	10	Mexican Restaurant	Burger Joint
75	16050	Xochimilco	Col. San Bernardino	19.268139	-99.121631	10	Convenience Store	Taco Place



In [121]:

```
#Let's visualize the resulting clusters
# create map
map_clusters = folium.Map(location=[latitude, longitude], zoom_start=11)
# set color scheme for the clusters
x = np.arange(kclusters)
ys = [i + x + (i*x)**2 for i in range(kclusters)]
colors_array = cm.rainbow(np.linspace(0, 1, len(ys)))
rainbow = [colors.rgb2hex(i) for i in colors_array]

# add markers to the map
markers_colors = []
for lat, lon, poi, cluster in zip(mexico_merged['Latitude'], mexico_merged['Longitude'], m
exico_merged['Neighborhood'], mexico_merged['Cluster Labels']):
    label = folium.Popup(str(poi) + ' Cluster ' + str(cluster), parse_html=True)

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

map_clusters
```

Out[121]:

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

In [ ]:

```
#Examine Clusters
```

```
#The discriminating venue categories that distinguish each cluster can be determined.
```

```
#Depending on the defining categories, a specific name could be assigned to each cluster
```

In [122]:

```
#Cluster 0  
mexico_merged.loc[mexico_merged['Cluster Labels'] == 0, mexico_merged.columns[[1] + list(range(5, mexico_merged.shape[1]))]]
```

Out[122]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue
1	Alvaro Obregon	0	Mexican Restaurant	Taco Place	Convenience Store	Cafeteria	Stables	Musical Venue
2	Alvaro Obregon	0	Mexican Restaurant	Burger Joint	Taco Place	Record Shop	Restaurant	Flea Market
5	Azcapotzalco	0	Mexican Restaurant	Taco Place	Bakery	BBQ Joint	Burger Joint	Ice Cream Shop
7	Azcapotzalco	0	Mexican Restaurant	Taco Place	BBQ Joint	Cosmetics Shop	Market	Seafood Restaurant
16	Benito Juarez	0	Mexican Restaurant	Taco Place	Sushi Restaurant	Bar	Bakery	Gym
20	Coyoacan	0	Taco Place	Museum	Pizza Place	Bakery	Mexican Restaurant	Restaurant
29	Cuauhtemoc	0	Taco Place	Bar	Seafood Restaurant	Mexican Restaurant	Bakery	Indie Theatre
35	Gustavo A. Madero	0	Mexican Restaurant	Taco Place	Pharmacy	Lounge	Shop & Service	Food Truck
37	Iztacalco	0	Mexican Restaurant	Juice Bar	Taco Place	Ice Cream Shop	Gym / Fitness Center	Seafood Restaurant
38	Iztacalco	0	Mexican Restaurant	Taco Place	Food Truck	Restaurant	Ice Cream Shop	Farmer Market
40	Iztacalco	0	Mexican Restaurant	Taco Place	Restaurant	Clothing Store	Gym Pool	Snack Place
42	Delegacion Iztapalapa	0	Taco Place	Mexican Restaurant	Ice Cream Shop	Coffee Shop	Burger Joint	Bakery
43	Delegacion Iztapalapa	0	Mexican Restaurant	Taco Place	Park	Coffee Shop	Department Store	Athletics Sports
46	Delegacion Iztapalapa	0	Mexican Restaurant	Lounge	Taco Place	Pizza Place	Fondue Restaurant	Fast Food Restaurant
48	Delegacion Iztapalapa	0	Taco Place	Mexican Restaurant	Food Truck	Department Store	Bar	Bakery
50	Magdalena Contreras	0	Mexican Restaurant	Taco Place	Convenience Store	Cafeteria	Stables	Musical Venue
51	Magdalena Contreras	0	Bakery	Mexican Restaurant	Pizza Place	Deli / Bodega	Candy Store	Diner
54	Miguel Hidalgo	0	Mexican Restaurant	Burger Joint	Taco Place	Sandwich Place	Italian Restaurant	Restaurant
70	Venustiano Carranza	0	Mexican Restaurant	Taco Place	Seafood Restaurant	Breakfast Spot	Tree	Squash Courts
73	Venustiano Carranza	0	Mexican Restaurant	Seafood Restaurant	Taco Place	Convenience Store	Market	Restaurant




In [125]:

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

Out[125]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue
4	Azcapotzalco	1	Rental Car Location	Food Truck	Women's Store	Food & Drink Shop	Fast Food Restaurant	Fish & Chips Shop	Flea Market

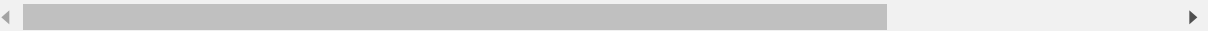


In [126]:

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

Out[126]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue
47	Delegacion Iztapalapa	2	Bakery	Coffee Shop	Arcade	Food & Drink Shop	Fast Food Restaurant	Fish & Chips Shop	Flea Market



In [127]:

#Cluster 3

```
mexico_merged.loc[mexico_merged['Cluster Labels'] == 3, mexico_merged.columns[[1] + list(range(5, mexico_merged.shape[1]))]]
```

Out[127]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue
6	Azcapotzalco	3	Clothing Store	Seafood Restaurant	Ice Cream Shop	Mexican Restaurant	Fast Food Restaurant	Hotel
14	Benito Juarez	3	Coffee Shop	Mexican Restaurant	Seafood Restaurant	Pizza Place	Japanese Restaurant	Café
23	Cuajimalpa	3	Gym	Coffee Shop	Restaurant	Deli / Bodega	Electronics Store	Nightclub
24	Cuajimalpa	3	Pizza Place	Taco Place	Mexican Restaurant	Yoga Studio	Scenic Lookout	Coffee Shop
26	Cuauhtemoc	3	Coffee Shop	Bakery	Hotel	Pizza Place	Chinese Restaurant	Cosmetics Shop
27	Cuauhtemoc	3	Coffee Shop	Boutique	Restaurant	Cocktail Bar	Vegetarian / Vegan Restaurant	Tea Room
39	Iztacalco	3	Sports Club	Stadium	Racetrack	Athletics & Sports	Music Venue	Gym
49	Delegacion Iztapalapa	3	Gym	Food Truck	Ice Cream Shop	Deli / Bodega	Grocery Store	Print Shop
57	Miguel Hidalgo	3	Restaurant	Café	Convenience Store	Bakery	Mexican Restaurant	Gym
58	Miguel Hidalgo	3	Seafood Restaurant	Coffee Shop	Bakery	Café	Italian Restaurant	Ice Cream Shop
60	Miguel Hidalgo	3	Coffee Shop	Seafood Restaurant	Bakery	Pharmacy	Gym / Fitness Center	Argentinian Restaurant
61	Miguel Hidalgo	3	Coffee Shop	Restaurant	Mexican Restaurant	Café	Spa	Liquor Store
63	Miguel Hidalgo	3	Pizza Place	Taco Place	Mexican Restaurant	Yoga Studio	Scenic Lookout	Coffee Shop





In [128]:

```
#Cluster 4
mexico_merged.loc[mexico_merged['Cluster Labels'] == 4, mexico_merged.columns[[1] + list(range(5, mexico_merged.shape[1]))]]
```

Out[128]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue
44	Delegacion Iztapalapa	4	Wings Joint	Ice Cream Shop	Fast Food Restaurant	Flea Market	Mexican Restaurant	Forest	Food Truck

In [129]:

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

Out[129]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue
67	Tlahuac	5	Martial Arts School	Flea Market	Pool Hall	Taco Place	Women's Store	Food	Fast Food Restaurant

In [130]:

```
#Cluster 6
mexico_merged.loc[mexico_merged['Cluster Labels'] == 6, mexico_merged.columns[[1] + list(range(5, mexico_merged.shape[1]))]]
```

Out[130]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue
72	Venustiano Carranza	6	Taco Place	Mexican Restaurant	Seafood Restaurant	Restaurant	Lounge	Convenience Store	Food Truck

In [131]:

```
#Cluster 7
mexico_merged.loc[mexico_merged['Cluster Labels'] == 7, mexico_merged.columns[[1] + list(range(5, mexico_merged.shape[1]))]]
```

Out[131]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue
45	Delegacion Iztapalapa	7	Mobile Phone Shop	Recreation Center	Food Service	Gym	Taco Place	Plaza	Seafood Restaurant

In [133]:

```
#Cluster 8
mexico_merged.loc[mexico_merged['Cluster Labels'] == 8, mexico_merged.columns[[1] + list(range(5, mexico_merged.shape[1]))]]
```

Out[133]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue
53	Miguel Hidalgo	8	Mexican Restaurant	Farmers Market	History Museum	Bakery	Shop & Service	Shopping Mall	Pharmacy

In [134]:

```
#Cluster 9
mexico_merged.loc[mexico_merged['Cluster Labels'] == 9, mexico_merged.columns[[1] + list(range(5, mexico_merged.shape[1]))]]
```

Out[134]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue
9	Azcapotzalco	9	Mexican Restaurant	Gastropub	Pet Store	Mediterranean Restaurant	Gym	Gym / Fitness Center	-

In [135]:

```
#Cluster 10  
mexico_merged.loc[mexico_merged['Cluster Labels'] == 10, mexico_merged.columns[[1] + list(  
range(5, mexico_merged.shape[1]))]]
```

Out[135]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6 C
0	Alvaro Obregon	10	Ice Cream Shop	Mexican Restaurant	Coffee Shop	Tapas Restaurant	Italian Restaurant	
3	Alvaro Obregon	10	Taco Place	Café	Garden Center	Restaurant	Park	Musi
8	Azcapotzalco	10	Mexican Restaurant	Ice Cream Shop	Taco Place	Café	Bakery	Re
10	Benito Juarez	10	Mexican Restaurant	Taco Place	Coffee Shop	Café	Bakery	Ice
11	Benito Juarez	10	Taco Place	Mexican Restaurant	Coffee Shop	Burger Joint	Café	Bl
12	Benito Juarez	10	Mexican Restaurant	Taco Place	Bakery	Coffee Shop	Ice Cream Shop	Re
13	Benito Juarez	10	Mexican Restaurant	Spa	Pharmacy	Grocery Store	Convenience Store	Re
15	Benito Juarez	10	Mexican Restaurant	Taco Place	Coffee Shop	Gym / Fitness Center	Furniture / Home Store	For
17	Benito Juarez	10	Ice Cream Shop	Mexican Restaurant	Coffee Shop	Tapas Restaurant	Italian Restaurant	
18	Benito Juarez	10	Mexican Restaurant	Coffee Shop	Restaurant	Café	Park	Re
19	Coyoacan	10	Mexican Restaurant	Ice Cream Shop	Café	Coffee Shop	Bar	
25	Cuauhtemoc	10	Mexican Restaurant	Bakery	Coffee Shop	Pizza Place	Ice Cream Shop	
28	Cuauhtemoc	10	Mexican Restaurant	Bar	Hotel	Taco Place	Bed & Breakfast	Admir
30	Cuauhtemoc	10	Mexican Restaurant	Movie Theater	Burger Joint	Diner	Snack Place	Ta
31	Gustavo A. Madero	10	Mexican Restaurant	Taco Place	Ice Cream Shop	Bakery	Playground	Conv
32	Gustavo A. Madero	10	Coffee Shop	Mexican Restaurant	Taco Place	Restaurant	Gym / Fitness Center	Pl
33	Gustavo A. Madero	10	Mexican Restaurant	Taco Place	Park	Restaurant	Wings Joint	Sna
34	Gustavo A. Madero	10	Convenience Store	Taco Place	Mexican Restaurant	Steakhouse	BBQ Joint	Gym ,

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6 C
36	Iztacalco	10	Food Truck	Pizza Place	Convenience Store	Lounge	Food Court	
41	Delegacion Iztapalapa	10	Taco Place	Mexican Restaurant	Convenience Store	Pharmacy	BBQ Joint	
52	Miguel Hidalgo	10	Taco Place	Spa	Bakery	Coffee Shop	Seafood Restaurant	PI
55	Miguel Hidalgo	10	Mexican Restaurant	Deli / Bodega	Park	Convenience Store	Ice Cream Shop	Re
56	Miguel Hidalgo	10	Mexican Restaurant	Spanish Restaurant	Coffee Shop	Ice Cream Shop	Café	
59	Miguel Hidalgo	10	Mexican Restaurant	Restaurant	Bakery	Italian Restaurant	Café	Ice
62	Miguel Hidalgo	10	Restaurant	Taco Place	Mexican Restaurant	BBQ Joint	Nightclub	Piz
64	Miguel Hidalgo	10	Taco Place	Bakery	Burger Joint	Ice Cream Shop	Bar	
65	Miguel Hidalgo	10	Taco Place	Restaurant	Furniture / Home Store	Coffee Shop	Mexican Restaurant	PI
66	Miguel Hidalgo	10	Mexican Restaurant	Taco Place	Pizza Place	Seafood Restaurant	Art Gallery	Re
68	Tlalpan	10	Mexican Restaurant	Café	Pizza Place	Bar	Italian Restaurant	
69	Tlalpan	10	Convenience Store	Pharmacy	Mexican Restaurant	Taco Place	Bakery	Fle
71	Venustiano Carranza	10	Mexican Restaurant	Clothing Store	Cosmetics Shop	Convenience Store	Restaurant	For
74	Venustiano Carranza	10	Mexican Restaurant	Burger Joint	Bakery	Ice Cream Shop	Taco Place	PI
75	Xochimilco	10	Convenience Store	Taco Place	Pharmacy	Mexican Restaurant	Lounge	

In [136]:

```
#Cluster 11
mexico_merged.loc[mexico_merged['Cluster Labels'] == 11, mexico_merged.columns[[1] + list(
range(5, mexico_merged.shape[1]))]]
```

Out[136]:

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue
21	Coyoacan	11	Taco Place	Office	Motel	Flower Shop	Salad Place	Auto Garage	Campground
22	Coyoacan	11	Office	Motel	Taco Place	Flower Shop	Salad Place	Auto Garage	Campground



In [ ]: