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## Install Plotly

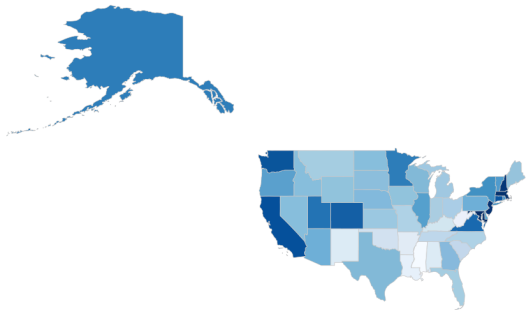
```
1 !pip install plotly
2 !pip install geopandas
```

```
➦ Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Requirement already satisfied: plotly in /usr/local/lib/python3.8/dist-packages (5.5.0)
Requirement already satisfied: tenacity>=6.2.0 in /usr/local/lib/python3.8/dist-packages (from plotly) (8.1.0)
Requirement already satisfied: six in /usr/local/lib/python3.8/dist-packages (from plotly) (1.15.0)
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Collecting geopandas
  Downloading geopandas-0.12.2-py3-none-any.whl (1.1 MB)
    ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 1.1/1.1 MB 35.7 MB/s eta 0:00:00
Requirement already satisfied: pandas>=1.0.0 in /usr/local/lib/python3.8/dist-packages (from geopandas) (1.3.5)
Requirement already satisfied: shapely>=1.7 in /usr/local/lib/python3.8/dist-packages (from geopandas) (2.0.0)
Collecting fiona>=1.8
  Downloading Fiona-1.8.22-cp38-cp38-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (16.6 MB)
    ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 16.6/16.6 MB 67.9 MB/s eta 0:00:00
Requirement already satisfied: packaging in /usr/local/lib/python3.8/dist-packages (from fiona>=1.8->geopandas) (21.3)
Collecting pyproj>=2.6.1.post1
  Downloading pyproj-3.4.1-cp38-cp38-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (7.8 MB)
    ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 7.8/7.8 MB 99.5 MB/s eta 0:00:00
Requirement already satisfied: certifi in /usr/local/lib/python3.8/dist-packages (from fiona>=1.8->geopandas) (2022.12.7)
Requirement already satisfied: click>=4.0 in /usr/local/lib/python3.8/dist-packages (from fiona>=1.8->geopandas) (7.1.2)
Requirement already satisfied: six>=1.7 in /usr/local/lib/python3.8/dist-packages (from fiona>=1.8->geopandas) (1.15.0)
Collecting cligj>=0.5
  Downloading cligj-0.7.2-py3-none-any.whl (7.1 kB)
Requirement already satisfied: attrs>=17 in /usr/local/lib/python3.8/dist-packages (from fiona>=1.8->geopandas) (22.2.0)
Requirement already satisfied: setuptools in /usr/local/lib/python3.8/dist-packages (from fiona>=1.8->geopandas) (57.4.0)
Collecting munch
  Downloading munch-2.5.0-py2.py3-none-any.whl (10 kB)
Collecting click-plugins>=1.0
  Downloading click_plugins-1.1.1-py2.py3-none-any.whl (7.5 kB)
Requirement already satisfied: pytz>=2017.3 in /usr/local/lib/python3.8/dist-packages (from pandas>=1.0.0->geopandas) (2022.7)
Requirement already satisfied: python-dateutil>=2.7.3 in /usr/local/lib/python3.8/dist-packages (from pandas>=1.0.0->geopandas) (2.8.2)
Requirement already satisfied: numpy>=1.17.3 in /usr/local/lib/python3.8/dist-packages (from pandas>=1.0.0->geopandas) (1.21.6)
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in /usr/local/lib/python3.8/dist-packages (from packaging->geopandas) (3.0.9)
Installing collected packages: pyproj, munch, cligj, click-plugins, fiona, geopandas
Successfully installed click-plugins-1.1.1 cligj-0.7.2 fiona-1.8.22 geopandas-0.12.2 munch-2.5.0 pyproj-3.4.1
```

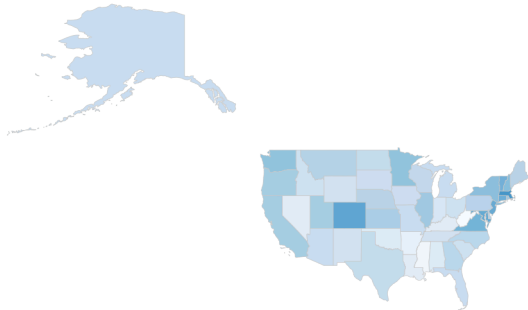
## Create the Choropleth Map

```
1 # import libraries
2 import geopandas as gpd
3 import matplotlib.pyplot as plt
4 import pandas as pd
```

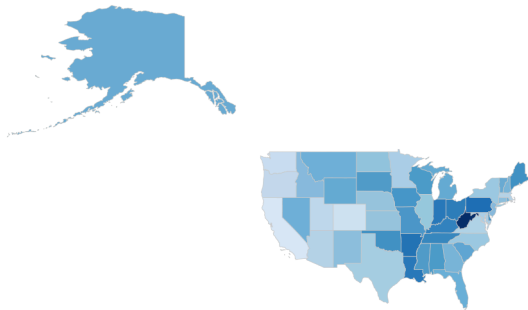
```
5
6 # read in data
7 url = 'https://raw.githubusercontent.com/Allen-Bian/QM2-Final-project/main/data.csv'
8 df = pd.read_csv(url)
9
10 # read in shapefile
11 df_map = gpd.read_file('cb_2021_us_state_20m.shp')
12
13 # merge dataframes. name of state in df_map is 'NAME' whilst in df is 'STATE'.
14 merged = df_map.set_index('NAME').join(df.set_index('STATE'))
15
16 # create list of columns (everything except state)
17 columns = df.columns[1:]
18
19 for column in columns:
20     # create figure and axes for Matplotlib
21     fig, ax = plt.subplots(1, figsize=(50, 10))
22     # create map
23     merged.plot(column=column, cmap='Blues', linewidth=0.8, ax=ax, edgecolor='0.8', legend=True)
24     # turn axis off to remove ticks and labels
25     ax.axis('off')
26     ax.set_title(column, fontdict={'fontsize': '20', 'fontweight' : '3'})
27     plt.show()
```



Median Household Income



Completing college



Completing High school

