

# Capstone Project - The Battle of Neighborhoods

## Introduction

**"What would you recommend in New York City to open a new affordable hotel?"**

New York City's demographics show that it is a large and ethnically diverse metropolis. It is the largest city in the United States with a long history of international immigration. New York City was home to nearly 8.5 million people in 2014, accounting for over 40% of the population of New York State and a slightly lower percentage of the New York metropolitan area, home to approximately 23.6 million. Over the last decade the city has been growing faster than the region. The New York region continues to be by far the leading metropolitan gateway for legal immigrants admitted into the United States.

New York City is so much more than a bunch of amazing points of interest spread across 5 boroughs. What truly makes this city so special is its distinct neighborhoods which themselves make up the integral parts of New York.

## Data

For this project we need the following data :

- New York City data that contains list Boroughs, Neighborhoods along with their latitude and longitude.
  - Data source : [https://cocl.us/new\\_york\\_dataset](https://cocl.us/new_york_dataset) ([https://cocl.us/new\\_york\\_dataset](https://cocl.us/new_york_dataset))
  - Description : This data set contains the required information. And we will use this data set to explore various neighborhoods of new york city.
- Hotels in each neighborhood of new york city.
  - Data source : Fousquare API
  - Description : By using this api we will get all the venues in each neighborhood. We can filter these venues to get only hotels.

## Import necessary Libraries

In [1]:

```
import pandas as pd
import numpy as np
pd.set_option('display.max_columns', None)
pd.set_option('display.max_rows', None)
import requests
from bs4 import BeautifulSoup
#!/conda install -c conda-forge geocoder --yes
import geocoder
import matplotlib.pyplot as plt
import matplotlib.cm as cm
import matplotlib.colors as colors
%matplotlib inline

print('Libraries imported.')
```

Libraries imported.

In [271]:

```
radius=1000
LIMIT=100
CLIENT_ID = 'LXNSRTYLAO40EMNE1SMWQLF1JJATF30SPCIEGL0VTLJWCXH2 '
CLIENT_SECRET = 'AUQ54H4GOHU4PRL3ZATZNDLTBLSMLAR51V3GV304MXPWMQMK '
VERSION = '20180605'
```

## New York neighborhood general stats

In [6]:

```
url='https://cocl.us/new_york_dataset'
```

In [7]:

```
def get_data(url):
    resp=requests.get(url).json()
    features=resp['features']
    column_names = ['Borough', 'Neighborhood', 'Latitude', 'Longitude']

    new_york_data = pd.DataFrame(columns=column_names)

    for data in features:
        borough = data['properties']['borough']
        neighborhood_name = data['properties']['name']

        neighborhood_latlon = data['geometry']['coordinates']
        neighborhood_lat = neighborhood_latlon[1]
        neighborhood_lon = neighborhood_latlon[0]

        new_york_data = new_york_data.append({'Borough': borough,
                                              'Neighborhood': neighborhood_name,
                                              'Latitude': neighborhood_lat,
                                              'Longitude': neighborhood_lon}, ignore
_index=True)

    return new_york_data
```

In [8]:

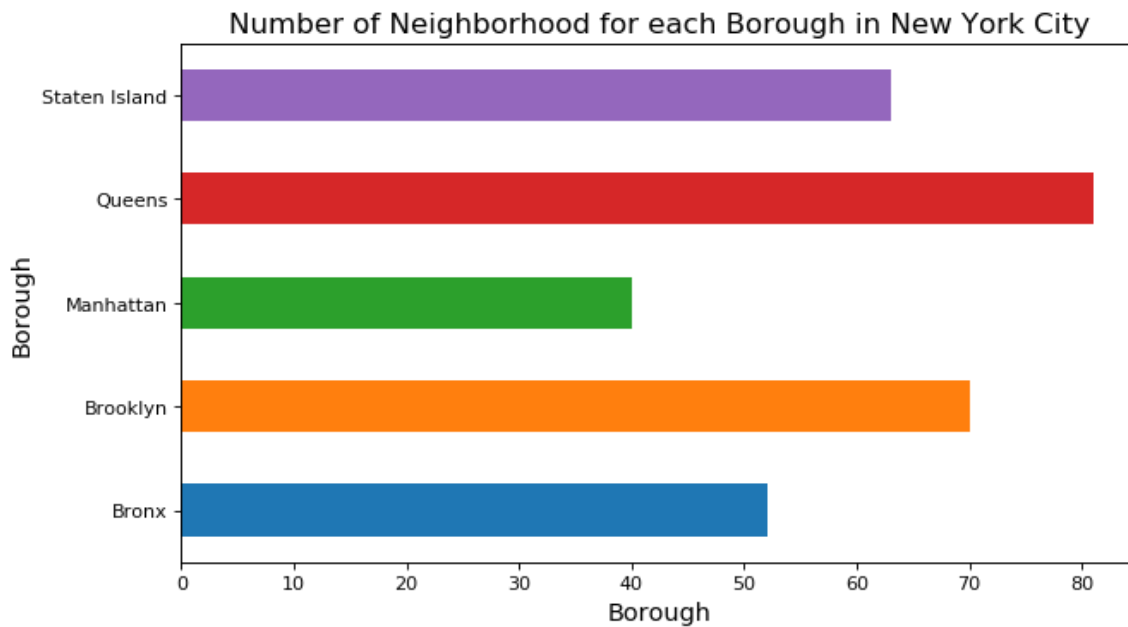
```
new_york_data=get_data(url)
new_york_data.head()
```

Out[8]:

	Borough	Neighborhood	Latitude	Longitude
0	Bronx	Wakefield	40.894705	-73.847201
1	Bronx	Co-op City	40.874294	-73.829939
2	Bronx	Eastchester	40.887556	-73.827806
3	Bronx	Fieldston	40.895437	-73.905643
4	Bronx	Riverdale	40.890834	-73.912585

In [263]:

```
plt.figure(figsize=(9,5), dpi = 80)
plt.title('Number of Neighborhood for each Borough in New York City',fontsize =
15)
plt.xlabel('Borough', fontsize = 13)
plt.ylabel('Number of Neighborhood', fontsize=13)
new_york_data.groupby('Borough')['Neighborhood'].count().plot(kind='barh')
plt.show()
```



## Get hotel venues in each neighborhood

In [272]:

```
def get_venues(lat,lng):

    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)

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

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

In [273]:

```
column_names=['Borough', 'Neighborhood', 'ID','Name']
hotel_ny=pd.DataFrame(columns=column_names)
count=1
for row in new_york_data.values.tolist():
    Borough, Neighborhood, Latitude, Longitude=row
    print(row)
    venues = get_venues(Latitude,Longitude)
    hotels=venues[venues['Category']=='Hotel']
    print('(' ,count,'/',len(new_york_data),')','Hotels in '+Neighborhood+', '+Borough+':'+str(len(hotels)))
    for hotel in hotels.values.tolist():
        id, name , category=hotel
        hotel_ny = hotel_ny.append({'Borough': Borough,
                                    'Neighborhood': Neighborhood,
                                    'ID': id,
                                    'Name' : name
                                    }, ignore_index=True)

    count+=1
```

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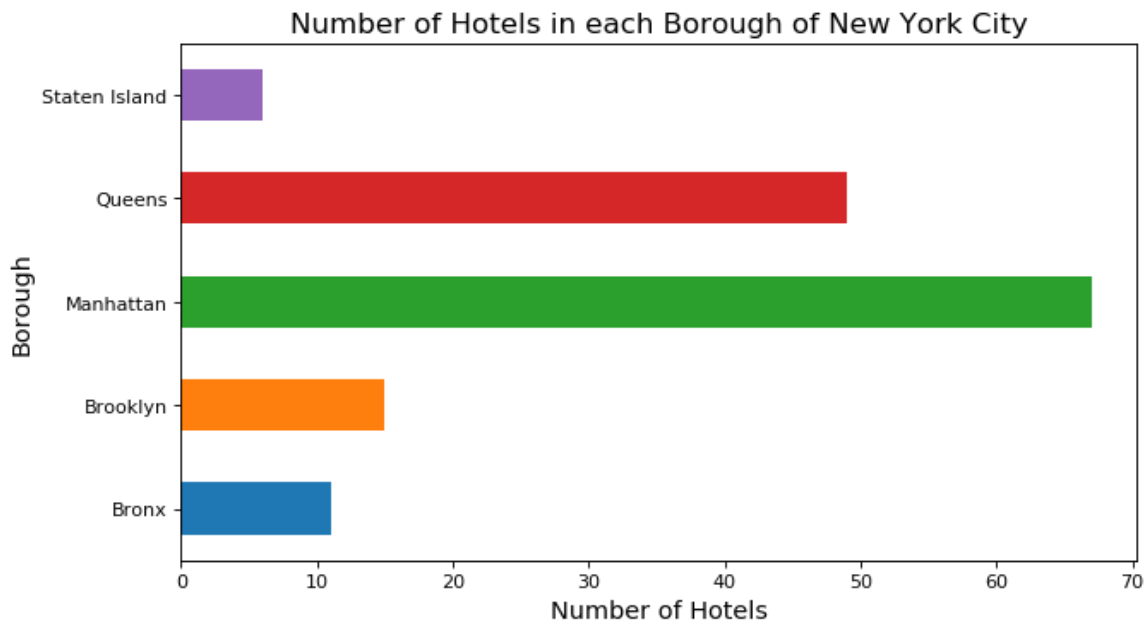
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( 294 / 306 ) Hotels in Richmond Valley, Staten Island:0
['Queens', 'Malba', 40.79060155670148, -73.82667757138641]
( 295 / 306 ) Hotels in Malba, Queens:1
['Brooklyn', 'Highland Park', 40.6819989345173, -73.890345709872]
( 296 / 306 ) Hotels in Highland Park, Brooklyn:0
['Brooklyn', 'Madison', 40.60937770113766, -73.94841515328893]
( 297 / 306 ) Hotels in Madison, Brooklyn:0
['Bronx', 'Bronxdale', 40.85272297633017, -73.86172577555115]
( 298 / 306 ) Hotels in Bronxdale, Bronx:0
['Bronx', 'Allerton', 40.86578787802982, -73.85931863221647]
( 299 / 306 ) Hotels in Allerton, Bronx:0
['Bronx', 'Kingsbridge Heights', 40.8703923914147, -73.9015226451314
4]
( 300 / 306 ) Hotels in Kingsbridge Heights, Bronx:0
['Brooklyn', 'Erasmus', 40.64692606658579, -73.94817709920184]
( 301 / 306 ) Hotels in Erasmus, Brooklyn:0
['Manhattan', 'Hudson Yards', 40.75665808227519, -74.00011136202637]
( 302 / 306 ) Hotels in Hudson Yards, Manhattan:6
['Queens', 'Hammels', 40.58733774018741, -73.80553002968718]
( 303 / 306 ) Hotels in Hammels, Queens:0
['Queens', 'Bayswater', 40.611321691283834, -73.76596781445627]
( 304 / 306 ) Hotels in Bayswater, Queens:0
['Queens', 'Queensbridge', 40.756091297094706, -73.94563070334091]
( 305 / 306 ) Hotels in Queensbridge, Queens:11
['Staten Island', 'Fox Hills', 40.61731079252983, -74.0817399221196
2]
( 306 / 306 ) Hotels in Fox Hills, Staten Island:0
```

**Manhattan has the largest number of hotels**

In [274]:

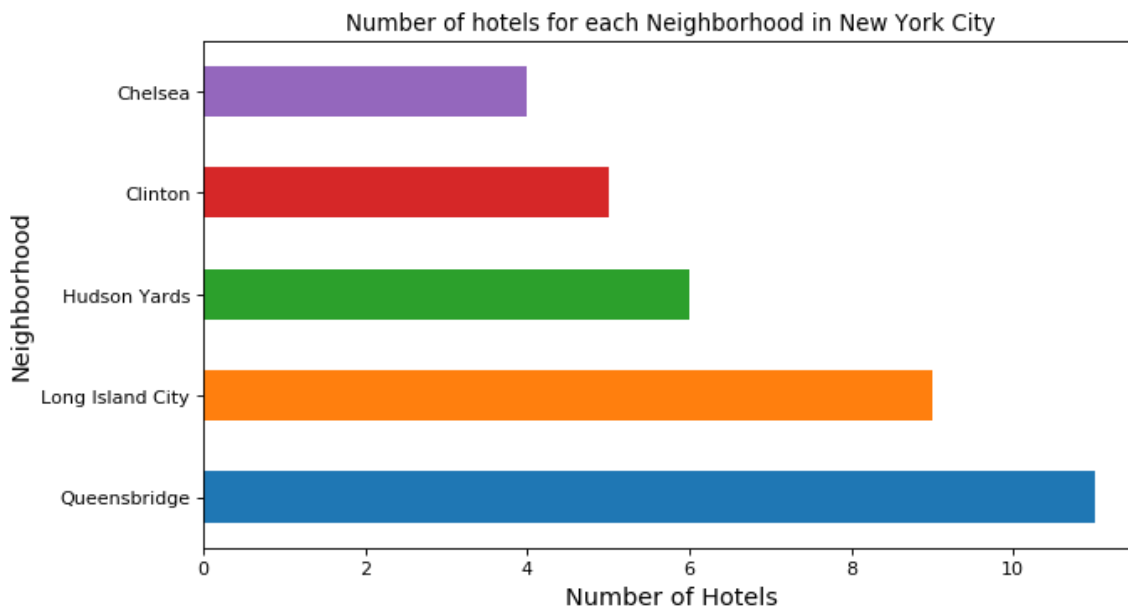
```
plt.figure(figsize=(9,5), dpi = 80)
plt.title('Number of Hotels in each Borough of New York City',fontsize = 15)
plt.ylabel('Borough', fontsize = 13)
plt.xlabel('Number of Hotels', fontsize=13)
hotel_ny.groupby('Borough')['ID'].count().plot(kind='barh')
plt.show()
plt.close()
```



**Queensbridge on top has 11 hotels**

In [275]:

```
plt.figure(figsize=(9,5), dpi = 80)
plt.title('Number of hotels for each Neighborhood in New York City')
plt.ylabel('Neighborhood', fontsize = 13)
plt.xlabel('Number of Hotels', fontsize=13)
hotel_ny.groupby('Neighborhood')['ID'].count().nlargest(5).plot(kind='barh')
plt.show()
plt.close()
```



In [276]:

```
hotel_ny[hotel_ny['Neighborhood']=='Queensbridge'].shape
```

Out[276]:

(11, 4)

## Get venue details of individual hotel

In [47]:

```
def get_venue_details(venue_id):

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

    results = requests.get(url).json()
    venue_data=results['response']['venue']
    venue_details=[]
    try:
        venue_id=venue_data['id']
        venue_name=venue_data['name']
        venue_likes=venue_data['likes']['count']
        venue_rating=venue_data['rating']
        venue_type=venue_data['categories'][1]['name']
        venue_details.append([venue_id,venue_name,venue_type,venue_likes,venue_r
ating])
    except KeyError:
        pass

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

In [94]:

```
column_names=['Borough', 'Neighborhood', 'ID','Name','Type','Likes','Rating']
hotel_stats_ny=pd.DataFrame(columns=column_names)

for row in hotel_ny.values.tolist():
    Borough,Neighborhood,ID,Name=row
    try:
        venue_details=get_venue_details(ID)
        print(venue_details)
        id,name,type,likes,rating=venue_details.values.tolist()[0]
    except IndexError:
        print('No data available for id=',ID)
        id,name,type,likes,rating=[0]*5
    hotel_stats_ny = hotel_stats_ny.append({'Borough': Borough,
                                             'Neighborhood': Neighborhood,
                                             'ID': id,
                                             'Name' : name,
                                             'Type':type,
                                             'Likes' : likes,
                                             'Rating' : rating,
                                             }, ignore_index=True)
```

```

      ID      Name      Type      Likes      Rating
0  4ca57d6e14c33704d2d0b63b  Ramada Bronx Motel          3          5.6
      ID      Name      Type      Likes      Rating
0  4ca57d6e14c33704d2d0b63b  Ramada Bronx Motel          3          5.6
No data available for id= 523122b311d2d7ba7a1a5f9c
No data available for id= 4bded394fe0e62b5b8fa0506
No data available for id= 4bded394fe0e62b5b8fa0506
No data available for id= 54932887498ee0902b1ed511
No data available for id= 54932887498ee0902b1ed511
No data available for id= 54932887498ee0902b1ed511
No data available for id= 4bded394fe0e62b5b8fa0506
Empty DataFrame
Columns: [ID, Name, Type, Likes, Rating]
Index: []
No data available for id= 4ba97dcbf964a5205e2a3ae3
No data available for id= 55fd42dd498e4df93558ce8e
No data available for id= 4bd1bb325e0cce7263e7a184
No data available for id= 54c11afe498e78ed162cf4a6
```

```

      ID      Name      Type
Likes \
0  57ed4330498e34539123c310  1 Hotel Brooklyn Bridge Wedding Hall
237
```

```

      Rating
0          9.1
No data available for id= 4a4d7a55f964a520f3ad1fe3
No data available for id= 573f2fed498eadf7637cf2bf
No data available for id= 4e8ee7de93ad4c1d6dbalc29
No data available for id= 4bd1bb325e0cce7263e7a184
No data available for id= 50ef0efb3950be41c0dc99ce
No data available for id= 572cf571cd104595c5a0ea90
No data available for id= 572cf571cd104595c5a0ea90
Empty DataFrame
Columns: [ID, Name, Type, Likes, Rating]
Index: []
No data available for id= 505c3b16e4b023e43f30e169
```

```

      ID      Name      Type      Likes      Rat
ing
0  578692f4498e1054905dbde7  Hotel 50 Bowery NYC Resort          71
9.0
No data available for id= 51050d4e5262d6654ddc83e1
No data available for id= 569823a1237c9cba6377efaf
```

```

      ID      Name      Type      Likes      Ratin
g
0  4b37853af964a520c54125e3  The Mark Hotel Hotel Bar          88          8.
7
No data available for id= 4ac8d0d3f964a520b3bc20e3
      ID      Name      Type      Likes      Rating
0  4ae0e432f964a5206e8321e3  The Surrey Spa          66          8.2
No data available for id= 4bf9bcfdb182c9b69a78795a
No data available for id= 4ae0fa2ff964a5203d8421e3
No data available for id= 4b58b0a5f964a520d66528e3
No data available for id= 4c2cdf2d8ef52d7fed9933ba
No data available for id= 53c5b774498e3c9a5c9219b8
No data available for id= 4a9f2ec3f964a520d73c20e3
No data available for id= 558dff09498e0910b7cbf9bd
No data available for id= 4b4e71caf964a520f8ed26e3
No data available for id= 56e0aba1498e940b849c48f6
No data available for id= 50eab63be4b09d1aedfe4e75
No data available for id= 518907b0498e1bdcf2664496
No data available for id= 518907b0498e1bdcf2664496
```

```
6/9/2019 DP0701EN-2-2-1-Foursquare-API-py-v1
No data available for id= 4bcd6bd937ca593fa40ad92
No data available for id= 59d793890a464d2a7845df62
No data available for id= 515a1b3ee4b0f84f522c4b7f
ID Name Type Likes Rating
0 40a16900f964a520f9f21ee3 Soho House Lounge 1101 9.2
No data available for id= 49d3d4a7f964a5201a5c1fe3
No data available for id= 4ac7e4a7f964a52065ba20e3
No data available for id= 5a71f5dafdb9a7499731c928
No data available for id= 536020eb11d2ce653fb711d0
ID Name Type Likes Rati
ng
0 4ab6c985f964a5200a7920e3 Greenwich Hotel Hotel Bar 92
8.8
No data available for id= 57c98c00498ede2ae6ad9755
No data available for id= 3fd66200f964a520bbe61ee3
No data available for id= 5a71f5dafdb9a7499731c928
No data available for id= 51050d4e5262d6654ddc83e1
ID Name Type Likes Rat
ing
0 578692f4498e1054905dbde7 Hotel 50 Bowery NYC Resort 71
9.0
No data available for id= 4ac7e4a7f964a52065ba20e3
No data available for id= 4ac7e4a7f964a52065ba20e3
No data available for id= 5a71f5dafdb9a7499731c928
No data available for id= 59d4126b8194fc768a2cfcde
No data available for id= 554c1b85498efa107620d07e
No data available for id= 4f22ca77e4b0ed3396a83a05
No data available for id= 57c640ad498e74977f98372f
ID Name Type Likes Rating
0 57ab3eb5498e2efa275dfef3 AKA Wall Street Resort 21 8.3
No data available for id= 566c66b838fa37fd4827c98e
No data available for id= 54aed577498ee5fc196739f7
No data available for id= 56d8c0f8498edb854f926e6a
No data available for id= 4bc382ebdce4eee1c8a2719d
No data available for id= 5523e3a6498eef3943a338dc
No data available for id= 569891a9498e0563f3617261
No data available for id= 59a7f381ccad6b7122ad13dd
No data available for id= 58217f14f5958470beea42d9
No data available for id= 5578639e498eb1d3badc495f
No data available for id= 5368e8d5498ec356083c4749
No data available for id= 575df971498eeee07a23079c
No data available for id= 522f406dbce6c9e333db1578
No data available for id= 4bf9bcfdb182c9b69a78795a
No data available for id= 4bc350f7dce4eee1838b719d
No data available for id= 5983beda04d1ae5cf67bba7d
No data available for id= 597a868d033693058a57056e
No data available for id= 4a41ee2ff964a5209fa51fe3
Empty DataFrame
Columns: [ID, Name, Type, Likes, Rating]
Index: []
No data available for id= 522bb48011d2b2f9b3d237d4
No data available for id= 4bc3bd01dce4eee107bb719d
ID Name
Type \
0 52af19d111d24b820c70cad6 Crowne Plaza JFK Airport New York City
Resort
Likes Rating
0 81 7.0
Empty DataFrame
Columns: [ID, Name, Type, Likes, Rating]
```



```
Index: []
No data available for id= 4ad4bb89f964a520f5e820e3
No data available for id= 4ff6e46764a40b36eb17ac2c
No data available for id= 5ba9d85942d8c2002cf94ce6
Empty DataFrame
Columns: [ID, Name, Type, Likes, Rating]
Index: []
No data available for id= 593ee5442ebb34636fb99f55
Empty DataFrame
Columns: [ID, Name, Type, Likes, Rating]
Index: []
No data available for id= 5b1ccd497cd14c0044b94f5e
Empty DataFrame
Columns: [ID, Name, Type, Likes, Rating]
Index: []
No data available for id= 4fffb2309e4b0cfb37152803c
No data available for id= 4b7a05e0f964a5207b1f2fe3
No data available for id= 5717bc73498ec5d6759b6935
No data available for id= 5717bc73498ec5d6759b6935
No data available for id= 5578639e498eb1d3badc495f
Empty DataFrame
Columns: [ID, Name, Type, Likes, Rating]
Index: []
No data available for id= 4c16d91c5e88c92826d62466
No data available for id= 4b53f852f964a520c1af27e3
Empty DataFrame
Columns: [ID, Name, Type, Likes, Rating]
Index: []
No data available for id= 4bc41a1cdce4eee163f0719d
No data available for id= 4c0055bfad15a5931dbe8d73
No data available for id= 4c96c79482b56dcdb0bde4aa
Empty DataFrame
Columns: [ID, Name, Type, Likes, Rating]
Index: []
No data available for id= 4bc41a1ddce4eee165f0719d
No data available for id= 4c0055bfad15a5931dbe8d73
No data available for id= 587f8878c45ee34e4c6c2f8a
No data available for id= 4ab04eb9f964a520fe6620e3
No data available for id= 51050d4e5262d6654ddc83e1
No data available for id= 57c640ad498e74977f98372f
No data available for id= 56d8c0f8498edb854f926e6a
No data available for id= 3fd66200f964a520bbe61ee3
ID Name Type Likes Rating
0 4ab6c985f964a5200a7920e3 Greenwich Hotel Hotel Bar 92
8.8
No data available for id= 4bec60a5f909ef3b2808a9c6
ID Name Type Likes Rating
0 4ae6f117f964a520a6a721e3 The NoMad Hotel Roof Deck 361
9.3
No data available for id= 518907b0498e1bdcf2664496
Empty DataFrame
Columns: [ID, Name, Type, Likes, Rating]
Index: []
No data available for id= 4bc41a1cdce4eee163f0719d
No data available for id= 5ba9d85942d8c2002cf94ce6
Empty DataFrame
Columns: [ID, Name, Type, Likes, Rating]
Index: []
No data available for id= 5b1ccd497cd14c0044b94f5e
```

Empty DataFrame

Columns: [ID, Name, Type, Likes, Rating]

Index: []

No data available for id= 4fffb2309e4b0cfb37152803c

Empty DataFrame

Columns: [ID, Name, Type, Likes, Rating]

Index: []

No data available for id= 593ee5442ebb34636fb99f55

No data available for id= 4b7a05e0f964a5207b1f2fe3

Empty DataFrame

Columns: [ID, Name, Type, Likes, Rating]

Index: []

No data available for id= 573f99df498ea33968800d06

No data available for id= 4bded394fe0e62b5b8fa0506

No data available for id= 4afb479af964a520951c22e3

No data available for id= 4e87b2e329c23b6afa01d71a

No data available for id= 4d1b7e9502a66dcb92846965

No data available for id= 4a7b8beaf964a52058eb1fe3

No data available for id= 4fe0634b7beb303528d17f94

No data available for id= 4a2af98bf964a52077961fe3

No data available for id= 5600aefd498e62f1e09fb66f

No data available for id= 554c1b85498efa107620d07e

No data available for id= 59d4126b8194fc768a2cfcde

No data available for id= 4bc350f7dce4eee1838b719d

ID

Name

Type

Likes \

0 57ed4330498e34539123c310 1 Hotel Brooklyn Bridge Wedding Hall  
237

Rating

0 9.1

No data available for id= 53c5b244498e0ffbbdc92ef4

ID

Name

Type

Likes \

0 57ed4330498e34539123c310 1 Hotel Brooklyn Bridge Wedding Hall  
237

Rating

0 9.1

No data available for id= 4bc35177dce4eee1c38b719d

No data available for id= 4b58b0a5f964a520d66528e3

No data available for id= 558dff09498e0910b7cbf9bd

No data available for id= 4da5dd2fcdalc55f755f88c5

No data available for id= 53c5b774498e3c9a5c9219b8

No data available for id= 4ee2659f61aff90fe487904f

No data available for id= 5a7b352bd807ee3ef81d893c

No data available for id= 4bf9bcfdb182c9b69a78795a

No data available for id= 5578639e498eb1d3badc495f

No data available for id= 5523e3a6498eef3943a338dc

No data available for id= 4f7f7611e4b09855f239377e

No data available for id= 59a7f381ccad6b7122ad13dd

No data available for id= 569891a9498e0563f3617261

No data available for id= 4b494c3df964a520c36c26e3

No data available for id= 58217f14f5958470beea42d9

ID

Name

Type

Likes

Rating

0 4dfa7f1c8877b30c3988120f Z NYC Hotel American Restaurant 73  
6.9

No data available for id= 57193525498e590d64281443

No data available for id= 4bd2ecbf9854d13a017efc4d

## Drop hotels missing available data

In [95]:

```
hotel_stats=hotel_stats_ny[hotel_stats_ny.ID != 0].reset_index(drop=True)
```

In [96]:

```
hotel_stats
```

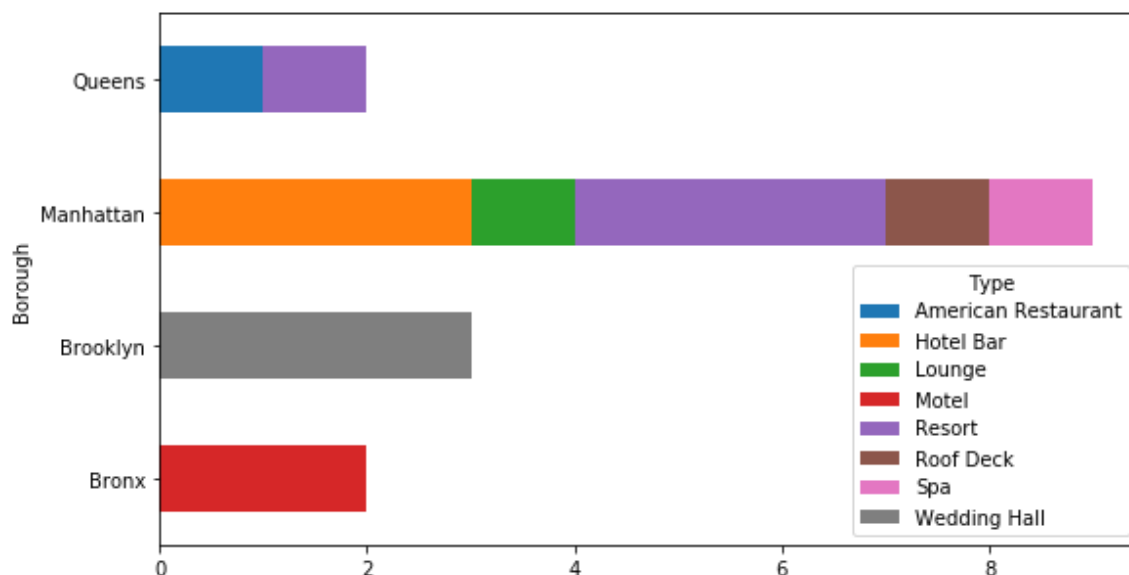
Out[96]:

	Borough	Neighborhood	ID	Name	Type	Like
0	Bronx	Co-op City	4ca57d6e14c33704d2d0b63b	Ramada Bronx	Motel	3
1	Bronx	Eastchester	4ca57d6e14c33704d2d0b63b	Ramada Bronx	Motel	3
2	Brooklyn	Brooklyn Heights	57ed4330498e34539123c310	1 Hotel Brooklyn Bridge	Wedding Hall	237
3	Manhattan	Chinatown	578692f4498e1054905dbde7	Hotel 50 Bowery NYC	Resort	71
4	Manhattan	Upper East Side	4b37853af964a520c54125e3	The Mark Hotel	Hotel Bar	88
5	Manhattan	Upper East Side	4ae0e432f964a5206e8321e3	The Surrey	Spa	66
6	Manhattan	Chelsea	40a16900f964a520f9f21ee3	Soho House	Lounge	110
7	Manhattan	Tribeca	4ab6c985f964a5200a7920e3	Greenwich Hotel	Hotel Bar	92
8	Manhattan	Little Italy	578692f4498e1054905dbde7	Hotel 50 Bowery NYC	Resort	71
9	Manhattan	Financial District	57ab3eb5498e2efa275dfef3	AKA Wall Street	Resort	21
10	Queens	South Ozone Park	52af19d111d24b820c70cad6	Crowne Plaza JFK Airport New York City	Resort	81
11	Manhattan	Civic Center	4ab6c985f964a5200a7920e3	Greenwich Hotel	Hotel Bar	92
12	Manhattan	Midtown South	4ae6f117f964a520a6a721e3	The NoMad Hotel	Roof Deck	361
13	Brooklyn	Fulton Ferry	57ed4330498e34539123c310	1 Hotel Brooklyn Bridge	Wedding Hall	237
14	Brooklyn	Dumbo	57ed4330498e34539123c310	1 Hotel Brooklyn Bridge	Wedding Hall	237
15	Queens	Queensbridge	4dfa7f1c8877b30c3988120f	Z NYC Hotel	American Restaurant	73

we can see foursquare has more hotels data available in Manhattan , which also has the most variety of hotel types.

In [347]:

```
hotel_stats.groupby(['Borough', 'Type'])['ID'].count().unstack().plot(kind='barh',
,stacked=True,figsize=(9,5))
plt.show()
```



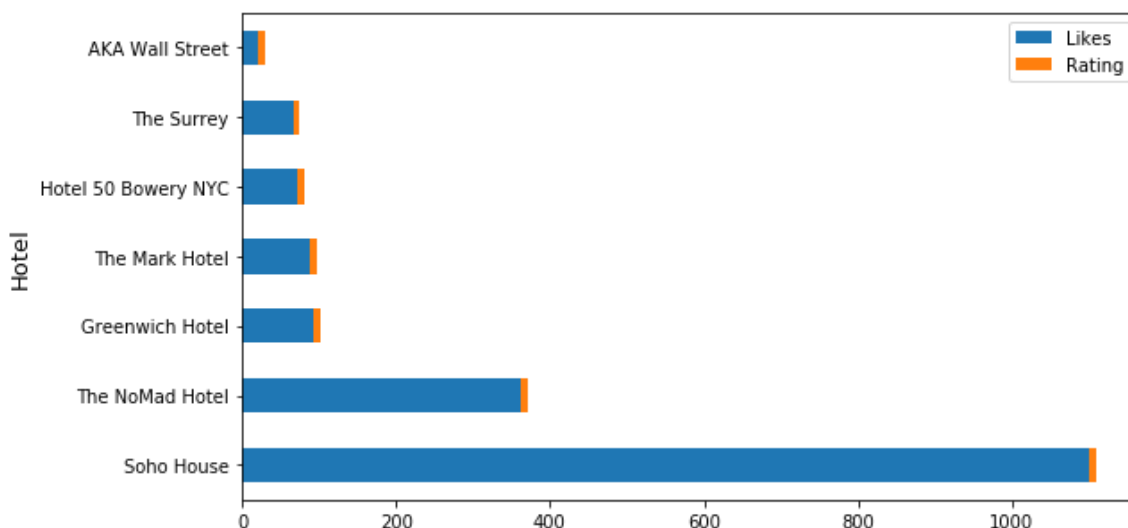
## 2. Explore an affordable hotel in Manhattan

[https://www.kayak.com/New-York-Hotels.15830.hotel.ksp?gclid=CjwKCAjwue3nBRACEiwAkpZhmR\\_IQCbfWMLn47unjmDwp\\_ulQkb8xA96Sl\\_p8JF55zVpUnl3hrC](https://www.kayak.com/New-York-Hotels.15830.hotel.ksp?gclid=CjwKCAjwue3nBRACEiwAkpZhmR_IQCbfWMLn47unjmDwp_ulQkb8xA96Sl_p8JF55zVpUnl3hrC)  
[https://www.kayak.com/New-York-Hotels.15830.hotel.ksp?gclid=CjwKCAjwue3nBRACEiwAkpZhmR\\_IQCbfWMLn47unjmDwp\\_ulQkb8xA96Sl\\_p8JF55zVpUnl3hrC](https://www.kayak.com/New-York-Hotels.15830.hotel.ksp?gclid=CjwKCAjwue3nBRACEiwAkpZhmR_IQCbfWMLn47unjmDwp_ulQkb8xA96Sl_p8JF55zVpUnl3hrC)

- Downtown Manhattan is a calm and historic area south of 14th Street, where you can find Hilton Garden Inn New York, which provides amenities including a gym. Midtown is located between 34th Street and 59th Street, near the busy Times Square area, where you can find The Roosevelt Hotel, which has rooms with a terrace.
- If you're visiting Manhattan on a budget, there are some **affordable options** if you are willing to stay a bit further from Times Square. Consider the Upper West Side or Upper East Side, where you can go for a walk in Central Park or enjoy attractions like the Museum of Modern Art (MoMA). A convenient option in these areas could be the Empire Hotel, which has a rooftop pool. Another cheap option could be The Franklin Hotel, which provides a free breakfast.
- Those attracted to outdoors and green spaces should head to **Greenwich Village**, just a 10-minute subway ride away from Central Park. There you will find several hotels with a pool, where you can relax after taking in the surroundings. Some examples are the Saratoga Hilton, the **Holiday Inn Saratoga Springs**, the Union Gables Bed & Breakfast and the Landmark Motor Inn.

In [348]:

```
man_stats=hotel_stats[hotel_stats['Borough']=='Manhattan'].sort_values(by=['Likes', 'Rating'],ascending=False)
man_stats=man_stats[['Name', 'Likes', 'Rating']].drop_duplicates().set_index(['Name'])
man_stats.plot(kind='barh',stacked=True, figsize=(9,5))
plt.ylabel('Hotel', fontsize = 13)
plt.show()
plt.close()
```



**Top rated ones are not easy on a budget. However we can see Soho house has way better ratings than the rest.**

## Pod 39 Hotel

In an elegant brick building in Manhattan's Murray Hill, this excellent **budget** option opened following the success of sister hotel, The Pod. It trumps the elder sibling – now renamed Pod 51 – as all its rooms are en suite and it has a fabulous brick-pillared rooftop bar serving tacos and a warm atmosphere amid fairylights and stunning views. The rooms, some with bunk beds, are called pods given their compact size and may not suit everyone. But with prices among the most competitive in Manhattan, budgeters will be happy. Other nice touches include free passes to customised group walking tours of the city, held four days a week by guides Streetwise New York. <https://www.theguardian.com/travel/2016/jun/20/10-best-affordable-new-hotels-new-york-city-brooklyn> (<https://www.theguardian.com/travel/2016/jun/20/10-best-affordable-new-hotels-new-york-city-brooklyn>)

In [157]:

```
hotel_ny[hotel_ny['Name']=='Pod 39 Hotel']
```

Out[157]:

	Borough	Neighborhood	ID	Name
121	Manhattan	Tudor City	4fe0634b7beb303528d17f94	Pod 39 Hotel

### Get the venue's details

In [191]:

```
venue_id = '4fe0634b7beb303528d17f94'
url = 'https://api.foursquare.com/v2/venues/{}?client_id={} & client_secret={} & v={}'.format(venue_id, CLIENT_ID, CLIENT_SECRET, VERSION)
result = requests.get(url).json()
```

### Get the venue's overall rating

In [184]:

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

8.4

Relatively good rating considering price.

### Get the number of tips



In [185]:

```
result['response']['venue']['tips']['count']
```

Out[185]:

113

### Get the venue's tips

Create URL and send GET request. Make sure to set limit to get all tips

In [186]:

```
limit = 15 # set limit to be greater than or equal to the total number of tips
url = 'https://api.foursquare.com/v2/venues/{}/tips?client_id={}&client_secret={}&v={}&limit={}'.format(venue_id, CLIENT_ID, CLIENT_SECRET, VERSION, limit)
results = requests.get(url).json()
results
```

Out[186]:

```
{'meta': {'code': 200, 'requestId': '5cfbe9eedb04f52f6130ad39'},
 'response': {'tips': {'count': 113,
 'items': [{'agreeCount': 3,
 'canonicalUrl': 'https://foursquare.com/item/50d23f6ae4b0d30355
96b148',
 'createdAt': 1355956074,
 'disagreeCount': 0,
 'id': '50d23f6ae4b0d3035596b148',
 'lang': 'en',
 'likes': {'count': 0, 'groups': []},
 'logView': True,
 'photo': {'createdAt': 1355956090,
 'height': 540,
 'id': '50d23f7ae4b0347489b62c5c',
 'prefix': 'https://fastly.4sqi.net/img/general/',
 'source': {'name': 'Foursquare for iOS',
 'url': 'https://foursquare.com/download/#/iphone'},
 'suffix': '/16366048_DAsP_CUwvwQxE_QaTWN4h8gpINUoVdgFCxkB_RZVb
zM.jpg',
 'visibility': 'public',
 'width': 720},
 'photourl': 'https://fastly.4sqi.net/img/general/original/16366
048_DAsP_CUwvwQxE_QaTWN4h8gpINUoVdgFCxkB_RZVbzM.jpg',
 'text': "Best hotel room ever! So efficient. There's a mini tab
le, light and outlet by each pillow, tv at the end of each bed and s
ee through shower/bathroom wall (awkward when staying with your guy
friend...) ",
 'todo': {'count': 0},
 'type': 'user',
 'user': {'firstName': 'Kelly',
 'gender': 'female',
 'id': '16366048',
 'lastName': 'D',
 'photo': {'prefix': 'https://fastly.4sqi.net/img/user/',
 'suffix': '/JBPZ51I1RR13OELO.jpg'}}}},
 {'agreeCount': 1,
 'canonicalUrl': 'https://foursquare.com/item/57c55982cd102cbf0b
c01b7e',
 'createdAt': 1472551298,
 'disagreeCount': 0,
 'id': '57c55982cd102cbf0bc01b7e',
 'lang': 'en',
 'likes': {'count': 0, 'groups': []},
 'logView': True,
 'text': "All-round cool, modern, good value-for-money hotel in
a very convenient location in Manhattan. Just one thing to make it b
etter - remove the captive login for the Wi-Fi. It's really annoyin
g!",
 'todo': {'count': 0},
 'type': 'user',
 'user': {'firstName': 'Kenneth',
 'gender': 'male',
 'id': '14934823',
 'lastName': 'M',
 'photo': {'prefix': 'https://fastly.4sqi.net/img/user/',
 'suffix': '/14934823-U3VSI0Z2ZX4MHEWY.jpg'}}}}]}
```

## Get tips and list of associated features

In [187]:

```
tips = results['response']['tips']['items']  
  
tip = results['response']['tips']['items'][0]  
tip.keys()
```

Out[187]:

```
dict_keys(['user', 'type', 'id', 'lang', 'agreeCount', 'createdAt',  
'canonicalUrl', 'logView', 'todo', 'photo', 'text', 'photourl', 'likes', 'disagreeCount'])
```

## Format column width and display all tips

In [192]:

```
pd.set_option('display.max_colwidth', -1)
from pandas.io.json import json_normalize
tips_df = json_normalize(tips) # json normalize tips
filtered_columns = ['text', 'agreeCount', 'disagreeCount', 'id', 'user.firstName', 'user.lastName', 'user.gender', 'user.id']
tips_filtered = tips_df.loc[:, filtered_columns]

tips_filtered
```

Out[192]:

	text	agreeCount	disagreeCount	id	user.firs
0	Best hotel room ever! So efficient. There's a mini table, light and outlet by each pillow, tv at the end of each bed and see through shower/bathroom wall (awkward when staying with your guy friend...)	3	0	50d23f6ae4b0d3035596b148	Kelly
1	All-round cool, modern, good value-for-money hotel in a very convenient location in Manhattan. Just one thing to make it better - remove the captive login for the Wi-Fi. It's really annoying!	1	0	57c55982cd102cbf0bc01b7e	Kenneth

**Explore venues near hotel**

In [193]:

```
url = 'https://api.foursquare.com/v2/venues/{}/nextvenues?client_id={}&client_se  
cret={}&v={}&limit={}'.format(venue_id, CLIENT_ID, CLIENT_SECRET, VERSION, limit  
)  
results = requests.get(url).json()
```

Out[193]:

```
{'meta': {'code': 200, 'requestId': '5cfbedaaf594df57ec474405'},
 'response': {'nextVenues': {'count': 5,
 'items': [{'categories': [{'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/nightlife/cocktails_',
 'suffix': '.png'},
 'id': '4bf58dd8d48988d11e941735',
 'name': 'Cocktail Bar',
 'pluralName': 'Cocktail Bars',
 'primary': True,
 'shortName': 'Cocktail'}]},
 'id': '502eabc5e4b0bde7260e8391',
 'location': {'address': '145 E 39th St',
 'cc': 'US',
 'city': 'New York',
 'country': 'United States',
 'crossStreet': 'btw Lexington & 3rd Ave',
 'formattedAddress': ['145 E 39th St (btw Lexington & 3rd Av
e)',
 'New York, NY 10016',
 'United States']},
 'labeledLatLngs': [{'label': 'display',
 'lat': 40.749300142910926,
 'lng': -73.97670163802239}],
 'lat': 40.749300142910926,
 'lng': -73.97670163802239,
 'postalCode': '10016',
 'state': 'NY'},
 'name': 'Pod 39 Rooftop Bar'},
 {'categories': [{'icon': {'prefix': 'https://ss3.4sqi.net/img/ca
tegories_v2/food/coffeeshop_',
 'suffix': '.png'},
 'id': '4bf58dd8d48988d1e0931735',
 'name': 'Coffee Shop',
 'pluralName': 'Coffee Shops',
 'primary': True,
 'shortName': 'Coffee Shop'}]},
 'id': '44afd4e4f964a5202d351fe3',
 'location': {'address': '360 Lexington Ave',
 'cc': 'US',
 'city': 'New York',
 'country': 'United States',
 'crossStreet': 'at E 40th St',
 'formattedAddress': ['360 Lexington Ave (at E 40th St)',
 'New York, NY 10017',
 'United States']},
 'labeledLatLngs': [{'label': 'display',
 'lat': 40.75033,
 'lng': -73.97704}],
 'lat': 40.75033,
 'lng': -73.97704,
 'postalCode': '10017',
 'state': 'NY'},
 'name': 'Starbucks'},
 {'categories': [{'icon': {'prefix': 'https://ss3.4sqi.net/img/ca
tegories_v2/food/diner_',
 'suffix': '.png'},
 'id': '4bf58dd8d48988d147941735',
 'name': 'Diner',
 'pluralName': 'Diners',
```



```

    'primary': True,
    'shortName': 'Diner'}],
  'delivery': {'id': '273721',
    'provider': {'icon': {'name': '/delivery_provider_seamless_201
80129.png',
    'prefix': 'https://fastly.4sqi.net/img/general/cap/',
    'sizes': [40, 50]},
    'name': 'seamless'},
    'url': 'https://www.seamless.com/menu/scottys-diner-336-lexing
ton-ave-new-york/273721?affiliate=1131&utm_source=foursquare-affilia
te-network&utm_medium=affiliate&utm_campaign=1131&utm_content=27372
1'}},
  'id': '4a62028cf964a520d2c21fe3',
  'location': {'address': '336 Lexington Ave',
    'cc': 'US',
    'city': 'New York',
    'country': 'United States',
    'crossStreet': 'btwn 39th St & 40th St',
    'formattedAddress': ['336 Lexington Ave (btwn 39th St & 40th S
t)',
    'New York, NY 10016',
    'United States']},
  'labeledLatLngs': [{'label': 'display',
    'lat': 40.749718,
    'lng': -73.977469}],
  'lat': 40.749718,
  'lng': -73.977469,
  'postalCode': '10016',
  'state': 'NY'},
  'name': "Scotty's Diner",
  'venuePage': {'id': '68082609'}},
  {'categories': [{'icon': {'prefix': 'https://ss3.4sqi.net/img/ca
tegories_v2/food/burger_',
    'suffix': '.png'},
    'id': '4bf58dd8d48988d16c941735',
    'name': 'Burger Joint',
    'pluralName': 'Burger Joints',
    'primary': True,
    'shortName': 'Burgers'}]},
  'id': '5460fb3b498e94400cc7fd29',
  'location': {'address': '600 3rd Ave',
    'cc': 'US',
    'city': 'New York',
    'country': 'United States',
    'crossStreet': 'at E 40th St',
    'formattedAddress': ['600 3rd Ave (at E 40th St)',
    'New York, NY 10016',
    'United States']},
  'labeledLatLngs': [{'label': 'display',
    'lat': 40.74966574698551,
    'lng': -73.97571869830242}],
  'lat': 40.74966574698551,
  'lng': -73.97571869830242,
  'postalCode': '10016',
  'state': 'NY'},
  'name': 'Shake Shack'},
  {'categories': [{'icon': {'prefix': 'https://ss3.4sqi.net/img/ca
tegories_v2/parks_outdoors/plaza_',
    'suffix': '.png'},
    'id': '4bf58dd8d48988d164941735',
    'name': 'Plaza',

```

```

        'pluralName': 'Plazas',
        'primary': True,
        'shortName': 'Plaza'}],
'id': '49b7ed6df964a52030531fe3',
'location': {'address': 'Broadway & 7th Ave',
'cc': 'US',
'city': 'New York',
'country': 'United States',
'crossStreet': 'btwn 42nd & 47th St',
'formattedAddress': ['Broadway & 7th Ave (btwn 42nd & 47th S
t)',
        'New York, NY 10036',
        'United States'],
'lat': 40.756936778141636,
'lng': -73.98603031011922,
'postalCode': '10036',
'state': 'NY'},
'name': 'Times Square'}}}]}}

```

In [234]:

```

nearby_list=[]
for i in range(results['response']['nextVenues']['count']):
    nearby=results['response']['nextVenues']['items'][i]['categories'][0]['sh
ortName']
    nearby_list.append(nearby)
nearby_list

```

Out[234]:

```
['Cocktail', 'Coffee Shop', 'Diner', 'Burgers', 'Plaza']
```

### 3. Search for a possible place for the new hotel

#### Search for similar hotels

In [235]:

```

url = 'https://api.foursquare.com/v2/venues/{}/similar?client_id={}&client_secre
t={}&v={}&limit={}'.format(venue_id, CLIENT_ID, CLIENT_SECRET, VERSION, limit)
results = requests.get(url).json()

```

In [253]:

```

column_names = ['ID', 'Name']
similar_list = []
pd.DataFrame(columns=column_names)
for i in range(results['response']['similarVenues']['count']):
    similar_id=results['response']['similarVenues']['items'][i]['id']
    similar_name=results['response']['similarVenues']['items'][i]['name']
    similar_list.append([similar_id,similar_name])
similar_df=pd.DataFrame(similar_list,columns=column_names)

```

#### ID and Name of similar hotels

In [254]:

similar\_df

Out[254]:

	ID	Name
0	43b042a4f964a520962c1fe3	The Roosevelt Hotel
1	48636489f964a520e0501fe3	Gramercy Park Hotel
2	4bc4f73c0191c9b6d2e8eab1	The Manhattan at Times Square Hotel
3	465f30baf964a52054471fe3	Dream Midtown
4	44d7b1f3f964a52070361fe3	W New York - Union Square

### Get nearby venues of those similar hotels

In [278]:

```
def nearby(venue_id):
    url = 'https://api.foursquare.com/v2/venues/{}/nextvenues?client_id={}&client_secret={}&v={}&limit={}'.format(venue_id, CLIENT_ID, CLIENT_SECRET, VERSION, limit)
    results = requests.get(url).json()
    nearby_list=[]
    for i in range(results['response']['nextVenues']['count']):
        nearby=results['response']['nextVenues']['items'][:,i]['categories'][0]['shortName']
        nearby_list.append(nearby)
    return nearby_list
```

In [321]:

```
nearby_l=[]
for i in range(similar_df.shape[0]):
    n=nearby(similar_df['ID'][i])
    nearby_l.append(n)
```

In [322]:

```
from itertools import chain
nearby_l.append(nearby_list)
nearby_venues=pd.DataFrame(list(chain.from_iterable(nearby_l)),columns=['name'])
```

In [323]:

```
nearby_venues['count']=1
nearby_venues=nearby_venues.groupby('name').count().sort_values(by='count',ascending=False)
nearby_venues
```

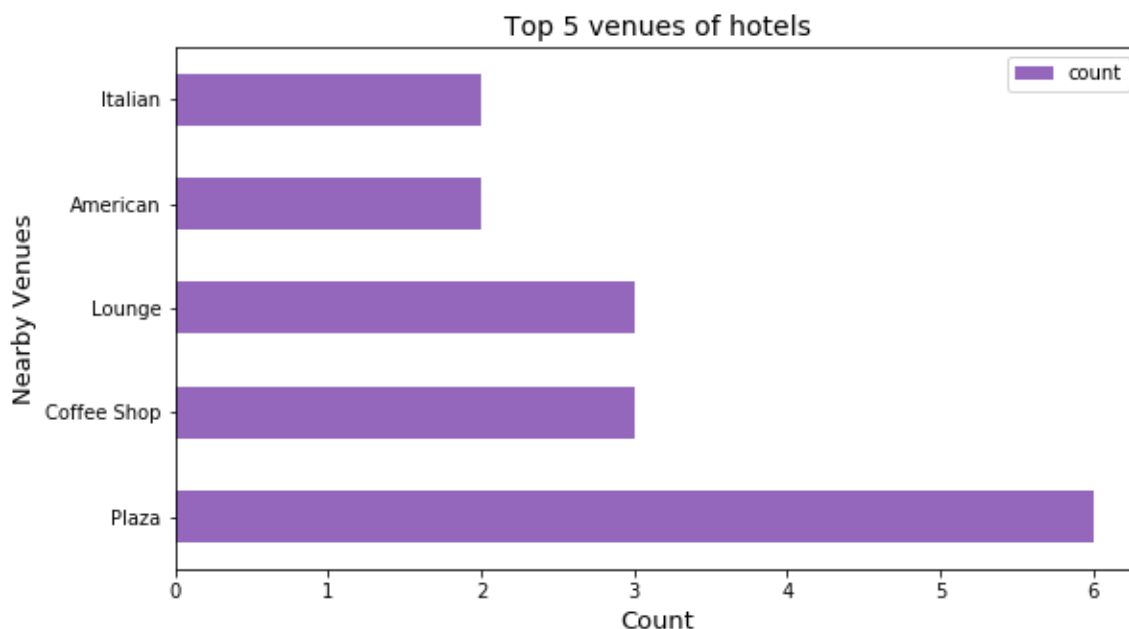
Out[323]:

	count
name	
Plaza	6
Coffee Shop	3
Lounge	3
American	2
Italian	2
Park	2
Pub	1
Pizza	1
Nightclub	1
Hotel Bar	1
Bookstore	1
Farmer's Market	1
Electronics	1
Diner	1
Cocktail	1
Candy Store	1
Burgers	1
Roof Deck	1

Display Top 5 venues near those similar hotels

In [356]:

```
nearby_venues.head(5).plot(kind='barh', figsize=(9,5),color='#9467bd')
plt.ylabel('Nearby Venues', fontsize = 13)
plt.xlabel('Count', fontsize=13)
plt.title('Top 5 venues of hotels', fontsize=14)
plt.show()
```



## 4. Find 5 possible neighborhood for the new hotel

In [392]:

```
l=nearby_venues.head(5).index.tolist()
```

In [384]:

```
column_names=['Borough', 'Neighborhood']
s=[]
sm=[]
for row in new_york_data.values.tolist():
    Borough, Neighborhood, Latitude, Longitude=row
    venues = get_venues(Latitude,Longitude)
    cn=[]
    for i in l:
        nb=venues[venues['Category']==i]
        cn.append(str(len(nb)))
    sm=[Borough,Neighborhood]+cn
    s.append(sm)
```

In [389]:

```
df=pd.DataFrame(s,columns=column_names+l)
df.sort_values(by=l,ascending=False,inplace=True)
```

In [391]:

```
df.head(5)
```

Out[391]:

	<b>Borough</b>	<b>Neighborhood</b>	<b>Plaza</b>	<b>Coffee Shop</b>	<b>Lounge</b>	<b>American</b>	<b>Italian</b>
<b>112</b>	Manhattan	Lincoln Square	4	5	1	1	4
<b>127</b>	Manhattan	Battery Park City	3	7	0	2	1
<b>114</b>	Manhattan	Midtown	3	4	1	1	2
<b>58</b>	Brooklyn	Windsor Terrace	3	4	0	3	5
<b>59</b>	Brooklyn	Prospect Heights	3	3	0	3	2

## 5. Conclusion

- In terms of popularity, traffic flow and transportation, a new affordable hotel should be located in Manhattan. Possible neighborhoods using those set of data are Lincoln Square, Battery Park City and Midtown. Neighborhood can vary due to different clustering categories.
- One obstacle of using Foursquare API for hotels is that many data are not available, thus rating and likes information can not be extracted, leading to nearly depending on those feedback data at all.
- In this report I only used near by venues of similar hotels recommended by Foursquare API, which is feeded by my chosen prototype hotel, Pod 39.
- As the answer to the project question, I would recommend Manhattan Midtown, upper east side and Greenwich Village. A good trade off between pricy place and passenger flow should be further studied.