Assignment 2: Chicago Crime in 2020/2021

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Trump on Chicago: 'A disaster' 'Out of control,' 'Not good!' ... 'It's a great city'

https://www.cbsnews.com/news/trump-chicago-disaster-out-of-control-not-good-its-a-great-city/

Deliverables:

- Submit a PDF file (or Word, Word Online, Google Docs, LaTeX, Apple/Open Pages, or Zoho) that has the following formats:
  - **Fixed Width font and plain Serif** (Courier and Lucida)
  - **Dark Text on a light background** (not Dracula and Solarized)
- Submit a Jupyter Notebook (.ipynb) and Jupyter Markdown (.md)

Objectives:

- Use SQL to analyze Chicago crime data to examine data from Chicago Crime dataset and Police stations dataset
- Use Geospatial queries to locate police stations and gun related crimes (with arrest or no arrest) in every district in Chicago
- Use Geospatial queries to provide descriptive statistics for each police district
- Use Geospatial queries to provide descriptive statistics for each Community Area
- Use Geospatial queries to determine which ward has the most Gun Related Crimes, the police station that has gun related crime reported in ward

Submission Formats :

- Complete PFIM crash test has the second crash in Pattern could be second and analyze the data. The code should be in a separate file and should be in a Jupyter Notebook (.ipynb) and Jupyter Markdown (.md)
- Submit a Jupyter Notebook (.ipynb) and Jupyter Markdown (.md) for all tables and visualizations in an easier-to-read, Dashboard-ready format
- Fixed Width font, Dark Text on a light background, 1.15 PRE, LEADING to Code as STYLE, of the STYLE file.

Formatting Python Code:

When programming in Python, refer to Kenneth Reitz' PEP 8: The Style Guide for Python Code https://pep8.org/ . Echo is an excellent code formatter for Python. Install it using "pip install echo" and run it against your code. Read about it at https://pypi.org/project/echo/ and https://linux.fosslife.org/ . Echo is an excellent alternative to an expensive, big, Commercial Linter and is natively available on most Linux distributions.

Descriptions and Requirement Specifications

Chicago Crimes

Crime data of every crime, unknown, precedent Trump mentioned Chicago crimes in three Trump's Rally of Crime Addictions

Chicago has more homicides than New York and Los Angeles combined

Columnist Clarence Page wrote an article, published by the Chicago Tribune stated that the criminal gangs that controlled Chicago have moved to the great cities of New York and Los Angeles combined.

Chicago Police Department

Chicago police department: 11,000+ sworn and civilians or visits/ruins on its website crime stats, and press releases for the different districts.

https://www.cbsnews.com/news/trump-chicago-disaster-out-of-control-not-good-its-a-great-city/

The CPD categorizes the crimes into 8 categories as follows:

https://www.cbsnews.com/news/trump-chicago-disaster-out-of-control-not-good-its-a-great-city/

Chicago Crimes Dataset

We'll be using a cleaver dataset for the data of Chicago is obtained from the police department for the city of Chicago. Here is the link for the dataset: https://www.kaggle.com/currie32/crimes-in-chicago

https://www.cbsnews.com/news/trump-chicago-disaster-out-of-control-not-good-its-a-great-city/

Loading the Dataset CSV file

There are 2 ways you could fix this overpowered:

1. The Chicago police release it as a spreadsheet on FBI server.
2. The Chicago dataset dumped on FBI server.
3. Chicago Police Department's website (which is downstream!) is the 3rd.

Therefore, we are going to upload the dataset on Kaggle or Chicago city data portal.

Based on Trumps Rants of the Crime Addictions and the articles written by columnist Clarence Page and published by the Chicago Tribune, we are going to analyze the Chicago Crime data to see if Trump's Rants of Crime Addictions are factual or just Fake News.

Columnist Clarence Page wrote an article, published by the Chicago Tribune stated that the criminal gangs that controlled Chicago have moved to the great cities of New York and Los Angeles combined.

1. Write a Chicago crime data analysis report using Jupyter Notebook.
2. Plot on Chicago crime by districts and their four nearest crimes
3. Plot on Chicago crime by wards and their four nearest crimes
4. What the crime rate in Chicago?
5. Which ward has the highest number of crime? Which ward has the lowest crime?
6. Which District in Chicago has gun related crime that is in the bottom Block from the policy station for every district

Rectangle crime boundary in Chicago PD, center to find each nearest Chicago Crime Dataset from the database. Each code 1 - 4 requires:

1. Find rectangle in Polygon(SQL) shape
2. Find the nearest crime using a haversine distance
3. Follow the Chicagoan ways of crime

Below are using PostgreSQL as our db, please read and bookmark! Chapter 4. Jaime Postgis Data Management and Queries

```
# Find every place and the five closest commission of crime Development 1
# Calculate the distance from crime to police station using haversine distance in km and meters
# Find the closest police station to each crime
SELECT DISTINCT ON (c.id) c.id, c.primary_type, c.location, ST_Distance(c.location_geom, p.geom)/1000 AS
FROM chicago_crimes_2020_2021 c, chicago_police_stations p
ORDER BY c.id, ST_Distance(c.location_geom, p.geom);

# Find the following Rectangle shape crime boundary in Chicago PD, center to find each nearest Chicago
# Find the nearest crime using a haversine distance
# Follow the Chicagoan ways of crime
SELECT DISTINCT ON (c.id) c.id, c.primary_type, c.location, ST_Distance(c.location_geom, p.geom)/1000 AS
FROM chicago_crimes_2020_2021 c, chicago_police_stations p
WHERE c.location_geom && ST_MakeEnvelope(-87.940, -42.000, -87.524, 36.615, 4326)
ORDER BY c.id, ST_Distance(c.location_geom, p.geom);
```

```
-- # Determinants Sorted By Area Descending
-- # Lists the crime scene districts in descending order of area along with their Crime Density in a formal Functional Definition.
-- # Crime Density = Number of Crimes per Square Mile.
SELECT DISTRICT_NAME, ROUND(CRIME_DENSITY, 2) AS "CRIME DENSITY", ROUND(AREA_SQ_MI, 2) AS "AREA SQ MI"
FROM
    DISTRICTS
ORDER BY
    AREA_SQ_MI DESC;
```

DISTRICT_NAME	CRIME DENSITY	AREA SQ MI
ARTESIA PARK	2.00	0.00
LAKEWOOD	2.00	0.00
ROOSEVELT	2.00	0.00
SOUTHGATE	2.00	0.00
CARMICHAEL GARDENS	2.00	0.00
ROOSEVELT	2.00	0.00
CARMICHAEL GARDENS	2.00	0.00
CARMICHAEL GARDENS	2.00	0.00
CARMICHAEL GARDENS	2.00	0.00
CARMICHAEL GARDENS	2.00	0.00
ROOSEVELT	2.00	0.00
ROOSEVELT	2.00	0.00
ROOSEVELT

Cell 20:
```
# location and crime
crime_df.head()
```

```
Output_20:
  DATE_OCC_and_time  ...  Crime_Code
0  2020-03-01 00:00  ...         354
1  2020-11-18 00:00  ...         354
2  2020-08-18 00:00  ...         354
3  2020-12-16 00:00  ...         354
4  2020-12-16 00:00  ...         354

[5 rows x 14 columns]
```

Cell 21:
```
# Find the 100 most common crime types and the top dept districts and plot bubble chart
# Merge top districts and top crime types
top_districts = crime_df[crime_df['Area_name'].isin(top_areas)]
top_crimes = crime_df[crime_df['Crime_Code_Description'].isin(top_crime_types)]
# Combine filtered data
combined = top_districts[top_districts['Crime_Code_Description'].isin(top_crime_types)]
# Create bubble chart data
bubble_data = combined.groupby(['Area_name', 'Crime_Code_Description', 'Latitude', 'Longitude'])[].shape[0].reset_index()
bubble_data.rename(columns={0: 'Count'}, inplace=True)
# Create the interactive map
fig = px.scatter_mapbox(bubble_data,
                        lat="Latitude",
                        lon="Longitude",
                        size="Count",
                        color="Area_name",
                        hover_name="Crime_Code_Description",
                        hover_data={"Count": True},
                        zoom=10,
                        mapbox_style="open-street-map",
                        title="Top 100 Crime Types in Top Areas")
fig.update_layout(legend_title="Area")
fig.show()
```

```
Output_21:
ValueError:
Mapbox error: Invalid value for property "layers[1].source" in style "open-street-map".
```

Cell 22:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude'], row['Longitude']],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_22:
Map saved as chicago_crime_map.html
```

Cell 23:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_23:
chicago_crime_map.html
```

Creating the folium maps

Cell 24:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_24:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 25:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_25:
chicago_crime_map.html
```

Cell 26:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_26:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 27:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_27:
chicago_crime_map.html
```

Cell 28:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_28:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 29:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_29:
chicago_crime_map.html
```

Cell 30:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_30:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 31:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_31:
chicago_crime_map.html
```

Cell 32:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_32:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 33:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_33:
chicago_crime_map.html
```

Cell 34:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_34:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 35:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_35:
chicago_crime_map.html
```

Cell 36:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_36:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 37:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_37:
chicago_crime_map.html
```

Cell 38:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_38:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 39:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_39:
chicago_crime_map.html
```

Cell 40:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_40:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 41:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_41:
chicago_crime_map.html
```

Cell 42:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_42:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 43:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_43:
chicago_crime_map.html
```

Cell 44:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_44:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 45:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_45:
chicago_crime_map.html
```

Cell 46:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_46:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 47:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_47:
chicago_crime_map.html
```

Cell 48:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_48:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 49:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_49:
chicago_crime_map.html
```

Cell 50:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_50:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 51:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_51:
chicago_crime_map.html
```

Cell 52:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_52:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 53:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_53:
chicago_crime_map.html
```

Cell 54:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_54:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 55:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_55:
chicago_crime_map.html
```

Cell 56:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_56:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 57:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_57:
chicago_crime_map.html
```

Cell 58:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_58:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 59:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_59:
chicago_crime_map.html
```

Cell 60:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_60:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 61:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_61:
chicago_crime_map.html
```

Cell 62:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_62:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 63:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_63:
chicago_crime_map.html
```

Cell 64:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_64:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 65:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_65:
chicago_crime_map.html
```

Cell 66:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_66:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 67:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_67:
chicago_crime_map.html
```

Cell 68:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_68:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 69:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_69:
chicago_crime_map.html
```

Cell 70:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_70:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 71:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_71:
chicago_crime_map.html
```

Cell 72:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_72:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 73:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_73:
chicago_crime_map.html
```

Cell 74:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_74:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 75:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_75:
chicago_crime_map.html
```

Cell 76:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_76:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 77:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_77:
chicago_crime_map.html
```

Cell 78:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_78:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 79:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_79:
chicago_crime_map.html
```

Cell 80:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_80:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 81:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_81:
chicago_crime_map.html
```

Cell 82:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_82:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 83:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_83:
chicago_crime_map.html
```

Cell 84:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_84:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 85:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_85:
chicago_crime_map.html
```

Cell 86:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_86:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 87:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_87:
chicago_crime_map.html
```

Cell 88:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_88:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 89:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_89:
chicago_crime_map.html
```

Cell 90:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_90:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 91:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_91:
chicago_crime_map.html
```

Cell 92:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_92:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 93:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_93:
chicago_crime_map.html
```

Cell 94:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_94:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 95:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_95:
chicago_crime_map.html
```

Cell 96:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_96:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 97:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_97:
chicago_crime_map.html
```

Cell 98:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
print("Map saved as chicago_crime_map.html")
```

```
Output_98:
SyntaxEror: invalid syntax. Perhaps you forgot a comma?
```

Cell 99:
```
# Display the map in the notebook
from IPython.display import display, HTML
display(HTML('chicago_crime_map.html'))
```

```
Output_99:
chicago_crime_map.html
```

Cell 100:
```
# Create a folium map centered on Downtown Chicago
m = folium.Map(location=[41.8781, -87.6298], zoom_start=11)
# Add markers for each crime
for idx, row in combined.sample(1000).iterrows():
    folium.CircleMarker(
        location=[row['Latitude', row['Longitude'],
        radius=5,
        popup=f"{row['Crime_Code_Description']}\n{row['Area_name']}\n{row['DATE_OCC_and_time']}",
        color='red',
        fill=True,
        fill_color='red',
        fill_opacity=0.7
    ).add_to(m)
# Save the map to an HTML file
m.save('chicago_crime_map.html')
```