

In [20]:

```
import numpy as np # library to handle data in a vectorized manner
import pandas as pd # library for data analysis
!conda install -c conda-forge geopy --yes # uncomment this line if you haven't completed the Foursquare API lab
from geopy.geocoders import Nominatim # convert an address into latitude and longitude values

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

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

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

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

print('Libraries imported.')
```

Collecting package metadata (current_repodata.json): done

Solving environment: done

All requested packages already installed.

Collecting package metadata (current_repodata.json): done

Solving environment: done

All requested packages already installed.

Libraries imported.

In [21]:

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

In [22]:

```
mynewdf2 = pd.read_csv(csv_path, header=0)
```

In [23]:

```
mynewdf2[0:5]
```

Out[23]:

| | Postal Code | Borough | Neighborhood | Latitude | Longitude |
|---|-------------|---------|--------------|-----------|-----------|
| 0 | 11 | Centro | Palacio | 40.416514 | -3.713708 |
| 1 | 12 | Centro | Embajadores | 40.409869 | -3.702972 |
| 2 | 13 | Centro | Cortes | 40.415226 | -3.697128 |
| 3 | 14 | Centro | Justicia | 40.423660 | -3.696469 |
| 4 | 15 | Centro | Universidad | 40.407078 | -3.709642 |

In [24]:

```
mynewdf2.columns
```

Out[24]:

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

In [25]:

```
mynewdf2.dtypes
```

Out[25]:

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

In [26]:

```
print('The dataframe has {} Boroughs and {} Neighborhoods.'.format(
    len(mynewdf2['Borough'].unique()),
    mynewdf2.shape[0]
))
mynewdf2['Borough'].unique()
```

The dataframe has 21 Boroughs and 131 Neighborhoods.

Out[26]:

```
array(['Centro', 'Arganzuela', 'Retiro', 'Salamanca', 'Chamartin',
      'Tetuan', 'Chamberi', 'Fuencarral-El Pardo', 'Moncloa-Aravaca',
      'Latina', 'Carabanchel', 'Usera', 'Puente de Vallecas',
      'Moratalaz', 'Ciudad Lineal', 'Hortaleza', 'Villaverde',
      'Villa de Vallecas', 'Vicalvaro', 'San Blas-Canillejas', 'Barajas'],
      dtype=object)
```

In [27]:

```
#Create a Map of Madrid with Neighborhoods superimposed using Latitude and Longitude values
#Passing Madrid coordinates manually
latitude=40.41831
longitude=-3.70275

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

# add markers to map
for lat, lng, borough, neighborhood in zip(mynewdf2['Latitude'], mynewdf2['Longitude'], mynewdf2['Borough'], mynewdf2['Neighborhood']):
    label = '{} , {}'.format(neighborhood, borough)
    label = folium.Popup(label, parse_html=True)
    folium.CircleMarker(
        [lat, lng],
        radius=5,
        popup=label,
        color='blue',
        fill=True,
        fill_color='#3186cc',
        fill_opacity=0.7,
        parse_html=False).add_to(map_madrid)

map_madrid
```

Out[27]:

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

In [28]:

```
#Next, start utilizing the Foursquare API
CLIENT_ID = 'ET5MEYPN14RDTKJNH4VVC0Q12R114CIOWGYVZ14FBSK1V32' # your Foursquare ID
CLIENT_SECRET = 'SUJMUIQ04X24ZKIPS31ZJFA12FJTFC11SJQXSGZG4ZMRLSV' # your Foursquare Secret
VERSION = '20180605' # Foursquare API version
LIMIT = 100 # A default Foursquare API limit value

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

Your credentials:

```
CLIENT_ID: ET5MEYPN14RDTKJNH4VVC0Q12R114CIOWGYVZ14FBSK1V32
CLIENT_SECRET: SUJMUIQ04X24ZKIPS31ZJFA12FJTFC11SJQXSGZG4ZMRLSV
```

In [29]:

```
#Let's explore the first neighborhood
mynewdf2.loc[0, 'Neighborhood']
#Get the Neighborhood's Latitude and Longitude
neighborhood_latitude = mynewdf2.loc[0, 'Latitude'] # neighborhood latitude value
neighborhood_longitude = mynewdf2.loc[0, 'Longitude'] # neighborhood longitude value

neighborhood_name = mynewdf2.loc[0, 'Neighborhood'] # neighborhood name

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

Latitude and longitude values of Palacio are 40.416514023873745, -3.7137077865943455.

In [34]:

```
#Now let's get the top 100 venues in 500m distance
#Let's create the GET request
#Import Latitude and Longitude Values
LIMIT = 100
radius = 500
url = 'https://api.foursquare.com/v2/venues/explore?client_id=ET5MEYPN14RDTKJNH4VVC0Q12R114CIOWGYVZ14FBSK1V32&client_secret=SUJMUIQ04X24ZKIPS31ZJFA12FJTFC11SJQXSGZG4ZMRLSV&ll=40.41831,-3.70275&oauth_token=&v=20180605&radius=500&limit=100'
url
```

Out[34]:

```
'https://api.foursquare.com/v2/venues/explore?client_id=ET5MEYPN14RDTKJNH4VVC0Q12R114CIOWGYVZ14FBSK1V32&client_secret=SUJMUIQ04X24ZKIPS31ZJFA12FJTFC11SJQXSGZG4ZMRLSV&ll=40.41831,-3.70275&oauth_token=&v=20180605&radius=500&limit=100'
```

In [35]:

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

Out[35]:

```
{'meta': {'code': 200, 'requestId': '6018563837a6ef7de4da76c5'},
 'response': {'suggestedFilters': {'header': 'Tap to show:',
 'filters': [{'name': 'Open now', 'key': 'openNow'}]},
 'headerLocation': 'Sol',
 'headerFullLocation': 'Sol, Madrid',
 'headerLocationGranularity': 'neighborhood',
 'totalResults': 80,
 'suggestedBounds': {'ne': {'lat': 40.4228100045, 'lng': -3.69685033008382
9},
 'sw': {'lat': 40.413809995499996, 'lng': -3.708649669916171}},
 'groups': [{'type': 'Recommended Places',
 'name': 'recommended',
 'items': [{'reasons': {'count': 0,
 'items': [{'summary': 'This spot is popular',
 'type': 'general',
 'reasonName': 'globalInteractionReason'}]},
 'venue': {'id': '4bddaac30ee3a59370242eb0',
 'name': 'Club del Gourmet Corte Ingles',
 'location': {'address': 'C. Preciados, 3',
 'lat': 40.41749665225322,
 'lng': -3.704686028127798,
 'labeledLatLngs': [{'label': 'display',
 'lat': 40.41749665225322,
 'lng': -3.704686028127798}]},
 'distance': 187,
 'postalCode': '28013',
 'cc': 'ES',
 'city': 'Madrid',
 'state': 'Madrid',
 'country': 'España',
 'formattedAddress': ['C. Preciados, 3',
 '28013 Madrid Madrid',
 'España']},
 'categories': [{'id': '4bf58dd8d48988d1f5941735',
 'name': 'Gourmet Shop',
 'pluralName': 'Gourmet Shops',
 'shortName': 'Gourmet',
 'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/shops/food_gourmet_',
 'suffix': '.png'},
 'primary': True}],
 'photos': {'count': 0, 'groups': []}},
 'referralId': 'e-0-4bddaac30ee3a59370242eb0-0'},
 {'reasons': {'count': 0,
 'items': [{'summary': 'This spot is popular',
 'type': 'general',
 'reasonName': 'globalInteractionReason'}]},
 'venue': {'id': '5431272e498e8e357f694549',
 'name': 'LUSH',
 'location': {'address': 'Calle del Carmen 24',
 'lat': 40.41901214762635,
 'lng': -3.704898374374776,
 'labeledLatLngs': [{'label': 'display',
 'lat': 40.41901214762635,
 'lng': -3.704898374374776}]},
```

```

'distance': 198,
'postalCode': '28013',
'cc': 'ES',
'city': 'Madrid',
'state': 'Madrid',
'country': 'España',
'formattedAddress': ['Calle del Carmen 24',
'28013 Madrid Madrid',
'España']],
'categories': [{'id': '4bf58dd8d48988d10c951735',
'name': 'Cosmetics Shop',
'pluralName': 'Cosmetics Shops',
'shortName': 'Cosmetics',
'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/shops/bea
uty_cosmetic_',
'suffix': '.png'},
'primary': True}],
'photos': {'count': 0, 'groups': []}},
'referralId': 'e-0-5431272e498e8e357f694549-1'},
{'reasons': {'count': 0,
'items': [{'summary': 'This spot is popular',
'type': 'general',
'reasonName': 'globalInteractionReason'}]},
'venue': {'id': '4adcda33f964a520aa3a21e3',
'name': 'Hotel Liabeny',
'location': {'address': 'C. Salud, 3',
'lat': 40.418742456171096,
'lng': -3.7039962765426564,
'labeledLatLngs': [{'label': 'display',
'lat': 40.418742456171096,
'lng': -3.7039962765426564}]},
'distance': 116,
'postalCode': '28013',
'cc': 'ES',
'city': 'Madrid',
'state': 'Madrid',
'country': 'España',
'formattedAddress': ['C. Salud, 3', '28013 Madrid Madrid', 'Españ
a']}},
'categories': [{'id': '4bf58dd8d48988d1fa931735',
'name': 'Hotel',
'pluralName': 'Hotels',
'shortName': 'Hotel',
'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/travel/ho
tel_',
'suffix': '.png'},
'primary': True}],
'photos': {'count': 0, 'groups': []}},
'referralId': 'e-0-4adcda33f964a520aa3a21e3-2'},
{'reasons': {'count': 0,
'items': [{'summary': 'This spot is popular',
'type': 'general',
'reasonName': 'globalInteractionReason'}]},
'venue': {'id': '523224b1498e6d691c94f859',
'name': 'Kiko store',
'location': {'address': 'C/ Gran Via 35',
'lat': 40.420127897296084,
```



```

'lng': -3.702316594742855,
'labeledLatLngs': [{'label': 'display',
  'lat': 40.420127897296084,
  'lng': -3.702316594742855}],
'distance': 205,
'postalCode': '28013',
'cc': 'ES',
'city': 'Madrid',
'state': 'Madrid',
'country': 'España',
'formattedAddress': ['C/ Gran Via 35',
  '28013 Madrid Madrid',
  'España']],
'categories': [{'id': '4bf58dd8d48988d10c951735',
  'name': 'Cosmetics Shop',
  'pluralName': 'Cosmetics Shops',
  'shortName': 'Cosmetics',
  'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/shops/bea
uty_cosmetic_',
    'suffix': '.png'},
  'primary': True}],
'photos': {'count': 0, 'groups': []},
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{'reasons': {'count': 0,
  'items': [{'summary': 'This spot is popular',
    'type': 'general',
    'reasonName': 'globalInteractionReason'}]},
'venue': {'id': '5374c6ff498eb7fa65ba2f4a',
  'name': 'TAKOS',
  'location': {'address': 'C. Abada, 2',
    'lat': 40.418938,
    'lng': -3.703748,
    'labeledLatLngs': [{'label': 'display',
      'lat': 40.418938,
      'lng': -3.703748}],
    'distance': 109,
    'postalCode': '28013',
    'cc': 'ES',
    'city': 'Madrid',
    'state': 'Madrid',
    'country': 'España',
    'formattedAddress': ['C. Abada, 2', '28013 Madrid Madrid', 'Españ
a']}},
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  'pluralName': 'Mexican Restaurants',
  'shortName': 'Mexican',
  'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/mexi
can_',
    'suffix': '.png'},
  'primary': True}],
'photos': {'count': 0, 'groups': []},
'referralId': 'e-0-5374c6ff498eb7fa65ba2f4a-4'},
{'reasons': {'count': 0,
  'items': [{'summary': 'This spot is popular',
    'type': 'general',
    'reasonName': 'globalInteractionReason'}]},

```

```

'venue': {'id': '5476a1ec498eb0f50cb79122',
'name': 'SunGate Hostel',
'location': {'address': 'Calle del Carmen, 16 - 2º Izq',
'lat': 40.41869565648317,
'lng': -3.7046225150264593,
'labeledLatLngs': [{'label': 'display',
'lat': 40.41869565648317,
'lng': -3.7046225150264593}]},
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'cc': 'ES',
'city': 'Madrid',
'state': 'Madrid',
'country': 'España',
'formattedAddress': ['Calle del Carmen, 16 - 2º Izq',
'28013 Madrid Madrid',
'España']},
'categories': [{'id': '4bf58dd8d48988d1ee931735',
'name': 'Hostel',
'pluralName': 'Hostels',
'shortName': 'Hostel',
'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/travel/ho
stel_',
'suffix': '.png'},
'primary': True}],
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'items': [{'summary': 'This spot is popular',
'type': 'general',
'reasonName': 'globalInteractionReason'}]},
'venue': {'id': '538a4c78498e264f18c776b2',
'name': 'Apple Puerta del Sol',
'location': {'address': 'Plaza De La Puerta Del Sol, 1',
'crossStreet': 'C. Alcalá',
'lat': 40.4169,
'lng': -3.7022512,
'labeledLatLngs': [{'label': 'display',
'lat': 40.4169,
'lng': -3.7022512}]},
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'cc': 'ES',
'city': 'Madrid',
'state': 'Madrid',
'country': 'España',
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'28013 Madrid Madrid',
'España']},
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'name': 'Electronics Store',
'pluralName': 'Electronics Stores',
'shortName': 'Electronics',
'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/shops/tec
hnology_',
'suffix': '.png'},
'primary': True}],

```

```

    'photos': {'count': 0, 'groups': []}},
    'referralId': 'e-0-538a4c78498e264f18c776b2-6'},
    {'reasons': {'count': 0,
        'items': [{'summary': 'This spot is popular',
            'type': 'general',
            'reasonName': 'globalInteractionReason'}]}},
    'venue': {'id': '4f33cbace4b0b5f6dee6d145',
        'name': 'La Pulpería de Victoria',
        'location': {'address': 'Calle de La Victoria, 2, (Junto a Puerta del
Sol)',
            'crossStreet': 'Carrera de San Jerónimo',
            'lat': 40.416506381,
            'lng': -3.70170887,
            'labeledLatLngs': [{'label': 'display',
                'lat': 40.416506381,
                'lng': -3.70170887}],
            'distance': 219,
            'postalCode': '28012',
            'cc': 'ES',
            'city': 'Madrid',
            'state': 'Madrid',
            'country': 'España',
            'formattedAddress': ['Calle de La Victoria, 2, (Junto a Puerta del So
1) (Carrera de San Jerónimo)',
                '28012 Madrid Madrid',
                'España']}},
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            'pluralName': 'Seafood Restaurants',
            'shortName': 'Seafood',
            'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/seaf
ood_',
                'suffix': '.png'},
            'primary': True}],
        'photos': {'count': 0, 'groups': []}},
        'referralId': 'e-0-4f33cbace4b0b5f6dee6d145-7'},
        {'reasons': {'count': 0,
            'items': [{'summary': 'This spot is popular',
                'type': 'general',
                'reasonName': 'globalInteractionReason'}]}},
        'venue': {'id': '4adcda34f964a520f73a21e3',
            'name': 'Casa Labra',
            'location': {'address': 'C. Tetuán, 12',
                'lat': 40.41715,
                'lng': -3.7045143,
                'labeledLatLngs': [{'label': 'display',
                    'lat': 40.41715,
                    'lng': -3.7045143}],
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                'cc': 'ES',
                'city': 'Madrid',
                'state': 'Madrid',
                'country': 'España',
                'formattedAddress': ['C. Tetuán, 12',
                    '28013 Madrid Madrid',
                    'España']}},

```

```

'categories': [{ 'id': '4bf58dd8d48988d1db931735',
  'name': 'Tapas Restaurant',
  'pluralName': 'Tapas Restaurants',
  'shortName': 'Tapas',
  'icon': { 'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/tapa
s_',
    'suffix': '.png'},
    'primary': True}],
'photos': { 'count': 0, 'groups': []},
'referralId': 'e-0-4adcda34f964a520f73a21e3-8'},
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  'items': [{ 'summary': 'This spot is popular',
    'type': 'general',
    'reasonName': 'globalInteractionReason'}]},
'venue': { 'id': '4adcda37f964a5201f3c21e3',
  'name': 'Puerta del Sol',
  'location': { 'address': 'Pl. Puerta del Sol',
    'lat': 40.41703364972091,
    'lng': -3.7052514433481516,
    'distance': 255,
    'postalCode': '28013',
    'cc': 'ES',
    'city': 'Madrid',
    'state': 'Madrid',
    'country': 'España',
    'formattedAddress': ['Pl. Puerta del Sol',
      '28013 Madrid Madrid',
      'España']},
  'categories': [{ 'id': '4bf58dd8d48988d164941735',
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    'pluralName': 'Plazas',
    'shortName': 'Plaza',
    'icon': { 'prefix': 'https://ss3.4sqi.net/img/categories_v2/parks_out
doors/plaza_',
      'suffix': '.png'},
      'primary': True}],
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        'items': [{ 'summary': 'This spot is popular',
          'type': 'general',
          'reasonName': 'globalInteractionReason'}]},
        'venue': { 'id': '4adcda3ef964a5204d3e21e3',
          'name': 'Casa del Libro',
          'location': { 'address': 'C. Gran Vía, 29',
            'lat': 40.42010059527963,
            'lng': -3.703192985614225,
            'labeledLatLngs': [{ 'label': 'display',
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              'lng': -3.703192985614225}],
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            'postalCode': '28013',
            'cc': 'ES',
            'city': 'Madrid',
            'state': 'Madrid',
            'country': 'España',
            'formattedAddress': ['C. Gran Vía, 29',

```

```

    '28013 Madrid Madrid',
    'España']},
    'categories': [{ 'id': '4bf58dd8d48988d114951735',
        'name': 'Bookstore',
        'pluralName': 'Bookstores',
        'shortName': 'Bookstore',
        'icon': { 'prefix': 'https://ss3.4sqi.net/img/categories_v2/shops/boo
kstore_',
            'suffix': '.png'},
        'primary': True}],
    'photos': { 'count': 0, 'groups': []},
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    { 'reasons': { 'count': 0,
        'items': [{ 'summary': 'This spot is popular',
            'type': 'general',
            'reasonName': 'globalInteractionReason'}]},
    'venue': { 'id': '4adcda37f964a520343c21e3',
        'name': 'Casino de Madrid',
        'location': { 'address': 'C. Alcala, 15',
            'lat': 40.4177045801265,
            'lng': -3.700036810016488,
            'labeledLatLngs': [{ 'label': 'display',
                'lat': 40.4177045801265,
                'lng': -3.700036810016488}],
            'distance': 239,
            'cc': 'ES',
            'city': 'Madrid',
            'state': 'Madrid',
            'country': 'España',
            'formattedAddress': ['C. Alcala, 15', 'Madrid Madrid', 'España']},
        'categories': [{ 'id': '4bf58dd8d48988d17c941735',
            'name': 'Casino',
            'pluralName': 'Casinos',
            'shortName': 'Casino',
            'icon': { 'prefix': 'https://ss3.4sqi.net/img/categories_v2/arts_ente
rtainment/casino_',
                'suffix': '.png'},
            'primary': True}],
        'photos': { 'count': 0, 'groups': []},
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        { 'reasons': { 'count': 0,
            'items': [{ 'summary': 'This spot is popular',
                'type': 'general',
                'reasonName': 'globalInteractionReason'}]},
        'venue': { 'id': '4adcda3ef964a5204c3e21e3',
            'name': 'Fnac',
            'location': { 'address': 'C. Preciados, 28',
                'lat': 40.41917587046351,
                'lng': -3.705268692635151,
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                    'lng': -3.705268692635151}],
                'distance': 234,
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                'cc': 'ES',
                'city': 'Madrid',
                'state': 'Madrid',

```

```

    'country': 'España',
    'formattedAddress': ['C. Preciados, 28',
    '28013 Madrid Madrid',
    'España']],
    'categories': [{ 'id': '4bf58dd8d48988d122951735',
    'name': 'Electronics Store',
    'pluralName': 'Electronics Stores',
    'shortName': 'Electronics',
    'icon': { 'prefix': 'https://ss3.4sqi.net/img/categories_v2/shops/tec
hnology_',
    'suffix': '.png'},
    'primary': True}],
    'photos': { 'count': 0, 'groups': []},
    'referralId': 'e-0-4adcda3ef964a5204c3e21e3-12'},
    { 'reasons': { 'count': 0,
    'items': [{ 'summary': 'This spot is popular',
    'type': 'general',
    'reasonName': 'globalInteractionReason'}]},
    'venue': { 'id': '53ce9a52498e0eaa7ccfb45f',
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    'location': { 'address': 'C. Montera, 37 - 4ª Planta',
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    'España']},
    'categories': [{'id': '4bf58dd8d48988d137941735',
    'name': 'Theater',

```

```

    'pluralName': 'Theaters',
    'shortName': 'Theater',
    'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/arts_entertainment/performingarts_theater_',
    'suffix': '.png'},
    'primary': True}],
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    'items': [{'summary': 'This spot is popular',
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    'name': 'Plaza de Pedro Zerolo',
    'location': {'address': 'Antigua Pl. Vázquez de Mella',
    'lat': 40.420828697901726,
    'lng': -3.6993528813228123,
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    'lng': -3.6993528813228123}]},
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    'España']},
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    'pluralName': 'Plazas',
    'shortName': 'Plaza',
    'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/parks_outdoors/plaza_',
    'suffix': '.png'},
    'primary': True}],
    'photos': {'count': 0, 'groups': []}},
    'referralId': 'e-0-4bda75d363c5c9b63c2d2468-68'},
    {'reasons': {'count': 0,
    'items': [{'summary': 'This spot is popular',
    'type': 'general',
    'reasonName': 'globalInteractionReason'}]}],
    'venue': {'id': '4cf3c4406195721e979f4ec1',
    'name': 'Wok to Walk',
    'location': {'address': 'C. Hortaleza, 7',
    'lat': 40.42060927264202,
    'lng': -3.700822040384814,
    'labeledLatLngs': [{'label': 'display',
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    'state': 'Madrid',
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```

```

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'España']],
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n_',
'suffix': '.png'},
'primary': True}],
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'items': [{'summary': 'This spot is popular',
'type': 'general',
'reasonName': 'globalInteractionReason'}]},
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'name': 'Fox In A Box Madrid - Juego de Escape Game',
'location': {'address': 'Calle Infantas, 25',
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'lng': -3.697489005665821,
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'lat': 40.42011505083917,
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'city': 'Madrid',
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'28004 Madrid Madrid',
'España']],
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'name': 'Escape Room',
'pluralName': 'Escape Rooms',
'shortName': 'Escape Room',
'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/arts_entertainment/default_',
'suffix': '.png'},
'primary': True}],
'photos': {'count': 0, 'groups': []},
'venuePage': {'id': '128768054'}},
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'reasonName': 'globalInteractionReason'}]},
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'lng': -3.701874586944422,
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'lng': -3.701874586944422}]},

```

```

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  'pluralName': 'Gyms or Fitness Centers',
  'shortName': 'Gym / Fitness',
  'icon': { 'prefix': 'https://ss3.4sqi.net/img/categories_v2/building/
gym_',
    'suffix': '.png'}},
  'primary': True}],
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  'name': 'Casa Jaguar',
  'location': { 'address': 'Calle de los Caños del Peral 9',
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      'lng': -3.7085157}]},
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      'España']},
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    'pluralName': 'Bistros',
    'shortName': 'Bistro',
    'icon': { 'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/defa
ult_',
      'suffix': '.png'}},
      'primary': True}],
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          'name': 'Plaza del Ángel',
          'location': { 'address': 'Pza del Ángel',
            'lat': 40.41435975349727,
            'lng': -3.7018864916485246,
```

```

    'labeledLatLngs': [{ 'label': 'display',
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      'shortName': 'Plaza',
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doors/plaza_',
        'suffix': '.png'},
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        'type': 'general',
        'reasonName': 'globalInteractionReason'}]},
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            'lng': -3.705613785627445}],
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          'state': 'Madrid',
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            'España']],
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            'pluralName': 'Indian Restaurants',
            'shortName': 'Indian',
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an_',
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            'primary': True}],
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```

```

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'España']},
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'primary': True}],
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'items': [{'summary': 'This spot is popular',
'type': 'general',
'reasonName': 'globalInteractionReason'}]},
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'location': {'address': 'Calle de Fuencarral, 37',
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'28004 Madrid Madrid',
'España']},
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'shortName': 'Cosmetics',
'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/shops/beauty_cosmetic_',
'suffix': '.png'},
'primary': True}],
'photos': {'count': 0, 'groups': []},

```



```

'referralId': 'e-0-4b9b8dbef964a5200b0f36e3-76'},
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  'name': 'Steakburger Arenal',
  'location': {'address': '26 Calle del Arenal',
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    'lng': -3.708287,
    'labeledLatLngs': [{'label': 'display',
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  'state': 'Madrid',
  'country': 'España',
  'formattedAddress': ['26 Calle del Arenal',
    '28013 Madrid Madrid',
    'España']},
'categories': [{'id': '4bf58dd8d48988d16c941735',
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  'pluralName': 'Burger Joints',
  'shortName': 'Burgers',
  'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/burg
er_',
    'suffix': '.png'}},
  'primary': True}],
'photos': {'count': 0, 'groups': []}},
'referralId': 'e-0-5d065fab3f069d0023aa21ee-77'},
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  'name': 'Zenith Brunch & Cocktails',
  'location': {'address': 'Calle Valverde 28',
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    'España']},
'categories': [{'id': '4bf58dd8d48988d16d941735',
  'name': 'Café',
  'pluralName': 'Cafés',
  'shortName': 'Café',

```

```

    'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/cafe
_ ',
    'suffix': '.png'},
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    'items': [{'summary': 'This spot is popular',
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    'name': 'La Rollerie',
    'location': {'address': 'C. Atocha, 20',
    'lat': 40.41385383986997,
    'lng': -3.7028908043886357,
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    'lng': -3.7028908043886357}]},
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    'country': 'España',
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    '28012 Madrid Madrid',
    'España']},
    'categories': [{'id': '4bf58dd8d48988d16d941735',
    'name': 'Café',
    'pluralName': 'Cafés',
    'shortName': 'Café',
    'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/cafe
_ ',
    'suffix': '.png'},
    'primary': True]],
    'photos': {'count': 0, 'groups': []}},
    'referralId': 'e-0-51d5c142498eb4644f053d0b-79'}]]]]}

```

In [36]:

```

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

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

```

In [37]:

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

nearby_venues = pd.json_normalize(venues) # flatten JSON

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

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

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

nearby_venues.head()
```

Out[37]:

| | name | categories | lat | lng |
|---|-------------------------------|--------------------|-----------|-----------|
| 0 | Club del Gourmet Corte Ingles | Gourmet Shop | 40.417497 | -3.704686 |
| 1 | LUSH | Cosmetics Shop | 40.419012 | -3.704898 |
| 2 | Hotel Liabeny | Hotel | 40.418742 | -3.703996 |
| 3 | Kiko store | Cosmetics Shop | 40.420128 | -3.702317 |
| 4 | TAKOS | Mexican Restaurant | 40.418938 | -3.703748 |

In [38]:

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

80 venues were returned by Foursquare.

In [39]:

```
## Next Explore Neighbourhoods in Madrid
```

In [40]:

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

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

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

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

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

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

    return(nearby_venues)
```

In [42]:

```
#Run the above function on each Neighbourhood and create the Dataframe madrid_venues
madrid_venues = getNearbyVenues(names=mynewdf2['Neighborhood'],
                                latitudes=mynewdf2['Latitude'],
                                longitudes=mynewdf2['Longitude'])
```

Palacio
Embajadores
Cortes
Justicia
Universidad
Sol
Imperial
Acacias
Chopera
Legazpi
Delicias
Palos de Moguer
Atocha
Pacifico
Adelfas
Estrella
Ibiza
Jeronimos
Nino Jesus
Recoletos
Goya
Fuente del Berro
Guindalera
Lista
Castellana
El Viso
Prosperidad
Ciudad Jardin
Hispanoamerica
Nueva Espana
Castilla
Bellas Vistas
Cuatro Caminos
Castillejos
Almenara
Valdeacederas
Berruguete
Gaztambide
Arapiles
Trafalgar
Almagro
Rios Rosas
Vallehermoso
El Pardo
Fuentelarreina
Penagrande
Pilar
La Paz
Valverde
Mirasierra
El Goloso
Casa de Campo
Arguelles
Ciudad Universitaria
Valdezarza
Valdemarin
El Plantio

Aravaca
Los Carmenes
Puerta del Angel
Lucero
Aluche
Campamento
Cuatro Vientos
Las Aguilas
Comillas
Opanel
San Isidro
Vista Alegre
Puerta Bonita
Buenavista
Abrantes
Orcasitas
Orcasur
San Fermin
Almendrales
Moscardo
Zofio
Pradolongo
Entrevias
San Diego
Palomeras Bajas
Palomeras Sureste
Portazgo
Numancia
Pavones
Horcajo
Marroquina
Media Legua
Fontarron
Vinateros
Ventas
Pueblo Nuevo
Quintana
Concepcion
San Pascual
San Juan Bautista
Colina
Atalaya
Costillares
Palomas
Piovera
Canillas
Pinar del Rey
Apostol Santiago
Valdefuentes
Villaverde Alto
San Cristobal
Butarque
Los Rosales
Los Angeles
Casco Historico de Vallecas
Santa Eugenia
Ensanche de Vallecas

Casco Historico de Vicalvaro
 Valdebernardo
 Valderrivas
 El Canaveral
 Simancas
 Hellin
 Amposta
 Arcos
 Rosas
 Rejas
 Canillejas
 Salvador
 Alameda de Osuna
 Aeropuerto
 Casco Historico de Barajas
 Timon
 Corralejos

In [43]:

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

(3439, 7)

Out[43]:

| | Neighborhood | Neighborhood Latitude | Neighborhood Longitude | Venue | Venue Latitude | Venue Longitude | Venue Category |
|---|--------------|--------------------------|---------------------------|--|-------------------|--------------------|----------------------|
| 0 | Palacio | 40.416514 | -3.713708 | Palacio Real de Madrid | 40.417940 | -3.714259 | Palace |
| 1 | Palacio | 40.416514 | -3.713708 | Santa Iglesia Catedral de Santa María la Real ... | 40.415767 | -3.714516 | Church |
| 2 | Palacio | 40.416514 | -3.713708 | Plaza de La Almudena | 40.416320 | -3.713777 | Plaza |
| 3 | Palacio | 40.416514 | -3.713708 | Plaza de Oriente | 40.418326 | -3.712196 | Plaza |
| 4 | Palacio | 40.416514 | -3.713708 | Zuccaru | 40.417179 | -3.711674 | Ice Cream Shop |

In [44]:

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

There are 277 unique categories.

In [45]:

```

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

# add neighborhood column back to dataframe
madrid_onehot['Neighborhood'] = madrid_venues['Neighborhood']

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

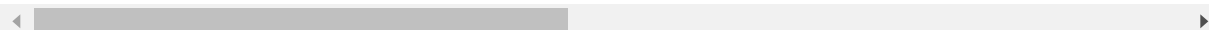
madrid_onehot.head()

```

Out[45]:

| | Yoga Studio | Accessories Store | Adult Boutique | Airport Gate | Airport Lounge | Airport Service | American Restaurant | Arcade | Arepa Restaurant | Arg Re |
|---|----------------|----------------------|-------------------|-----------------|-------------------|--------------------|------------------------|--------|---------------------|-----------|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

5 rows × 277 columns



In [46]:

```

#New dataframe size
madrid_onehot.shape

```

Out[46]:

(3439, 277)

In [47]:

```
##Let's group rows by Neighborhood and by taking the mean of the frequency of the occurrence of each category
```

```
madrid_grouped = madrid_onehot.groupby('Neighborhood').mean().reset_index()
```

```
madrid_grouped
```

Out[47]:

| | Neighborhood | Yoga Studio | Accessories Store | Adult Boutique | Airport Gate | Airport Lounge | Airport Service | American Restaurant | Airline |
|-----|------------------|-------------|-------------------|----------------|--------------|----------------|-----------------|---------------------|---------|
| 0 | Abrantes | 0.0 | 0.0 | 0.0 | 0.000000 | 0.000000 | 0.000000 | 0.0 | 0.0 |
| 1 | Acacias | 0.0 | 0.0 | 0.0 | 0.000000 | 0.000000 | 0.000000 | 0.0 | 0.0 |
| 2 | Adelfas | 0.0 | 0.0 | 0.0 | 0.000000 | 0.000000 | 0.000000 | 0.0 | 0.0 |
| 3 | Aeropuerto | 0.0 | 0.0 | 0.0 | 0.058824 | 0.294118 | 0.058824 | 0.0 | 0.0 |
| 4 | Alameda de Osuna | 0.0 | 0.0 | 0.0 | 0.000000 | 0.000000 | 0.000000 | 0.0 | 0.0 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 122 | Ventas | 0.0 | 0.0 | 0.0 | 0.000000 | 0.000000 | 0.000000 | 0.0 | 0.0 |
| 123 | Villaverde Alto | 0.0 | 0.0 | 0.0 | 0.000000 | 0.000000 | 0.000000 | 0.0 | 0.0 |
| 124 | Vinateros | 0.0 | 0.0 | 0.0 | 0.000000 | 0.000000 | 0.000000 | 0.0 | 0.0 |
| 125 | Vista Alegre | 0.0 | 0.0 | 0.0 | 0.000000 | 0.000000 | 0.000000 | 0.0 | 0.0 |
| 126 | Zofio | 0.0 | 0.0 | 0.0 | 0.000000 | 0.000000 | 0.000000 | 0.0 | 0.0 |

127 rows × 277 columns

In [48]:

```
#Confirm new size
```

```
madrid_grouped.shape
```

Out[48]:

(127, 277)

In [49]:

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

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

----Abrantes----

| | venue | freq |
|---|----------------------|------|
| 0 | Park | 0.29 |
| 1 | Metro Station | 0.14 |
| 2 | Pizza Place | 0.14 |
| 3 | Gym / Fitness Center | 0.14 |
| 4 | Athletics & Sports | 0.14 |

----Acacias----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.11 |
| 1 | Bar | 0.09 |
| 2 | Supermarket | 0.06 |
| 3 | Tapas Restaurant | 0.06 |
| 4 | Pizza Place | 0.06 |

----Adelfas----

| | venue | freq |
|---|----------------------|------|
| 0 | Spanish Restaurant | 0.08 |
| 1 | Supermarket | 0.08 |
| 2 | Grocery Store | 0.08 |
| 3 | Bar | 0.05 |
| 4 | Fast Food Restaurant | 0.05 |

----Aeropuerto----

| | venue | freq |
|---|--------------------|------|
| 0 | Airport Lounge | 0.29 |
| 1 | Spanish Restaurant | 0.12 |
| 2 | Coffee Shop | 0.12 |
| 3 | Border Crossing | 0.06 |
| 4 | Men's Store | 0.06 |

----Alameda de Osuna----

| | venue | freq |
|---|---------------------|------|
| 0 | Smoke Shop | 0.10 |
| 1 | Cocktail Bar | 0.05 |
| 2 | Fried Chicken Joint | 0.05 |
| 3 | Pizza Place | 0.05 |
| 4 | Spanish Restaurant | 0.05 |

----Almagro----

| | venue | freq |
|---|--------------------------|------|
| 0 | Spanish Restaurant | 0.14 |
| 1 | Restaurant | 0.12 |
| 2 | Bar | 0.05 |
| 3 | Japanese Restaurant | 0.05 |
| 4 | Mediterranean Restaurant | 0.04 |

----Almenara----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.2 |

| | | |
|---|----------------------|-----|
| 1 | Library | 0.2 |
| 2 | Gym / Fitness Center | 0.2 |
| 3 | Martial Arts School | 0.2 |
| 4 | Flea Market | 0.2 |

----Almendrales----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.22 |
| 1 | Seafood Restaurant | 0.11 |
| 2 | Bakery | 0.06 |
| 3 | Grocery Store | 0.06 |
| 4 | Bar | 0.06 |

----Aluche----

| | venue | freq |
|---|--------------------|------|
| 0 | Italian Restaurant | 0.18 |
| 1 | Bus Station | 0.09 |
| 2 | Pizza Place | 0.09 |
| 3 | Grocery Store | 0.09 |
| 4 | Park | 0.09 |

----Amposta----

| | venue | freq |
|---|--------------------|------|
| 0 | Park | 0.25 |
| 1 | Spanish Restaurant | 0.12 |
| 2 | Snack Place | 0.12 |
| 3 | Music Venue | 0.12 |
| 4 | Food | 0.12 |

----Apostol Santiago----

| | venue | freq |
|---|---------------|------|
| 0 | Grocery Store | 0.43 |
| 1 | Park | 0.29 |
| 2 | Soccer Field | 0.14 |
| 3 | Metro Station | 0.14 |
| 4 | Noodle House | 0.00 |

----Arapiles----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.10 |
| 1 | Bar | 0.09 |
| 2 | Bakery | 0.07 |
| 3 | Café | 0.06 |
| 4 | Tapas Restaurant | 0.06 |

----Aravaca----

| | venue | freq |
|---|--------------------|------|
| 0 | Italian Restaurant | 0.50 |
| 1 | Athletics & Sports | 0.25 |
| 2 | Gym Pool | 0.25 |
| 3 | Yoga Studio | 0.00 |

4 North Indian Restaurant 0.00

----Arcos----

| | venue | freq |
|---|----------------------|------|
| 0 | Soccer Field | 0.08 |
| 1 | Restaurant | 0.08 |
| 2 | Chinese Restaurant | 0.08 |
| 3 | Gym / Fitness Center | 0.08 |
| 4 | Toy / Game Store | 0.08 |

----Arguelles----

| | venue | freq |
|---|--------------------------|------|
| 0 | Tapas Restaurant | 0.12 |
| 1 | Spanish Restaurant | 0.10 |
| 2 | Mediterranean Restaurant | 0.08 |
| 3 | Hotel | 0.08 |
| 4 | Bookstore | 0.05 |

----Atalaya----

| | venue | freq |
|---|---------------------|------|
| 0 | Spanish Restaurant | 0.3 |
| 1 | American Restaurant | 0.1 |
| 2 | Bakery | 0.1 |
| 3 | Chinese Restaurant | 0.1 |
| 4 | Park | 0.1 |

----Atocha----

| | venue | freq |
|---|--------------------|------|
| 0 | Platform | 0.12 |
| 1 | Spanish Restaurant | 0.10 |
| 2 | Train Station | 0.10 |
| 3 | Restaurant | 0.05 |
| 4 | Hotel | 0.05 |

----Bellas Vistas----

| | venue | freq |
|---|---------------------------|------|
| 0 | Bar | 0.13 |
| 1 | Spanish Restaurant | 0.13 |
| 2 | Pizza Place | 0.09 |
| 3 | Seafood Restaurant | 0.09 |
| 4 | Latin American Restaurant | 0.04 |

----Berruguete----

| | venue | freq |
|---|----------------------|------|
| 0 | Tapas Restaurant | 0.10 |
| 1 | Supermarket | 0.10 |
| 2 | Bar | 0.10 |
| 3 | Gym / Fitness Center | 0.05 |
| 4 | Pizza Place | 0.05 |

----Buenavista----

| | venue | freq |
|---|-------------------|------|
| 0 | Restaurant | 0.25 |
| 1 | Supermarket | 0.12 |
| 2 | Gym | 0.12 |
| 3 | Electronics Store | 0.12 |
| 4 | Tapas Restaurant | 0.12 |

----Butarque----

| | venue | freq |
|---|---------------|------|
| 0 | Plaza | 0.25 |
| 1 | Sports Bar | 0.25 |
| 2 | Grocery Store | 0.25 |
| 3 | Park | 0.25 |
| 4 | Yoga Studio | 0.00 |

----Campamento----

| | venue | freq |
|---|----------------|------|
| 0 | Pool | 0.33 |
| 1 | Golf Course | 0.33 |
| 2 | Garden | 0.33 |
| 3 | Yoga Studio | 0.00 |
| 4 | Nightlife Spot | 0.00 |

----Canillas----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.28 |
| 1 | Juice Bar | 0.11 |
| 2 | Gym | 0.06 |
| 3 | Pizza Place | 0.06 |
| 4 | Pub | 0.06 |

----Canillejas----

| | venue | freq |
|---|-------------------|------|
| 0 | Restaurant | 0.27 |
| 1 | Plaza | 0.09 |
| 2 | Food & Drink Shop | 0.09 |
| 3 | Café | 0.09 |
| 4 | Park | 0.09 |

----Casa de Campo----

| | venue | freq |
|---|-----------------------|------|
| 0 | Trail | 1.0 |
| 1 | Yoga Studio | 0.0 |
| 2 | Outdoors & Recreation | 0.0 |
| 3 | Other Great Outdoors | 0.0 |
| 4 | Optical Shop | 0.0 |

----Casco Historico de Barajas----

| | venue | freq |
|---|-------|------|
| 0 | Hotel | 0.15 |

| | | |
|---|--------------------|------|
| 1 | Spanish Restaurant | 0.09 |
| 2 | Tapas Restaurant | 0.06 |
| 3 | Restaurant | 0.06 |
| 4 | Gastropub | 0.03 |

----Casco Historico de Vicalvaro----

| | venue | freq |
|---|--------------------------|------|
| 0 | Mediterranean Restaurant | 1.0 |
| 1 | Yoga Studio | 0.0 |
| 2 | Noodle House | 0.0 |
| 3 | Other Great Outdoors | 0.0 |
| 4 | Optical Shop | 0.0 |

----Castellana----

| | venue | freq |
|---|--------------------------|------|
| 0 | Spanish Restaurant | 0.15 |
| 1 | Restaurant | 0.10 |
| 2 | Coffee Shop | 0.09 |
| 3 | Boutique | 0.07 |
| 4 | Mediterranean Restaurant | 0.04 |

----Castilla----

| | venue | freq |
|---|------------------|------|
| 0 | Platform | 0.28 |
| 1 | Coffee Shop | 0.12 |
| 2 | Metro Station | 0.06 |
| 3 | Toy / Game Store | 0.03 |
| 4 | Burger Joint | 0.03 |

----Castillejos----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.14 |
| 1 | Restaurant | 0.08 |
| 2 | Coffee Shop | 0.07 |
| 3 | Hotel | 0.04 |
| 4 | Cocktail Bar | 0.03 |

----Chopera----

| | venue | freq |
|---|--------------------|------|
| 0 | Tapas Restaurant | 0.07 |
| 1 | Park | 0.05 |
| 2 | Burger Joint | 0.05 |
| 3 | Coffee Shop | 0.05 |
| 4 | Spanish Restaurant | 0.05 |

----Ciudad Jardin----

| | venue | freq |
|---|--------------------|------|
| 0 | Café | 0.10 |
| 1 | Restaurant | 0.10 |
| 2 | Bakery | 0.08 |
| 3 | Spanish Restaurant | 0.08 |

4 Tapas Restaurant 0.08

----Ciudad Universitaria----

| | venue | freq |
|---|-------------|------|
| 0 | Golf Course | 0.33 |
| 1 | Cafeteria | 0.33 |
| 2 | Coffee Shop | 0.33 |
| 3 | Yoga Studio | 0.00 |
| 4 | Office | 0.00 |

----Colina----

| | venue | freq |
|---|----------------------|------|
| 0 | Spanish Restaurant | 0.15 |
| 1 | Chinese Restaurant | 0.15 |
| 2 | Brazilian Restaurant | 0.05 |
| 3 | Restaurant | 0.05 |
| 4 | Seafood Restaurant | 0.05 |

----Comillas----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.15 |
| 1 | Tapas Restaurant | 0.07 |
| 2 | Beer Garden | 0.07 |
| 3 | Grocery Store | 0.07 |
| 4 | Bakery | 0.07 |

----Concepcion----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.1 |
| 1 | Korean Restaurant | 0.1 |
| 2 | Bar | 0.1 |
| 3 | Park | 0.1 |
| 4 | Restaurant | 0.1 |

----Corralejos----

| | venue | freq |
|---|--------------------|------|
| 0 | Hotel | 0.33 |
| 1 | Spanish Restaurant | 0.17 |
| 2 | Park | 0.17 |
| 3 | Lake | 0.17 |
| 4 | Dog Run | 0.17 |

----Cortes----

| | venue | freq |
|---|------------|------|
| 0 | Restaurant | 0.10 |
| 1 | Plaza | 0.09 |
| 2 | Hotel | 0.08 |
| 3 | Bar | 0.04 |
| 4 | Café | 0.04 |

----Costillares----

| | venue | freq |
|---|----------------------|------|
| 0 | Gym / Fitness Center | 0.20 |
| 1 | Grocery Store | 0.13 |
| 2 | Bar | 0.13 |
| 3 | Pet Store | 0.07 |
| 4 | Fish & Chips Shop | 0.07 |

----Cuatro Caminos----

| | venue | freq |
|---|---------------------|------|
| 0 | Bakery | 0.10 |
| 1 | Tapas Restaurant | 0.06 |
| 2 | Spanish Restaurant | 0.06 |
| 3 | Japanese Restaurant | 0.05 |
| 4 | Italian Restaurant | 0.05 |

----Cuatro Vientos----

| | venue | freq |
|---|-----------------------|------|
| 0 | Restaurant | 0.50 |
| 1 | Locksmith | 0.25 |
| 2 | Campground | 0.25 |
| 3 | Paella Restaurant | 0.00 |
| 4 | Outdoors & Recreation | 0.00 |

----Delicias----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.10 |
| 1 | Restaurant | 0.09 |
| 2 | Tapas Restaurant | 0.04 |
| 3 | Grocery Store | 0.04 |
| 4 | Café | 0.03 |

----El Pardo----

| | venue | freq |
|---|-------------------------|------|
| 0 | Canal Lock | 1.0 |
| 1 | North Indian Restaurant | 0.0 |
| 2 | Outdoors & Recreation | 0.0 |
| 3 | Other Nightlife | 0.0 |
| 4 | Other Great Outdoors | 0.0 |

----El Plantio----

| | venue | freq |
|---|---------------------|------|
| 0 | Italian Restaurant | 0.22 |
| 1 | Burger Joint | 0.22 |
| 2 | Gym | 0.11 |
| 3 | Japanese Restaurant | 0.11 |
| 4 | American Restaurant | 0.11 |

----El Viso----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.11 |

| | | |
|---|--------------------------|------|
| 1 | Restaurant | 0.11 |
| 2 | Mediterranean Restaurant | 0.11 |
| 3 | Theme Restaurant | 0.05 |
| 4 | Diner | 0.05 |

----Embajadores----

| | venue | freq |
|---|-------------|------|
| 0 | Plaza | 0.08 |
| 1 | Hostel | 0.08 |
| 2 | Hotel | 0.05 |
| 3 | Pizza Place | 0.04 |
| 4 | Coffee Shop | 0.04 |

----Ensanche de Vallecas----

| | venue | freq |
|---|--------------------|------|
| 0 | Clothing Store | 0.20 |
| 1 | Supermarket | 0.05 |
| 2 | Spanish Restaurant | 0.05 |
| 3 | Coffee Shop | 0.05 |
| 4 | Optical Shop | 0.02 |

----Entrevias----

| | venue | freq |
|---|----------------------|------|
| 0 | Grocery Store | 0.2 |
| 1 | Music Venue | 0.2 |
| 2 | Gym / Fitness Center | 0.2 |
| 3 | Park | 0.2 |
| 4 | Business Service | 0.2 |

----Estrella----

| | venue | freq |
|---|--------------------|------|
| 0 | Park | 0.07 |
| 1 | Coffee Shop | 0.07 |
| 2 | Asian Restaurant | 0.07 |
| 3 | Bar | 0.07 |
| 4 | Italian Restaurant | 0.04 |

----Fontarron----

| | venue | freq |
|---|---------------|------|
| 0 | Grocery Store | 0.25 |
| 1 | Supermarket | 0.25 |
| 2 | Flower Shop | 0.25 |
| 3 | Plaza | 0.25 |
| 4 | Pie Shop | 0.00 |

----Fuente del Berro----

| | venue | freq |
|---|----------------------|------|
| 0 | Spanish Restaurant | 0.11 |
| 1 | Grocery Store | 0.08 |
| 2 | Bar | 0.08 |
| 3 | Gym / Fitness Center | 0.08 |

4 Park 0.06

----Fuentelarreina----

| | venue | freq |
|---|----------------|------|
| 0 | Golf Course | 0.5 |
| 1 | Soccer Field | 0.5 |
| 2 | Yoga Studio | 0.0 |
| 3 | Nightlife Spot | 0.0 |
| 4 | Optical Shop | 0.0 |

----Gaztambide----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.09 |
| 1 | Café | 0.07 |
| 2 | Tapas Restaurant | 0.05 |
| 3 | Bar | 0.05 |
| 4 | Restaurant | 0.05 |

----Goya----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.16 |
| 1 | Restaurant | 0.06 |
| 2 | Tapas Restaurant | 0.05 |
| 3 | Bakery | 0.05 |
| 4 | Café | 0.04 |

----Guindalera----

| | venue | freq |
|---|---------------------|------|
| 0 | Spanish Restaurant | 0.09 |
| 1 | Bakery | 0.09 |
| 2 | Seafood Restaurant | 0.06 |
| 3 | Japanese Restaurant | 0.06 |
| 4 | Bar | 0.06 |

----Hellin----

| | venue | freq |
|---|-------------|------|
| 0 | Gym | 0.25 |
| 1 | Music Venue | 0.25 |
| 2 | Snack Place | 0.25 |
| 3 | Park | 0.25 |
| 4 | Yoga Studio | 0.00 |

----Hispanoamerica----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.14 |
| 1 | Restaurant | 0.13 |
| 2 | Bar | 0.06 |
| 3 | Gastropub | 0.05 |
| 4 | Grocery Store | 0.05 |

----Horcajo----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.17 |
| 1 | Pizza Place | 0.17 |
| 2 | Soccer Stadium | 0.17 |
| 3 | Soccer Field | 0.17 |
| 4 | Chinese Restaurant | 0.17 |

----Ibiza----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.22 |
| 1 | Restaurant | 0.12 |
| 2 | Tapas Restaurant | 0.10 |
| 3 | Seafood Restaurant | 0.06 |
| 4 | Italian Restaurant | 0.06 |

----Imperial----

| | venue | freq |
|---|--------------------|------|
| 0 | Tapas Restaurant | 0.19 |
| 1 | Spanish Restaurant | 0.07 |
| 2 | Bar | 0.07 |
| 3 | Plaza | 0.05 |
| 4 | Art Gallery | 0.05 |

----Jeronimos----

| | venue | freq |
|---|---------------------|------|
| 0 | Hotel | 0.13 |
| 1 | Monument / Landmark | 0.13 |
| 2 | Exhibit | 0.07 |
| 3 | Art Museum | 0.07 |
| 4 | Spanish Restaurant | 0.07 |

----Justicia----

| | venue | freq |
|---|--------------------|------|
| 0 | Restaurant | 0.08 |
| 1 | Hotel | 0.06 |
| 2 | Italian Restaurant | 0.04 |
| 3 | Spanish Restaurant | 0.04 |
| 4 | Bakery | 0.04 |

----La Paz----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.22 |
| 1 | Pizza Place | 0.11 |
| 2 | Italian Restaurant | 0.11 |
| 3 | Athletics & Sports | 0.11 |
| 4 | Food & Drink Shop | 0.11 |

----Las Aguilas----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.1 |

| | | |
|---|------------------|-----|
| 1 | Train Station | 0.1 |
| 2 | Sports Club | 0.1 |
| 3 | Café | 0.1 |
| 4 | Tapas Restaurant | 0.1 |

----Legazpi----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.09 |
| 1 | Bar | 0.09 |
| 2 | Grocery Store | 0.05 |
| 3 | Plaza | 0.05 |
| 4 | Restaurant | 0.05 |

----Lista----

| | venue | freq |
|---|--------------------------|------|
| 0 | Spanish Restaurant | 0.14 |
| 1 | Restaurant | 0.12 |
| 2 | Coffee Shop | 0.06 |
| 3 | Mediterranean Restaurant | 0.06 |
| 4 | Tapas Restaurant | 0.04 |

----Los Angeles----

| | venue | freq |
|---|--------------------|------|
| 0 | Grocery Store | 0.25 |
| 1 | Park | 0.25 |
| 2 | Bar | 0.25 |
| 3 | Spanish Restaurant | 0.25 |
| 4 | Music School | 0.00 |

----Los Carmenes----

| | venue | freq |
|---|-------------------------|------|
| 0 | Grocery Store | 0.25 |
| 1 | Clothing Store | 0.25 |
| 2 | Restaurant | 0.25 |
| 3 | Bakery | 0.25 |
| 4 | New American Restaurant | 0.00 |

----Los Rosales----

| | venue | freq |
|---|--------------------|------|
| 0 | Pizza Place | 0.18 |
| 1 | Restaurant | 0.18 |
| 2 | Train Station | 0.09 |
| 3 | Chinese Restaurant | 0.09 |
| 4 | Snack Place | 0.09 |

----Lucero----

| | venue | freq |
|---|--------------------|------|
| 0 | Pizza Place | 0.29 |
| 1 | Grocery Store | 0.14 |
| 2 | Spanish Restaurant | 0.14 |
| 3 | Italian Restaurant | 0.14 |

4 Tapas Restaurant 0.14

----Marroquina----

| | venue | freq |
|---|----------------|------|
| 0 | Bar | 0.25 |
| 1 | Park | 0.25 |
| 2 | Brewery | 0.25 |
| 3 | Dessert Shop | 0.12 |
| 4 | Nightlife Spot | 0.12 |

----Media Legua----

| | venue | freq |
|---|----------------------|------|
| 0 | Fast Food Restaurant | 0.15 |
| 1 | Restaurant | 0.08 |
| 2 | Sandwich Place | 0.08 |
| 3 | Chinese Restaurant | 0.08 |
| 4 | Big Box Store | 0.08 |

----Mirasierra----

| | venue | freq |
|---|-------------------|------|
| 0 | Grocery Store | 0.25 |
| 1 | Convenience Store | 0.25 |
| 2 | Café | 0.25 |
| 3 | Metro Station | 0.25 |
| 4 | Office | 0.00 |

----Moscardo----

| | venue | freq |
|---|----------------------|------|
| 0 | Pool | 0.12 |
| 1 | Restaurant | 0.12 |
| 2 | Nightclub | 0.12 |
| 3 | Gastropub | 0.12 |
| 4 | Fast Food Restaurant | 0.12 |

----Nino Jesus----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.12 |
| 1 | Italian Restaurant | 0.09 |
| 2 | Plaza | 0.06 |
| 3 | Asian Restaurant | 0.06 |
| 4 | Café | 0.06 |

----Nueva Espana----

| | venue | freq |
|---|------------------|------|
| 0 | Restaurant | 0.17 |
| 1 | Deli / Bodega | 0.08 |
| 2 | Steakhouse | 0.08 |
| 3 | Big Box Store | 0.08 |
| 4 | Tapas Restaurant | 0.08 |

----Numancia----

| | venue | freq |
|---|--------------------------|------|
| 0 | Restaurant | 0.1 |
| 1 | Beer Garden | 0.1 |
| 2 | Mediterranean Restaurant | 0.1 |
| 3 | Scenic Lookout | 0.1 |
| 4 | Chinese Restaurant | 0.1 |

----Opanel----

| | venue | freq |
|---|----------------|------|
| 0 | Coffee Shop | 0.20 |
| 1 | Grocery Store | 0.13 |
| 2 | Plaza | 0.07 |
| 3 | Shop & Service | 0.07 |
| 4 | Supermarket | 0.07 |

----Orcasitas----

| | venue | freq |
|---|---------------------|------|
| 0 | Spanish Restaurant | 0.14 |
| 1 | Kids Store | 0.14 |
| 2 | Plaza | 0.14 |
| 3 | Sporting Goods Shop | 0.14 |
| 4 | Café | 0.14 |

----Orcasur----

| | venue | freq |
|---|----------------|------|
| 0 | Coffee Shop | 0.20 |
| 1 | Farmers Market | 0.07 |
| 2 | Grocery Store | 0.07 |
| 3 | Pizza Place | 0.07 |
| 4 | Plaza | 0.07 |

----Pacífico----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.12 |
| 1 | Bar | 0.11 |
| 2 | Museum | 0.06 |
| 3 | Tapas Restaurant | 0.05 |
| 4 | Bakery | 0.05 |

----Palacio----

| | venue | freq |
|---|--------------------|------|
| 0 | Plaza | 0.10 |
| 1 | Tapas Restaurant | 0.08 |
| 2 | Spanish Restaurant | 0.06 |
| 3 | Bar | 0.05 |
| 4 | Historic Site | 0.04 |

----Palomas----

| | venue | freq |
|---|-------|------|
| 0 | Gym | 0.11 |

| | | |
|---|----------------------|------|
| 1 | Shopping Mall | 0.11 |
| 2 | Fast Food Restaurant | 0.11 |
| 3 | Café | 0.11 |
| 4 | Restaurant | 0.11 |

----Palomeras Bajas----

| | venue | freq |
|---|-------------------|------|
| 0 | Restaurant | 0.17 |
| 1 | Toy / Game Store | 0.17 |
| 2 | Food & Drink Shop | 0.17 |
| 3 | Park | 0.17 |
| 4 | Coffee Shop | 0.17 |

----Palomeras Sureste----

| | venue | freq |
|---|----------------------|------|
| 0 | Pizza Place | 0.25 |
| 1 | Pool | 0.12 |
| 2 | Bar | 0.12 |
| 3 | Café | 0.12 |
| 4 | Fast Food Restaurant | 0.12 |

----Palos de Moguer----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.12 |
| 1 | Restaurant | 0.07 |
| 2 | Beer Garden | 0.05 |
| 3 | Café | 0.05 |
| 4 | Tapas Restaurant | 0.05 |

----Pavones----

| | venue | freq |
|---|--------------------|------|
| 0 | Grocery Store | 0.17 |
| 1 | Metro Station | 0.17 |
| 2 | Spanish Restaurant | 0.17 |
| 3 | Tea Room | 0.17 |
| 4 | Athletics & Sports | 0.17 |

----Penagrande----

| | venue | freq |
|---|------------------|------|
| 0 | Supermarket | 0.11 |
| 1 | Restaurant | 0.11 |
| 2 | Soccer Field | 0.11 |
| 3 | Nightclub | 0.11 |
| 4 | Tapas Restaurant | 0.11 |

----Pilar----

| | venue | freq |
|---|----------------------|------|
| 0 | Clothing Store | 0.11 |
| 1 | Italian Restaurant | 0.05 |
| 2 | Fast Food Restaurant | 0.05 |
| 3 | Burger Joint | 0.05 |

4 Tapas Restaurant 0.05

----Pinar del Rey----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.15 |
| 1 | Tapas Restaurant | 0.15 |
| 2 | Supermarket | 0.15 |
| 3 | Pub | 0.08 |
| 4 | Metro Station | 0.08 |

----Piovera----

| | venue | freq |
|---|----------------------|------|
| 0 | Farmers Market | 0.14 |
| 1 | Cosmetics Shop | 0.14 |
| 2 | Cheese Shop | 0.14 |
| 3 | Gym / Fitness Center | 0.14 |
| 4 | Sports Club | 0.14 |

----Portazgo----

| | venue | freq |
|---|---------------|------|
| 0 | Grocery Store | 0.25 |
| 1 | Bar | 0.25 |
| 2 | Pizza Place | 0.25 |
| 3 | Building | 0.25 |
| 4 | Noodle House | 0.00 |

----Pradolongo----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.2 |
| 1 | Plaza | 0.2 |
| 2 | Park | 0.2 |
| 3 | Theater | 0.2 |
| 4 | Beer Garden | 0.2 |

----Prosperidad----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.10 |
| 1 | Bakery | 0.08 |
| 2 | Tapas Restaurant | 0.06 |
| 3 | Coffee Shop | 0.05 |
| 4 | Café | 0.05 |

----Pueblo Nuevo----

| | venue | freq |
|---|---------------|------|
| 0 | Park | 0.50 |
| 1 | Metro Station | 0.25 |
| 2 | Bar | 0.12 |
| 3 | Supermarket | 0.12 |
| 4 | Noodle House | 0.00 |

----Puerta Bonita----

| | venue | freq |
|---|--------------|------|
| 0 | Plaza | 0.25 |
| 1 | Bar | 0.25 |
| 2 | Pizza Place | 0.25 |
| 3 | Park | 0.25 |
| 4 | Noodle House | 0.00 |

----Puerta del Angel----

| | venue | freq |
|---|-------------------------------|------|
| 0 | Spanish Restaurant | 0.25 |
| 1 | Grocery Store | 0.19 |
| 2 | Vegetarian / Vegan Restaurant | 0.06 |
| 3 | Supermarket | 0.06 |
| 4 | Bakery | 0.06 |

----Quintana----

| | venue | freq |
|---|--------------------|------|
| 0 | Tapas Restaurant | 0.13 |
| 1 | Bar | 0.10 |
| 2 | Clothing Store | 0.10 |
| 3 | Spanish Restaurant | 0.10 |
| 4 | Supermarket | 0.07 |

----Recoletos----

| | venue | freq |
|---|---------------------|------|
| 0 | Restaurant | 0.17 |
| 1 | Spanish Restaurant | 0.15 |
| 2 | Bakery | 0.06 |
| 3 | Clothing Store | 0.05 |
| 4 | Japanese Restaurant | 0.04 |

----Rejas----

| | venue | freq |
|---|--------------------|------|
| 0 | Restaurant | 0.29 |
| 1 | Spanish Restaurant | 0.29 |
| 2 | BBQ Joint | 0.14 |
| 3 | Road | 0.14 |
| 4 | Paella Restaurant | 0.14 |

----Rios Rosas----

| | venue | freq |
|---|---------------------|------|
| 0 | Tapas Restaurant | 0.10 |
| 1 | Restaurant | 0.10 |
| 2 | Japanese Restaurant | 0.07 |
| 3 | Italian Restaurant | 0.07 |
| 4 | Café | 0.07 |

----Rosas----

| | venue | freq |
|---|-------------------|------|
| 0 | Electronics Store | 0.5 |

| | | |
|---|----------------------|-----|
| 1 | Gastropub | 0.5 |
| 2 | Yoga Studio | 0.0 |
| 3 | Noodle House | 0.0 |
| 4 | Other Great Outdoors | 0.0 |

----Salvador----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.17 |
| 1 | Asian Restaurant | 0.17 |
| 2 | Restaurant | 0.08 |
| 3 | Snack Place | 0.08 |
| 4 | Bistro | 0.08 |

----San Cristobal----

| | venue | freq |
|---|----------------|------|
| 0 | Metro Station | 0.25 |
| 1 | Breakfast Spot | 0.25 |
| 2 | Snack Place | 0.25 |
| 3 | Train Station | 0.25 |
| 4 | Nightlife Spot | 0.00 |

----San Diego----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.3 |
| 1 | Pub | 0.1 |
| 2 | Music Venue | 0.1 |
| 3 | Supermarket | 0.1 |
| 4 | Tapas Restaurant | 0.1 |

----San Fermin----

| | venue | freq |
|---|------------------------|------|
| 0 | Furniture / Home Store | 0.08 |
| 1 | Shopping Mall | 0.08 |
| 2 | Grocery Store | 0.08 |
| 3 | Farmers Market | 0.08 |
| 4 | Bed & Breakfast | 0.08 |

----San Isidro----

| | venue | freq |
|---|-----------------------|------|
| 0 | Park | 0.33 |
| 1 | Fast Food Restaurant | 0.33 |
| 2 | Bed & Breakfast | 0.33 |
| 3 | Yoga Studio | 0.00 |
| 4 | Outdoors & Recreation | 0.00 |

----San Juan Bautista----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.17 |
| 1 | Bar | 0.17 |
| 2 | Restaurant | 0.11 |
| 3 | Pharmacy | 0.06 |

4 Burger Joint 0.06

----San Pascual----

| | venue | freq |
|---|-------------------------|------|
| 0 | Grocery Store | 0.20 |
| 1 | Spanish Restaurant | 0.12 |
| 2 | Italian Restaurant | 0.08 |
| 3 | Coffee Shop | 0.08 |
| 4 | Fruit & Vegetable Store | 0.04 |

----Santa Eugenia----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.09 |
| 1 | Coffee Shop | 0.09 |
| 2 | Miscellaneous Shop | 0.09 |
| 3 | Supermarket | 0.09 |
| 4 | Tapas Restaurant | 0.09 |

----Simancas----

| | venue | freq |
|---|--------------------|------|
| 0 | Restaurant | 0.15 |
| 1 | Spanish Restaurant | 0.15 |
| 2 | Hotel | 0.11 |
| 3 | Café | 0.09 |
| 4 | Coffee Shop | 0.04 |

----Sol----

| | venue | freq |
|---|--------------------|------|
| 0 | Plaza | 0.08 |
| 1 | Hotel | 0.07 |
| 2 | Tapas Restaurant | 0.04 |
| 3 | Spanish Restaurant | 0.04 |
| 4 | Clothing Store | 0.04 |

----Timon----

| | venue | freq |
|---|----------------------|------|
| 0 | Bakery | 1.0 |
| 1 | Yoga Studio | 0.0 |
| 2 | Noodle House | 0.0 |
| 3 | Other Great Outdoors | 0.0 |
| 4 | Optical Shop | 0.0 |

----Trafalgar----

| | venue | freq |
|---|--------------------|------|
| 0 | Restaurant | 0.09 |
| 1 | Spanish Restaurant | 0.09 |
| 2 | Tapas Restaurant | 0.07 |
| 3 | Bar | 0.06 |
| 4 | Plaza | 0.05 |

----Universidad----

| | venue | freq |
|---|----------------------|------|
| 0 | Bar | 0.10 |
| 1 | Tapas Restaurant | 0.10 |
| 2 | Theater | 0.07 |
| 3 | Gym / Fitness Center | 0.07 |
| 4 | Art Gallery | 0.07 |

----Valdeacederas----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.36 |
| 1 | Restaurant | 0.09 |
| 2 | Art Studio | 0.09 |
| 3 | Grocery Store | 0.09 |
| 4 | Bookstore | 0.09 |

----Valdebernardo----

| | venue | freq |
|---|----------------------|------|
| 0 | Spanish Restaurant | 0.14 |
| 1 | Miscellaneous Shop | 0.14 |
| 2 | Gym | 0.14 |
| 3 | Fast Food Restaurant | 0.14 |
| 4 | Food | 0.14 |

----Valdemarin----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.33 |
| 1 | Bar | 0.33 |
| 2 | Arcade | 0.33 |
| 3 | Noodle House | 0.00 |
| 4 | Other Nightlife | 0.00 |

----Valderrivas----

| | venue | freq |
|---|--------------------|------|
| 0 | Pizza Place | 0.4 |
| 1 | Spanish Restaurant | 0.2 |
| 2 | Falafel Restaurant | 0.2 |
| 3 | Park | 0.2 |
| 4 | Noodle House | 0.0 |

----Valdezarza----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.4 |
| 1 | Soccer Field | 0.2 |
| 2 | Asian Restaurant | 0.2 |
| 3 | Supermarket | 0.2 |
| 4 | Nightlife Spot | 0.0 |

----Vallehermoso----

| | venue | freq |
|---|-------|------|
| 0 | Bar | 0.13 |

| | | |
|---|--------------------|------|
| 1 | Restaurant | 0.11 |
| 2 | Spanish Restaurant | 0.09 |
| 3 | Pizza Place | 0.05 |
| 4 | Sandwich Place | 0.05 |

----Valverde----

| | venue | freq |
|---|----------------|------|
| 0 | Coffee Shop | 0.17 |
| 1 | Plaza | 0.06 |
| 2 | Breakfast Spot | 0.06 |
| 3 | Burger Joint | 0.06 |
| 4 | Snack Place | 0.06 |

----Ventas----

| | venue | freq |
|---|----------------|------|
| 0 | Soccer Field | 0.50 |
| 1 | Pizza Place | 0.25 |
| 2 | Supermarket | 0.25 |
| 3 | Yoga Studio | 0.00 |
| 4 | Nightlife Spot | 0.00 |

----Villaverde Alto----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.17 |
| 1 | Design Studio | 0.17 |
| 2 | Restaurant | 0.17 |
| 3 | Train Station | 0.17 |
| 4 | Diner | 0.17 |

----Vinateros----

| | venue | freq |
|---|--------------|------|
| 0 | Playground | 0.12 |
| 1 | Bakery | 0.12 |
| 2 | Plaza | 0.12 |
| 3 | Flower Shop | 0.12 |
| 4 | Skating Rink | 0.12 |

----Vista Alegre----

| | venue | freq |
|---|--------------------|------|
| 0 | Pizza Place | 0.11 |
| 1 | Park | 0.11 |
| 2 | Grocery Store | 0.11 |
| 3 | Bakery | 0.11 |
| 4 | Spanish Restaurant | 0.06 |

----Zofio----

| | venue | freq |
|---|--------------------|------|
| 0 | Spanish Restaurant | 0.50 |
| 1 | Park | 0.17 |
| 2 | Athletics & Sports | 0.17 |
| 3 | Beer Garden | 0.17 |

4 Music Store 0.00

In [50]:

```
#Put into a Pandas Dataframe  
#First use function to classify venues in descending order  
def return_most_common_venues(row, num_top_venues):  
    row_categories = row.iloc[1:]  
    row_categories_sorted = row_categories.sort_values(ascending=False)  
  
    return row_categories_sorted.index.values[0:num_top_venues]
```


In [51]:

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

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

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

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

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

neighborhoods_venues_sorted.head()
```

Out[51]:

| | 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 Ven |
|---|---------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------|
| 0 | Abrantes | Park | Pizza Place | Athletics & Sports | Metro Station | Fast Food Restaurant | Gym / Fitness Center | Wome Si |
| 1 | Acacias | Spanish Restaurant | Bar | Tapas Restaurant | Supermarket | Pizza Place | Asian Restaurant | Gy Fitn Cer |
| 2 | Adelfas | Spanish Restaurant | Grocery Store | Supermarket | Bar | Fast Food Restaurant | Coffee Shop | Books |
| 3 | Aeropuerto | Airport Lounge | Spanish Restaurant | Coffee Shop | Sporting Goods Shop | Breakfast Spot | Border Crossing | Air G |
| 4 | Alameda de Osuna | Smoke Shop | Pizza Place | Bakery | Cocktail Bar | Plaza | Chinese Restaurant | Restau |



In [52]:

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

madrid_grouped_clustering = madrid_grouped.drop('Neighborhood', 1)

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

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

Out[52]:

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

In [53]:

```

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

madrid_merged = mynewdf2

# merge madrid_grouped with mynewdf2 to add Latitude/Longitude for each neighborhood
madrid_merged = madrid_merged.join(neighborhoods_venues_sorted.set_index('Neighborhood'),
on='Neighborhood')

madrid_merged.head() # check the last columns!

```

Out[53]:

| | Postal Code | Borough | Neighborhood | Latitude | Longitude | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue |
|---|-------------|---------|--------------|-----------|-----------|----------------|-----------------------|-----------------------|-----------------------|
| 0 | 11 | Centro | Palacio | 40.416514 | -3.713708 | 5.0 | Plaza | Tapas Restaurant | Spar Restau |
| 1 | 12 | Centro | Embajadores | 40.409869 | -3.702972 | 5.0 | Hostel | Plaza | H |
| 2 | 13 | Centro | Cortes | 40.415226 | -3.697128 | 5.0 | Restaurant | Plaza | H |
| 3 | 14 | Centro | Justicia | 40.423660 | -3.696469 | 5.0 | Restaurant | Hotel | Spar Restau |
| 4 | 15 | Centro | Universidad | 40.407078 | -3.709642 | 5.0 | Bar | Tapas Restaurant | The: |



In [54]:

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

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

Out[54]:

| | Postal Code | Borough | Neighborhood | Latitude | Longitude | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Common Venue |
|-----|----------------|---------|----------------------------------|-----------|-----------|-------------------|-----------------------------|-----------------------------|------------------------|
| 0 | 11 | Centro | Palacio | 40.416514 | -3.713708 | 5.0 | Plaza | Tapas Restaurant | Spanish Restaurant |
| 1 | 12 | Centro | Embajadores | 40.409869 | -3.702972 | 5.0 | Hostel | Plaza | |
| 2 | 13 | Centro | Cortes | 40.415226 | -3.697128 | 5.0 | Restaurant | Plaza | |
| 3 | 14 | Centro | Justicia | 40.423660 | -3.696469 | 5.0 | Restaurant | Hotel | Spanish Restaurant |
| 4 | 15 | Centro | Universidad | 40.407078 | -3.709642 | 5.0 | Bar | Tapas Restaurant | Spanish Restaurant |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 122 | 211 | Barajas | Alameda de Osuna | 40.456636 | -3.590373 | 5.0 | Smoke Shop | Pizza Place | Spanish Restaurant |
| 123 | 212 | Barajas | Aeropuerto | 40.498348 | -3.567781 | 5.0 | Airport Lounge | Spanish Restaurant | Spanish Restaurant |
| 124 | 213 | Barajas | Casco Historico de Barajas | 40.474305 | -3.578636 | 5.0 | Hotel | Spanish Restaurant | Spanish Restaurant |
| 125 | 214 | Barajas | Timon | 40.476295 | -3.592266 | 1.0 | Bakery | Women's Store | |
| 126 | 215 | Barajas | Corralejos | 40.463715 | -3.610260 | 5.0 | Hotel | Spanish Restaurant | |

127 rows × 16 columns



In [55]:

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

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

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

map_clusters
```

Out[55]:

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

In [56]:

```
#Examine Clusters
```

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

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

In [57]:

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

Out[57]:

| | Borough | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue |
|-----|---------------------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 16 | Retiro | 0.0 | Spanish Restaurant | Restaurant | Tapas Restaurant | Italian Restaurant | Seafood Restaurant | Gastrop |
| 35 | Tetuan | 0.0 | Spanish Restaurant | Gym / Fitness Center | Art Studio | Bookstore | Restaurant | Grocery Store |
| 47 | Fuencarral-El Pardo | 0.0 | Spanish Restaurant | Italian Restaurant | Pizza Place | Food & Drink Shop | Tapas Restaurant | Athletic Sports |
| 53 | Moncloa-Aravaca | 0.0 | Spanish Restaurant | Soccer Field | Asian Restaurant | Supermarket | Women's Store | Fast Food Restaurant |
| 54 | Moncloa-Aravaca | 0.0 | Spanish Restaurant | Bar | Arcade | Women's Store | Fish & Chips Shop | Exhibition |
| 58 | Latina | 0.0 | Spanish Restaurant | Grocery Store | Park | Supermarket | Paella Restaurant | Dir |
| 59 | Latina | 0.0 | Pizza Place | Spanish Restaurant | Tapas Restaurant | Grocery Store | Asian Restaurant | Italian Restaurant |
| 74 | Usera | 0.0 | Spanish Restaurant | Seafood Restaurant | Gastropub | Bar | Bakery | Fast Food Restaurant |
| 76 | Usera | 0.0 | Spanish Restaurant | Beer Garden | Athletics & Sports | Park | Fish & Chips Shop | Exhibition |
| 77 | Usera | 0.0 | Theater | Spanish Restaurant | Park | Beer Garden | Plaza | Flower Shop |
| 79 | Puente de Vallecas | 0.0 | Spanish Restaurant | Music Venue | Light Rail Station | Tapas Restaurant | Restaurant | Supermarket |
| 85 | Moratalaz | 0.0 | Pizza Place | Soccer Stadium | Spanish Restaurant | Soccer Field | Park | Chinese Restaurant |
| 97 | Ciudad Lineal | 0.0 | Spanish Restaurant | Bakery | Paella Restaurant | American Restaurant | Restaurant | Pizzeria |
| 101 | Hortaleza | 0.0 | Spanish Restaurant | Juice Bar | Miscellaneous Shop | Pub | Bar | Irish Pub |
| 113 | Vicalvaro | 0.0 | Pizza Place | Spanish Restaurant | Park | Falafel Restaurant | Farmers Market | Esca |
| 119 | San Blas-Canillejas | 0.0 | Spanish Restaurant | Restaurant | BBQ Joint | Road | Paella Restaurant | Fabric Shop |



In [58]:

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

Out[58]:

| | Borough | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue | 7th Most Common Venue |
|-----|---------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 125 | Barajas | 1.0 | Bakery | Women's Store | Fish & Chips Shop | Exhibit | Fabric Shop | Falafel Restaurant | Farmers Market |

In [59]:

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

Out[59]:

| | Borough | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue | 7th Most Common Venue |
|----|---------------------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 43 | Fuencarral-El Pardo | 2.0 | Canal Lock | Fast Food Restaurant | Escape Room | Event Space | Exhibit | Fabric Shop | Falafel Restaurant |

In [60]:

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

Out[60]:

| | Borough | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue | 7th Most Common Venue |
|-----|-----------|----------------|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 111 | Vicalvaro | 3.0 | Mediterranean Restaurant | Women's Store | Event Space | Exhibit | Fabric Shop | Falafel Restaurant | Farm Market |

In [61]:

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

Out[61]:

| | Borough | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue | 7th Most Common Venue |
|----|-------------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 66 | Carabanchel | 4.0 | Bed & Breakfast | Park | Fast Food Restaurant | Electronics Store | Event Space | Exhibit | Fab Shop |

In [62]:

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

Out[62]:

| | Borough | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue |
|-----|---------------------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------------------|--------------------------|
| 0 | Centro | 5.0 | Plaza | Tapas Restaurant | Spanish Restaurant | Bar | Vegetarian / Vegan Restaurant | Restaurant |
| 1 | Centro | 5.0 | Hostel | Plaza | Hotel | Spanish Restaurant | Bar | Tapas Restaurant |
| 2 | Centro | 5.0 | Restaurant | Plaza | Hotel | Café | Bar | Mediterranean Restaurant |
| 3 | Centro | 5.0 | Restaurant | Hotel | Spanish Restaurant | Italian Restaurant | Vegetarian / Vegan Restaurant | Bakery |
| 4 | Centro | 5.0 | Bar | Tapas Restaurant | Theater | Plaza | Gym / Fitness Center | Art Gallery |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 121 | San Blas-Canillejas | 5.0 | Spanish Restaurant | Asian Restaurant | Hotel | Grocery Store | Snack Place | Restaurant |
| 122 | Barajas | 5.0 | Smoke Shop | Pizza Place | Bakery | Cocktail Bar | Plaza | Chinese Restaurant |
| 123 | Barajas | 5.0 | Airport Lounge | Spanish Restaurant | Coffee Shop | Sporting Goods Shop | Breakfast Spot | Border Crossing |
| 124 | Barajas | 5.0 | Hotel | Spanish Restaurant | Restaurant | Tapas Restaurant | Japanese Restaurant | Bistro |
| 126 | Barajas | 5.0 | Hotel | Spanish Restaurant | Lake | Dog Run | Park | Farmers Market |

91 rows × 12 columns



In [63]:

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

Out[63]:

| | Borough | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue | 7th Most Common Venue |
|-----|---------------------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 118 | San Blas-Canillejas | 6.0 | Gastropub | Electronics Store | Women's Store | Fast Food Restaurant | Event Space | Exhibit | Fabric Shop |



In [64]:

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

Out[64]:

| | Borough | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue |
|-----|---------------------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 68 | Carabanchel | 7.0 | Plaza | Pizza Place | Bar | Park | Falafel Restaurant | Escape Room |
| 70 | Carabanchel | 7.0 | Park | Pizza Place | Athletics & Sports | Metro Station | Fast Food Restaurant | Gym / Fitness Center |
| 78 | Puente de Vallecas | 7.0 | Grocery Store | Business Service | Music Venue | Park | Gym / Fitness Center | Women's Store |
| 86 | Moratalaz | 7.0 | Bar | Brewery | Park | Nightlife Spot | Dessert Shop | Women's Store |
| 91 | Ciudad Lineal | 7.0 | Park | Metro Station | Supermarket | Bar | Fast Food Restaurant | Exhibit |
| 103 | Hortaleza | 7.0 | Grocery Store | Park | Soccer Field | Metro Station | Women's Store | Falafel Restaurant |
| 106 | Villaverde | 7.0 | Plaza | Sports Bar | Grocery Store | Park | Falafel Restaurant | Electronics Store |
| 108 | Villaverde | 7.0 | Spanish Restaurant | Bar | Grocery Store | Park | Women's Store | Farmers Market |
| 115 | San Blas-Canillejas | 7.0 | Snack Place | Park | Music Venue | Gym | Women's Store | Falafel Restaurant |
| 116 | San Blas-Canillejas | 7.0 | Park | Food | Snack Place | Spanish Restaurant | Metro Station | Music Venue |



In [65]:

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

Out[65]:

| | Borough | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue | 7th Most Common Venue |
|----|---------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 61 | Latina | 8.0 | Golf Course | Garden | Pool | Electronics Store | Escape Room | Event Space | Exhibit |

In [66]:

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

Out[66]:

| | Borough | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue | 7th Most Common Venue |
|----|-----------------|----------------|-----------------------|-----------------------|-----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 50 | Moncloa-Aravaca | 9.0 | Trail | Women's Store | Eastern European Restaurant | Escape Room | Event Space | Exhibit | Fabric Shop |

In [67]:

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

Out[67]:

| | Borough | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue | 7th Most Common Venue |
|----|---------------------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 44 | Fuencarral-El Pardo | 10.0 | Golf Course | Soccer Field | Fast Food Restaurant | Escape Room | Event Space | Exhibit | Fabric Shop |
| 90 | Ciudad Lineal | 10.0 | Soccer Field | Pizza Place | Supermarket | Food | Flower Shop | Flea Market | Fish Market |

In [68]:

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

Out[68]:

| | Borough | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue | 7th Most Common Venue |
|----|-----------------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 56 | Moncloa-Aravaca | 11.0 | Italian Restaurant | Athletics & Sports | Gym Pool | Women's Store | Fast Food Restaurant | Event Space | Exhibit |

In []:

In [1]:

In [2]:

In [3]: