Which city to visit when you want to see museums?

1. Introduction

1a. Background

When travelers go on vacation, they try to reduce costs by spending less on transportation. Many will avoid renting a car and want a city where everything is close by. These travelers are trying to determine the best city to travel to with the greatest number of museums close by. This project will focus on comparing multiple cities within the United States to determine which location has the highest density of museums.

1b. Problem

We want to determine which city has the highest density of museums which would require the least amount of traveling within the city.

1c. Target Audience

The target audience is anyone looking for an educational vacation with multiple museums within a close area.

2. Data Section

2a. Data

FourSquare API will be where the data comes from because museums can be captured with a code of 4bf58dd8d48988d181941735. I'll collect data for the most popular cities for museums which is San Francisco, CA, Baltimore, MD, Boston, MA, Philadelphia, PA, New Orleans, LA, Seattle, WA, Los Angeles, CA, Chicago, IL, Washington DC, and New York, NY. This will provide me with a good population to compare to determine who has the highest density of museums. This analysis will allow for our museum goers to be able to experience as much as possible during their trip.

Note: The FourSquare data will max at 100 records for each city.

2b. Process Overview

The method to collecting and comparing this data is to compare the top museums within the selected cities. Each city will be displayed on a map with all museum datapoints present to see which map is the most clustered together. The mean distance between the city and the museums will be calculated to ultimately determine which city has the highest density of museums. Once the data is collected and analyzed, we will be able to conclude and have a solution for our target audience.

3. Methodology

3a. Central Location Calculation

First calculation needed was where the central location was for each city. To do this we took the museum locations for each city and took the mean of the latitude and longitude for each city. This resulted in a corresponding latitude and longitude for the respective city.

3b. Mean Distance Calculation

Next, we needed to calculate the mean distance to each museum location. This required calculating the distance from the central point calculated in the previous section and finding the distance between that location to the museum location. Then we took those numbers and calculated the mean distance.

3c. Map Creation

We took all the results from the FourSquare data and created a map for each individual city. On the map, we added a blue dot for every museum, a black dot for the central location, and added a name and mean distance to the top of each map. This provided us with a useful visual of each city to see how clustered or spread out the city was. Figures 1 through 10 show each individual map that was produced. Visually, it looks like Los Angeles, CA and Chicago, IL are the most spread out cities and Washington DC and New Orleans, LA are the most clustered together.

```
Baltimore, MD
0.020073717409405126
```

Out[142]:

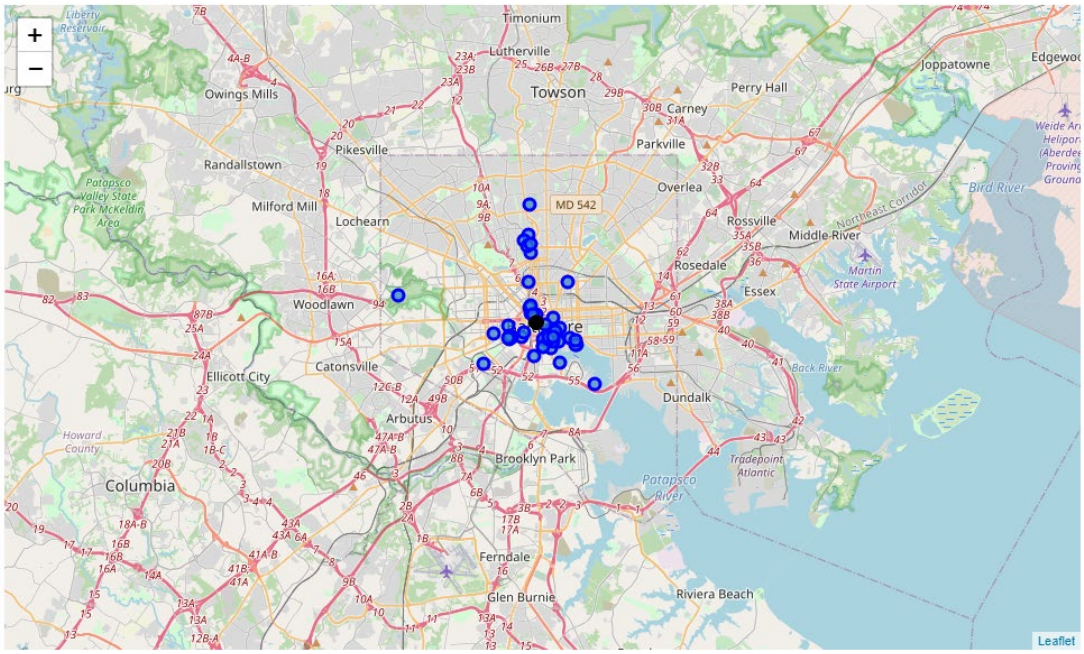

Figure 1: Map of Baltimore, MD.

```
Washington DC
0.01634594456940411
```

Out[149]:

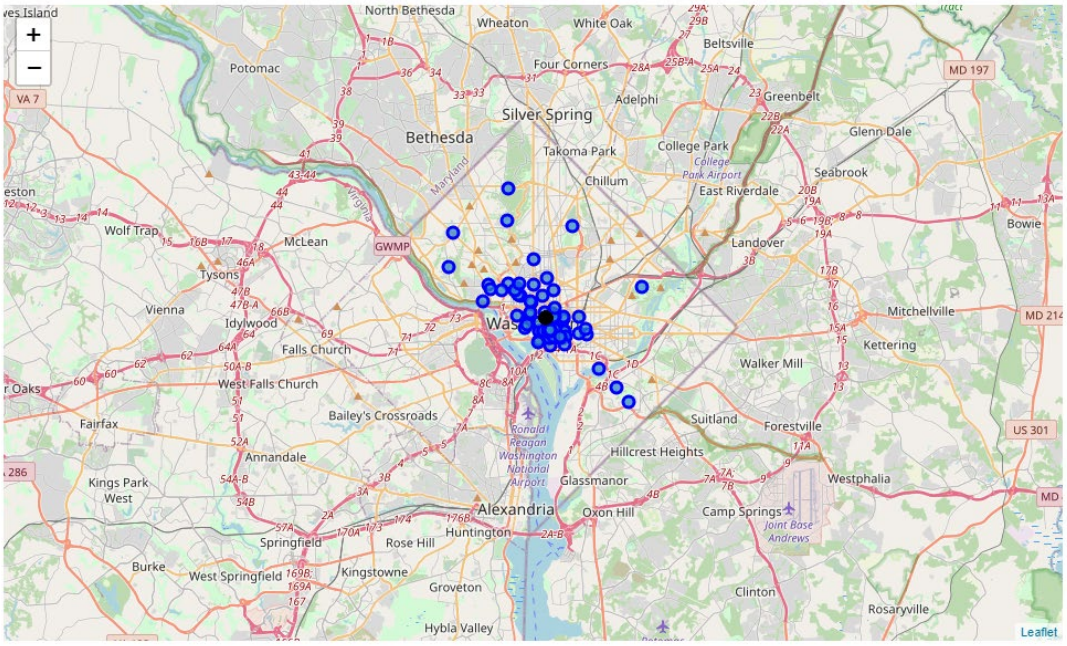

Figure 2: Map of Washington DC.

```
Seattle, WA
0.042603402640903336
```

Out[146]:

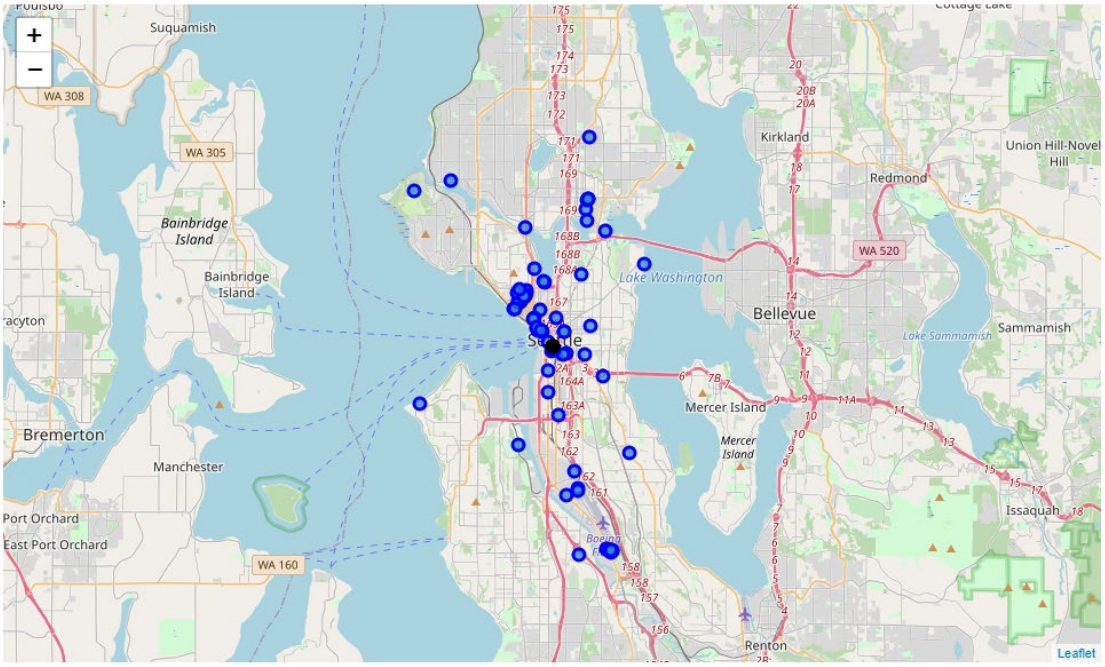

Figure 3: Map of Seattle, WA.

```
Chicago, IL
0.05576715324048896
```

Out[148]:

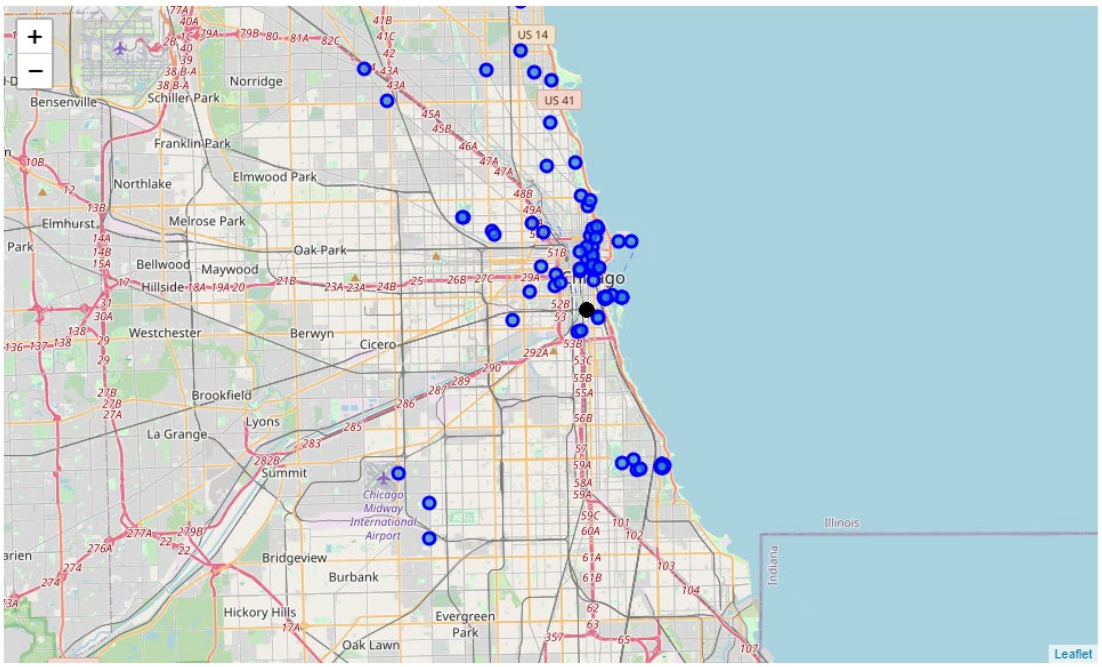

Figure 4: Map of Chicago, IL.

```
Los Angeles, CA
0.09572948648339497
```

Out[147]:

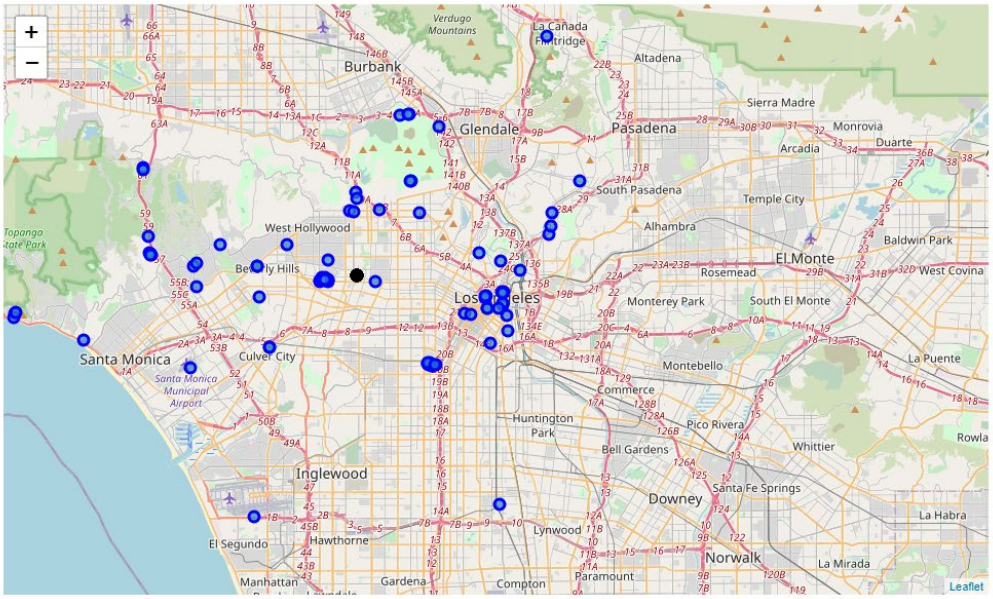

Figure 5: Map of Los Angeles, CA.

```
Boston, MA
0.025193997533364668
```

Out[143]:

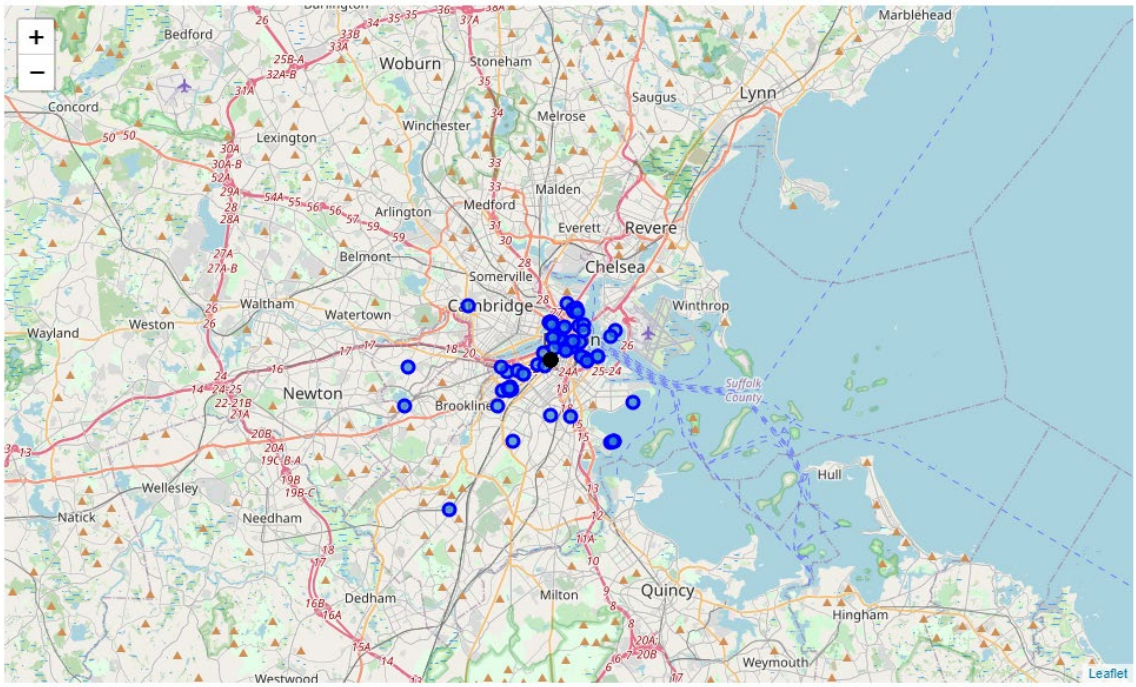

Figure 6: Map of Boston, MA.

```
New Orleans, LA
0.01732314304627997
```

Out[145]:

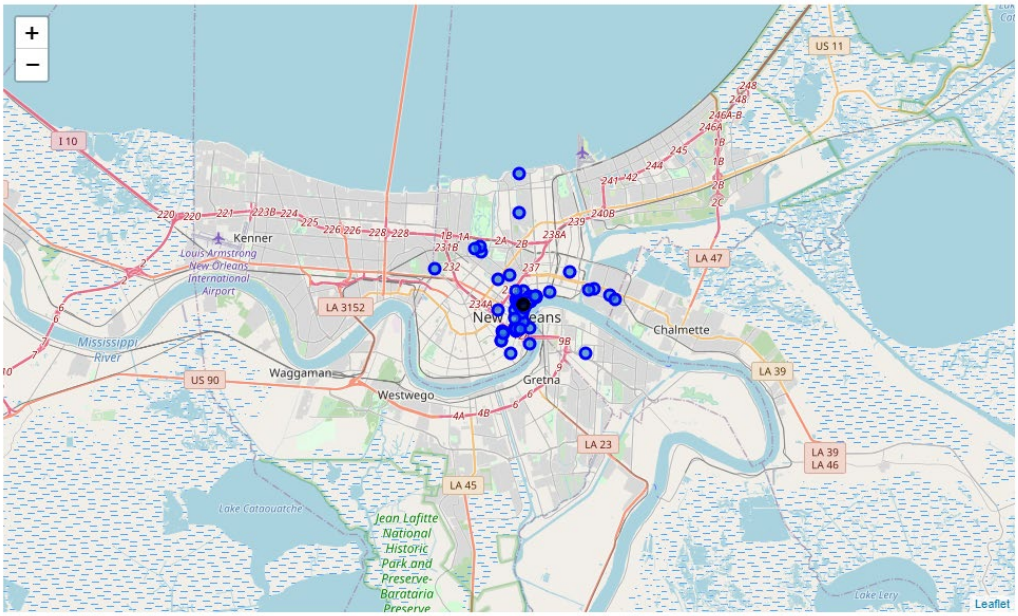

Figure 7: Map of New Orleans, LA.

```
New York, NY
0.028179112015207917
```

Out[140]:

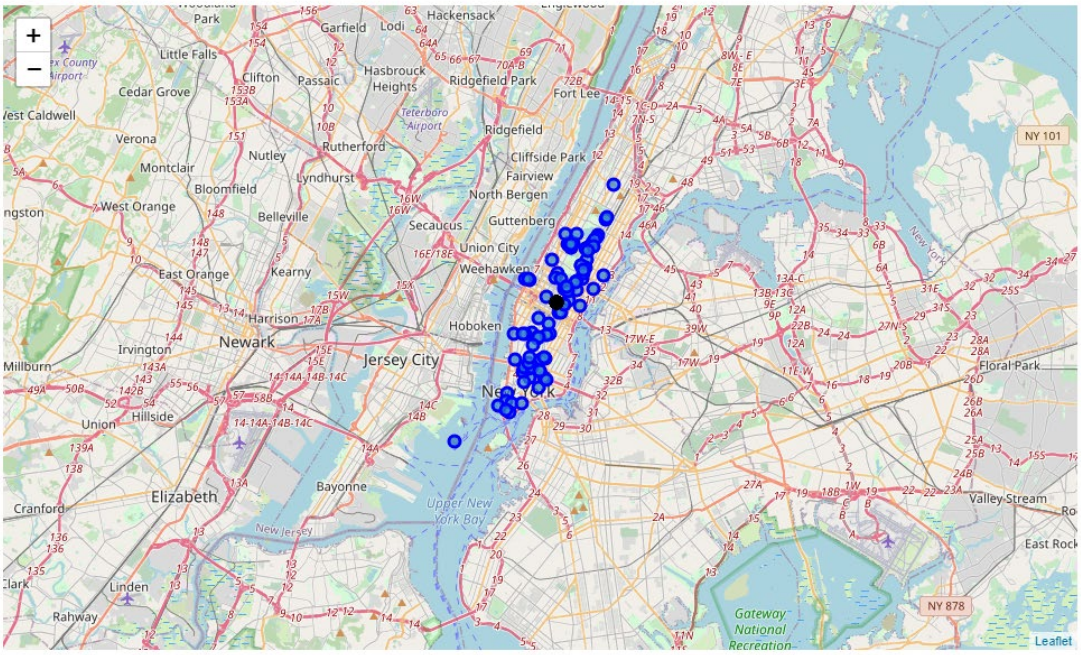

Figure 8: Map of New York, NY.

```
Philadelphia, PA
0.030391238804207542
```

Out[144]:

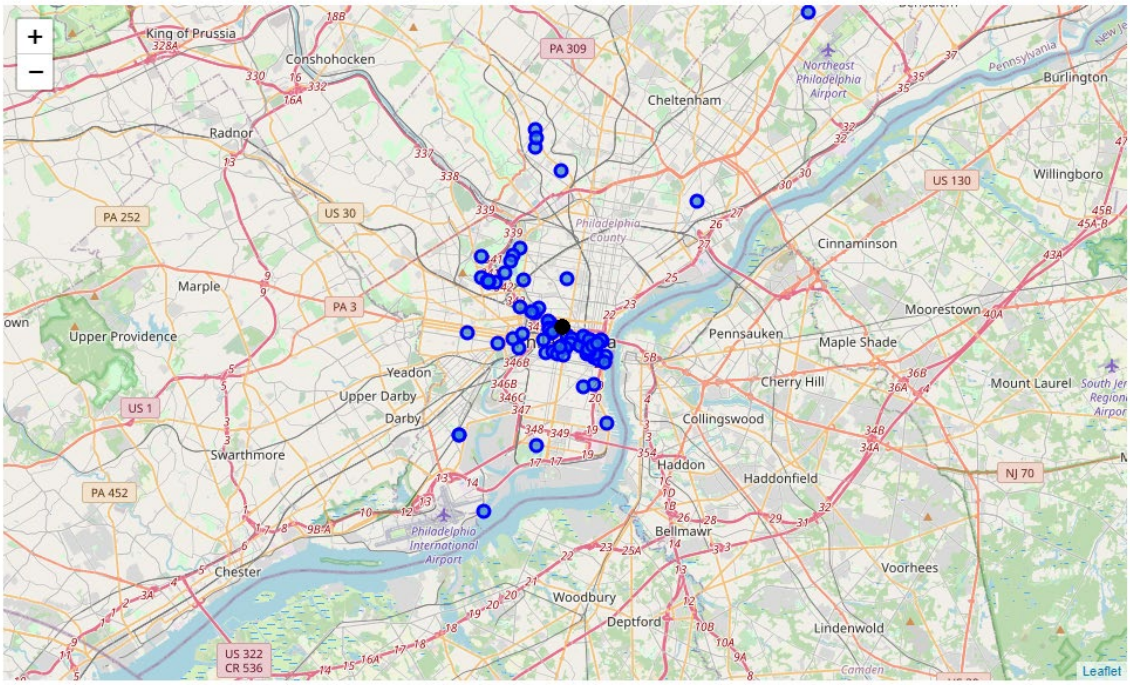

Figure 9: Map of Philadelphia, PA.

```
San Francisco, CA
0.036903794278582425
```

Out[141]:

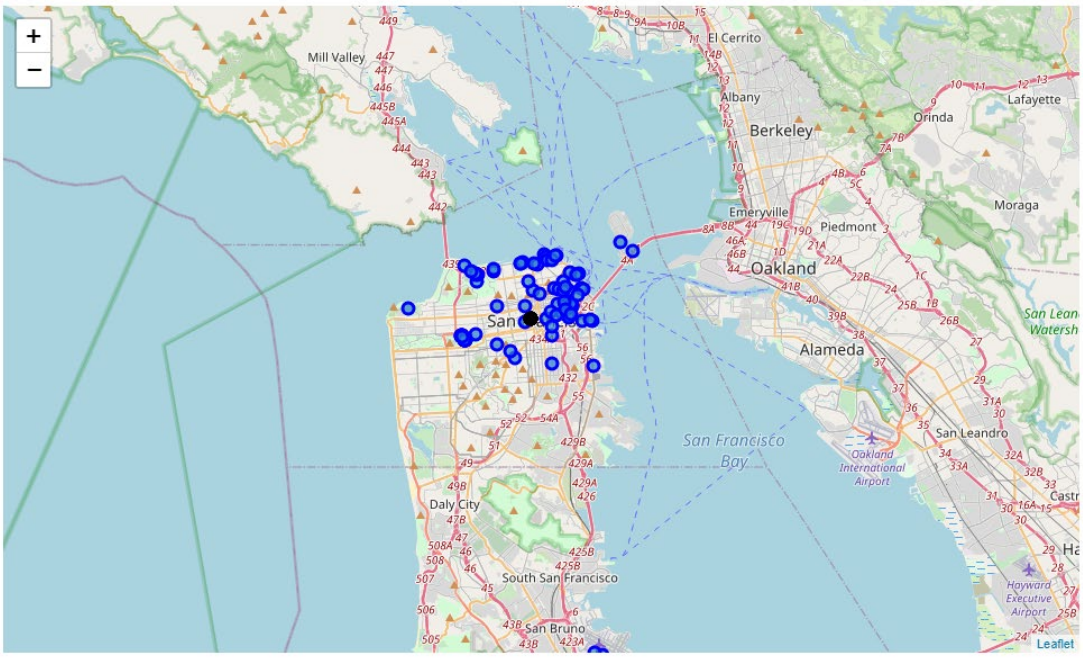

Figure 10: Map of San Francisco, CA.

4. Results

4a. DataFrame Creation

After reviewing the maps, the next step was to get this information together on a DataFrame to help analyze the numbers better. Figure 11 shows the table that was created to help review the information presented in the maps.

Out[153]:

City	Mean Distance	Total Museums	Max Museums Reviewed	Latitude, Longitude
New York, NY	0.028179	189	100	[40.75424234522059, -73.98281677705133]
San Francisco, CA	0.036904	119	100	[37.78010728075259, -122.42588125502732]
Baltimore, MD	0.020074	52	52	[39.29291402871929, -76.6160116179364]
Boston, MA	0.025194	76	76	[42.35136614115616, -71.07083477066293]
Philadelphia, PA	0.030391	101	100	[39.9593977887982, -75.16565891996316]
New Orleans, LA	0.017323	68	68	[29.956932692429223, -90.06575947440294]
Seattle, WA	0.042603	84	84	[47.60090287961491, -122.33114639130766]
Los Angeles, CA	0.095729	174	100	[34.06576958566551, -118.3367902099242]
Chicago, IL	0.055767	146	100	[41.86092322200809, -87.62846317781916]
Washington DC	0.016346	183	100	[38.89751372885385, -77.02835154630353]

Figure 11: DataFrame created with all data.

5. Discussion

5a. DataFrame Review

The DataFrame shows that Washington DC, New Orleans, LA and Baltimore, MD are the most clustered together when it comes to museums near a central location. It's such small differences between them that it wouldn't make sense to decide just based on that number alone. Along with the lower mean distance, Washington DC also has the second most total museums. Baltimore, MD and New Orleans, LA combined only have 120 compared to 183 within Washington DC.

5b. Hotel Review

Since Washington DC has the lowest mean distance at .016346 and one of the highest amounts of museums at 183, we need to determine what hotel is closest to the central location chosen. We did a search query sent to FourSquare to retrieve the closest hotel

to the central latitude and longitude provided. That hotel retrieved in Figure 12 was Hotel Harrington located at 436 11th St NW, Washington, D.C. 20004.

Out[157]:

	name	categories	address	cc	city	country	distance	formattedAddress	labeledLatLngs	lat	lng	postalCode	state	
0	Hotel Harrington	Hotel	436 11th St NW	US	Washington	United States	153	[436 11th St NW, Washington, D.C. 20004, Unite...	[{'label': 'display', 'lat': 38.89617549241759...	38.896175	-77.027921	20004	D.C.	4

Figure 12: Hotel located closest to the central location.

6. Conclusion

6a. Final Thoughts

Washington DC has the lowest mean distance of .016346 and one of the highest amounts of museums at 183. Washington DC is the best place to travel to when someone is looking for the highest density of museums that are all located close. The best central hotel to book is Hotel Harrington.

6b. West Coast Travelers

For west coast travelers who can't travel to the east coast, they should go to San Francisco, CA with a mean distance of .036904 and a total amount of 119 museums.