

Name(s): \_\_\_\_\_

# DATA 101 Assignment 6: Maps in Python

Work in teams of 2

**Instructions.** Create a new Jupyter Notebook. Use Markdown cells for all text explanations/headings and Code cells for Python code. Once finished, export the notebook to HTML via `File → Save and export notebook as → HTML (.html)` and bring a printed copy to class.

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1. Complete the *Visualizing Geospatial Data in Python* course on DataCamp: <https://app.datacamp.com/learn/courses/visualizing-geospatial-data-in-python>.
2. Import the geopandas library as `import geopandas as gpd`. If needed, install it with `!pip install geopandas`. Then load the built-in world map using the line below and assign it to a variable called `world`.

```
world = gpd.read_file(gpd.datasets.get_path("naturalearth_lowres"))
```

Filter to just Australia and assign it to a variable called `aus`. Run `aus.head()` to inspect it.

3. Create a simple static map of Australia using Matplotlib.
  - (a) Use `aus.plot()` to draw the shape and set a fill color.
  - (b) Set a title and remove axis lines using `ax.set_axis_off()`.
4. Add the coordinates of Australian capital cities by creating the DataFrame below as a dataframe called `capitals`. Plot them on your map using `plt.scatter()` and label each city using a `for`-loop with `plt.text()`.

```
import pandas as pd

capitals = pd.DataFrame({
    "city": ["Sydney", "Melbourne", "Brisbane", "Adelaide",
             "Perth", "Hobart", "Canberra", "Darwin"],
    "lat": [-33.8688, -37.8136, -27.4698, -34.9285,
            -31.9505, -42.8821, -35.2809, -12.4634],
    "lon": [151.2093, 144.9631, 153.0251, 138.6007,
            115.8605, 147.3272, 149.1300, 130.8456]
})
```

5. Create an interactive map using `folium`.

- (a) Set the map center to [-25, 135] and zoom level to 4.
- (b) Use `folium.GeoJson()` to add the country outline.
- (c) Add hover info that shows the country name using `folium.features.GeoJsonTooltip()`.

6. Add the capital cities to your interactive map.

- (a) Use a `for`-loop to add each city with `folium.CircleMarker()`.
- (b) Set the color to red and include tooltips with the city names.
- (c) Save the map as `australia_map.html`.