IBM Applied Data Science -The Battle of Neighbhorhoods

Opening a New Authentic Indian Restaurant in London City

This final project explores the best locations for Indian restaurants throughout the London City.Londonk City is the biggest city in the United Kingdom with a long history of international immigration. They came from many parts of the world.. With its diverse culture, comes diverse food items. There are many restaurants in London City, each belonging to different categories like Chinese, Indian, French, etc.

Firstly we will import all the required libraries for the analysis

```
In [1]:  import pandas as pd
         import numpy as np
         #!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 latitud
         e and longitude values
         #!pip install geocoder
         import geocoder # to get coordinates
         import requests # library to handle requests
         from pandas.io.json import json_normalize # tranform JSON file into a p
         andas dataframe

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

```python
# 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.')
```

Libraries imported.

1. Data Preparation

Lets build a dataframe of neighborhoods in London by web scraping the data from Wikipedia page. I have used Beautiful Soup package for web scrapping the data

In [2]:
```python
# import the library we use to open URLs
import urllib.request
# import the BeautifulSoup library so we can parse HTML and XML documen
ts
from bs4 import BeautifulSoup

url = 'https://en.wikipedia.org/wiki/List_of_areas_of_London'
page = urllib.request.urlopen(url)

# parse the HTML from our URL into the BeautifulSoup parse tree format
soup = BeautifulSoup(page, "lxml")
right_table=soup.find('table', class_='wikitable')
#right_table
```

In [3]:
```python
#Organising the data into 3 cloumns
A=[]
B=[]
C=[]
D=[]
```

```
for tag in right_table(['span', 'sup']):
    tag.decompose()

for data in right_table.findAll('tr'):
    ref_data= data.findAll('a')
    for cd in ref_data:
        # print(cd.text)
        A.append(cd.text)



  # row_data=row.findall('a')
    #print(row_data)
for tag in right_table(['a']):
    tag.decompose()

for tr in right_table.findAll('tr')[1:]:
    td = tr.find_all('td')
    row = [i.text for i in td]
    B.append(row[1])
    C.append(row[2])
    D.append(row[3])
```

In [4]:
```
#Assiging the headers and applying pandas to create dataframe
df=pd.DataFrame(A,columns=['Neighborhood'])
df['London Borough']=B
df['Post town']=C
df['Postcode district']=D
df[df.columns] = df.apply(lambda x: x.str.strip())  #Stripping extra space from the columns
df.head()
```

Out[4]:

	Neighborhood	London Borough	Post town	Postcode district
0	Abbey Wood	Bexley, Greenwich	LONDON	SE2
1	Acton	Ealing, Hammersmith and Fulham	LONDON	W3, W4
2	Addington	Croydon	CROYDON	CR0
3	Addiscombe	Croydon	CROYDON	CR0

	Neighborhood	London Borough	Post town	Postcode district
3	Addiscombe	Croydon	CROYDON	CR0

	Neighborhood	London Borough	Post town	Postcode district
4	Albany Park	Bexley	BEXLEY, SIDCUP	DA5, DA14

We have to get the geographical coordinates of the neighborhoods. I have used a csv file which contains the London Boroughs and geographical coordinates which was available on the dataset link of London. I have merged the data to get them all together.

In [5]:
```python
df_geodata = pd.read_csv('London_Borughs.csv')
df_geodata.rename(columns={'Borough':'London Borough'},inplace=True)
london_df = pd.merge(df, df_geodata, on='London Borough', how='inner')
london_df.head()
```

Out[5]:

	Neighborhood	London Borough	Post town	Postcode district	Latitude	Longitude
0	Addington	Croydon	CROYDON	CR0	51.3714	0.0977
1	Addiscombe	Croydon	CROYDON	CR0	51.3714	0.0977
2	Coombe	Croydon	CROYDON	CR0	51.3714	0.0977
3	Coulsdon	Croydon	COULSDON	CR5	51.3714	0.0977
4	Croydon	Croydon	CROYDON	CR0	51.3714	0.0977

Let's get the geographical coordinates of London.

In [6]:
```python
address='Croydon, LN'
geolocator = Nominatim(user_agent="ln_explorer")
location = geolocator.geocode(address)
latitude=location.latitude
longitude=location.longitude
print(address)

print('The geograpical coordinate of London City  are {}, {}.'.format(latitude, longitude))
```

Croydon, LN

The geograpical coordinate of London City are 51.3713049, -0.101957.

Creating the map, Let's visualize London neighborhoods in it.

In [7]:
```python
# create map of London using latitude and longitude values
map_london = folium.Map(location=[latitude, longitude], zoom_start=10)

# add markers to map
for lat, lng, borough, neigh in zip(london_df['Latitude'], london_df['Longitude'], london_df['London Borough'], london_df['Neighborhood']):
    label = '{}, {}'.format(neigh, 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_london)

map_london
```

Out[7]:
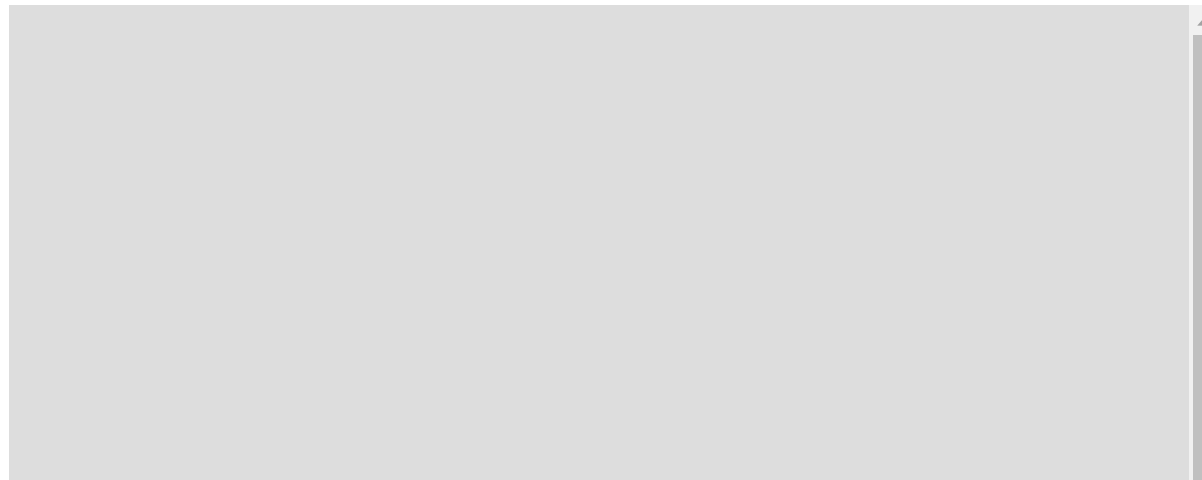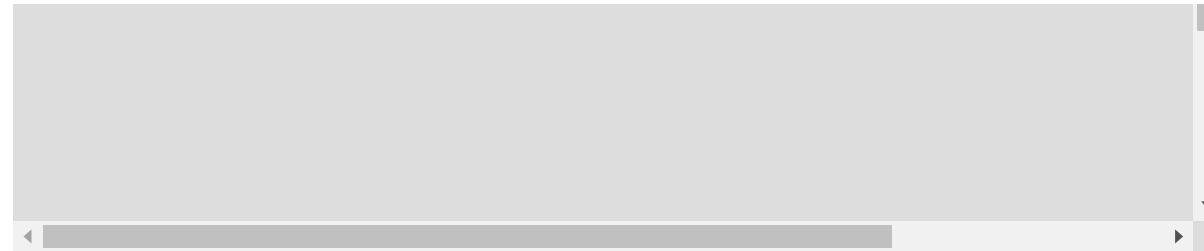
Next, we are going to start utilizing the Foursquare API to explore the neighborhoods and segment them.

Define Foursquare credentials and version

```
In [8]:  CLIENT_ID = 'OAXOSYW1GBKW3UABYT4JOZ0WJNDHW24B2JKLP31O34D0PZAH' # your F
         oursquare ID
         CLIENT_SECRET = 'TN0DARG02KSPHIIDLYXSRE2MZHA2NPFFERLKYC4L5L4EWVHH' # yo
         ur Foursquare Secret
         VERSION = '20180605' # Foursquare API version

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

```
Your credentails:
CLIENT_ID: OAXOSYW1GBKW3UABYT4JOZ0WJNDHW24B2JKLP31O34D0PZAH
CLIENT_SECRET:TN0DARG02KSPHIIDLYXSRE2MZHA2NPFFERLKYC4L5L4EWVHH
```

Let's explore the first neighborhood in our dataframe.

Get the neighborhood's name.

```
In [9]:  london_df.loc[0, 'Neighborhood']
```

```
Out[9]:  'Addington'
```

Get the neighborhood's latitude and longitude values.

```
In [10]: neighborhood_latitude = london_df.loc[0, 'Latitude'] # neighborhood lat
         itude value
         neighborhood_longitude = london_df.loc[0, 'Longitude'] # neighborhood l
         ongitude value

         neighborhood_name = london_df.loc[0, 'Neighborhood'] # neighborhood nam
         e

         print('Latitude and longitude values of {} are {}, {}.'.format(neighbor
         hood_name,
                                                                        neighbor
         hood_latitude,
                                                                        neighbor
         hood_longitude))
```

```
Latitude and longitude values of Addington are 51.3714, 0.0977.
```

Now, let's get the top 100 venues that are in Addington within a radius of 1000 meters.

First, let's create the GET request URL. Name your URL url.

```
In [11]: LIMIT=100
         radius = 1000 # define radius
         url = 'https://api.foursquare.com/v2/venues/explore?&client_id={}&clien
         t_secret={}&v={}&ll={},{}&radius={}&limit={}'.format(
             CLIENT_ID,
             CLIENT_SECRET,
             VERSION,
             neighborhood_latitude,
             neighborhood_longitude,
             radius,
             LIMIT)
         url
```

```
Out[11]: 'https://api.foursquare.com/v2/venues/explore?&client_id=0AX0SYW1GBKW3U
```

ABYT4JOZ0WJNDHW24B2JKLP31O34D0PZAH&client_secret=TN0DARG02KSPHIIDLYXSRE
2MZHA2NPFFERLKYC4L5L4EWVHH&v=20180605&ll=51.3714,0.0977&radius=1000&lim
it=100'

Send the GET request and examine the resutls

```
In [12]:  results = requests.get(url).json()
          results
```

```
Out[12]: {'meta': {'code': 200, 'requestId': '5ee0e26b8e93482181dfd927'},
          'response': {'suggestedFilters': {'header': 'Tap to show:',
           'filters': [{'name': 'Open now', 'key': 'openNow'}]},
          'headerLocation': 'Orpington',
          'headerFullLocation': 'Orpington, London',
          'headerLocationGranularity': 'neighborhood',
          'totalResults': 32,
          'suggestedBounds': {'ne': {'lat': 51.38040000900001,
            'lng': 0.11208994399129145},
           'sw': {'lat': 51.36239999099999, 'lng': 0.08331005600870854}},
          'groups': [{'type': 'Recommended Places',
            'name': 'recommended',
            'items': [{'reasons': {'count': 0,
              'items': [{'summary': 'This spot is popular',
                'type': 'general',
                'reasonName': 'globalInteractionReason'}]},
             'venue': {'id': '4d0638d19d33a143df24c578',
              'name': 'Primo Cafe',
              'location': {'address': 'High Street',
               'crossStreet': 'Knoll Rise',
               'lat': 51.37410479121223,
               'lng': 0.09783041601631369,
               'labeledLatLngs': [{'label': 'display',
                 'lat': 51.37410479121223,
                 'lng': 0.09783041601631369}],
               'distance': 301,
               'postalCode': 'BR 6 9',
               'cc': 'GB',
               'city': 'Orpington',
```

```
                    'state': 'Greater London',
                    'country': 'United Kingdom',
                    'formattedAddress': ['High Street (Knoll Rise)',
                     'Orpington',
                     'Greater London',
                     'BR 6 9',
                     'United Kingdom']},
                  'categories': [{'id': '4bf58dd8d48988d1e0931735',
                    'name': 'Coffee Shop',
                    'pluralName': 'Coffee Shops',
                    'shortName': 'Coffee Shop',
                    'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/foo
d/coffeeshop_',
                     'suffix': '.png'},
                    'primary': True}],
                  'photos': {'count': 0, 'groups': []}},
                 'referralId': 'e-0-4d0638d19d33a143df24c578-0'},
                {'reasons': {'count': 0,
                  'items': [{'summary': 'This spot is popular',
                    'type': 'general',
                    'reasonName': 'globalInteractionReason'}]},
                 'venue': {'id': '4c421a83e26920a11d8b5fe7',
                  'name': "Xi'an",
                  'location': {'address': '324 High St',
                   'lat': 51.37389975375316,
                   'lng': 0.09800124258616544,
                   'labeledLatLngs': [{'label': 'display',
                     'lat': 51.37389975375316,
                     'lng': 0.09800124258616544}],
                   'distance': 279,
                   'postalCode': 'BR6 0NG',
                   'cc': 'GB',
                   'city': 'Orpington',
                   'state': 'Greater London',
                   'country': 'United Kingdom',
                   'formattedAddress': ['324 High St',
                    'Orpington',
                    'Greater London',
                    'BR6 0NG',
```

                    'United Kingdom']},
                  'categories': [{'id': '4bf58dd8d48988d145941735',
                    'name': 'Chinese Restaurant',
                    'pluralName': 'Chinese Restaurants',
                    'shortName': 'Chinese',
                    'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/foo
          d/asian_',
                    'suffix': '.png'},
                    'primary': True}],
                  'photos': {'count': 0, 'groups': []}},
                 'referralId': 'e-0-4c421a83e26920a11d8b5fe7-1'},
                {'reasons': {'count': 0,
                  'items': [{'summary': 'This spot is popular',
                    'type': 'general',
                    'reasonName': 'globalInteractionReason'}]},
                 'venue': {'id': '56a92e57498eaa2e87071f50',
                  'name': 'PureGym',
                  'location': {'address': 'Crown House',
                   'crossStreet': 'High St',
                   'lat': 51.37684960209922,
                   'lng': 0.10166055826233265,
                   'labeledLatLngs': [{'label': 'display',
                     'lat': 51.37684960209922,
                     'lng': 0.10166055826233265}],
                   'distance': 666,
                   'postalCode': 'BR6 0TW',
                   'cc': 'GB',
                   'city': 'Orpington',
                   'state': 'Greater London',
                   'country': 'United Kingdom',
                   'formattedAddress': ['Crown House (High St)',
                    'Orpington',
                    'Greater London',
                    'BR6 0TW',
                    'United Kingdom']},
                  'categories': [{'id': '4bf58dd8d48988d175941735',
                    'name': 'Gym / Fitness Center',
                    'pluralName': 'Gyms or Fitness Centers',
                    'shortName': 'Gym / Fitness',

              'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/bui
lding/gym_',
                'suffix': '.png'},
              'primary': True}],
            'photos': {'count': 0, 'groups': []}},
           'referralId': 'e-0-56a92e57498eaa2e87071f50-2'},
          {'reasons': {'count': 0,
            'items': [{'summary': 'This spot is popular',
              'type': 'general',
              'reasonName': 'globalInteractionReason'}]},
           'venue': {'id': '50796745e4b0ce42c63bd0be',
            'name': 'Osteria Da Fabrizio',
            'location': {'lat': 51.375789237102744,
             'lng': 0.0991958332769815,
             'labeledLatLngs': [{'label': 'display',
               'lat': 51.375789237102744,
               'lng': 0.0991958332769815}],
             'distance': 499,
             'cc': 'GB',
             'country': 'United Kingdom',
             'formattedAddress': ['United Kingdom']},
            'categories': [{'id': '4bf58dd8d48988d110941735',
              'name': 'Italian Restaurant',
              'pluralName': 'Italian Restaurants',
              'shortName': 'Italian',
              'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/foo
d/italian_',
                'suffix': '.png'},
              'primary': True}],
            'photos': {'count': 0, 'groups': []}},
           'referralId': 'e-0-50796745e4b0ce42c63bd0be-3'},
          {'reasons': {'count': 0,
            'items': [{'summary': 'This spot is popular',
              'type': 'general',
              'reasonName': 'globalInteractionReason'}]},
           'venue': {'id': '55ce16bb498e503baeacebc8',
            'name': 'Pato Lounge',
            'location': {'address': '202-206 High St',
             'lat': 51.3770085608021,

        'lng': 0.0999937959360211,
        'labeledLatLngs': [{'label': 'display',
          'lat': 51.3770085608021,
          'lng': 0.0999937959360211}],
        'distance': 644,
        'postalCode': 'BR6 0JN',
        'cc': 'GB',
        'city': 'Orpington',
        'state': 'Greater London',
        'country': 'United Kingdom',
        'formattedAddress': ['202-206 High St',
         'Orpington',
         'Greater London',
         'BR6 0JN',
         'United Kingdom']},
       'categories': [{'id': '4bf58dd8d48988d1c4941735',
         'name': 'Restaurant',
         'pluralName': 'Restaurants',
         'shortName': 'Restaurant',
         'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/foo
d/default_',
          'suffix': '.png'},
         'primary': True}],
       'photos': {'count': 0, 'groups': []}},
      'referralId': 'e-0-55ce16bb498e503baeacebc8-4'},
     {'reasons': {'count': 0,
       'items': [{'summary': 'This spot is popular',
         'type': 'general',
         'reasonName': 'globalInteractionReason'}]},
      'venue': {'id': '4bd6fe8b6f649521d7b071ec',
       'name': 'Costa Coffee',
       'location': {'address': 'High St',
        'lat': 51.37516814408364,
        'lng': 0.10703730104149171,
        'labeledLatLngs': [{'label': 'display',
          'lat': 51.37516814408364,
          'lng': 0.10703730104149171}],
        'distance': 772,
        'cc': 'GB',

                        'city': 'Orpington',
                        'state': 'Greater London',
                        'country': 'United Kingdom',
                        'formattedAddress': ['High St',
                         'Orpington',
                         'Greater London',
                         'United Kingdom']},
                      'categories': [{'id': '4bf58dd8d48988d1e0931735',
                         'name': 'Coffee Shop',
                         'pluralName': 'Coffee Shops',
                         'shortName': 'Coffee Shop',
                         'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/foo
d/coffeeshop_',
                          'suffix': '.png'},
                         'primary': True}],
                      'photos': {'count': 0, 'groups': []}},
                     'referralId': 'e-0-4bd6fe8b6f649521d7b071ec-5'},
                   {'reasons': {'count': 0,
                      'items': [{'summary': 'This spot is popular',
                         'type': 'general',
                         'reasonName': 'globalInteractionReason'}]},
                    'venue': {'id': '4e21d81e88774a43b76e342b',
                      'name': 'Hisar Meze',
                      'location': {'address': '105 Orpington By-Pass',
                       'lat': 51.37882639169992,
                       'lng': 0.10195383362835417,
                       'labeledLatLngs': [{'label': 'display',
                         'lat': 51.37882639169992,
                         'lng': 0.10195383362835417}],
                       'distance': 877,
                       'postalCode': 'BR6 0LG',
                       'cc': 'GB',
                       'city': 'Bromley',
                       'state': 'Greater London',
                       'country': 'United Kingdom',
                       'formattedAddress': ['105 Orpington By-Pass',
                        'Bromley',
                        'Greater London',
                        'BR6 0LG',

'United Kingdom']},
        'categories': [{'id': '4d4b7105d754a06374d81259',
          'name': 'Food',
          'pluralName': 'Food',
          'shortName': 'Food',
          'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/foo
d/default_',
          'suffix': '.png'},
          'primary': True}],
        'photos': {'count': 0, 'groups': []}},
       'referralId': 'e-0-4e21d81e88774a43b76e342b-6'},
      {'reasons': {'count': 0,
        'items': [{'summary': 'This spot is popular',
          'type': 'general',
          'reasonName': 'globalInteractionReason'}]},
       'venue': {'id': '5695cc3e498e5867681d9b6f',
        'name': 'Odeon',
        'location': {'address': 'The Walnuts Shopping Centre, Orpingto
n',
          'crossStreet': 'High St',
          'lat': 51.3766391,
          'lng': 0.101231,
          'labeledLatLngs': [{'label': 'display',
            'lat': 51.3766391,
            'lng': 0.101231}],
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          'postalCode': 'BR6 0TW',
          'cc': 'GB',
          'city': 'Greater London',
          'state': 'Greater London',
          'country': 'United Kingdom',
          'formattedAddress': ['The Walnuts Shopping Centre, Orpington (H
igh St)',
          'Greater London',
          'BR6 0TW',
          'United Kingdom']},
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          'name': 'Movie Theater',
          'pluralName': 'Movie Theaters',

                        'shortName': 'Movie Theater',
                        'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/art
                s_entertainment/movietheater_',
                          'suffix': '.png'},
                        'primary': True}],
                     'photos': {'count': 0, 'groups': []}},
                   'referralId': 'e-0-5695cc3e498e5867681d9b6f-7'},
                  {'reasons': {'count': 0,
                     'items': [{'summary': 'This spot is popular',
                        'type': 'general',
                        'reasonName': 'globalInteractionReason'}]},
                   'venue': {'id': '4cc2d0f89141370469dfb655',
                     'name': 'Pizza Express',
                     'location': {'address': '97 High Street',
                       'lat': 51.37917952948439,
                       'lng': 0.1025958748340372,
                       'labeledLatLngs': [{'label': 'display',
                         'lat': 51.37917952948439,
                         'lng': 0.1025958748340372}],
                       'distance': 930,
                       'postalCode': 'BR6 0LF',
                       'cc': 'GB',
                       'city': 'Kent',
                       'state': 'Kent',
                       'country': 'United Kingdom',
                       'formattedAddress': ['97 High Street',
                        'Kent',
                        'BR6 0LF',
                        'United Kingdom']},
                     'categories': [{'id': '4bf58dd8d48988d1ca941735',
                        'name': 'Pizza Place',
                        'pluralName': 'Pizza Places',
                        'shortName': 'Pizza',
                        'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/foo
                d/pizza_',
                        'suffix': '.png'},
                        'primary': True}],
                     'photos': {'count': 0, 'groups': []}},
                   'referralId': 'e-0-4cc2d0f89141370469dfb655-8'},

```
{'reasons': {'count': 0,
  'items': [{'summary': 'This spot is popular',
    'type': 'general',
    'reasonName': 'globalInteractionReason'}]},
 'venue': {'id': '4e3d336f62e19d61096aa684',
  'name': 'Greggs',
  'location': {'address': '145 High St',
   'crossStreet': 'The Walnuts Shopping Centre',
   'lat': 51.377834633856324,
   'lng': 0.10088324546813965,
   'labeledLatLngs': [{'label': 'display',
     'lat': 51.377834633856324,
     'lng': 0.10088324546813965}],
   'distance': 749,
   'postalCode': 'BR6 0LS',
   'cc': 'GB',
   'city': 'Orpington',
   'state': 'Greater London',
   'country': 'United Kingdom',
   'formattedAddress': ['145 High St (The Walnuts Shopping Centr
e)',
    'Orpington',
    'Greater London',
    'BR6 0LS',
    'United Kingdom']},
  'categories': [{'id': '4bf58dd8d48988d16a941735',
    'name': 'Bakery',
    'pluralName': 'Bakeries',
    'shortName': 'Bakery',
    'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/foo
d/bakery_',
     'suffix': '.png'},
    'primary': True}],
  'photos': {'count': 0, 'groups': []}},
 'referralId': 'e-0-4e3d336f62e19d61096aa684-9'},
{'reasons': {'count': 0,
  'items': [{'summary': 'This spot is popular',
    'type': 'general',
    'reasonName': 'globalInteractionReason'}]},
```

                'venue': {'id': '5d72e64d6c160b00084fe41b',
                'name': "Nando's",
                'location': {'address': 'High St',
                'lat': 51.377389,
                'lng': 0.101865,
                'labeledLatLngs': [{'label': 'display',
                  'lat': 51.377389,
                  'lng': 0.101865}],
                'distance': 726,
                'postalCode': 'BR6 0TW',
                'cc': 'GB',
                'city': 'Orpington',
                'state': 'Greater London',
                'country': 'United Kingdom',
                'formattedAddress': ['High St',
                 'Orpington',
                 'Greater London',
                 'BR6 0TW',
                 'United Kingdom']},
               'categories': [{'id': '4def73e84765ae376e57713a',
                 'name': 'Portuguese Restaurant',
                 'pluralName': 'Portuguese Restaurants',
                 'shortName': 'Portuguese',
                 'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/foo
d/portuguese_',
                  'suffix': '.png'},
                 'primary': True}],
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                   'lng': 0.08910907339460646}],
                 'distance': 647,
                 'postalCode': 'BR6 0SX',
                 'cc': 'GB',
                 'city': 'Orpington',
                 'state': 'Greater London',
                 'country': 'United Kingdom',
                 'formattedAddress': ['Orpington Railway Station (ORP) (Station
Approach)',
                  'Orpington',
                  'Greater London',
                  'BR6 0SX',
                  'United Kingdom']},
                'categories': [{'id': '4f4531504b9074f6e4fb0102',
                  'name': 'Platform',
                  'pluralName': 'Platforms',
                  'shortName': 'Platform',
                  'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/tra
vel/trainstation_',
                   'suffix': '.png'},
                  'primary': True}],
                 'photos': {'count': 0, 'groups': []}},
                'referralId': 'e-0-4ccbcb72c0378cfa60a68148-28'},
              {'reasons': {'count': 0,

```
            'items': [{'summary': 'This spot is popular',
              'type': 'general',
              'reasonName': 'globalInteractionReason'}]},
           'venue': {'id': '4d31b32beefa8cfac32d2eb3',
            'name': 'Platform 4',
            'location': {'address': 'Orpington Railway Station (ORP)',
             'crossStreet': 'Station Approach',
             'lat': 51.37362832054002,
             'lng': 0.08902778192130363,
             'labeledLatLngs': [{'label': 'display',
               'lat': 51.37362832054002,
               'lng': 0.08902778192130363}],
             'distance': 651,
             'postalCode': 'BR6 0SX',
             'cc': 'GB',
             'city': 'London',
             'state': 'Greater London',
             'country': 'United Kingdom',
             'formattedAddress': ['Orpington Railway Station (ORP) (Station
Approach)',
             'London',
             'Greater London',
             'BR6 0SX',
             'United Kingdom']},
            'categories': [{'id': '4f4531504b9074f6e4fb0102',
             'name': 'Platform',
             'pluralName': 'Platforms',
             'shortName': 'Platform',
             'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/tra
vel/trainstation_',
              'suffix': '.png'},
             'primary': True}],
            'photos': {'count': 0, 'groups': []}},
           'referralId': 'e-0-4d31b32beefa8cfac32d2eb3-29'},
          {'reasons': {'count': 0,
            'items': [{'summary': 'This spot is popular',
              'type': 'general',
              'reasonName': 'globalInteractionReason'}]},
           'venue': {'id': '4c645be311c4a5936722e911',
```

```
                     'name': 'White Hart',
                     'location': {'address': '106 High St',
                      'lat': 51.37926986082972,
                      'lng': 0.10223905822128963,
                      'labeledLatLngs': [{'label': 'display',
                        'lat': 51.37926986082972,
                        'lng': 0.10223905822128963}],
                      'distance': 931,
                      'postalCode': 'Br6',
                      'cc': 'GB',
                      'city': 'Orpington',
                      'state': 'Greater London',
                      'country': 'United Kingdom',
                      'formattedAddress': ['106 High St',
                       'Orpington',
                       'Greater London',
                       ' Br6',
                       'United Kingdom']},
                     'categories': [{'id': '4bf58dd8d48988d11b941735',
                       'name': 'Pub',
                       'pluralName': 'Pubs',
                       'shortName': 'Pub',
                       'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/nig
htlife/pub_',
                        'suffix': '.png'},
                       'primary': True}],
                     'photos': {'count': 0, 'groups': []}},
                    'referralId': 'e-0-4c645be311c4a5936722e911-30'},
                   {'reasons': {'count': 0,
                     'items': [{'summary': 'This spot is popular',
                       'type': 'general',
                       'reasonName': 'globalInteractionReason'}]},
                    'venue': {'id': '4d4ebe1520d3236aab9a9e28',
                     'name': 'Platform 2',
                     'location': {'address': 'Orpington Railway Station (ORP)',
                      'lat': 51.37369424246071,
                      'lng': 0.0885756000128438,
                      'labeledLatLngs': [{'label': 'display',
                        'lat': 51.37369424246071,
```

```
                        'lng': 0.0885756000128438}],
                'distance': 683,
                'postalCode': 'BR6 0SX',
                'cc': 'GB',
                'city': 'Orpington',
                'state': 'Greater London',
                'country': 'United Kingdom',
                'formattedAddress': ['Orpington Railway Station (ORP)',
                 'Orpington',
                 'Greater London',
                 'BR6 0SX',
                 'United Kingdom']},
               'categories': [{'id': '4f4531504b9074f6e4fb0102',
                 'name': 'Platform',
                 'pluralName': 'Platforms',
                 'shortName': 'Platform',
                 'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/tra
        vel/trainstation_',
                  'suffix': '.png'},
                 'primary': True}],
               'photos': {'count': 0, 'groups': []}},
              'referralId': 'e-0-4d4ebe1520d3236aab9a9e28-31'}]}]}}
```

We know that all the information is in the items key. Before we proceed, let's borrow the get_category_type function from the Foursquare lab.

In [13]:
```python
# function that extracts the category of the venue
def get_category_type(row):
    try:
        categories_list = row['categories']
    except:
        categories_list = row['venue.categories']

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

Now we are ready to clean the json and structure it into a pandas dataframe.

```
In [14]: venues = results['response']['groups'][0]['items']

         nearby_venues = json_normalize(venues) # flatten JSON

         # filter columns
         filtered_columns = ['venue.name', 'venue.categories', 'venue.location.l
         at', '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_ty
         pe, axis=1)

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

         nearby_venues.head()
```

Out[14]:

	name	categories	lat	lng
0	Primo Cafe	Coffee Shop	51.374105	0.097830
1	Xi'an	Chinese Restaurant	51.373900	0.098001
2	PureGym	Gym / Fitness Center	51.376850	0.101661
3	Osteria Da Fabrizio	Italian Restaurant	51.375789	0.099196
4	Pato Lounge	Restaurant	51.377009	0.099994

```
In [ ]: print('{} venues were returned by Foursquare.'.format(nearby_venues.sha
        pe[0]))
```

2: Explore Neighborhoods

Let's create a function to repeat the same process to all the neighborhoods in Addington

In [17]:
```python
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]['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 = ['Neighborhood',
                  'Neighborhood Latitude',
                  'Neighborhood Longitude',
```

```
                        'Venue',
                        'Venue Latitude',
                        'Venue Longitude',
                        'Venue Category']

    return(nearby_venues)
```

In [18]:
```
london_venues = getNearbyVenues(names=london_df['Neighborhood'],
                                latitudes=london_df['Latitude'],
                                longitudes=london_df['Longitude']
                                )
```

```
Addington
Addiscombe
Coombe
Coulsdon
Croydon
Forestdale
Kenley
New Addington
Norbury
Old Coulsdon
Purley
Riddlesdown
Sanderstead
Selhurst
Selsdon
Shirley
South Croydon
South Norwood
Thornton Heath
Upper Norwood
Waddon
Woodside
Albany Park
Barnehurst
Barnes Cray
Belvedere
Bexley
```

Bexleyheath
Blackfen
Blendon
Colyers
Crayford
Crook Log
Crossness
East Wickham
Erith
Foots Cray
Lamorbey
Lessness Heath
Longlands
North Cray
North End
Northumberland Heath
Sidcup
Slade Green
Upton
Welling
West Heath
Aldborough Hatch
Barkingside
Gants Hill
Goodmayes
Hainault
Ilford
Loxford
Newbury Park
Redbridge
Seven Kings
South Woodford
Wanstead
Woodford
Aldwych
Bayswater
Belgravia
Charing Cross
Chinatown

Covent Garden
Knightsbridge
Lisson Grove
Little Venice
Maida Vale
Marylebone
Mayfair
Millbank
Paddington
Pimlico
Soho
St James's
St John's Wood
Westminster
Alperton
Brent Park
Brondesbury
Church End
Dollis Hill
Harlesden
Kensal Green
Kingsbury
Neasden
Preston
Queen's Park
Stonebridge
Tokyngton
Wembley
Wembley Park
Willesden
Anerley
Aperfield
Beckenham
Bickley
Biggin Hill
Bromley
Bromley Common
Chelsfield
Chislehurst

Coney Hall
Crystal Palace
Cudham
Derry Downs
Downe
Eden Park
Elmers End
Elmstead
Goddington
Hayes
Hazelwood
Keston
Leaves Green
Locksbottom
Mottingham
Orpington
Penge
Petts Wood
Plaistow
Pratt's Bottom
Southborough
St Mary Cray
St Paul's Cray
Sundridge
West Wickham
Widmore
Angel
Archway
Barnsbury
Canonbury
Clerkenwell
De Beauvoir Town
Finsbury
Highbury
Holloway
Islington
Nag's Head
Pentonville
St Luke's

Upper Holloway
Ardleigh Green
Chase Cross
Collier Row
Cranham
Elm Park
Emerson Park
Gallows Corner
Gidea Park
Harold Hill
Harold Park
Harold Wood
Havering-atte-Bower
Hornchurch
Noak Hill
North Ockendon
Rainham
Romford
South Hornchurch
Upminster
Upminster Bridge
Wennington
Arkley
Barnet Gate
Barnet
Brent Cross
Brunswick Park
Burnt Oak
Burroughs, The
Childs Hill
Church End
Colindale
Colney Hatch
East Barnet
East Finchley
Edgware
Finchley
Friern Barnet
Golders Green

Grahame Park
The Hale
Hampstead Garden Suburb
Hendon
The Hyde
Mill Hill
Monken Hadley
New Barnet
New Southgate
North Finchley
Oakleigh Park
Osidge
Temple Fortune
Totteridge
West Hendon
Whetstone
Woodside Park
Arnos Grove
Botany Bay
Brimsdown
Bulls Cross
Crews Hill
Edmonton
Enfield Highway
Enfield Lock
Enfield Town
Enfield Wash
Freezywater
Grange Park
Hadley Wood
Palmers Green
Ponders End
Southgate
Winchmore Hill
Balham
Battersea
Earlsfield
Nine Elms
Putney

Roehampton
Southfields
Tooting
Tooting Bec
Wandsworth
Bankside
Bermondsey
Camberwell
Denmark Hill
Dulwich
East Dulwich
Elephant and Castle
Newington
Nunhead
Peckham
Rotherhithe
Surrey Quays
Walworth
Barking
Becontree
Becontree Heath
Castle Green
Creekmouth
Dagenham
Marks Gate
Rush Green
Barnes
Castelnau
East Sheen
Eel Pie Island
Fulwell
Ham
Hampton
Hampton Hill
Hampton Wick
Kew
Mortlake
North Sheen
Petersham

Richmond
St Margarets
Strawberry Hill
Teddington
Twickenham
Whitton
Beckton
Canning Town
Custom House
East Ham
Forest Gate
Little Ilford
Manor Park
Maryland
North Woolwich
Plaistow
Silvertown
Stratford
Upton Park
West Ham
Beddington
Belmont
Carshalton
Cheam
Sutton
Wallington
Bedford Park
Ealing
Greenford
Hanwell
Northolt
Norwood Green
Perivale
Southall
West Ealing
Bellingham
Blackheath
Brockley
Catford

Chinbrook
Crofton Park
Deptford
Downham
Forest Hill
Grove Park
Hither Green
Honor Oak
Ladywell
Lee
Lewisham
New Cross
Southend
St Johns
Belmont
Harrow
Harrow on the Hill
Harrow Weald
Hatch End
North Harrow
Pinner
Rayners Lane
South Harrow
Stanmore
Wealdstone
West Harrow
Belsize Park
Bloomsbury
Camden Town
Chalk Farm
Fitzrovia
Frognal
Gospel Oak
Hampstead
Highgate
Holborn
Kentish Town
Primrose Hill
Somerstown

St Giles
St Pancras
Swiss Cottage
West Hampstead
Berrylands
Chessington
Coombe
Hook
Kingston Vale
Kingston upon Thames
Malden Rushett
Motspur Park
New Malden
Norbiton
Old Malden
Surbiton
Tolworth
Bethnal Green
Blackwall
Bow
Bromley
Cambridge Heath
Canary Wharf
Cubitt Town
Isle of Dogs
Leamouth
Limehouse
Mile End
Millwall
Old Ford
Poplar
Ratcliff
Shadwell
Spitalfields
Stepney
Tower Hill
Wapping
Whitechapel
Bounds Green

Bowes Park
Crouch End
Fortis Green
Harringay
Hornsey
Seven Sisters
South Tottenham
Stroud Green
Tottenham
Tottenham Green
Tottenham Hale
Turnpike Lane
West Green
Wood Green
Brentford
Cranford
East Bedfont
Feltham
Grove Park
Gunnersbury
Hanworth
Hatton
Heston
Hounslow
Isleworth
Lampton
Osterley
Woodlands
Brixton
Gipsy Hill
Herne Hill
Lambeth
Oval
Stockwell
Streatham
Tulse Hill
Vauxhall
West Norwood
Cann Hall

Chingford
Highams Park
Leyton
Leytonstone
Upper Walthamstow
Walthamstow
Walthamstow Village
Chelsea
Earls Court
Holland Park
Kensington
North Kensington
Notting Hill
South Kensington
West Brompton
Colliers Wood
Lower Morden
Merton Park
Mitcham
Morden
Morden Park
Raynes Park
South Wimbledon
St Helier
Wimbledon
Cowley
Eastcote
Harefield
Harlington
Harmondsworth
Hayes
Hillingdon
Ickenham
Longford
Northwood
Ruislip
Sipson
South Ruislip
Uxbridge

```
West Drayton
Yeading
Yiewsley
Dalston
Hackney
Hackney Central
Hackney Marshes
Hackney Wick
Haggerston
Homerton
Hoxton
Lea Bridge
Lower Clapton
Manor House
Shacklewell
Shoreditch
South Hackney
Stamford Hill
Stoke Newington
Upper Clapton
West Hackney
```

Checking the size of the Datframe

In [19]:
```python
print(london_venues.shape)
london_venues.head()
```

```
(5076, 7)
```

Out[19]:

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Addington	51.3714	0.0977	Primo Cafe	51.374105	0.097830	Coffee Shop
1	Addington	51.3714	0.0977	Xi'an	51.373900	0.098001	Chinese Restaurant
2	Addington	51.3714	0.0977	Osteria Da Fabrizio	51.375789	0.099196	Italian Restaurant

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
3	Addington	51.3714	0.0977	Tesco Extra	51.373557	0.096622	Supermarket
4	Addington	51.3714	0.0977	Domino's Pizza	51.374614	0.098277	Pizza Place

In [20]: `london_venues.groupby('Neighborhood').count()`

Out[20]:

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Addington	6	6	6	6	6	6
Addiscombe	6	6	6	6	6	6
Albany Park	29	29	29	29	29	29
Aldborough Hatch	41	41	41	41	41	41
Aldwych	1	1	1	1	1	1
Alperton	2	2	2	2	2	2
Anerley	39	39	39	39	39	39
Angel	4	4	4	4	4	4
Aperfield	39	39	39	39	39	39
Archway	4	4	4	4	4	4
Ardleigh Green	44	44	44	44	44	44
Arnos Grove	4	4	4	4	4	4
Balham	2	2	2	2	2	2
Bankside	3	3	3	3	3	3
Barking	7	7	7	7	7	7

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Barkingside	41	41	41	41	41	41
Barnehurst	29	29	29	29	29	29
Barnes	5	5	5	5	5	5
Barnes Cray	29	29	29	29	29	29
Barnsbury	4	4	4	4	4	4
Battersea	2	2	2	2	2	2
Bayswater	1	1	1	1	1	1
Beckenham	39	39	39	39	39	39
Beckton	14	14	14	14	14	14
Becontree	7	7	7	7	7	7
Becontree Heath	7	7	7	7	7	7
Beddington	2	2	2	2	2	2
Bedford Park	2	2	2	2	2	2
Belgravia	1	1	1	1	1	1
Bellingham	6	6	6	6	6	6
...	...	...	...	...	...	...
Wallington	2	2	2	2	2	2
Walworth	3	3	3	3	3	3
Wandsworth	2	2	2	2	2	2
Wanstead	41	41	41	41	41	41
Wapping	12	12	12	12	12	12
Welling	29	29	29	29	29	29
Wembley	2	2	2	2	2	2

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Wembley Park	2	2	2	2	2	2
Wennington	44	44	44	44	44	44
West Drayton	1	1	1	1	1	1
West Ealing	2	2	2	2	2	2
West Green	3	3	3	3	3	3
West Hackney	8	8	8	8	8	8
West Ham	14	14	14	14	14	14
West Hampstead	4	4	4	4	4	4
West Heath	29	29	29	29	29	29
West Norwood	9	9	9	9	9	9
West Wickham	39	39	39	39	39	39
Westminster	1	1	1	1	1	1
Whitechapel	12	12	12	12	12	12
Whitton	5	5	5	5	5	5
Widmore	39	39	39	39	39	39
Willesden	2	2	2	2	2	2
Wimbledon	2	2	2	2	2	2
Winchmore Hill	4	4	4	4	4	4
Wood Green	3	3	3	3	3	3
Woodford	41	41	41	41	41	41
Woodside	6	6	6	6	6	6

	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Neighborhood						
Yeading	1	1	1	1	1	1
Yiewsley	1	1	1	1	1	1

397 rows × 6 columns

Lets find out how many unique categories in Venue category

In [21]:
```python
print('There are {} uniques categories.'.format(len(london_venues['Venue Category'].unique())))
```

There are 90 uniques categories.

In [22]:
```python
# print out the list of categories
london_venues['Venue Category'].unique()
```

Out[22]: array(['Coffee Shop', 'Chinese Restaurant', 'Italian Restaurant',
        'Supermarket', 'Pizza Place', 'Pub', 'Furniture / Home Store',
        'Clothing Store', 'Department Store', 'Bakery', 'Plaza',
        'Pharmacy', 'Sandwich Place', 'Video Game Store', 'Hotel',
        'American Restaurant', 'Portuguese Restaurant',
        'Fast Food Restaurant', 'Shopping Mall', 'Warehouse Store',
        'Movie Theater', 'Irish Pub', 'Theater', 'Bookstore',
        'Indian Restaurant', 'Buffet', 'Grocery Store',
        'Gym / Fitness Center', 'Stationery Store', 'Turkish Restauran
t',
        'Platform', 'Dessert Shop', 'Breakfast Spot', 'Golf Course',
        'Ice Cream Shop', 'Electronics Store', 'Burger Joint', 'Bar',
        'Asian Restaurant', 'Donut Shop', 'Chocolate Shop',
        'Sushi Restaurant', 'Cosmetics Shop', 'Café', 'English Restauran
t',
        'Noodle House', 'Fish & Chips Shop', 'Martial Arts Dojo',
        'Metro Station', 'Multiplex', 'Gym', 'Discount Store', 'Boutiqu
e',

```
                 'Music Store', 'Casino', 'Jewelry Store', 'Lingerie Store',
                 'Sporting Goods Shop', 'Park', 'Convenience Store',
                 'Construction & Landscaping', 'Harbor / Marina',
                 'Business Service', 'IT Services', 'Bus Station', 'Pool',
                 'Soccer Stadium', 'Train Station', 'Rafting', 'Airport',
                 'Airport Service', 'Airport Lounge', 'Duty-free Shop',
                 'Currency Exchange', 'Historic Site', 'Home Service',
                 'Veterinarian', 'Polish Restaurant', 'Bus Stop', 'Skate Park',
                 'Rugby Pitch', 'Nature Preserve', 'Pier', 'Lighthouse', 'Diner',
                 'Athletics & Sports', 'Food & Drink Shop', 'Playground', 'Stable
         s',
                 'Restaurant'], dtype=object)
```

Check whether the results contain Indian Restaurant

In [23]:
```python
# check if the results contain "Indian Restaurant"
"Neighborhood" in london_venues['Venue Category'].unique()
```

Out[23]: False

3. Analyze Each Neighborhood

In [24]:
```python
# one hot encoding
london_onehot = pd.get_dummies(london_venues[['Venue Category']], prefix="", prefix_sep="")

# add neighborhood column back to dataframe
london_onehot['Neighborhood'] = london_venues['Neighborhood']

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

london_onehot.head()
```

Out[24]:

	Neighborhood	Airport	Airport Lounge	Airport Service	American Restaurant	Asian Restaurant	Athletics & Sports	Bakery	Bar	Book
0	Addington	0	0	0	0	0	0	0	0	
1	Addington	0	0	0	0	0	0	0	0	
2	Addington	0	0	0	0	0	0	0	0	
3	Addington	0	0	0	0	0	0	0	0	
4	Addington	0	0	0	0	0	0	0	0	

5 rows × 91 columns
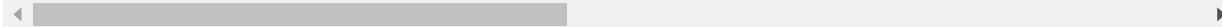
In [27]: `london_onehot.shape`

Out[27]: `(5076, 91)`

Next, let's group rows by neighborhood and by taking the mean of the frequency of occurrence of each category

In [28]:
```
london_grouped = london_onehot.groupby('Neighborhood').mean().reset_index()
london_grouped.head()
```

Out[28]:

	Neighborhood	Airport	Airport Lounge	Airport Service	American Restaurant	Asian Restaurant	Athletics & Sports	Bakery	Bar	Bo
0	Addington	0.0	0.0	0.0	0.000000	0.0	0.0	0.000000	0.0	
1	Addiscombe	0.0	0.0	0.0	0.000000	0.0	0.0	0.000000	0.0	
2	Albany Park	0.0	0.0	0.0	0.034483	0.0	0.0	0.034483	0.0	
3	Aldborough Hatch	0.0	0.0	0.0	0.000000	0.0	0.0	0.073171	0.0	

	Neighborhood	Airport	Airport Lounge	Airport Service	American Restaurant	Asian Restaurant	Athletics & Sports	Bakery	Bar	Bo
4	Aldwych	0.0	0.0	0.0	0.000000	0.0	0.0	0.000000	0.0	

5 rows × 91 columns

Lets see the new size

```
In [29]:  london_grouped.shape
```

```
Out[29]:  (397, 91)
```

Let's print each neighborhood along with the top 5 most common venues

```
In [30]:  num_top_venues = 5

          for hood in london_grouped['Neighborhood']:
              print("----"+hood+"----")
              temp = london_grouped[london_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')
```

```
          ----Addington----
                          venue  freq
          0         Pizza Place  0.17
          1  Italian Restaurant  0.17
          2         Coffee Shop  0.17
          3                 Pub  0.17
```

```
3              Pub   0.17
4       Supermarket  0.17


----Addiscombe----
                venue  freq
0         Pizza Place  0.17
1   Italian Restaurant  0.17
2         Coffee Shop  0.17
3                 Pub  0.17
4         Supermarket  0.17


----Albany Park----
               venue  freq
0                Pub  0.10
1        Coffee Shop  0.10
2     Clothing Store  0.10
3        Supermarket  0.07
4           Pharmacy  0.07


----Aldborough Hatch----
                 venue  freq
0        Clothing Store  0.10
1           Supermarket  0.07
2                Bakery  0.07
3   Fast Food Restaurant  0.07
4     Turkish Restaurant  0.05


----Aldwych----
                venue  freq
0       Breakfast Spot   1.0
1              Airport   0.0
2            Multiplex   0.0
3           Playground   0.0
4             Platform   0.0
```

```
----Alperton----
       venue  freq
0          Pub   0.5
1  Golf Course   0.5
2      Airport   0.0
3    Multiplex   0.0
4     Platform   0.0


----Anerley----
            venue  freq
0  Clothing Store  0.15
1     Coffee Shop  0.13
2             Bar  0.05
3    Burger Joint  0.05
4     Pizza Place  0.05


----Angel----
             venue  freq
0  Fish & Chips Shop  0.25
1               Café  0.25
2  Martial Arts Dojo  0.25
3      Metro Station  0.25
4        Music Store  0.00


----Aperfield----
            venue  freq
0  Clothing Store  0.15
1     Coffee Shop  0.13
2             Bar  0.05
3    Burger Joint  0.05
4     Pizza Place  0.05


----Archway----
             venue  freq
0  Fish & Chips Shop  0.25
```

```
1               Café  0.25
2  Martial Arts Dojo  0.25
3      Metro Station  0.25
4        Music Store  0.00


----Ardleigh Green----
                 venue  freq
0           Coffee Shop  0.09
1                 Hotel  0.07
2         Shopping Mall  0.07
3        Clothing Store  0.07
4  Fast Food Restaurant  0.05


----Arnos Grove----
                    venue  freq
0                    Park  0.50
1        Convenience Store  0.25
2  Construction & Landscaping  0.25
3                Irish Pub  0.00
4        Italian Restaurant  0.00


----Balham----
                    venue  freq
0  Construction & Landscaping  0.5
1                      Gym  0.5
2                 Multiplex  0.0
3                Playground  0.0
4                 Platform  0.0


----Bankside----
               venue  freq
0        IT Services  0.33
1      Harbor / Marina  0.33
2     Business Service  0.33
3         Music Store  0.00
```

```
4           Playground   0.00


----Barking----
                      venue   freq
0                      Pool   0.14
1   Gym / Fitness Center   0.14
2                      Park   0.14
3              Supermarket   0.14
4              Golf Course   0.14


----Barkingside----
                       venue   freq
0           Clothing Store   0.10
1               Supermarket   0.07
2                    Bakery   0.07
3   Fast Food Restaurant   0.07
4      Turkish Restaurant   0.05


----Barnehurst----
                     venue   freq
0                      Pub   0.10
1             Coffee Shop   0.10
2         Clothing Store   0.10
3             Supermarket   0.07
4                Pharmacy   0.07


----Barnes----
                       venue   freq
0      Sporting Goods Shop    0.2
1      American Restaurant    0.2
2               Coffee Shop    0.2
3              Train Station    0.2
4             Soccer Stadium    0.2
```

```
            ----Barnes Cray----
              venue   freq
0               Pub   0.10
1        Coffee Shop  0.10
2     Clothing Store  0.10
3        Supermarket  0.07
4           Pharmacy  0.07


            ----Barnsbury----
                   venue   freq
0       Fish & Chips Shop  0.25
1                    Café  0.25
2        Martial Arts Dojo 0.25
3           Metro Station  0.25
4             Music Store  0.00


            ----Battersea----
                          venue   freq
0   Construction & Landscaping    0.5
1                          Gym    0.5
2                     Multiplex   0.0
3                    Playground   0.0
4                      Platform   0.0


            ----Bayswater----
              venue   freq
0    Breakfast Spot   1.0
1           Airport   0.0
2         Multiplex   0.0
3        Playground   0.0
4          Platform   0.0


            ----Beckenham----
              venue   freq
0    Clothing Store  0.15
```

```
1      Coffee Shop   0.13
2             Bar    0.05
3     Burger Joint   0.05
4      Pizza Place   0.05


----Beckton----
                  venue   freq
0                 Hotel   0.29
1   Chinese Restaurant    0.07
2       Sandwich Place    0.07
3             Rafting     0.07
4            Pharmacy     0.07


----Becontree----
                     venue   freq
0                    Pool    0.14
1   Gym / Fitness Center    0.14
2                    Park    0.14
3            Supermarket    0.14
4            Golf Course    0.14


----Becontree Heath----
                     venue   freq
0                    Pool    0.14
1   Gym / Fitness Center    0.14
2                    Park    0.14
3            Supermarket    0.14
4            Golf Course    0.14


----Beddington----
                venue   freq
0   Historic Site       1.0
1           Airport     0.0
2          Multiplex    0.0
3           Platform    0.0
```

```
4      Pizza Place    0.0


----Bedford Park----
              venue   freq
0       Home Service   0.5
1   Business Service   0.5
2           Airport    0.0
3         Multiplex    0.0
4          Platform    0.0


----Belgravia----
              venue   freq
0   Breakfast Spot    1.0
1          Airport    0.0
2         Multiplex    0.0
3        Playground   0.0
4         Platform    0.0


----Bellingham----
               venue   freq
0       Polish Restaurant   0.17
1   Fast Food Restaurant   0.17
2          Veterinarian    0.17
3                   Pub    0.17
4                  Park    0.17


----Belmont----
              venue   freq
0   Historic Site    1.0
1          Airport    0.0
2         Multiplex    0.0
3          Platform    0.0
4       Pizza Place    0.0
```

```
----Belsize Park----
              venue  freq
0        Skate Park  0.25
1               Gym  0.25
2       Rugby Pitch  0.25
3  Business Service  0.25
4           Airport  0.00


----Belvedere----
             venue  freq
0              Pub  0.10
1      Coffee Shop  0.10
2   Clothing Store  0.10
3      Supermarket  0.07
4         Pharmacy  0.07


----Bermondsey----
              venue  freq
0       IT Services  0.33
1    Harbor / Marina  0.33
2  Business Service  0.33
3       Music Store  0.00
4        Playground  0.00


----Berrylands----
            venue  freq
0  Clothing Store   1.0
1         Airport   0.0
2     Music Store   0.0
3      Playground   0.0
4        Platform   0.0


----Bethnal Green----
             venue  freq
0         Platform  0.17
```

```
1      Food & Drink Shop   0.08
2         Nature Preserve   0.08
3      Italian Restaurant   0.08
4              Lighthouse   0.08


----Bexley----
             venue   freq
0              Pub   0.10
1      Coffee Shop   0.10
2   Clothing Store   0.10
3      Supermarket   0.07
4         Pharmacy   0.07


----Bexleyheath----
             venue   freq
0              Pub   0.10
1      Coffee Shop   0.10
2   Clothing Store   0.10
3      Supermarket   0.07
4         Pharmacy   0.07


----Bickley----
             venue   freq
0   Clothing Store   0.15
1      Coffee Shop   0.13
2              Bar   0.05
3     Burger Joint   0.05
4      Pizza Place   0.05


----Biggin Hill----
             venue   freq
0   Clothing Store   0.15
1      Coffee Shop   0.13
2              Bar   0.05
3     Burger Joint   0.05
```

```
4       Pizza Place  0.05


----Blackfen----
                venue  freq
0                 Pub  0.10
1         Coffee Shop  0.10
2      Clothing Store  0.10
3         Supermarket  0.07
4            Pharmacy  0.07


----Blackheath----
                   venue  freq
0        Polish Restaurant  0.17
1   Fast Food Restaurant  0.17
2            Veterinarian  0.17
3                     Pub  0.17
4                    Park  0.17


----Blackwall----
                  venue  freq
0              Platform  0.17
1      Food & Drink Shop  0.08
2         Nature Preserve  0.08
3      Italian Restaurant  0.08
4              Lighthouse  0.08


----Blendon----
                venue  freq
0                 Pub  0.10
1         Coffee Shop  0.10
2      Clothing Store  0.10
3         Supermarket  0.07
4            Pharmacy  0.07
```

```
----Bloomsbury----
                venue  freq
0        Skate Park  0.25
1               Gym  0.25
2       Rugby Pitch  0.25
3  Business Service  0.25
4            Airport  0.00


----Botany Bay----
                          venue  freq
0                          Park  0.50
1            Convenience Store  0.25
2  Construction & Landscaping  0.25
3                    Irish Pub  0.00
4            Italian Restaurant  0.00


----Bounds Green----
                venue  freq
0               Park  0.33
1  Business Service  0.33
2        Skate Park  0.33
3            Airport  0.00
4        Music Store  0.00


----Bow----
                 venue  freq
0            Platform  0.17
1   Food & Drink Shop  0.08
2     Nature Preserve  0.08
3  Italian Restaurant  0.08
4           Lighthouse  0.08


----Bowes Park----
          venue  freq
0          Park  0.33
```

```
1   Business Service  0.33
2         Skate Park  0.33
3            Airport  0.00
4        Music Store  0.00


----Brent Park----
           venue  freq
0            Pub   0.5
1   Golf Course   0.5
2        Airport   0.0
3      Multiplex   0.0
4       Platform   0.0


----Brimsdown----
                          venue  freq
0                          Park  0.50
1             Convenience Store  0.25
2   Construction & Landscaping   0.25
3                     Irish Pub  0.00
4            Italian Restaurant  0.00


----Brixton----
            venue  freq
0     Coffee Shop  0.22
1             Pub  0.22
2     Supermarket  0.22
3  Soccer Stadium  0.11
4            Café  0.11


----Brockley----
                   venue  freq
0      Polish Restaurant  0.17
1   Fast Food Restaurant  0.17
2           Veterinarian  0.17
3                    Pub  0.17
```

```
4                Park  0.17


----Bromley----
            venue  freq
0  Clothing Store  0.12
1     Coffee Shop  0.12
2        Platform  0.04
3    Burger Joint  0.04
4             Bar  0.04


----Bromley Common----
            venue  freq
0  Clothing Store  0.15
1     Coffee Shop  0.13
2             Bar  0.05
3    Burger Joint  0.05
4     Pizza Place  0.05


----Brondesbury----
          venue  freq
0           Pub   0.5
1   Golf Course   0.5
2       Airport   0.0
3     Multiplex   0.0
4      Platform   0.0


----Bulls Cross----
                     venue  freq
0                     Park  0.50
1         Convenience Store  0.25
2  Construction & Landscaping  0.25
3                 Irish Pub  0.00
4         Italian Restaurant  0.00
```

```
----Camberwell----
                   venue   freq
0        IT Services   0.33
1    Harbor / Marina   0.33
2   Business Service   0.33
3        Music Store   0.00
4         Playground   0.00


----Cambridge Heath----
                    venue   freq
0          Platform   0.17
1    Food & Drink Shop   0.08
2      Nature Preserve   0.08
3   Italian Restaurant   0.08
4           Lighthouse   0.08


----Camden Town----
                   venue   freq
0         Skate Park   0.25
1                Gym   0.25
2        Rugby Pitch   0.25
3   Business Service   0.25
4            Airport   0.00


----Canary Wharf----
                    venue   freq
0          Platform   0.17
1    Food & Drink Shop   0.08
2      Nature Preserve   0.08
3   Italian Restaurant   0.08
4           Lighthouse   0.08


----Canning Town----
                   venue   freq
0              Hotel   0.29
```

```
1  Chinese Restaurant  0.07
2      Sandwich Place  0.07
3            Rafting   0.07
4           Pharmacy   0.07


----Canonbury----
               venue  freq
0  Fish & Chips Shop  0.25
1               Café  0.25
2  Martial Arts Dojo  0.25
3      Metro Station  0.25
4        Music Store  0.00


----Carshalton----
            venue  freq
0  Historic Site   1.0
1        Airport   0.0
2      Multiplex   0.0
3       Platform   0.0
4    Pizza Place   0.0


----Castelnau----
                 venue  freq
0   Sporting Goods Shop   0.2
1   American Restaurant   0.2
2           Coffee Shop   0.2
3         Train Station   0.2
4        Soccer Stadium   0.2


----Castle Green----
                 venue  freq
0                 Pool  0.14
1   Gym / Fitness Center  0.14
2                 Park  0.14
3           Supermarket  0.14
```

```
4           Golf Course  0.14


----Catford----
                 venue   freq
0      Polish Restaurant  0.17
1  Fast Food Restaurant  0.17
2           Veterinarian  0.17
3                    Pub  0.17
4                   Park  0.17


----Chalk Farm----
                venue  freq
0        Skate Park  0.25
1               Gym  0.25
2       Rugby Pitch  0.25
3  Business Service  0.25
4           Airport  0.00


----Charing Cross----
              venue  freq
0  Breakfast Spot   1.0
1         Airport   0.0
2        Multiplex   0.0
3       Playground   0.0
4         Platform   0.0


----Chase Cross----
                 venue  freq
0           Coffee Shop  0.09
1                 Hotel  0.07
2         Shopping Mall  0.07
3         Clothing Store  0.07
4  Fast Food Restaurant  0.05
```

```
----Cheam----
        venue  freq
0  Historic Site   1.0
1        Airport   0.0
2      Multiplex   0.0
3       Platform   0.0
4    Pizza Place   0.0


----Chelsfield----
        venue  freq
0  Clothing Store  0.15
1     Coffee Shop  0.13
2            Bar   0.05
3    Burger Joint  0.05
4     Pizza Place  0.05


----Chessington----
        venue  freq
0  Clothing Store   1.0
1        Airport   0.0
2    Music Store   0.0
3     Playground   0.0
4       Platform   0.0


----Chinatown----
        venue  freq
0  Breakfast Spot   1.0
1        Airport   0.0
2      Multiplex   0.0
3     Playground   0.0
4       Platform   0.0


----Chinbrook----
          venue  freq
0    Polish Restaurant  0.17
```

```
          1   Fast Food Restaurant   0.17
          2           Veterinarian   0.17
          3                    Pub   0.17
          4                   Park   0.17


----Chislehurst----
                venue   freq
          0   Clothing Store   0.15
          1      Coffee Shop   0.13
          2              Bar   0.05
          3     Burger Joint   0.05
          4      Pizza Place   0.05


----Church End----
              venue   freq
          0          Pub    0.5
          1   Golf Course    0.5
          2      Airport    0.0
          3     Multiplex    0.0
          4      Platform    0.0


----Clerkenwell----
                  venue   freq
          0   Fish & Chips Shop   0.25
          1               Café   0.25
          2   Martial Arts Dojo   0.25
          3       Metro Station   0.25
          4         Music Store   0.00


----Collier Row----
                    venue   freq
          0         Coffee Shop   0.09
          1               Hotel   0.07
          2       Shopping Mall   0.07
          3       Clothing Store   0.07
```

```
4  Fast Food Restaurant  0.05


----Colliers Wood----
           venue  freq
0            Pub   1.0
1        Airport   0.0
2      Multiplex   0.0
3       Platform   0.0
4    Pizza Place   0.0


----Colyers----
            venue  freq
0             Pub  0.10
1     Coffee Shop  0.10
2  Clothing Store  0.10
3     Supermarket  0.07
4        Pharmacy  0.07


----Coney Hall----
            venue  freq
0  Clothing Store  0.15
1     Coffee Shop  0.13
2             Bar  0.05
3    Burger Joint  0.05
4     Pizza Place  0.05


----Coombe----
               venue  freq
0  Italian Restaurant  0.14
1                Pub  0.14
2        Coffee Shop  0.14
3     Clothing Store  0.14
4        Pizza Place  0.14
```

```
----Coulsdon----
               venue  freq
0        Pizza Place  0.17
1  Italian Restaurant  0.17
2        Coffee Shop  0.17
3                Pub  0.17
4        Supermarket  0.17


----Covent Garden----
             venue  freq
0  Breakfast Spot   1.0
1         Airport   0.0
2       Multiplex   0.0
3      Playground   0.0
4        Platform   0.0


----Cowley----
            venue  freq
0        Stables   1.0
1        Airport   0.0
2  Movie Theater   0.0
3       Platform   0.0
4    Pizza Place   0.0


----Cranham----
                 venue  freq
0          Coffee Shop  0.09
1                Hotel  0.07
2        Shopping Mall  0.07
3        Clothing Store  0.07
4  Fast Food Restaurant  0.05


----Crayford----
           venue  freq
0            Pub  0.10
```

```
                1       Coffee Shop   0.10
                2    Clothing Store   0.10
                3       Supermarket   0.07
                4          Pharmacy   0.07


                ----Creekmouth----
                                  venue   freq
                0                  Pool   0.14
                1   Gym / Fitness Center  0.14
                2                  Park   0.14
                3           Supermarket   0.14
                4           Golf Course   0.14


                ----Crews Hill----
                                        venue   freq
                0                        Park   0.50
                1            Convenience Store   0.25
                2    Construction & Landscaping  0.25
                3                    Irish Pub   0.00
                4            Italian Restaurant  0.00


                ----Crofton Park----
                                  venue   freq
                0       Polish Restaurant   0.17
                1    Fast Food Restaurant   0.17
                2            Veterinarian   0.17
                3                     Pub   0.17
                4                    Park   0.17


                ----Crook Log----
                               venue   freq
                0                Pub   0.10
                1        Coffee Shop   0.10
                2     Clothing Store   0.10
                3        Supermarket   0.07
```

```
4         Pharmacy   0.07


----Crossness----
             venue   freq
0              Pub   0.10
1       Coffee Shop   0.10
2   Clothing Store   0.10
3       Supermarket   0.07
4         Pharmacy   0.07


----Crouch End----
             venue   freq
0             Park   0.33
1   Business Service   0.33
2       Skate Park   0.33
3           Airport   0.00
4       Music Store   0.00


----Croydon----
              venue   freq
0       Pizza Place   0.17
1   Italian Restaurant   0.17
2        Coffee Shop   0.17
3               Pub   0.17
4        Supermarket   0.17


----Crystal Palace----
             venue   freq
0   Clothing Store   0.15
1       Coffee Shop   0.13
2               Bar   0.05
3       Burger Joint   0.05
4        Pizza Place   0.05
```

```
----Cubitt Town----
                 venue  freq
0            Platform  0.17
1   Food & Drink Shop  0.08
2     Nature Preserve  0.08
3   Italian Restaurant  0.08
4          Lighthouse  0.08


----Cudham----
              venue  freq
0   Clothing Store  0.15
1      Coffee Shop  0.13
2              Bar  0.05
3     Burger Joint  0.05
4       Pizza Place  0.05


----Custom House----
                   venue  freq
0                  Hotel  0.29
1    Chinese Restaurant  0.07
2        Sandwich Place  0.07
3               Rafting  0.07
4              Pharmacy  0.07


----Dagenham----
                    venue  freq
0                    Pool  0.14
1    Gym / Fitness Center  0.14
2                    Park  0.14
3            Supermarket  0.14
4            Golf Course  0.14


----Dalston----
                 venue  freq
0    Indian Restaurant  0.38
```

```
1             Hotel  0.12
2     Train Station  0.12
3              Park  0.12
4        Restaurant  0.12


----De Beauvoir Town----
               venue  freq
0  Fish & Chips Shop  0.25
1               Café  0.25
2  Martial Arts Dojo  0.25
3      Metro Station  0.25
4        Music Store  0.00


----Denmark Hill----
              venue  freq
0        IT Services  0.33
1    Harbor / Marina  0.33
2  Business Service  0.33
3        Music Store  0.00
4         Playground  0.00


----Deptford----
                 venue  freq
0     Polish Restaurant  0.17
1  Fast Food Restaurant  0.17
2          Veterinarian  0.17
3                   Pub  0.17
4                  Park  0.17


----Derry Downs----
             venue  freq
0  Clothing Store  0.15
1     Coffee Shop  0.13
2             Bar  0.05
3    Burger Joint  0.05
```

```
4    Pizza Place  0.05


----Dollis Hill----
           venue  freq
0            Pub   0.5
1  Golf Course    0.5
2       Airport   0.0
3     Multiplex   0.0
4      Platform   0.0


----Downe----
             venue  freq
0  Clothing Store  0.15
1     Coffee Shop  0.13
2             Bar  0.05
3    Burger Joint  0.05
4     Pizza Place  0.05


----Downham----
                 venue  freq
0      Polish Restaurant  0.17
1  Fast Food Restaurant  0.17
2          Veterinarian  0.17
3                   Pub  0.17
4                  Park  0.17


----Dulwich----
               venue  freq
0        IT Services  0.33
1     Harbor / Marina  0.33
2    Business Service  0.33
3         Music Store  0.00
4          Playground  0.00
```

```
----Ealing----
              venue  freq
0       Home Service   0.5
1   Business Service   0.5
2            Airport   0.0
3           Multiplex   0.0
4            Platform   0.0


----Earlsfield----
                      venue  freq
0   Construction & Landscaping   0.5
1                         Gym   0.5
2                    Multiplex   0.0
3                   Playground   0.0
4                    Platform   0.0


----East Dulwich----
              venue  freq
0        IT Services  0.33
1    Harbor / Marina  0.33
2   Business Service  0.33
3        Music Store  0.00
4         Playground  0.00


----East Ham----
                venue  freq
0               Hotel  0.29
1   Chinese Restaurant  0.07
2      Sandwich Place  0.07
3             Rafting  0.07
4            Pharmacy  0.07


----East Sheen----
                venue   freq
0   Sporting Goods Shop    0.2
```

```
            1   American Restaurant    0.2
            2            Coffee Shop    0.2
            3          Train Station    0.2
            4         Soccer Stadium    0.2


    ----East Wickham----
                  venue   freq
    0               Pub   0.10
    1       Coffee Shop   0.10
    2    Clothing Store   0.10
    3       Supermarket   0.07
    4          Pharmacy   0.07


    ----Eastcote----
                  venue    freq
    0            Stables    1.0
    1            Airport    0.0
    2      Movie Theater    0.0
    3           Platform    0.0
    4        Pizza Place    0.0


    ----Eden Park----
                  venue   freq
    0    Clothing Store   0.15
    1       Coffee Shop   0.13
    2               Bar   0.05
    3       Burger Joint   0.05
    4        Pizza Place   0.05


    ----Edmonton----
                             venue   freq
    0                         Park   0.50
    1             Convenience Store   0.25
    2    Construction & Landscaping   0.25
    3                    Irish Pub   0.00
```

```
4        Italian Restaurant  0.00


----Eel Pie Island----
                venue  freq
0  Sporting Goods Shop   0.2
1  American Restaurant   0.2
2          Coffee Shop   0.2
3        Train Station   0.2
4       Soccer Stadium   0.2


----Elephant and Castle----
               venue  freq
0        IT Services  0.33
1      Harbor / Marina  0.33
2   Business Service  0.33
3         Music Store  0.00
4          Playground  0.00


----Elm Park----
                venue  freq
0          Coffee Shop  0.09
1                Hotel  0.07
2        Shopping Mall  0.07
3        Clothing Store  0.07
4   Fast Food Restaurant  0.05


----Elmers End----
              venue  freq
0   Clothing Store  0.15
1       Coffee Shop  0.13
2               Bar  0.05
3       Burger Joint  0.05
4        Pizza Place  0.05
```

```
----Elmstead----
            venue  freq
0  Clothing Store  0.15
1     Coffee Shop  0.13
2             Bar  0.05
3    Burger Joint  0.05
4     Pizza Place  0.05


----Emerson Park----
                 venue  freq
0          Coffee Shop  0.09
1                Hotel  0.07
2        Shopping Mall  0.07
3       Clothing Store  0.07
4  Fast Food Restaurant  0.05


----Enfield Highway----
                       venue  freq
0                       Park  0.50
1           Convenience Store  0.25
2  Construction & Landscaping  0.25
3                   Irish Pub  0.00
4          Italian Restaurant  0.00


----Enfield Lock----
                       venue  freq
0                       Park  0.50
1           Convenience Store  0.25
2  Construction & Landscaping  0.25
3                   Irish Pub  0.00
4          Italian Restaurant  0.00


----Enfield Town----
                 venue  freq
0                 Park  0.50
```

```
1             Convenience Store  0.25
2    Construction & Landscaping  0.25
3                     Irish Pub  0.00
4             Italian Restaurant  0.00


----Enfield Wash----
                          venue  freq
0                          Park  0.50
1             Convenience Store  0.25
2    Construction & Landscaping  0.25
3                     Irish Pub  0.00
4             Italian Restaurant  0.00


----Erith----
            venue  freq
0             Pub  0.10
1     Coffee Shop  0.10
2   Clothing Store  0.10
3     Supermarket  0.07
4        Pharmacy  0.07


----Finsbury----
               venue  freq
0    Fish & Chips Shop  0.25
1               Café  0.25
2    Martial Arts Dojo  0.25
3      Metro Station  0.25
4        Music Store  0.00


----Fitzrovia----
               venue  freq
0        Skate Park  0.25
1               Gym  0.25
2       Rugby Pitch  0.25
3   Business Service  0.25
```

```
4              Airport   0.00


----Foots Cray----
             venue   freq
0              Pub   0.10
1      Coffee Shop   0.10
2   Clothing Store   0.10
3       Supermarket  0.07
4         Pharmacy   0.07


----Forest Gate----
                venue   freq
0               Hotel   0.29
1   Chinese Restaurant  0.07
2       Sandwich Place  0.07
3              Rafting  0.07
4             Pharmacy  0.07


----Forest Hill----
                 venue   freq
0      Polish Restaurant  0.17
1   Fast Food Restaurant  0.17
2          Veterinarian  0.17
3                  Pub   0.17
4                 Park   0.17


----Forestdale----
                venue   freq
0          Pizza Place  0.17
1    Italian Restaurant  0.17
2          Coffee Shop  0.17
3                 Pub   0.17
4          Supermarket  0.17
```

```
----Fortis Green----
              venue  freq
0             Park  0.33
1  Business Service  0.33
2       Skate Park  0.33
3          Airport  0.00
4      Music Store  0.00


----Freezywater----
                       venue  freq
0                       Park  0.50
1           Convenience Store  0.25
2  Construction & Landscaping  0.25
3                   Irish Pub  0.00
4           Italian Restaurant  0.00


----Frognal----
              venue  freq
0        Skate Park  0.25
1              Gym  0.25
2       Rugby Pitch  0.25
3  Business Service  0.25
4          Airport  0.00


----Fulwell----
                venue  freq
0  Sporting Goods Shop   0.2
1  American Restaurant   0.2
2         Coffee Shop   0.2
3       Train Station   0.2
4      Soccer Stadium   0.2


----Gallows Corner----
              venue  freq
0        Coffee Shop  0.09
```

```
1                 Hotel  0.07
2         Shopping Mall  0.07
3        Clothing Store  0.07
4  Fast Food Restaurant  0.05


----Gants Hill----
                  venue  freq
0        Clothing Store  0.10
1           Supermarket  0.07
2                Bakery  0.07
3  Fast Food Restaurant  0.07
4     Turkish Restaurant  0.05


----Gidea Park----
                  venue  freq
0           Coffee Shop  0.09
1                 Hotel  0.07
2         Shopping Mall  0.07
3        Clothing Store  0.07
4  Fast Food Restaurant  0.05


----Gipsy Hill----
            venue  freq
0     Coffee Shop  0.22
1             Pub  0.22
2     Supermarket  0.22
3  Soccer Stadium  0.11
4            Café  0.11


----Goddington----
            venue  freq
0  Clothing Store  0.15
1     Coffee Shop  0.13
2             Bar  0.05
3    Burger Joint  0.05
```

```
4       Pizza Place   0.05


----Goodmayes----
                  venue  freq
0         Clothing Store  0.10
1            Supermarket  0.07
2                 Bakery  0.07
3   Fast Food Restaurant  0.07
4      Turkish Restaurant  0.05


----Gospel Oak----
                 venue  freq
0           Skate Park  0.25
1                  Gym  0.25
2          Rugby Pitch  0.25
3     Business Service  0.25
4              Airport  0.00


----Grange Park----
                         venue  freq
0                          Park  0.50
1             Convenience Store  0.25
2   Construction & Landscaping  0.25
3                     Irish Pub  0.00
4            Italian Restaurant  0.00


----Greenford----
                 venue  freq
0         Home Service   0.5
1     Business Service   0.5
2              Airport   0.0
3             Multiplex   0.0
4              Platform   0.0
```

```
----Grove Park----
                     venue  freq
0     Polish Restaurant  0.17
1  Fast Food Restaurant  0.17
2          Veterinarian  0.17
3                   Pub  0.17
4                  Park  0.17


----Hackney----
                  venue  freq
0  Indian Restaurant  0.38
1              Hotel  0.12
2      Train Station  0.12
3               Park  0.12
4         Restaurant  0.12


----Hackney Central----
                  venue  freq
0  Indian Restaurant  0.38
1              Hotel  0.12
2      Train Station  0.12
3               Park  0.12
4         Restaurant  0.12


----Hackney Marshes----
                  venue  freq
0  Indian Restaurant  0.38
1              Hotel  0.12
2      Train Station  0.12
3               Park  0.12
4         Restaurant  0.12


----Hackney Wick----
                  venue  freq
0  Indian Restaurant  0.38
```

```
1                 Hotel  0.12
2         Train Station  0.12
3                  Park  0.12
4            Restaurant  0.12


----Hadley Wood----
                             venue  freq
0                             Park  0.50
1                Convenience Store  0.25
2    Construction & Landscaping    0.25
3                        Irish Pub  0.00
4               Italian Restaurant  0.00


----Haggerston----
                  venue  freq
0    Indian Restaurant  0.38
1                 Hotel  0.12
2         Train Station  0.12
3                  Park  0.12
4            Restaurant  0.12


----Hainault----
                     venue  freq
0          Clothing Store  0.10
1             Supermarket  0.07
2                  Bakery  0.07
3    Fast Food Restaurant  0.07
4       Turkish Restaurant  0.05


----Ham----
                     venue  freq
0    Sporting Goods Shop    0.2
1    American Restaurant    0.2
2             Coffee Shop    0.2
3           Train Station    0.2
```

```
4       Soccer Stadium    0.2


----Hampstead----
                venue  freq
0         Skate Park  0.25
1               Gym  0.25
2        Rugby Pitch  0.25
3  Business Service  0.25
4            Airport  0.00


----Hampton----
                  venue  freq
0  Sporting Goods Shop   0.2
1  American Restaurant   0.2
2          Coffee Shop   0.2
3        Train Station   0.2
4       Soccer Stadium   0.2


----Hampton Hill----
                  venue  freq
0  Sporting Goods Shop   0.2
1  American Restaurant   0.2
2          Coffee Shop   0.2
3        Train Station   0.2
4       Soccer Stadium   0.2


----Hampton Wick----
                  venue  freq
0  Sporting Goods Shop   0.2
1  American Restaurant   0.2
2          Coffee Shop   0.2
3        Train Station   0.2
4       Soccer Stadium   0.2
```

```
          ----Hanwell----
                   venue  freq
0         Home Service   0.5
1     Business Service   0.5
2              Airport   0.0
3             Multiplex   0.0
4              Platform   0.0


          ----Harefield----
                 venue  freq
0            Stables   1.0
1            Airport   0.0
2       Movie Theater   0.0
3            Platform   0.0
4         Pizza Place   0.0


          ----Harlesden----
                venue  freq
0               Pub   0.5
1        Golf Course   0.5
2            Airport   0.0
3           Multiplex   0.0
4           Platform   0.0


          ----Harlington----
                 venue  freq
0            Stables   1.0
1            Airport   0.0
2       Movie Theater   0.0
3            Platform   0.0
4         Pizza Place   0.0


          ----Harmondsworth----
                 venue  freq
0            Stables   1.0
```

```
1         Airport   0.0
2  Movie Theater   0.0
3       Platform   0.0
4    Pizza Place   0.0


----Harold Hill----
                 venue  freq
0          Coffee Shop  0.09
1                Hotel  0.07
2        Shopping Mall  0.07
3       Clothing Store  0.07
4  Fast Food Restaurant  0.05


----Harold Park----
                 venue  freq
0          Coffee Shop  0.09
1                Hotel  0.07
2        Shopping Mall  0.07
3       Clothing Store  0.07
4  Fast Food Restaurant  0.05


----Harold Wood----
                 venue  freq
0          Coffee Shop  0.09
1                Hotel  0.07
2        Shopping Mall  0.07
3       Clothing Store  0.07
4  Fast Food Restaurant  0.05


----Harringay----
                  venue  freq
0                 Park  0.33
1     Business Service  0.33
2           Skate Park  0.33
3              Airport  0.00
```

```
4          Music Store   0.00


----Havering-atte-Bower----
                      venue   freq
0            Coffee Shop   0.09
1                 Hotel   0.07
2         Shopping Mall   0.07
3        Clothing Store   0.07
4  Fast Food Restaurant   0.05


----Hayes----
                venue   freq
0   Clothing Store   0.15
1      Coffee Shop   0.12
2     Burger Joint   0.05
3              Bar   0.05
4      Pizza Place   0.05


----Hazelwood----
                venue   freq
0   Clothing Store   0.15
1      Coffee Shop   0.13
2              Bar   0.05
3     Burger Joint   0.05
4      Pizza Place   0.05


----Herne Hill----
                venue   freq
0      Coffee Shop   0.22
1              Pub   0.22
2      Supermarket   0.22
3   Soccer Stadium   0.11
4             Café   0.11
```

```
----Highbury----
                 venue  freq
0  Fish & Chips Shop  0.25
1              Café  0.25
2  Martial Arts Dojo  0.25
3     Metro Station  0.25
4       Music Store  0.00


----Highgate----
                  venue  freq
0        Skate Park  0.25
1              Gym  0.25
2       Rugby Pitch  0.25
3  Business Service  0.25
4           Airport  0.00


----Hillingdon----
              venue  freq
0        Stables   1.0
1        Airport   0.0
2  Movie Theater   0.0
3       Platform   0.0
4    Pizza Place   0.0


----Hither Green----
                   venue  freq
0      Polish Restaurant  0.17
1  Fast Food Restaurant  0.17
2          Veterinarian  0.17
3                  Pub  0.17
4                 Park  0.17


----Holborn----
                 venue  freq
0        Skate Park  0.25
```

```
1                  Gym  0.25
2          Rugby Pitch  0.25
3     Business Service  0.25
4               Airport  0.00


----Holloway----
                venue  freq
0    Fish & Chips Shop  0.25
1                 Café  0.25
2    Martial Arts Dojo  0.25
3        Metro Station  0.25
4          Music Store  0.00


----Homerton----
                venue  freq
0    Indian Restaurant  0.38
1                Hotel  0.12
2        Train Station  0.12
3                 Park  0.12
4           Restaurant  0.12


----Honor Oak----
                  venue  freq
0        Polish Restaurant  0.17
1    Fast Food Restaurant  0.17
2            Veterinarian  0.17
3                     Pub  0.17
4                    Park  0.17


----Hook----
                venue  freq
0       Clothing Store   1.0
1               Airport   0.0
2           Music Store   0.0
3            Playground   0.0
```

```
4          Platform   0.0


----Hornchurch----
                   venue  freq
0           Coffee Shop  0.09
1                 Hotel  0.07
2         Shopping Mall  0.07
3        Clothing Store  0.07
4  Fast Food Restaurant  0.05


----Hornsey----
                venue  freq
0                Park  0.33
1    Business Service  0.33
2          Skate Park  0.33
3             Airport  0.00
4         Music Store  0.00


----Hoxton----
                venue  freq
0   Indian Restaurant  0.38
1               Hotel  0.12
2       Train Station  0.12
3                Park  0.12
4          Restaurant  0.12


----Ickenham----
              venue  freq
0           Stables   1.0
1           Airport   0.0
2     Movie Theater   0.0
3          Platform   0.0
4       Pizza Place   0.0
```

```
----Ilford----
                  venue  freq
0       Clothing Store   0.10
1          Supermarket   0.07
2               Bakery   0.07
3  Fast Food Restaurant  0.07
4    Turkish Restaurant   0.05


----Isle of Dogs----
                  venue  freq
0             Platform   0.17
1    Food & Drink Shop   0.08
2      Nature Preserve   0.08
3    Italian Restaurant  0.08
4            Lighthouse  0.08


----Islington----
                 venue  freq
0   Fish & Chips Shop   0.25
1                Café   0.25
2   Martial Arts Dojo   0.25
3       Metro Station   0.25
4         Music Store   0.00


----Kenley----
                 venue  freq
0         Pizza Place   0.17
1   Italian Restaurant  0.17
2         Coffee Shop   0.17
3                 Pub   0.17
4         Supermarket   0.17


----Kensal Green----
          venue  freq
0           Pub   0.5
```

```
              1  Golf Course   0.5
              2      Airport   0.0
              3    Multiplex   0.0
              4     Platform   0.0


----Kentish Town----
                    venue  freq
0           Skate Park  0.25
1                  Gym  0.25
2          Rugby Pitch  0.25
3     Business Service  0.25
4              Airport  0.00


----Keston----
                  venue  freq
0     Clothing Store  0.15
1        Coffee Shop  0.13
2                Bar  0.05
3       Burger Joint  0.05
4         Pizza Place  0.05


----Kew----
                       venue  freq
0     Sporting Goods Shop   0.2
1     American Restaurant   0.2
2             Coffee Shop   0.2
3           Train Station   0.2
4          Soccer Stadium   0.2


----Kingsbury----
                  venue  freq
0                 Pub   0.5
1         Golf Course   0.5
2             Airport   0.0
3           Multiplex   0.0
```

```
4        Platform    0.0


----Kingston Vale----
              venue   freq
0   Clothing Store    1.0
1          Airport    0.0
2      Music Store    0.0
3       Playground    0.0
4         Platform    0.0


----Kingston upon Thames----
              venue   freq
0   Clothing Store    1.0
1          Airport    0.0
2      Music Store    0.0
3       Playground    0.0
4         Platform    0.0


----Knightsbridge----
              venue   freq
0   Breakfast Spot    1.0
1          Airport    0.0
2         Multiplex   0.0
3       Playground    0.0
4         Platform    0.0


----Ladywell----
                  venue   freq
0       Polish Restaurant  0.17
1  Fast Food Restaurant   0.17
2          Veterinarian   0.17
3                   Pub   0.17
4                  Park   0.17
```

```
----Lambeth----
              venue  freq
0      Coffee Shop  0.22
1              Pub  0.22
2      Supermarket  0.22
3   Soccer Stadium  0.11
4             Café  0.11


----Lamorbey----
              venue  freq
0              Pub  0.10
1      Coffee Shop  0.10
2   Clothing Store  0.10
3      Supermarket  0.07
4         Pharmacy  0.07


----Lea Bridge----
                 venue  freq
0    Indian Restaurant  0.38
1                Hotel  0.12
2        Train Station  0.12
3                 Park  0.12
4           Restaurant  0.12


----Leamouth----
                 venue  freq
0             Platform  0.17
1     Food & Drink Shop  0.08
2       Nature Preserve  0.08
3    Italian Restaurant  0.08
4           Lighthouse  0.08


----Leaves Green----
              venue  freq
0   Clothing Store  0.15
```

```
1       Coffee Shop  0.13
2              Bar  0.05
3     Burger Joint  0.05
4      Pizza Place  0.05


----Lee----
                  venue  freq
0       Polish Restaurant  0.17
1  Fast Food Restaurant  0.17
2          Veterinarian  0.17
3                   Pub  0.17
4                  Park  0.17


----Lessness Heath----
              venue  freq
0              Pub  0.10
1      Coffee Shop  0.10
2   Clothing Store  0.10
3       Supermarket  0.07
4         Pharmacy  0.07


----Lewisham----
                  venue  freq
0       Polish Restaurant  0.17
1  Fast Food Restaurant  0.17
2          Veterinarian  0.17
3                   Pub  0.17
4                  Park  0.17


----Limehouse----
                  venue  freq
0             Platform  0.17
1    Food & Drink Shop  0.08
2        Nature Preserve  0.08
3   Italian Restaurant  0.08
```

```
        4          Lighthouse  0.08


----Lisson Grove----
            venue  freq
0  Breakfast Spot   1.0
1         Airport   0.0
2       Multiplex   0.0
3      Playground   0.0
4        Platform   0.0


----Little Ilford----
               venue  freq
0              Hotel  0.29
1  Chinese Restaurant  0.07
2     Sandwich Place  0.07
3            Rafting  0.07
4           Pharmacy  0.07


----Little Venice----
            venue  freq
0  Breakfast Spot   1.0
1         Airport   0.0
2       Multiplex   0.0
3      Playground   0.0
4        Platform   0.0


----Locksbottom----
            venue  freq
0  Clothing Store  0.15
1      Coffee Shop  0.13
2             Bar  0.05
3     Burger Joint  0.05
4      Pizza Place  0.05
```

```
----Longford----
            venue  freq
0        Stables   1.0
1        Airport   0.0
2  Movie Theater   0.0
3       Platform   0.0
4    Pizza Place   0.0


----Longlands----
              venue  freq
0               Pub  0.10
1        Coffee Shop  0.10
2    Clothing Store  0.10
3       Supermarket  0.07
4          Pharmacy  0.07


----Lower Clapton----
                venue  freq
0  Indian Restaurant   0.38
1              Hotel   0.12
2      Train Station   0.12
3               Park   0.12
4         Restaurant   0.12


----Lower Morden----
          venue  freq
0           Pub   1.0
1       Airport   0.0
2     Multiplex   0.0
3      Platform   0.0
4   Pizza Place   0.0


----Loxford----
               venue  freq
0     Clothing Store  0.10
```

```
1           Supermarket  0.07
2               Bakery  0.07
3  Fast Food Restaurant  0.07
4    Turkish Restaurant  0.05


----Maida Vale----
           venue  freq
0  Breakfast Spot   1.0
1         Airport   0.0
2       Multiplex   0.0
3      Playground   0.0
4        Platform   0.0


----Malden Rushett----
           venue  freq
0  Clothing Store   1.0
1         Airport   0.0
2     Music Store   0.0
3      Playground   0.0
4        Platform   0.0


----Manor House----
               venue  freq
0  Indian Restaurant  0.38
1              Hotel  0.12
2      Train Station  0.12
3               Park  0.12
4         Restaurant  0.12


----Manor Park----
               venue  freq
0              Hotel  0.29
1  Chinese Restaurant  0.07
2      Sandwich Place  0.07
3            Rafting  0.07
```

```
4               Pharmacy  0.07


----Marks Gate----
                     venue  freq
0                     Pool  0.14
1  Gym / Fitness Center  0.14
2                     Park  0.14
3              Supermarket  0.14
4              Golf Course  0.14


----Maryland----
                    venue  freq
0                   Hotel  0.29
1  Chinese Restaurant  0.07
2       Sandwich Place  0.07
3              Rafting  0.07
4             Pharmacy  0.07


----Marylebone----
             venue  freq
0  Breakfast Spot   1.0
1          Airport   0.0
2         Multiplex   0.0
3        Playground   0.0
4          Platform   0.0


----Mayfair----
             venue  freq
0  Breakfast Spot   1.0
1          Airport   0.0
2         Multiplex   0.0
3        Playground   0.0
4          Platform   0.0
```

```
        ----Merton Park----
                  venue   freq
0             Pub   1.0
1         Airport   0.0
2       Multiplex   0.0
3        Platform   0.0
4     Pizza Place   0.0


        ----Mile End----
                        venue   freq
0              Platform   0.17
1    Food & Drink Shop   0.08
2       Nature Preserve   0.08
3    Italian Restaurant   0.08
4            Lighthouse   0.08


        ----Millbank----
                  venue   freq
0   Breakfast Spot   1.0
1          Airport   0.0
2        Multiplex   0.0
3       Playground   0.0
4         Platform   0.0


        ----Millwall----
                        venue   freq
0              Platform   0.17
1    Food & Drink Shop   0.08
2       Nature Preserve   0.08
3    Italian Restaurant   0.08
4            Lighthouse   0.08


        ----Mitcham----
                  venue   freq
0             Pub   1.0
```

```
1         Airport   0.0
2       Multiplex   0.0
3        Platform   0.0
4     Pizza Place   0.0


----Morden----
            venue  freq
0             Pub   1.0
1         Airport   0.0
2       Multiplex   0.0
3        Platform   0.0
4     Pizza Place   0.0


----Morden Park----
            venue  freq
0             Pub   1.0
1         Airport   0.0
2       Multiplex   0.0
3        Platform   0.0
4     Pizza Place   0.0


----Mortlake----
                 venue  freq
0   Sporting Goods Shop   0.2
1   American Restaurant   0.2
2           Coffee Shop   0.2
3         Train Station   0.2
4        Soccer Stadium   0.2


----Motspur Park----
            venue  freq
0   Clothing Store   1.0
1          Airport   0.0
2      Music Store   0.0
3       Playground   0.0
```

```
4         Platform   0.0


----Mottingham----
              venue  freq
0  Clothing Store  0.15
1     Coffee Shop  0.13
2             Bar  0.05
3     Burger Joint  0.05
4      Pizza Place  0.05


----Nag's Head----
                venue  freq
0  Fish & Chips Shop  0.25
1               Café  0.25
2  Martial Arts Dojo  0.25
3      Metro Station  0.25
4        Music Store  0.00


----Neasden----
            venue  freq
0            Pub   0.5
1    Golf Course   0.5
2        Airport   0.0
3      Multiplex   0.0
4       Platform   0.0


----New Addington----
                venue  freq
0        Pizza Place  0.17
1  Italian Restaurant  0.17
2        Coffee Shop  0.17
3               Pub   0.17
4        Supermarket  0.17
```

```
----New Cross----
                 venue  freq
0      Polish Restaurant  0.17
1  Fast Food Restaurant  0.17
2           Veterinarian  0.17
3                    Pub  0.17
4                   Park  0.17


----New Malden----
             venue  freq
0  Clothing Store   1.0
1          Airport   0.0
2      Music Store   0.0
3       Playground   0.0
4         Platform   0.0


----Newbury Park----
                 venue  freq
0       Clothing Store  0.10
1           Supermarket  0.07
2                Bakery  0.07
3  Fast Food Restaurant  0.07
4     Turkish Restaurant  0.05


----Newington----
              venue  freq
0        IT Services  0.33
1     Harbor / Marina  0.33
2   Business Service  0.33
3        Music Store  0.00
4         Playground  0.00


----Nine Elms----
                     venue  freq
0  Construction & Landscaping   0.5
```

```
1                    Gym   0.5
2              Multiplex   0.0
3             Playground   0.0
4               Platform   0.0


----Noak Hill----
                venue  freq
0          Coffee Shop  0.09
1                Hotel  0.07
2        Shopping Mall  0.07
3       Clothing Store  0.07
4  Fast Food Restaurant  0.05


----Norbiton----
              venue  freq
0    Clothing Store   1.0
1           Airport   0.0
2       Music Store   0.0
3        Playground   0.0
4          Platform   0.0


----Norbury----
                venue  freq
0          Pizza Place  0.17
1    Italian Restaurant  0.17
2          Coffee Shop  0.17
3                  Pub  0.17
4          Supermarket  0.17


----North Cray----
                venue  freq
0                  Pub  0.10
1          Coffee Shop  0.10
2       Clothing Store  0.10
3          Supermarket  0.07
```

```
4        Pharmacy  0.07


----North End----
            venue   freq
0              Pub  0.10
1      Coffee Shop  0.10
2  Clothing Store   0.10
3     Supermarket   0.07
4        Pharmacy   0.07


----North Ockendon----
                venue   freq
0        Coffee Shop   0.09
1              Hotel   0.07
2      Shopping Mall   0.07
3     Clothing Store   0.07
4  Fast Food Restaurant  0.05


----North Sheen----
                 venue   freq
0   Sporting Goods Shop   0.2
1   American Restaurant   0.2
2          Coffee Shop   0.2
3        Train Station   0.2
4       Soccer Stadium   0.2


----North Woolwich----
               venue   freq
0              Hotel  0.29
1  Chinese Restaurant  0.07
2     Sandwich Place  0.07
3            Rafting  0.07
4           Pharmacy  0.07
```

```
        ----Northolt----
                   venue  freq
0        Home Service   0.5
1    Business Service   0.5
2             Airport   0.0
3           Multiplex   0.0
4            Platform   0.0


        ----Northumberland Heath----
                 venue  freq
0                  Pub  0.10
1          Coffee Shop  0.10
2       Clothing Store  0.10
3          Supermarket  0.07
4             Pharmacy  0.07


        ----Northwood----
                venue  freq
0             Stables   1.0
1             Airport   0.0
2       Movie Theater   0.0
3            Platform   0.0
4         Pizza Place   0.0


        ----Norwood Green----
                   venue  freq
0        Home Service   0.5
1    Business Service   0.5
2             Airport   0.0
3           Multiplex   0.0
4            Platform   0.0


        ----Nunhead----
                 venue  freq
0          IT Services  0.33
```

```
1     Harbor / Marina   0.33
2     Business Service  0.33
3           Music Store  0.00
4            Playground  0.00


----Old Coulsdon----
                  venue  freq
0          Pizza Place   0.17
1   Italian Restaurant   0.17
2          Coffee Shop   0.17
3                  Pub   0.17
4          Supermarket   0.17


----Old Ford----
                  venue  freq
0             Platform   0.17
1    Food & Drink Shop   0.08
2       Nature Preserve   0.08
3   Italian Restaurant   0.08
4            Lighthouse   0.08


----Old Malden----
               venue  freq
0   Clothing Store    1.0
1          Airport    0.0
2       Music Store    0.0
3        Playground    0.0
4           Platform    0.0


----Orpington----
               venue  freq
0   Clothing Store   0.15
1       Coffee Shop   0.13
2               Bar   0.05
3       Burger Joint   0.05
```

```
4        Pizza Place   0.05


----Oval----
              venue   freq
0       Coffee Shop   0.22
1              Pub   0.22
2       Supermarket   0.22
3   Soccer Stadium   0.11
4             Café   0.11


----Paddington----
              venue   freq
0   Breakfast Spot    1.0
1           Airport    0.0
2          Multiplex    0.0
3         Playground    0.0
4           Platform    0.0


----Palmers Green----
                         venue   freq
0                         Park   0.50
1             Convenience Store   0.25
2   Construction & Landscaping   0.25
3                    Irish Pub   0.00
4           Italian Restaurant   0.00


----Peckham----
               venue   freq
0       IT Services   0.33
1     Harbor / Marina   0.33
2   Business Service   0.33
3         Music Store   0.00
4          Playground   0.00
```

```
----Penge----
             venue  freq
0  Clothing Store  0.15
1     Coffee Shop  0.13
2             Bar  0.05
3    Burger Joint  0.05
4     Pizza Place  0.05


----Pentonville----
                venue  freq
0  Fish & Chips Shop  0.25
1               Café  0.25
2  Martial Arts Dojo  0.25
3      Metro Station  0.25
4        Music Store  0.00


----Perivale----
              venue  freq
0      Home Service   0.5
1  Business Service   0.5
2           Airport   0.0
3         Multiplex   0.0
4          Platform   0.0


----Petersham----
                venue  freq
0  Sporting Goods Shop   0.2
1  American Restaurant   0.2
2          Coffee Shop   0.2
3        Train Station   0.2
4       Soccer Stadium   0.2


----Petts Wood----
             venue  freq
0  Clothing Store  0.15
```

```
1      Coffee Shop  0.13
2             Bar  0.05
3     Burger Joint  0.05
4      Pizza Place  0.05


----Pimlico----
           venue  freq
0  Breakfast Spot   1.0
1         Airport   0.0
2        Multiplex   0.0
3       Playground   0.0
4         Platform   0.0


----Plaistow----
           venue  freq
0  Clothing Store  0.11
1      Coffee Shop  0.09
2            Hotel  0.08
3  Sandwich Place  0.04
4              Bar  0.04


----Ponders End----
                         venue  freq
0                         Park  0.50
1             Convenience Store  0.25
2     Construction & Landscaping  0.25
3                     Irish Pub  0.00
4            Italian Restaurant  0.00


----Poplar----
                venue  freq
0            Platform  0.17
1    Food & Drink Shop  0.08
2       Nature Preserve  0.08
3  Italian Restaurant  0.08
```

```
4        Lighthouse   0.08


----Pratt's Bottom----
             venue   freq
0   Clothing Store   0.15
1      Coffee Shop   0.13
2              Bar   0.05
3     Burger Joint   0.05
4      Pizza Place   0.05


----Preston----
          venue   freq
0           Pub   0.5
1   Golf Course   0.5
2       Airport   0.0
3     Multiplex   0.0
4      Platform   0.0


----Primrose Hill----
              venue   freq
0        Skate Park   0.25
1               Gym   0.25
2       Rugby Pitch   0.25
3  Business Service   0.25
4           Airport   0.00


----Purley----
               venue   freq
0        Pizza Place   0.17
1  Italian Restaurant   0.17
2        Coffee Shop   0.17
3                Pub   0.17
4        Supermarket   0.17
```

```
----Putney----
                        venue  freq
0  Construction & Landscaping   0.5
1                        Gym    0.5
2                   Multiplex   0.0
3                  Playground   0.0
4                    Platform   0.0


----Queen's Park----
        venue  freq
0         Pub   0.5
1  Golf Course   0.5
2      Airport   0.0
3    Multiplex   0.0
4     Platform   0.0


----Rainham----
                 venue  freq
0          Coffee Shop  0.09
1                Hotel  0.07
2        Shopping Mall  0.07
3       Clothing Store  0.07
4  Fast Food Restaurant  0.05


----Ratcliff----
                venue  freq
0            Platform  0.17
1     Food & Drink Shop  0.08
2       Nature Preserve  0.08
3   Italian Restaurant  0.08
4           Lighthouse  0.08


----Raynes Park----
        venue  freq
0         Pub   1.0
```

```
1        Airport   0.0
2      Multiplex   0.0
3       Platform   0.0
4    Pizza Place   0.0


----Redbridge----
                   venue   freq
0         Clothing Store   0.10
1            Supermarket   0.07
2                 Bakery   0.07
3   Fast Food Restaurant   0.07
4     Turkish Restaurant   0.05


----Richmond----
                   venue   freq
0    Sporting Goods Shop    0.2
1    American Restaurant    0.2
2            Coffee Shop    0.2
3          Train Station    0.2
4         Soccer Stadium    0.2


----Riddlesdown----
                  venue   freq
0           Pizza Place   0.17
1     Italian Restaurant  0.17
2            Coffee Shop  0.17
3                   Pub   0.17
4           Supermarket   0.17


----Roehampton----
                       venue   freq
0   Construction & Landscaping   0.5
1                         Gym   0.5
2                   Multiplex   0.0
3                  Playground   0.0
```

```
4                   Platform   0.0


----Romford----
                venue   freq
0          Coffee Shop  0.09
1               Hotel   0.07
2       Shopping Mall   0.07
3       Clothing Store  0.07
4  Fast Food Restaurant  0.05


----Rotherhithe----
                venue   freq
0        IT Services   0.33
1    Harbor / Marina   0.33
2   Business Service   0.33
3        Music Store   0.00
4         Playground   0.00


----Ruislip----
             venue   freq
0          Stables   1.0
1          Airport   0.0
2    Movie Theater   0.0
3         Platform   0.0
4      Pizza Place   0.0


----Rush Green----
                   venue   freq
0                   Pool   0.14
1   Gym / Fitness Center  0.14
2                   Park   0.14
3            Supermarket  0.14
4            Golf Course  0.14
```

```
----Sanderstead----
                venue  freq
0         Pizza Place  0.17
1   Italian Restaurant  0.17
2          Coffee Shop  0.17
3                 Pub  0.17
4          Supermarket  0.17


----Selhurst----
                venue  freq
0         Pizza Place  0.17
1   Italian Restaurant  0.17
2          Coffee Shop  0.17
3                 Pub  0.17
4          Supermarket  0.17


----Selsdon----
                venue  freq
0         Pizza Place  0.17
1   Italian Restaurant  0.17
2          Coffee Shop  0.17
3                 Pub  0.17
4          Supermarket  0.17


----Seven Kings----
                   venue  freq
0          Clothing Store  0.10
1             Supermarket  0.07
2                  Bakery  0.07
3   Fast Food Restaurant  0.07
4     Turkish Restaurant  0.05


----Seven Sisters----
              venue  freq
0              Park  0.33
```

```
              1    Business Service   0.33
              2          Skate Park   0.33
              3             Airport   0.00
              4         Music Store   0.00


----Shacklewell----
                    venue   freq
0    Indian Restaurant   0.38
1                Hotel   0.12
2        Train Station   0.12
3                 Park   0.12
4           Restaurant   0.12


----Shadwell----
                    venue   freq
0             Platform   0.17
1    Food & Drink Shop   0.08
2      Nature Preserve   0.08
3    Italian Restaurant   0.08
4           Lighthouse   0.08


----Shirley----
                    venue   freq
0          Pizza Place   0.17
1    Italian Restaurant   0.17
2          Coffee Shop   0.17
3                  Pub   0.17
4          Supermarket   0.17


----Shoreditch----
                    venue   freq
0    Indian Restaurant   0.38
1                Hotel   0.12
2        Train Station   0.12
3                 Park   0.12
```

```
4          Restaurant  0.12


----Sidcup----
              venue  freq
0               Pub  0.10
1       Coffee Shop  0.10
2   Clothing Store  0.10
3       Supermarket  0.07
4          Pharmacy  0.07


----Silvertown----
              venue  freq
0             Hotel  0.29
1  Chinese Restaurant  0.07
2    Sandwich Place  0.07
3           Rafting  0.07
4          Pharmacy  0.07


----Sipson----
             venue  freq
0          Stables   1.0
1          Airport   0.0
2    Movie Theater   0.0
3         Platform   0.0
4      Pizza Place   0.0


----Slade Green----
              venue  freq
0               Pub  0.10
1       Coffee Shop  0.10
2   Clothing Store  0.10
3       Supermarket  0.07
4          Pharmacy  0.07
```

```
----Soho----
          venue  freq
0  Breakfast Spot   1.0
1         Airport   0.0
2       Multiplex   0.0
3      Playground   0.0
4        Platform   0.0


----Somerstown----
             venue  freq
0        Skate Park  0.25
1              Gym  0.25
2       Rugby Pitch  0.25
3  Business Service  0.25
4           Airport  0.00


----South Croydon----
                venue  freq
0         Pizza Place  0.17
1  Italian Restaurant  0.17
2         Coffee Shop  0.17
3                Pub  0.17
4        Supermarket  0.17


----South Hackney----
               venue  freq
0  Indian Restaurant  0.38
1              Hotel  0.12
2      Train Station  0.12
3               Park  0.12
4         Restaurant  0.12


----South Hornchurch----
            venue  freq
0     Coffee Shop  0.09
```

```
1                Hotel  0.07
2        Shopping Mall  0.07
3        Clothing Store  0.07
4  Fast Food Restaurant  0.05


----South Norwood----
                venue  freq
0          Pizza Place  0.17
1    Italian Restaurant  0.17
2          Coffee Shop  0.17
3                  Pub  0.17
4          Supermarket  0.17


----South Ruislip----
          venue  freq
0        Stables   1.0
1        Airport   0.0
2  Movie Theater   0.0
3       Platform   0.0
4    Pizza Place   0.0


----South Tottenham----
              venue  freq
0              Park  0.33
1  Business Service  0.33
2        Skate Park  0.33
3           Airport  0.00
4       Music Store  0.00


----South Wimbledon----
        venue  freq
0          Pub   1.0
1      Airport   0.0
2    Multiplex   0.0
3     Platform   0.0
```

```
4  Pizza Place    0.0


----South Woodford----
                        venue  freq
0          Clothing Store  0.10
1             Supermarket  0.07
2                  Bakery  0.07
3   Fast Food Restaurant  0.07
4      Turkish Restaurant  0.05


----Southall----
                   venue  freq
0      Home Service   0.5
1  Business Service   0.5
2           Airport   0.0
3         Multiplex   0.0
4          Platform   0.0


----Southborough----
                venue  freq
0  Clothing Store  0.15
1     Coffee Shop  0.13
2             Bar  0.05
3     Burger Joint  0.05
4      Pizza Place  0.05


----Southend----
                        venue  freq
0      Polish Restaurant  0.17
1  Fast Food Restaurant  0.17
2           Veterinarian  0.17
3                    Pub  0.17
4                   Park  0.17
```

```
----Southfields----
                        venue  freq
0  Construction & Landscaping   0.5
1                        Gym    0.5
2                   Multiplex   0.0
3                  Playground   0.0
4                    Platform   0.0


----Southgate----
                        venue  freq
0                        Park  0.50
1            Convenience Store  0.25
2  Construction & Landscaping  0.25
3                   Irish Pub  0.00
4           Italian Restaurant  0.00


----Spitalfields----
                 venue  freq
0             Platform  0.17
1     Food & Drink Shop  0.08
2       Nature Preserve  0.08
3   Italian Restaurant  0.08
4           Lighthouse  0.08


----St Giles----
               venue  freq
0         Skate Park  0.25
1                Gym  0.25
2        Rugby Pitch  0.25
3   Business Service  0.25
4             Airport  0.00


----St Helier----
         venue  freq
0          Pub   1.0
```

```
1        Airport    0.0
2      Multiplex    0.0
3       Platform    0.0
4    Pizza Place    0.0


----St James's----
               venue  freq
0     Breakfast Spot   1.0
1            Airport   0.0
2          Multiplex   0.0
3         Playground   0.0
4           Platform   0.0


----St John's Wood----
               venue  freq
0     Breakfast Spot   1.0
1            Airport   0.0
2          Multiplex   0.0
3         Playground   0.0
4           Platform   0.0


----St Johns----
                  venue  freq
0       Polish Restaurant  0.17
1   Fast Food Restaurant  0.17
2            Veterinarian  0.17
3                     Pub  0.17
4                    Park  0.17


----St Luke's----
                venue  freq
0     Fish & Chips Shop  0.25
1                  Café  0.25
2      Martial Arts Dojo  0.25
3          Metro Station  0.25
```

```
4        Music Store   0.00


----St Margarets----
                 venue  freq
0  Sporting Goods Shop   0.2
1  American Restaurant   0.2
2          Coffee Shop   0.2
3        Train Station   0.2
4       Soccer Stadium   0.2


----St Mary Cray----
              venue  freq
0  Clothing Store   0.15
1     Coffee Shop   0.13
2             Bar   0.05
3    Burger Joint   0.05
4     Pizza Place   0.05


----St Pancras----
               venue  freq
0        Skate Park   0.25
1               Gym   0.25
2       Rugby Pitch   0.25
3  Business Service   0.25
4           Airport   0.00


----St Paul's Cray----
              venue  freq
0  Clothing Store   0.15
1     Coffee Shop   0.13
2             Bar   0.05
3    Burger Joint   0.05
4     Pizza Place   0.05
```

```
----Stamford Hill----
              venue  freq
0  Indian Restaurant  0.38
1              Hotel  0.12
2      Train Station  0.12
3               Park  0.12
4         Restaurant  0.12


----Stepney----
                venue  freq
0            Platform  0.17
1   Food & Drink Shop  0.08
2      Nature Preserve  0.08
3  Italian Restaurant  0.08
4          Lighthouse  0.08


----Stockwell----
            venue  freq
0      Coffee Shop  0.22
1              Pub  0.22
2      Supermarket  0.22
3   Soccer Stadium  0.11
4             Café  0.11


----Stoke Newington----
              venue  freq
0  Indian Restaurant  0.38
1              Hotel  0.12
2      Train Station  0.12
3               Park  0.12
4         Restaurant  0.12


----Stonebridge----
         venue  freq
0          Pub   0.5
```

```
1  Golf Course    0.5
2      Airport    0.0
3    Multiplex    0.0
4     Platform    0.0


----Stratford----
                   venue  freq
0                  Hotel  0.29
1  Chinese Restaurant  0.07
2      Sandwich Place  0.07
3             Rafting  0.07
4            Pharmacy  0.07


----Strawberry Hill----
                   venue  freq
0  Sporting Goods Shop   0.2
1  American Restaurant   0.2
2          Coffee Shop   0.2
3        Train Station   0.2
4       Soccer Stadium   0.2


----Streatham----
                venue  freq
0      Coffee Shop  0.22
1              Pub  0.22
2      Supermarket  0.22
3   Soccer Stadium  0.11
4             Café  0.11


----Stroud Green----
                  venue  freq
0               Park  0.33
1   Business Service  0.33
2         Skate Park  0.33
3            Airport  0.00
```

```
4        Music Store  0.00


----Sundridge----
             venue  freq
0  Clothing Store  0.15
1     Coffee Shop  0.13
2             Bar  0.05
3    Burger Joint  0.05
4     Pizza Place  0.05


----Surbiton----
             venue  freq
0  Clothing Store   1.0
1         Airport   0.0
2     Music Store   0.0
3      Playground   0.0
4        Platform   0.0


----Surrey Quays----
               venue  freq
0       IT Services  0.33
1    Harbor / Marina  0.33
2  Business Service  0.33
3       Music Store  0.00
4        Playground  0.00


----Sutton----
             venue  freq
0   Historic Site   1.0
1         Airport   0.0
2       Multiplex   0.0
3        Platform   0.0
4     Pizza Place   0.0
```

```
            ----Swiss Cottage----
                    venue  freq
0          Skate Park  0.25
1                 Gym  0.25
2         Rugby Pitch  0.25
3    Business Service  0.25
4             Airport  0.00


            ----Teddington----
                       venue  freq
0   Sporting Goods Shop   0.2
1   American Restaurant   0.2
2           Coffee Shop   0.2
3         Train Station   0.2
4        Soccer Stadium   0.2


            ----Thornton Heath----
                       venue  freq
0           Pizza Place  0.17
1    Italian Restaurant  0.17
2           Coffee Shop  0.17
3                   Pub  0.17
4           Supermarket  0.17


            ----Tokyngton----
                 venue  freq
0               Pub   0.5
1       Golf Course   0.5
2           Airport   0.0
3         Multiplex   0.0
4          Platform   0.0


            ----Tolworth----
                  venue  freq
0     Clothing Store   1.0
```

```
1          Airport   0.0
2      Music Store   0.0
3       Playground   0.0
4         Platform   0.0


----Tooting----
                          venue   freq
0  Construction & Landscaping    0.5
1                         Gym    0.5
2                    Multiplex   0.0
3                   Playground   0.0
4                    Platform    0.0


----Tooting Bec----
                          venue   freq
0  Construction & Landscaping    0.5
1                         Gym    0.5
2                    Multiplex   0.0
3                   Playground   0.0
4                    Platform    0.0


----Tottenham----
                 venue   freq
0                Park   0.33
1  Business Service    0.33
2         Skate Park   0.33
3            Airport   0.00
4        Music Store   0.00


----Tottenham Green----
                 venue   freq
0                Park   0.33
1  Business Service    0.33
2         Skate Park   0.33
3            Airport   0.00
```

```
4         Music Store  0.00


----Tottenham Hale----
               venue  freq
0               Park  0.33
1   Business Service  0.33
2         Skate Park  0.33
3            Airport  0.00
4        Music Store  0.00


----Tower Hill----
                venue  freq
0            Platform  0.17
1    Food & Drink Shop  0.08
2      Nature Preserve  0.08
3   Italian Restaurant  0.08
4           Lighthouse  0.08


----Tulse Hill----
              venue  freq
0       Coffee Shop  0.22
1               Pub  0.22
2       Supermarket  0.22
3    Soccer Stadium  0.11
4              Café  0.11


----Turnpike Lane----
               venue  freq
0               Park  0.33
1   Business Service  0.33
2         Skate Park  0.33
3            Airport  0.00
4        Music Store  0.00
```

```
----Twickenham----
                  venue  freq
0   Sporting Goods Shop   0.2
1   American Restaurant   0.2
2           Coffee Shop   0.2
3         Train Station   0.2
4        Soccer Stadium   0.2


----Upminster----
                   venue  freq
0            Coffee Shop  0.09
1                  Hotel  0.07
2          Shopping Mall  0.07
3         Clothing Store  0.07
4   Fast Food Restaurant  0.05


----Upminster Bridge----
                   venue  freq
0            Coffee Shop  0.09
1                  Hotel  0.07
2          Shopping Mall  0.07
3         Clothing Store  0.07
4   Fast Food Restaurant  0.05


----Upper Clapton----
                 venue  freq
0   Indian Restaurant  0.38
1               Hotel  0.12
2       Train Station  0.12
3                Park  0.12
4          Restaurant  0.12


----Upper Holloway----
                venue  freq
0   Fish & Chips Shop  0.25
```

```
1            Café  0.25
2  Martial Arts Dojo  0.25
3      Metro Station  0.25
4        Music Store  0.00


----Upper Norwood----
              venue  freq
0        Pizza Place  0.17
1  Italian Restaurant  0.17
2         Coffee Shop  0.17
3                Pub  0.17
4         Supermarket  0.17


----Upton----
             venue  freq
0              Pub  0.10
1       Coffee Shop  0.10
2    Clothing Store  0.10
3        Supermarket  0.07
4          Pharmacy  0.07


----Upton Park----
               venue  freq
0              Hotel  0.29
1  Chinese Restaurant  0.07
2      Sandwich Place  0.07
3             Rafting  0.07
4           Pharmacy  0.07


----Uxbridge----
             venue  freq
0            Stables   1.0
1             Airport   0.0
2      Movie Theater   0.0
3          Platform   0.0
```

```
4       Pizza Place    0.0


----Vauxhall----
              venue   freq
0      Coffee Shop    0.22
1              Pub    0.22
2      Supermarket    0.22
3   Soccer Stadium    0.11
4             Café    0.11


----Waddon----
                 venue   freq
0         Pizza Place    0.17
1   Italian Restaurant    0.17
2         Coffee Shop    0.17
3                Pub    0.17
4        Supermarket    0.17


----Wallington----
              venue   freq
0   Historic Site    1.0
1          Airport    0.0
2        Multiplex    0.0
3         Platform    0.0
4      Pizza Place    0.0


----Walworth----
               venue   freq
0       IT Services    0.33
1     Harbor / Marina    0.33
2   Business Service    0.33
3        Music Store    0.00
4         Playground    0.00
```

```
----Wandsworth----
                      venue  freq
0  Construction & Landscaping   0.5
1                        Gym   0.5
2                   Multiplex   0.0
3                  Playground   0.0
4                    Platform   0.0


----Wanstead----
                   venue  freq
0         Clothing Store  0.10
1            Supermarket  0.07
2                 Bakery  0.07
3    Fast Food Restaurant  0.07
4      Turkish Restaurant  0.05


----Wapping----
                venue  freq
0            Platform  0.17
1    Food & Drink Shop  0.08
2      Nature Preserve  0.08
3    Italian Restaurant  0.08
4           Lighthouse  0.08


----Welling----
              venue  freq
0               Pub  0.10
1        Coffee Shop  0.10
2     Clothing Store  0.10
3        Supermarket  0.07
4           Pharmacy  0.07


----Wembley----
         venue  freq
0           Pub   0.5
```

```
1  Golf Course   0.5
2     Airport   0.0
3   Multiplex   0.0
4    Platform   0.0


----Wembley Park----
        venue  freq
0         Pub   0.5
1  Golf Course   0.5
2     Airport   0.0
3   Multiplex   0.0
4    Platform   0.0


----Wennington----
              venue  freq
0        Coffee Shop  0.09
1              Hotel  0.07
2      Shopping Mall  0.07
3      Clothing Store  0.07
4  Fast Food Restaurant  0.05


----West Drayton----
          venue  freq
0        Stables   1.0
1        Airport   0.0
2  Movie Theater   0.0
3       Platform   0.0
4    Pizza Place   0.0


----West Ealing----
             venue  freq
0     Home Service   0.5
1  Business Service   0.5
2          Airport   0.0
3        Multiplex   0.0
```

```
4           Platform   0.0


----West Green----
               venue  freq
0               Park  0.33
1   Business Service  0.33
2         Skate Park  0.33
3            Airport  0.00
4        Music Store  0.00


----West Hackney----
                venue  freq
0   Indian Restaurant  0.38
1               Hotel  0.12
2       Train Station  0.12
3                Park  0.12
4          Restaurant  0.12


----West Ham----
                 venue  freq
0                Hotel  0.29
1   Chinese Restaurant  0.07
2       Sandwich Place  0.07
3              Rafting  0.07
4             Pharmacy  0.07


----West Hampstead----
               venue  freq
0         Skate Park  0.25
1                Gym  0.25
2        Rugby Pitch  0.25
3   Business Service  0.25
4            Airport  0.00
```

```
----West Heath----
            venue  freq
0            Pub   0.10
1    Coffee Shop   0.10
2 Clothing Store   0.10
3    Supermarket   0.07
4       Pharmacy   0.07


----West Norwood----
            venue  freq
0    Coffee Shop   0.22
1            Pub   0.22
2    Supermarket   0.22
3 Soccer Stadium   0.11
4           Café   0.11


----West Wickham----
            venue  freq
0 Clothing Store   0.15
1    Coffee Shop   0.13
2            Bar   0.05
3   Burger Joint   0.05
4    Pizza Place   0.05


----Westminster----
            venue  freq
0 Breakfast Spot    1.0
1        Airport    0.0
2      Multiplex    0.0
3     Playground    0.0
4       Platform    0.0


----Whitechapel----
             venue   freq
0         Platform   0.17
```

```
1     Food & Drink Shop   0.08
2        Nature Preserve   0.08
3      Italian Restaurant   0.08
4               Lighthouse   0.08


----Whitton----
               venue   freq
0   Sporting Goods Shop    0.2
1   American Restaurant    0.2
2           Coffee Shop    0.2
3          Train Station    0.2
4         Soccer Stadium    0.2


----Widmore----
            venue   freq
0   Clothing Store   0.15
1      Coffee Shop   0.13
2              Bar   0.05
3     Burger Joint   0.05
4       Pizza Place   0.05


----Willesden----
          venue   freq
0            Pub    0.5
1    Golf Course    0.5
2        Airport    0.0
3       Multiplex    0.0
4       Platform    0.0


----Wimbledon----
          venue   freq
0            Pub    1.0
1        Airport    0.0
2       Multiplex    0.0
3       Platform    0.0
```

```
4  Pizza Place    0.0


----Winchmore Hill----
                              venue  freq
0                              Park  0.50
1                 Convenience Store  0.25
2         Construction & Landscaping  0.25
3                         Irish Pub  0.00
4                Italian Restaurant  0.00


----Wood Green----
                    venue  freq
0                    Park  0.33
1        Business Service  0.33
2              Skate Park  0.33
3                 Airport  0.00
4             Music Store  0.00


----Woodford----
                         venue  freq
0               Clothing Store  0.10
1                  Supermarket  0.07
2                       Bakery  0.07
3          Fast Food Restaurant  0.07
4            Turkish Restaurant  0.05


----Woodside----
                      venue  freq
0               Pizza Place  0.17
1         Italian Restaurant  0.17
2                Coffee Shop  0.17
3                        Pub  0.17
4                Supermarket  0.17
```

```
----Yeading----
            venue  freq
0         Stables   1.0
1         Airport   0.0
2   Movie Theater   0.0
3        Platform   0.0
4     Pizza Place   0.0


----Yiewsley----
            venue  freq
0         Stables   1.0
1         Airport   0.0
2   Movie Theater   0.0
3        Platform   0.0
4     Pizza Place   0.0
```

In [31]:
```python
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 [32]:
```python
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'] = london_grouped['Neighborh
ood']

for ind in np.arange(london_grouped.shape[0]):
    neighborhoods_venues_sorted.iloc[ind, 1:] = return_most_common_venu
es(london_grouped.iloc[ind, :], num_top_venues)

neighborhoods_venues_sorted.head()
```

Out[32]:

	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 M Comm Ver
0	Addington	Pizza Place	Coffee Shop	Chinese Restaurant	Supermarket	Italian Restaurant	Pub	Do Sh
1	Addiscombe	Pizza Place	Coffee Shop	Chinese Restaurant	Supermarket	Italian Restaurant	Pub	Do Sh
2	Albany Park	Pub	Coffee Shop	Clothing Store	Fast Food Restaurant	Italian Restaurant	Supermarket	Pharma
3	Aldborough Hatch	Clothing Store	Fast Food Restaurant	Supermarket	Bakery	Turkish Restaurant	Grocery Store	Col Sh
4	Aldwych	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store	Dessert Shop	Di

In [33]:
```
len(london_grouped[london_grouped["Indian Restaurant"] > 0])
```

Out[33]: 31

Create a new dataframe with only Indian Restuarant data

In [34]:
```
london_data = london_grouped[["Neighborhood","Indian Restaurant"]]
```

```
In [35]: london_data.head()
```

Out[35]:

	Neighborhood	Indian Restaurant
0	Addington	0.00000
1	Addiscombe	0.00000
2	Albany Park	0.00000
3	Aldborough Hatch	0.02439
4	Aldwych	0.00000

4. Cluster Neighbhorhoods

We will extract Indian restaurant data from above table and fit this into the code for finding best value of K.

```
In [36]: import matplotlib.pyplot as plt # plotting library
         # backend for rendering plots within the browser
         %matplotlib inline

         from sklearn.cluster import KMeans
         from sklearn.datasets.samples_generator import make_blobs
         from sklearn.preprocessing import StandardScaler

         X = london_data.values[:,1:]
         X = np.nan_to_num(X)
         cluster_london = StandardScaler().fit_transform(X)
         cluster_london

         cost=[]
         for i in range(1,11):
             KM=KMeans(n_clusters=i, max_iter=500)
             KM.fit(cluster_london)
             cost.append(KM.inertia_)
```

```python
plt.plot(range(1,11), cost, color='g',linewidth='3')

plt.xlabel('Value of k')
plt.ylabel('Squared Error(cost)')
plt.grid()
plt.show()
```

```
C:\Users\nived\Anaconda3\lib\site-packages\sklearn\utils\validation.py:
595: DataConversionWarning: Data with input dtype object was converted
to float64 by StandardScaler.
  warnings.warn(msg, DataConversionWarning)
C:\Users\nived\Anaconda3\lib\site-packages\sklearn\utils\validation.py:
595: DataConversionWarning: Data with input dtype object was converted
to float64 by StandardScaler.
  warnings.warn(msg, DataConversionWarning)
C:\Users\nived\Anaconda3\lib\site-packages\sklearn\cluster\k_means_.py:
971: ConvergenceWarning: Number of distinct clusters (3) found smaller
than n_clusters (4). Possibly due to duplicate points in X.
  return_n_iter=True)
C:\Users\nived\Anaconda3\lib\site-packages\sklearn\cluster\k_means_.py:
971: ConvergenceWarning: Number of distinct clusters (3) found smaller
than n_clusters (5). Possibly due to duplicate points in X.
  return_n_iter=True)
C:\Users\nived\Anaconda3\lib\site-packages\sklearn\cluster\k_means_.py:
971: ConvergenceWarning: Number of distinct clusters (3) found smaller
than n_clusters (6). Possibly due to duplicate points in X.
  return_n_iter=True)
C:\Users\nived\Anaconda3\lib\site-packages\sklearn\cluster\k_means_.py:
971: ConvergenceWarning: Number of distinct clusters (3) found smaller
than n_clusters (7). Possibly due to duplicate points in X.
  return_n_iter=True)
C:\Users\nived\Anaconda3\lib\site-packages\sklearn\cluster\k_means_.py:
971: ConvergenceWarning: Number of distinct clusters (3) found smaller
than n_clusters (8). Possibly due to duplicate points in X.
  return_n_iter=True)
C:\Users\nived\Anaconda3\lib\site-packages\sklearn\cluster\k_means_.py:
971: ConvergenceWarning: Number of distinct clusters (3) found smaller
than n_clusters (9). Possibly due to duplicate points in X.
  return_n_iter=True)
```
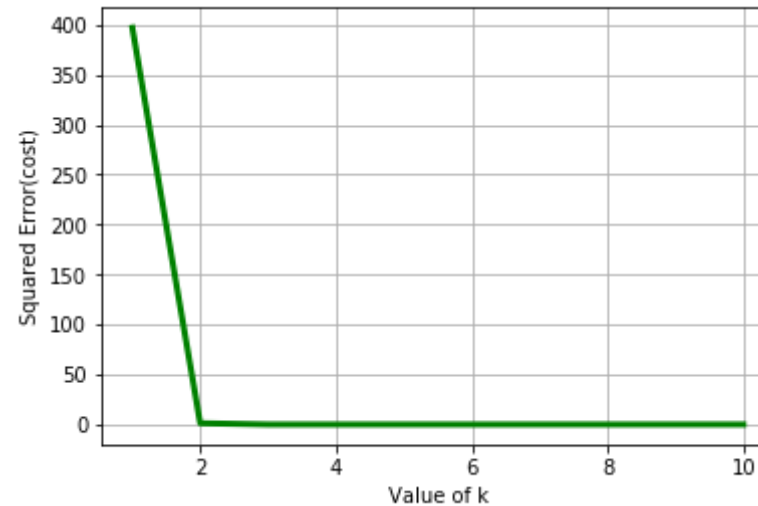
From the above image we see that best value of K will be 2 according to Elbow method. We will merge above table with our London dataframe so that we will get coordinates of all neighborhoods Run k-means to cluster the neighborhood into 2 clusters.

In [37]:
```python
# set number of clusters
kclusters = 2

london_grouped_clustering = london_grouped.drop('Neighborhood', 1)

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

# check cluster labels generated for each row in the dataframe
kmeans.labels_[0:10]
```

Out[37]: array([0, 0, 0, 0, 1, 0, 0, 0, 0, 0])

Let's create a new dataframe that includes the cluster as well as the top 10 venues for each neighborhood.

In [38]:
```python
# add clustering labels
neighborhoods_venues_sorted.insert(0, 'Cluster Labels', kmeans.labels_)

london_merged = london_data

# merge london_grouped with london_data to add latitude/longitude for each
london_merged = london_merged.join(neighborhoods_venues_sorted.set_index('Neighborhood'), on='Neighborhood')

london_merged= london_merged.join(london_df.set_index('Neighborhood'), on='Neighborhood')# check the last columns!
```

In [39]:
```python
london_merged.head()
```

Out[39]:

	Neighborhood	Indian Restaurant	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Addington	0.00000	0	Pizza Place	Coffee Shop	Chinese Restaurant	Supermarket	Italian Restaurant
1	Addiscombe	0.00000	0	Pizza Place	Coffee Shop	Chinese Restaurant	Supermarket	Italian Restaurant
2	Albany Park	0.00000	0	Pub	Coffee Shop	Clothing Store	Fast Food Restaurant	Italian Restaurant
3	Aldborough Hatch	0.02439	0	Clothing Store	Fast Food Restaurant	Supermarket	Bakery	Turkish Restaurant
4	Aldwych	0.00000	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store

In [40]:
```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(london_merged['Latitude'], london_mer
ged['Longitude'], london_merged['Neighborhood'], london_merged['Cluster
 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
```
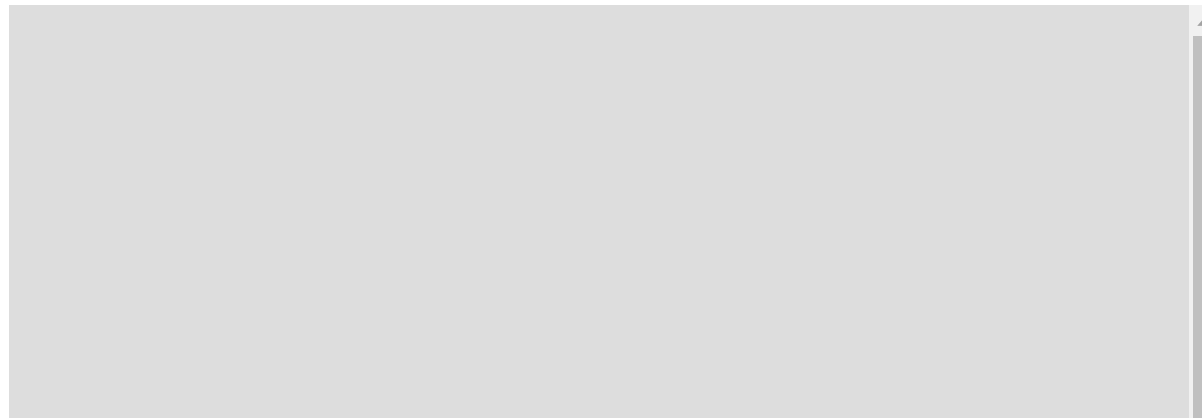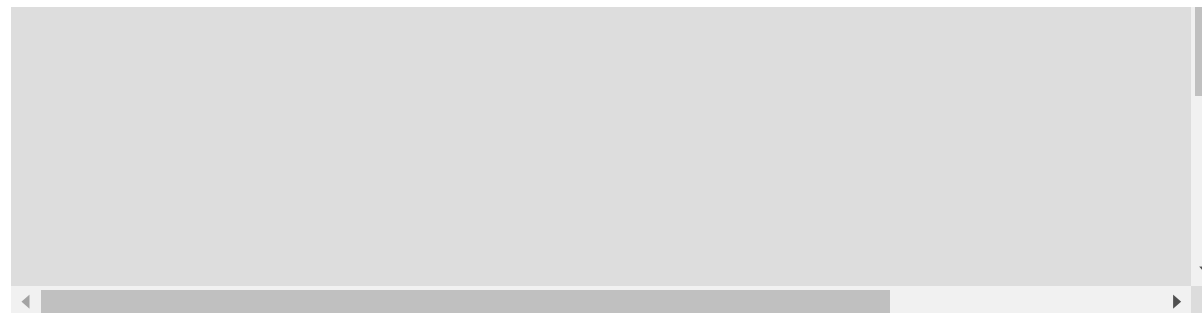
Out[40]:

5. Examine Clusters

Here, we have 2 clusters 0 and 1 respectively. In cluster 0 we have neighborhoods which have more number of Indian Restaurants. Cluster 0 has Red color in the map.

Cluster 0

In [41]: `london_merged.loc[london_merged['Cluster Labels'] == 0]`

Out[41]:

	Neighborhood	Indian Restaurant	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	
0	Addington	0.00000	0	Pizza Place	Coffee Shop	Chinese Restaurant	Supermarket	R
1	Addiscombe	0.00000	0	Pizza Place	Coffee Shop	Chinese Restaurant	Supermarket	R
2	Albany Park	0.00000	0	Pub	Coffee Shop	Clothing Store	Fast Food Restaurant	R
3	Aldborough Hatch	0.02439	0	Clothing Store	Fast Food Restaurant	Supermarket	Bakery	R
5	Alperton	0.00000	0	Golf Course	Pub	Warehouse Store	Duty-free Shop	Cor

	Neighborhood	Indian Restaurant	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	
6	Anerley	0.00000	0	Clothing Store	Coffee Shop	Pizza Place	Bar	Bu
7	Angel	0.00000	0	Martial Arts Dojo	Metro Station	Café	Fish & Chips Shop	
8	Aperfield	0.00000	0	Clothing Store	Coffee Shop	Pizza Place	Bar	Bu
9	Archway	0.00000	0	Martial Arts Dojo	Metro Station	Café	Fish & Chips Shop	
10	Ardleigh Green	0.00000	0	Coffee Shop	Clothing Store	Hotel	Shopping Mall	
11	Arnos Grove	0.00000	0	Park	Convenience Store	Construction & Landscaping	Cosmetics Shop	
12	Balham	0.00000	0	Gym	Construction & Landscaping	Warehouse Store	Electronics Store	
13	Bankside	0.00000	0	Harbor / Marina	IT Services	Business Service	Electronics Store	
14	Barking	0.00000	0	Gym / Fitness Center	Park	Golf Course	Pool	Sup
15	Barkingside	0.02439	0	Clothing Store	Fast Food Restaurant	Supermarket	Bakery	R
16	Barnehurst	0.00000	0	Pub	Coffee Shop	Clothing Store	Fast Food Restaurant	R
17	Barnes	0.00000	0	Train Station	American Restaurant	Sporting Goods Shop	Soccer Stadium	Co
18	Barnes Cray	0.00000	0	Pub	Coffee Shop	Clothing Store	Fast Food Restaurant	R

	Neighborhood	Indian Restaurant	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	
19	Barnsbury	0.00000	0	Martial Arts Dojo	Metro Station	Café	Fish & Chips Shop	
20	Battersea	0.00000	0	Gym	Construction & Landscaping	Warehouse Store	Electronics Store	C
22	Beckenham	0.00000	0	Clothing Store	Coffee Shop	Pizza Place	Bar	Bu
23	Beckton	0.00000	0	Hotel	Airport	Italian Restaurant	Currency Exchange	R
24	Becontree	0.00000	0	Gym / Fitness Center	Park	Golf Course	Pool	Su
25	Becontree Heath	0.00000	0	Gym / Fitness Center	Park	Golf Course	Pool	Su
26	Beddington	0.00000	0	Historic Site	Construction & Landscaping	Cosmetics Shop	Currency Exchange	De
27	Bedford Park	0.00000	0	Home Service	Business Service	Electronics Store	Cosmetics Shop	
29	Bellingham	0.00000	0	Veterinarian	Park	Polish Restaurant	Pub	R
30	Belmont	0.00000	0	Historic Site	Construction & Landscaping	Cosmetics Shop	Currency Exchange	De
30	Belmont	0.00000	0	Historic Site	Construction & Landscaping	Cosmetics Shop	Currency Exchange	De
31	Belsize Park	0.00000	0	Skate Park	Gym	Business Service	Rugby Pitch	
...	...	...	...	...	...	...	...	

	Neighborhood	Indian Restaurant	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	
366	Waddon	0.00000	0	Pizza Place	Coffee Shop	Chinese Restaurant	Supermarket	R
367	Wallington	0.00000	0	Historic Site	Construction & Landscaping	Cosmetics Shop	Currency Exchange	De
368	Walworth	0.00000	0	Harbor / Marina	IT Services	Business Service	Electronics Store	C
369	Wandsworth	0.00000	0	Gym	Construction & Landscaping	Warehouse Store	Electronics Store	C
370	Wanstead	0.02439	0	Clothing Store	Fast Food Restaurant	Supermarket	Bakery	R
371	Wapping	0.00000	0	Platform	Italian Restaurant	Coffee Shop	Park	
372	Welling	0.00000	0	Pub	Coffee Shop	Clothing Store	Fast Food Restaurant	R
373	Wembley	0.00000	0	Golf Course	Pub	Warehouse Store	Duty-free Shop	Cor
374	Wembley Park	0.00000	0	Golf Course	Pub	Warehouse Store	Duty-free Shop	Cor
375	Wennington	0.00000	0	Coffee Shop	Clothing Store	Hotel	Shopping Mall	
376	West Drayton	0.00000	0	Stables	Warehouse Store	Electronics Store	Convenience Store	C
377	West Ealing	0.00000	0	Home Service	Business Service	Electronics Store	Cosmetics Shop	
378	West Green	0.00000	0	Skate Park	Park	Business Service	Construction & Landscaping	C
379	West Hackney	0.37500	0	Indian Restaurant	Hotel	Train Station	Park	R

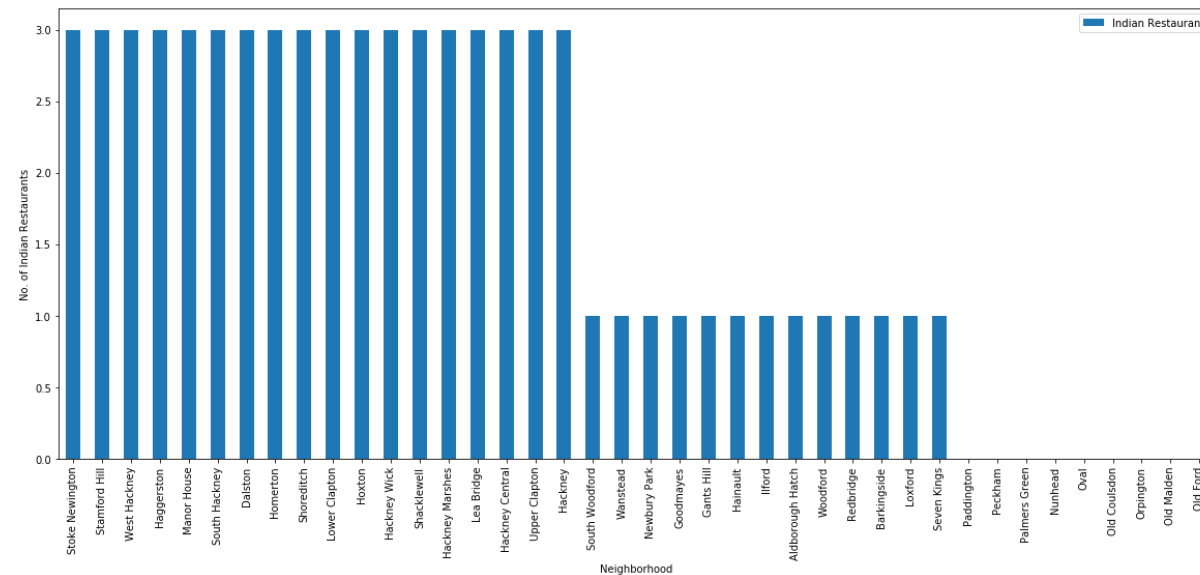|	Neighborhood	Indian Restaurant	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	
380	West Ham	0.00000	0	Hotel	Airport	Italian Restaurant	Currency Exchange	R
381	West Hampstead	0.00000	0	Skate Park	Gym	Business Service	Rugby Pitch	
382	West Heath	0.00000	0	Pub	Coffee Shop	Clothing Store	Fast Food Restaurant	R
383	West Norwood	0.00000	0	Supermarket	Pub	Coffee Shop	Playground	
384	West Wickham	0.00000	0	Clothing Store	Coffee Shop	Pizza Place	Bar	Bu
386	Whitechapel	0.00000	0	Platform	Italian Restaurant	Coffee Shop	Park	
387	Whitton	0.00000	0	Train Station	American Restaurant	Sporting Goods Shop	Soccer Stadium	Co
388	Widmore	0.00000	0	Clothing Store	Coffee Shop	Pizza Place	Bar	Bu
389	Willesden	0.00000	0	Golf Course	Pub	Warehouse Store	Duty-free Shop	Cor
390	Wimbledon	0.00000	0	Pub	Warehouse Store	Duty-free Shop	Convenience Store	C
391	Winchmore Hill	0.00000	0	Park	Convenience Store	Construction & Landscaping	Cosmetics Shop	
392	Wood Green	0.00000	0	Skate Park	Park	Business Service	Construction & Landscaping	C
393	Woodford	0.02439	0	Clothing Store	Fast Food Restaurant	Supermarket	Bakery	R
394	Woodside	0.00000	0	Pizza Place	Coffee Shop	Chinese Restaurant	Supermarket	R

	Neighborhood	Indian Restaurant	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	
395	Yeading	0.00000	0	Stables	Warehouse Store	Electronics Store	Convenience Store	
396	Yiewsley	0.00000	0	Stables	Warehouse Store	Electronics Store	Convenience Store	

385 rows × 18 columns

In the cluster 1: We have all neighborhoods which have highly dense Indian Restaurants. Cluster 1 has purple color on map.

Cluster 1

In [42]: `london_merged.loc[london_merged['Cluster Labels'] == 1]`

Out[42]:

	Neighborhood	Indian Restaurant	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	
4	Aldwych	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store	
21	Bayswater	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store	
28	Belgravia	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store	
68	Charing Cross	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store	
73	Chinatown	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store	
84	Covent Garden	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store	

	Neighborhood	Indian Restaurant	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
198	Knightsbridge	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store
209	Lisson Grove	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store
211	Little Venice	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store
218	Maida Vale	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store
224	Marylebone	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store
225	Mayfair	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store
228	Millbank	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store
262	Paddington	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store
270	Pimlico	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store
304	Soho	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store
322	St James's	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store
323	St John's Wood	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store
385	Westminster	0.0	1	Breakfast Spot	English Restaurant	Cosmetics Shop	Currency Exchange	Department Store

Lets visualize the maximum number of Indian Restaurants

```python
london_graph=pd.DataFrame(london_onehot.groupby('Neighborhood')['Indian
 Restaurant'].sum())
london_graph=london_graph.sort_values(by='Indian Restaurant', ascending
=False)
london_graph.iloc[:40].plot(kind='bar', figsize=(20,8))
plt.xlabel('Neighborhood')
plt.ylabel('No. of Indian Restaurants')
plt.show
```

Out[43]: `<function matplotlib.pyplot.show(*args, **kw)>`

Results

1. Most of the Indian restuarants are concentrated in the central London city, with the highest number in cluster. On the otherhand, cluster 1 has very low number to totally no of Indian restuarants in the neighborhoods. This represents a great opportunity and high potential areas to open new reaturant as there is less competitions.Therefore, this project recommends property developers to capitalize on these findings to open new restaurants in neighborhoods in cluster 1 with little to no competition.

2. If we observe the above data Visulaization graph, this gives a fair idea on which neighborhoods to consider and which on not to consider.
3. Property developers with unique selling propositions to stand out from the competition can also open new Indian restuarants in neighborhoods in cluster 0 with more competition. Lastly, property developers are advised to avoid neighborhoods in cluster 0 which already have high concentration of Indian restuarants and suffering from intense competition.

In [ ]: