You need to submit 3 tree maps, 3 area charts and 3 stacked area charts using Tableau or PowerBI, Python and R using the data below (or your own datasets). You can also submit using D3. You can choose which library to use in Python or R, documentation is provided to help you decide and as you start to play around in the libraries, you will decide which you prefer.

Python

In [1]:
```
# Import libraries
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
import chart_studio.plotly as py
import cufflinks as cf
import seaborn as sns
```

In [2]:
```
# Read world population data
dirData = 'ex4-2/'
f_crime = 'crimerates-by-state-2005.csv'

dir_crime = dirData+f_crime
crime = pd.read_csv(dir_crime)
crime_state = crime[crime['state']!='United States']

print(crime_state.head())
```

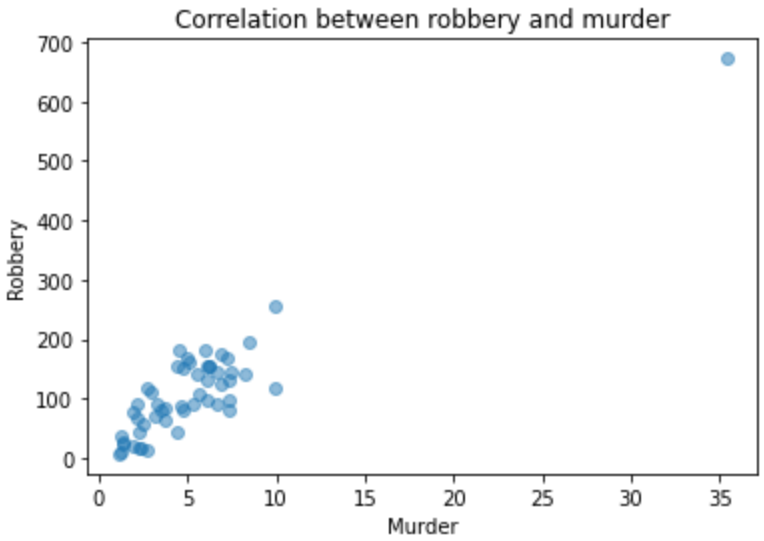
```
        state  murder  forcible_rape  robbery  aggravated_assault  burglary  \
1     Alabama     8.2           34.3    141.4               247.8     953.8
2      Alaska     4.8           81.1     80.9               465.1     622.5
3     Arizona     7.5           33.8    144.4               327.4     948.4
4    Arkansas     6.7           42.9     91.1               386.8    1084.6
5  California     6.9           26.0    176.1               317.3     693.3

   larceny_theft  motor_vehicle_theft  population
1         2650.0                288.3     4545049
2         2599.1                391.0      669488
3         2965.2                924.4     5974834
4         2711.2                262.1     2776221
5         1916.5                712.8    35795255
```

1. Scatter plot

In [3]:
```
# Create a scatter plot showing correlation between murder and robbery

plt.scatter(x=crime['murder'], y=crime['robbery'],alpha=0.5)
plt.title('Correlation between robbery and murder')
plt.xlabel('Murder')
plt.ylabel('Robbery')
plt.show()
```



2. Bubble Chart

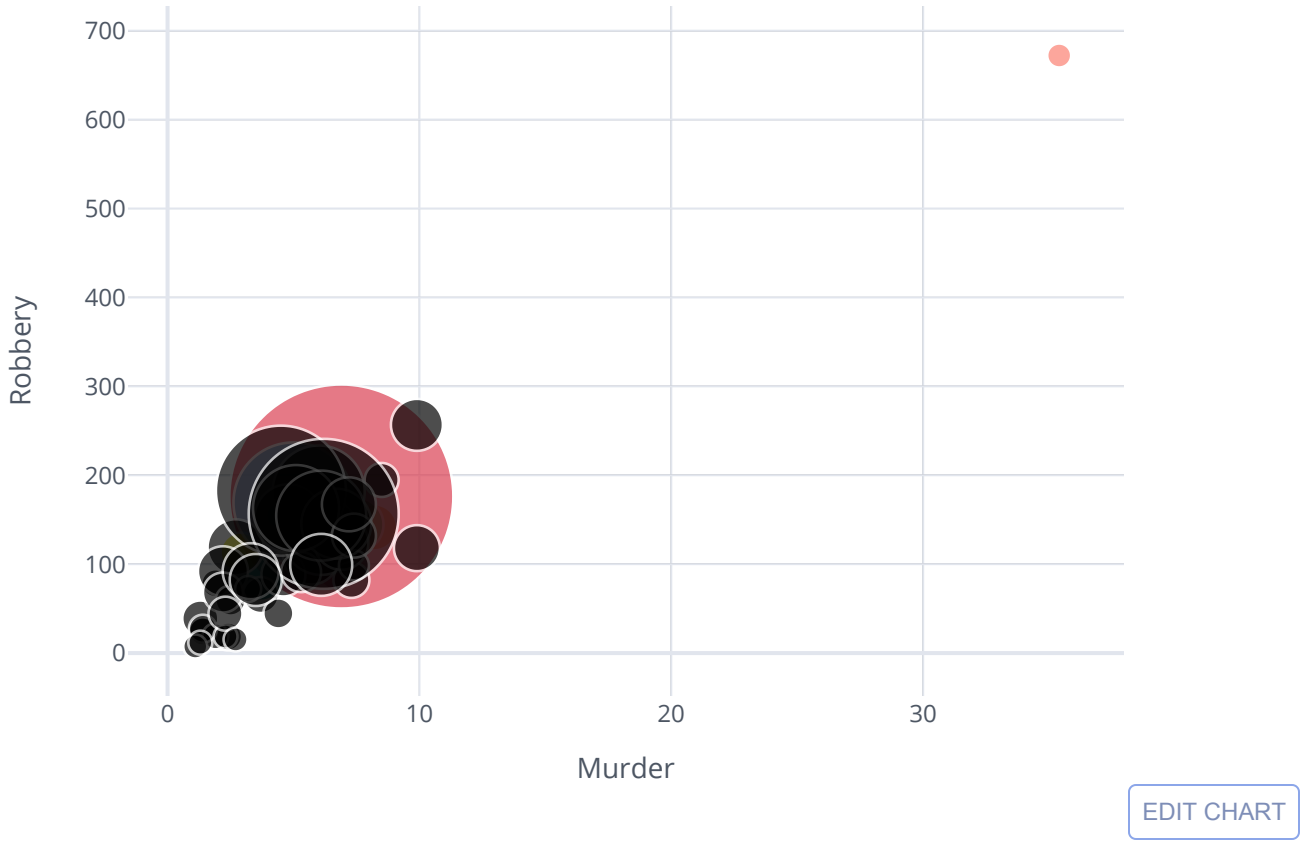
In [4]:

```
# For this excercise I used the API service from plotly (https://plot.ly/)

py.plotly.tools.set_credentials_file(username='vkoppul', api_key='HZkq8JtTPj1Q4RbEm6eV')
cf.set_config_file(offline=False, world_readable=True, theme='pearl')

crime_state.iplot(kind='bubble', x='murder', y='robbery', size='population', text='state',
             xTitle='Murder', yTitle='Robbery',
             filename='Murder vs Robbery by Population')
```

Out[4]:



3. Density plot

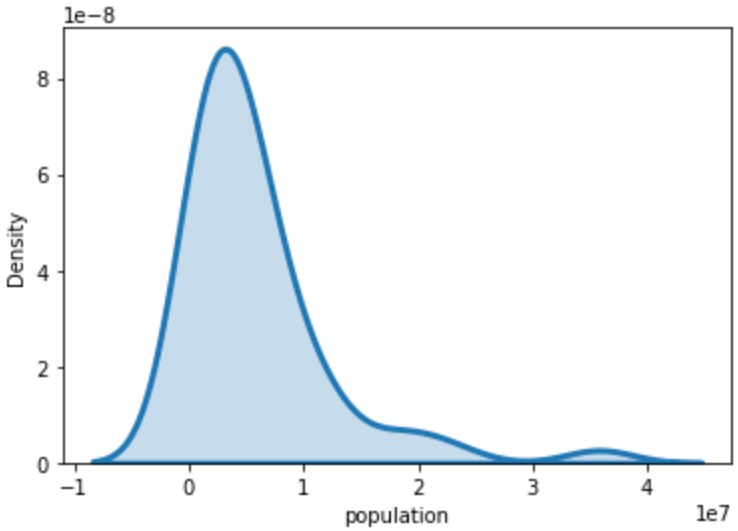
In [5]:
```
# Plotting distribution of population

sns.distplot(crime_state['population'], hist = False, kde = True,
                 kde_kws = {'shade': True, 'linewidth': 3})
```

```
/Users/veerareddykoppula/opt/anaconda3/lib/python3.9/site-packages/seaborn/distributions.py:2619: FutureWarning:

`distplot` is a deprecated function and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar flexibility) or `kdeplot` (an axes-level function for kernel density plots).
```

Out[5]:
```
<AxesSubplot:xlabel='population', ylabel='Density'>
```



End of code