

In [42]:

```
pip install geopy
```

Requirement already satisfied: geopy in c:\users\vasyl\anaconda3\lib\site-packages (2.3.0)
Requirement already satisfied: geographiclib<3,>=1.52 in c:\users\vasyl\anaconda3\lib\site-packages (from geopy) (2.0)
Note: you may need to restart the kernel to use updated packages.

In [43]:

```
from geopy.geocoders import Nominatim  
from geopy.exc import GeocoderTimedOut  
import pandas as pd
```

In [44]:

```
df = pd.read_csv('Cities.csv')
```

In [45]:

```
geolocator = Nominatim(timeout=10, user_agent = "my-App")
```

In [46]:

```
df['Combined'] = df['State '].astype(str) + ', ' + df['City']
```

In [47]:

```
df=df.drop('Location', axis=1)
```

In [48]:

```
df
```

Out[48]:

	2021 rank	State	City	2020 population density	2020 population density(Km2)	2021 estimate	2020 census
0	1.0	New York	New York	29,298/sq mi	11,312/km	8,467,513	8,804,190
1	2.0	California	Los Angeles	8,304/sq mi	3,206/km	3,849,297	3,898,747
2	3.0	Illinois	Chicago	12,061/sq mi	4,657/km	2,696,555	2,746,388
3	4.0	Texas	Houston	3,599/sq mi	1,390/km	2,288,250	2,304,580
4	5.0	Arizona	Phoenix	3,105/sq mi	1,199/km	1,624,569	1,608,139
...
328	329.0	Colorado	Longmont	3,434/sq mi	1,326/km	100,758	98,885
329	330.0	Alabama	Tuscaloosa	1,609/sq mi	621/km	100,618	99,600
330	331.0	California	Norwalk	10,595/sq mi	4,091/km	100,373	102,773
331	NaN	NaN	NaN	NaN	NaN	NaN	NaN
332	NaN	NaN	https://www.downloadexcelfiles.com/	NaN	NaN	NaN	NaN

333 rows × 11 columns

```
In [49]: latitudes = []
         longitudes = []
```

```
In [50]: for address in df['Combined']:
         try:
             location = geolocator.geocode(address)
             if location is not None:
                 latitudes.append(location.latitude)
                 longitudes.append(location.longitude)
             else:
                 latitudes.append(None)
                 longitudes.append(None)
         except GeocoderTimedOut:
             latitudes.append(None)
             longitudes.append(None)
             print('Geocoding service timed out for address:', address)
```

```
In [51]: df['Latitude'] = latitudes
         df['Longitude'] = longitudes
```

```
In [52]: df
```

Out[52]:

	2021 rank	State	City	2020 population density	2020 population density(Km2)	2021 estimate	2020 census
0	1.0	New York	New York	29,298/sq mi	11,312/km	8,467,513	8,804,190
1	2.0	California	Los Angeles	8,304/sq mi	3,206/km	3,849,297	3,898,747
2	3.0	Illinois	Chicago	12,061/sq mi	4,657/km	2,696,555	2,746,388
3	4.0	Texas	Houston	3,599/sq mi	1,390/km	2,288,250	2,304,580
4	5.0	Arizona	Phoenix	3,105/sq mi	1,199/km	1,624,569	1,608,139
...
328	329.0	Colorado	Longmont	3,434/sq mi	1,326/km	100,758	98,885
329	330.0	Alabama	Tuscaloosa	1,609/sq mi	621/km	100,618	99,600
330	331.0	California	Norwalk	10,595/sq mi	4,091/km	100,373	102,773
331	NaN	NaN	NaN	NaN	NaN	NaN	NaN
332	NaN	NaN	https://www.downloadexcelfiles.com/	NaN	NaN	NaN	NaN

333 rows × 13 columns

