

**Group of
Horribly
Optimistic
STatisticians**

O Data Visualizations pt.3

Intro to Data Science

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Uncertainty

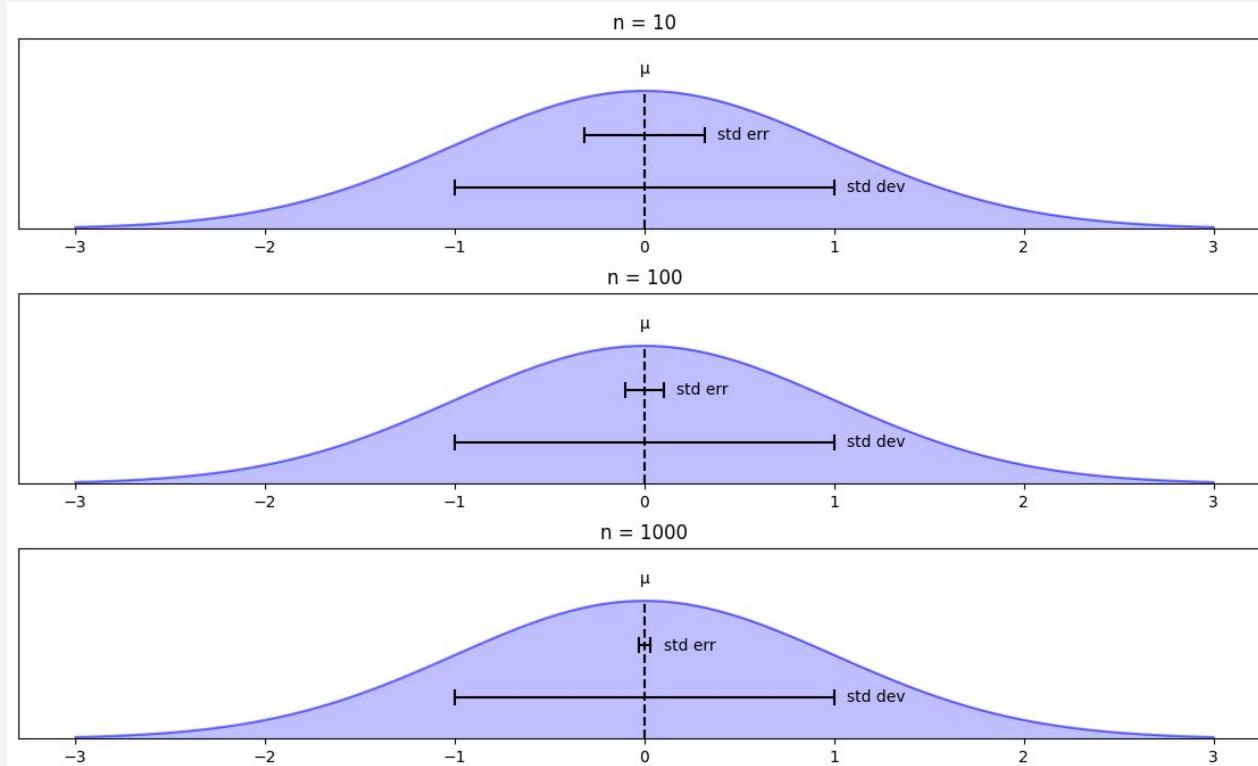


Standard error

$$SE = \frac{\sigma}{\sqrt{n}} \qquad CI = \bar{x} \pm z \frac{\sigma}{\sqrt{n}}$$

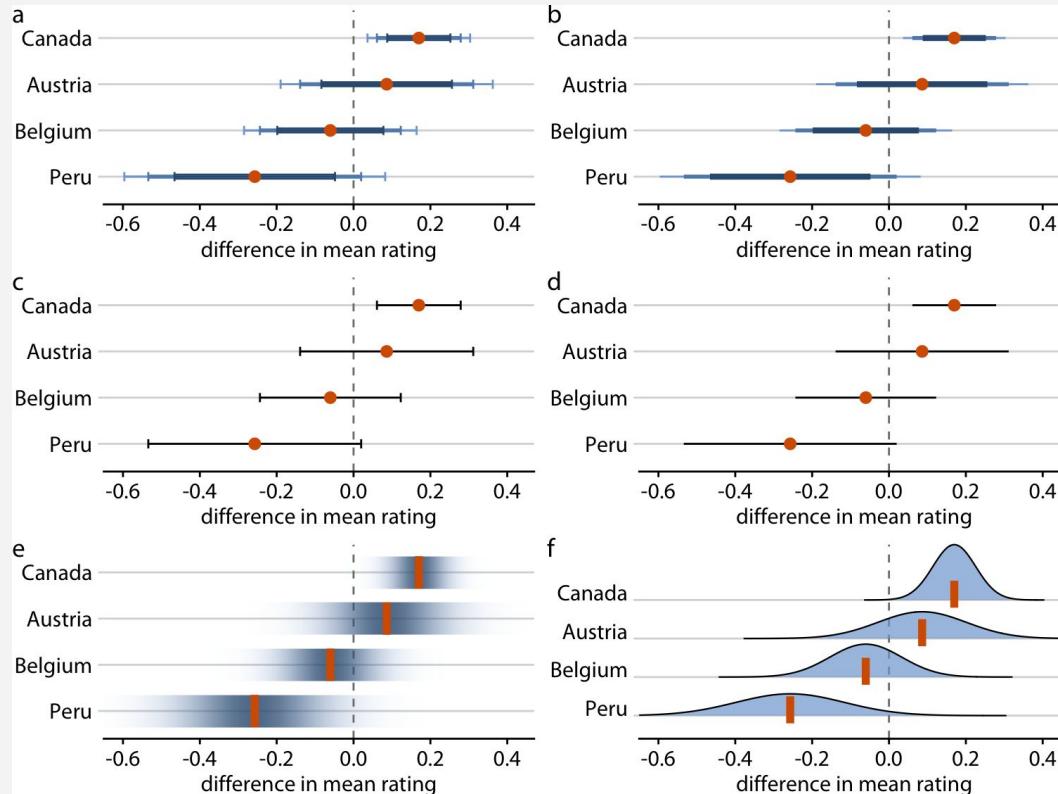


Standard error



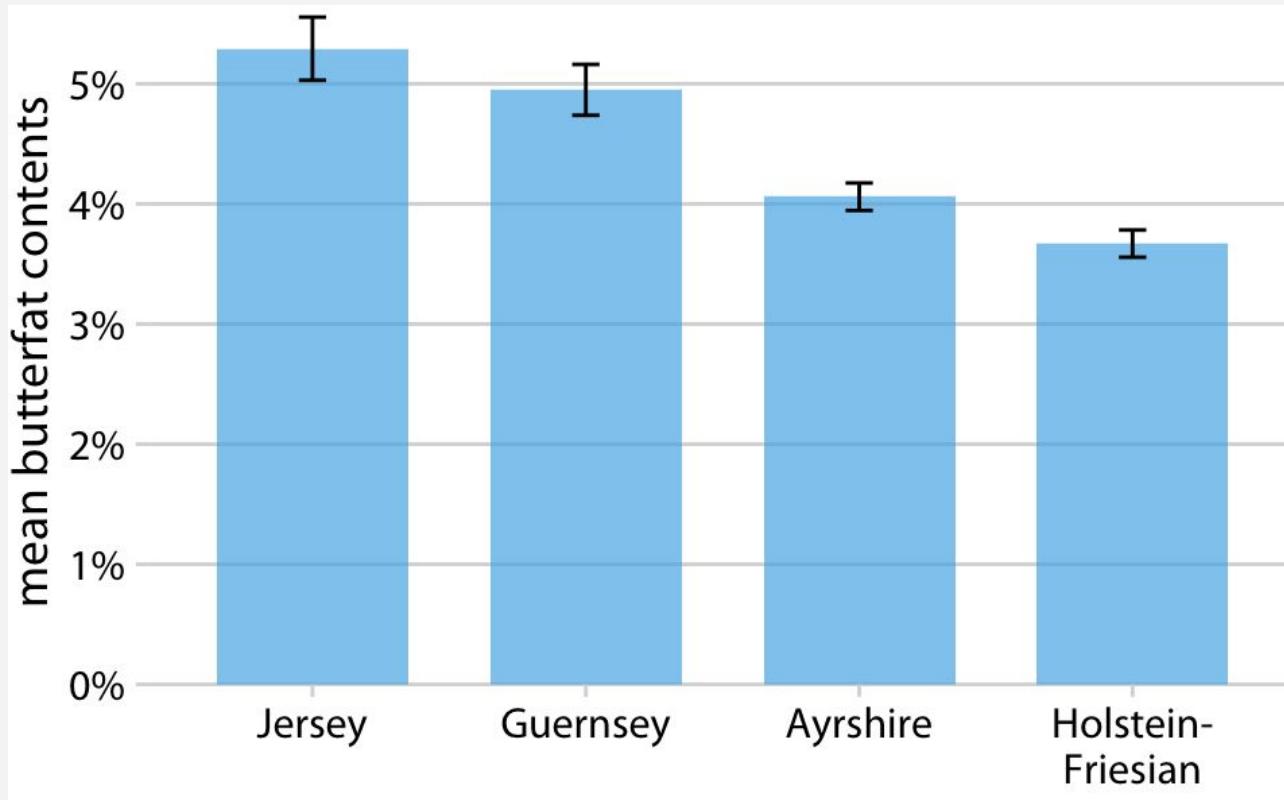


Confidence Intervals



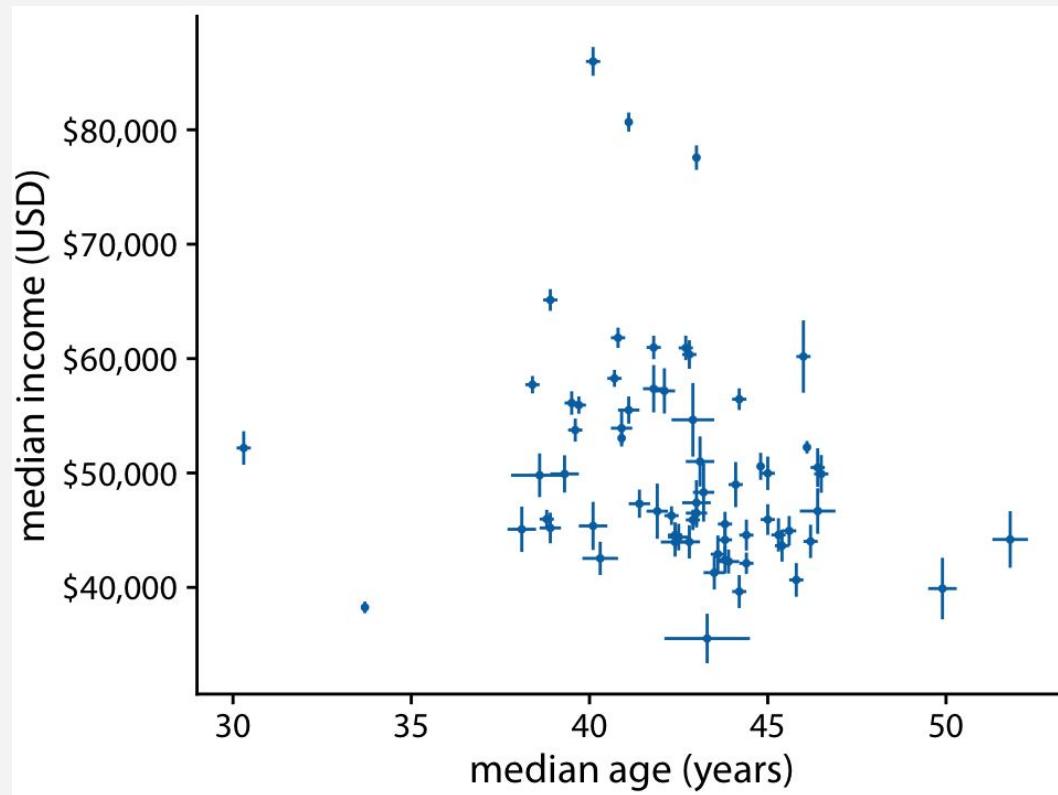


Confidence Intervals



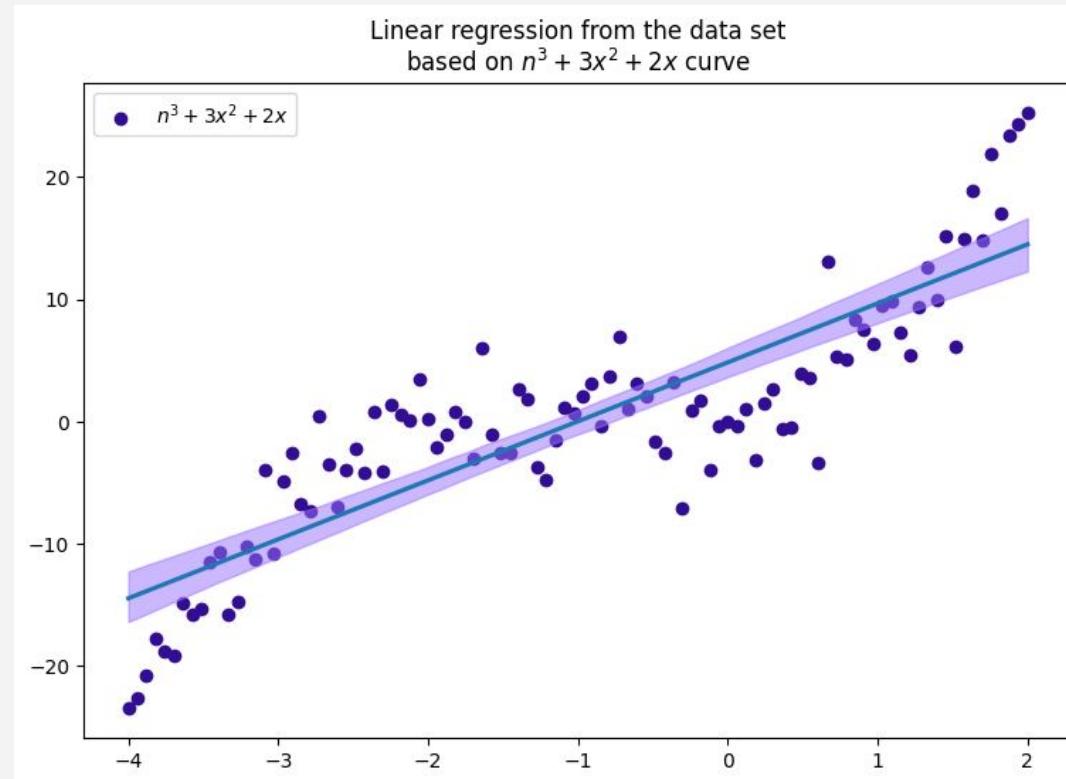


Confidence Intervals



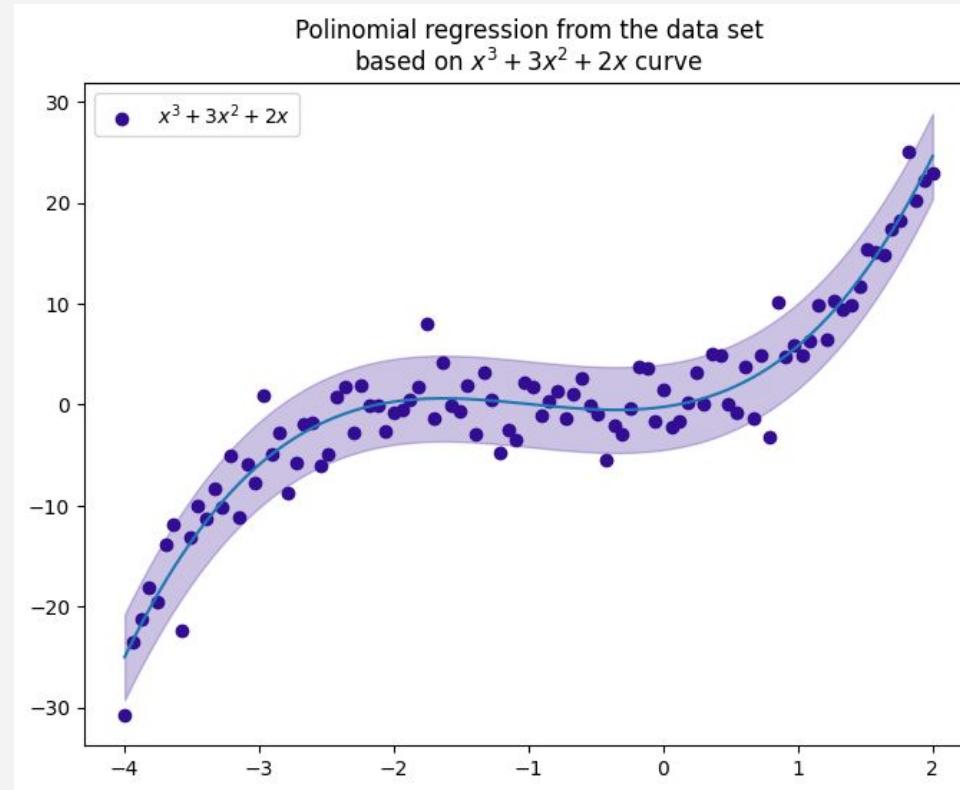


Uncertainty range for linear regression





Uncertainty range for polynomial regression





Geospatial



Ways of representing a map

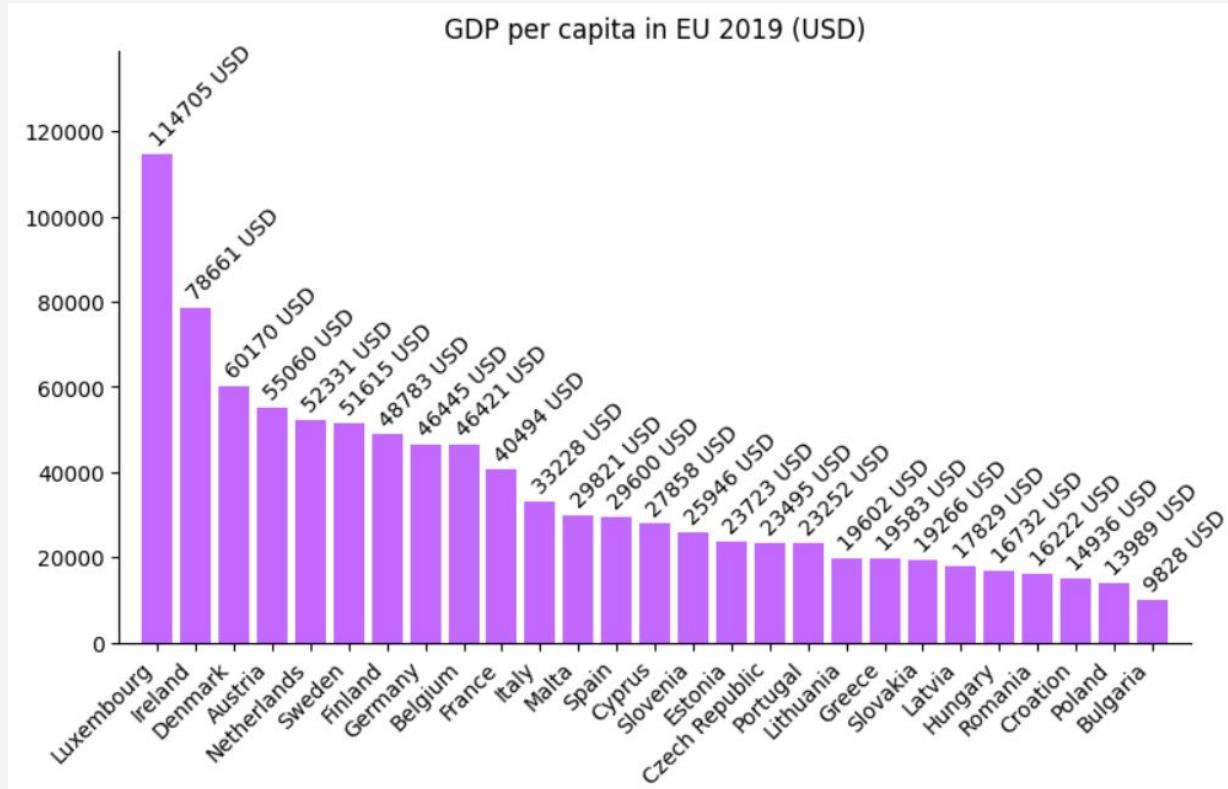


Why we need maps?

	country	GDP per capita (USD)
0	Austria	55060
1	Belgium	46421
2	Bulgaria	9828
3	Croatia	14936
4	Cyprus	27858
5	Czech Republic	23495
6	Denmark	60170
7	Estonia	23723
8	Finland	48783
9	France	40494



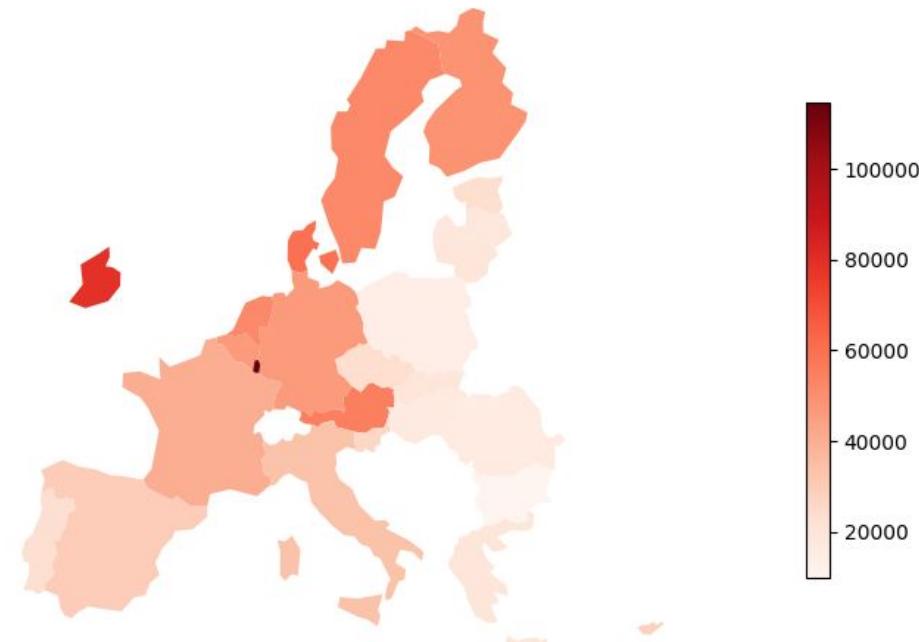
Why we need maps?





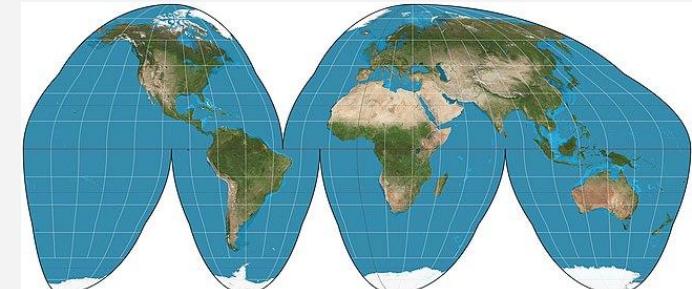
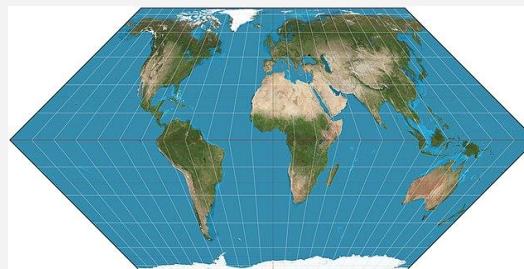
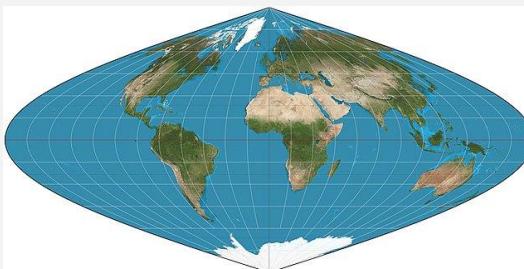
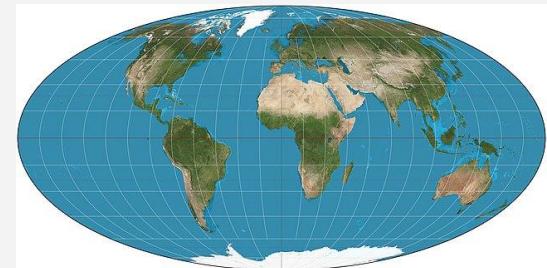
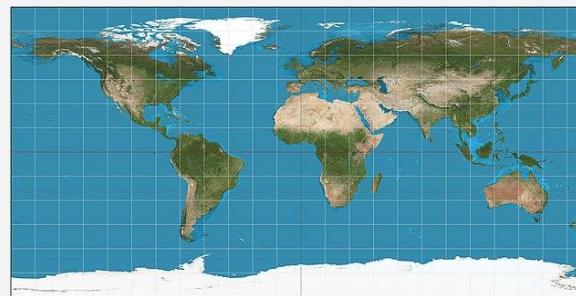
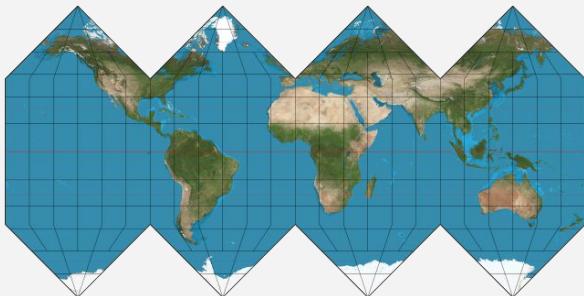
Why we need maps?

GDP per capita in EU 2019 (USD)



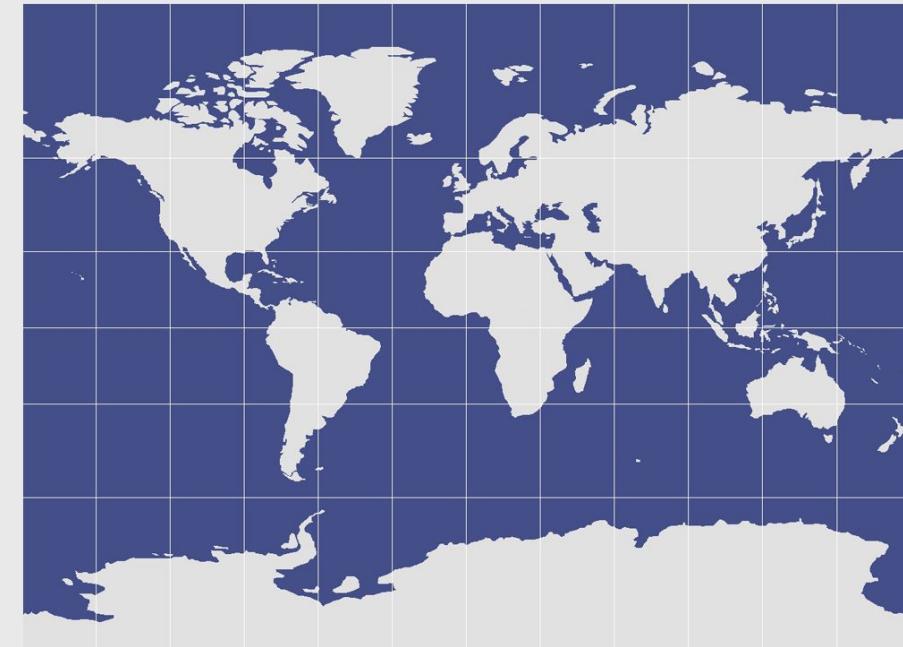
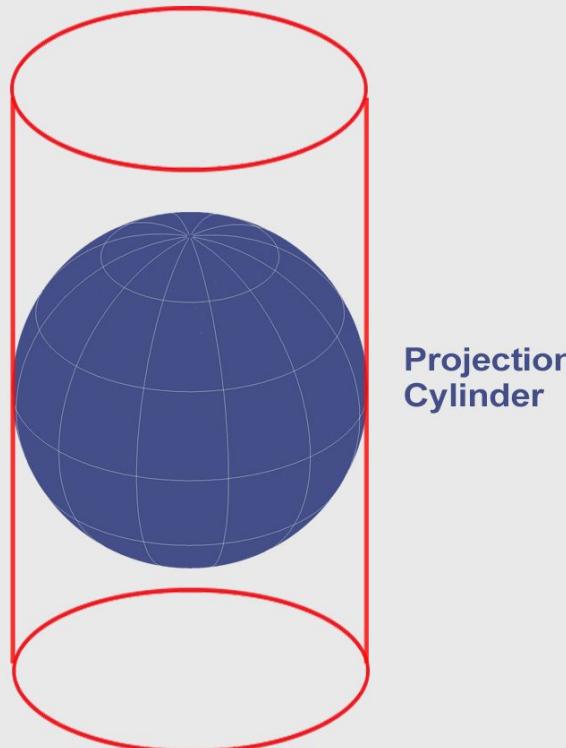


Many, many different projections...



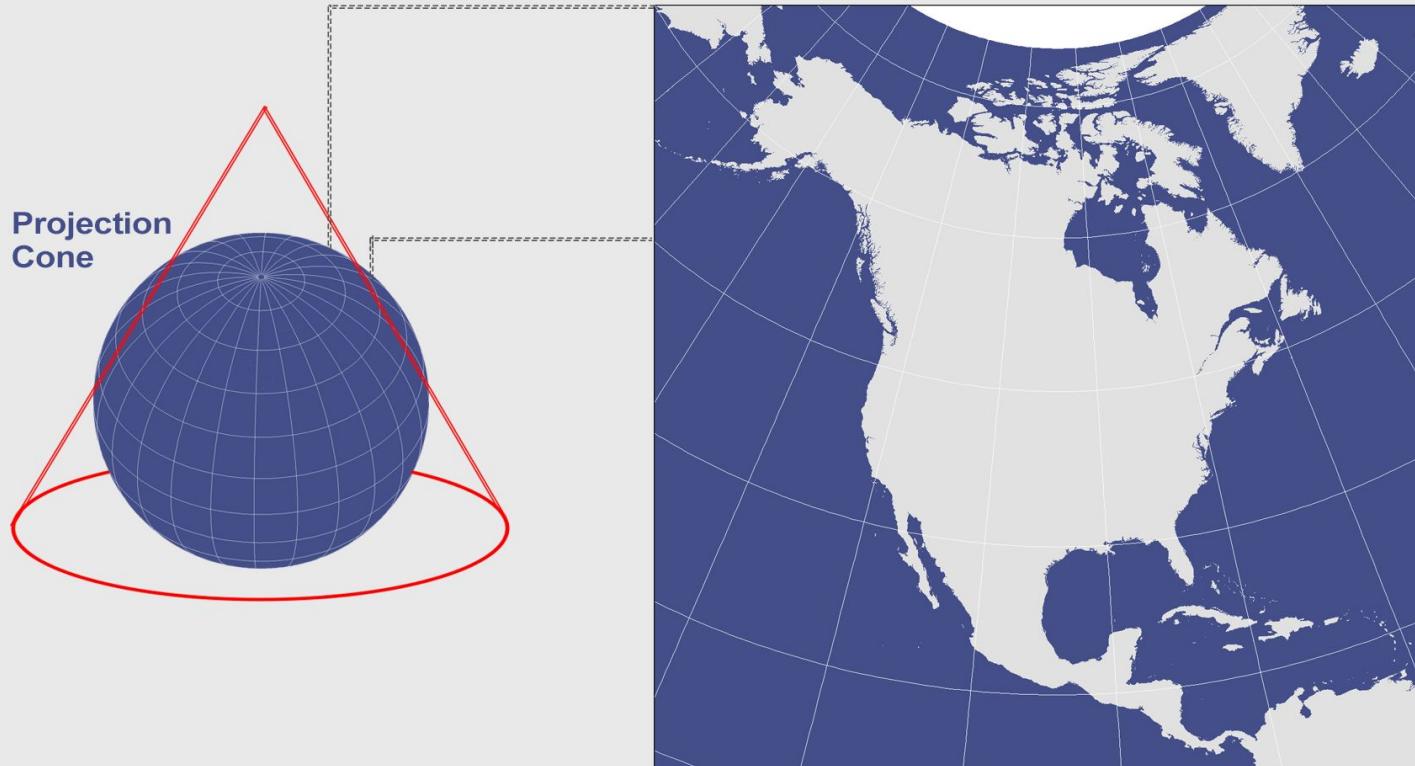


Mercator projection





Albers projection





Mercator projection





Albers projection





Mercator vs. Albers projection comparison

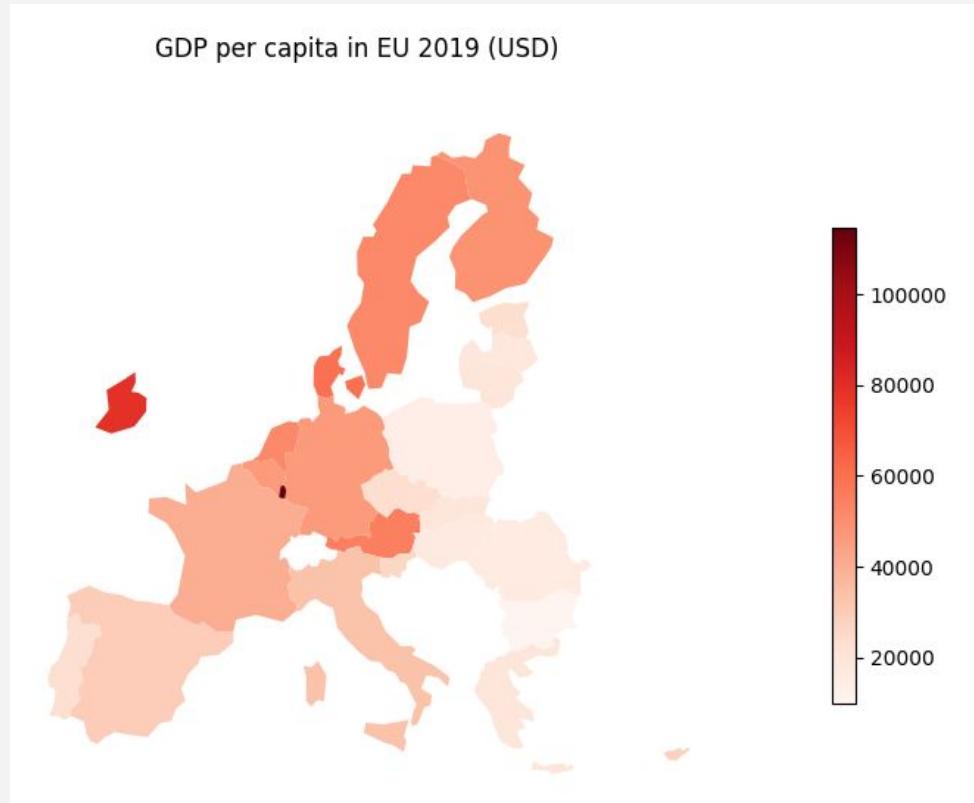




Types of map visualizations

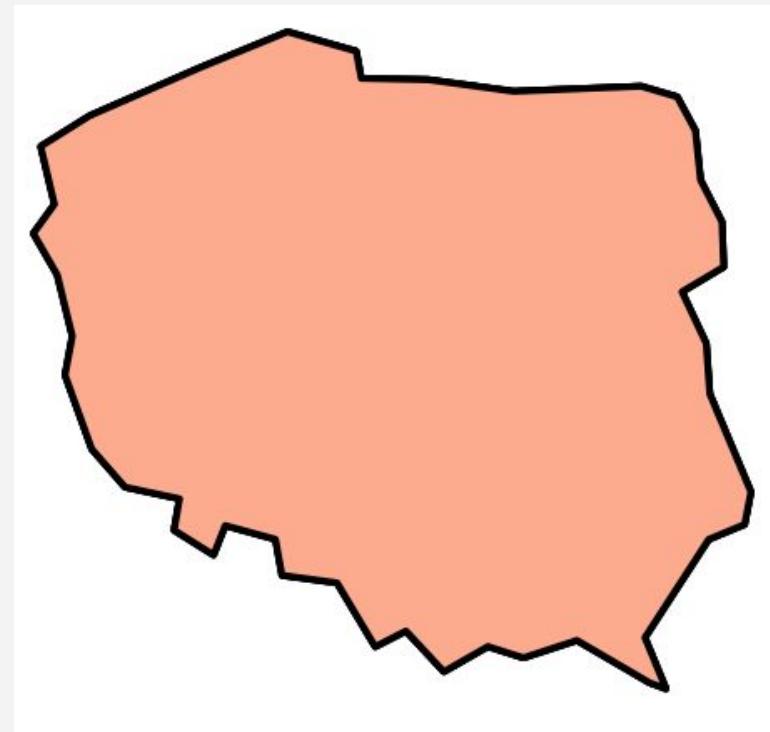


Choropleth



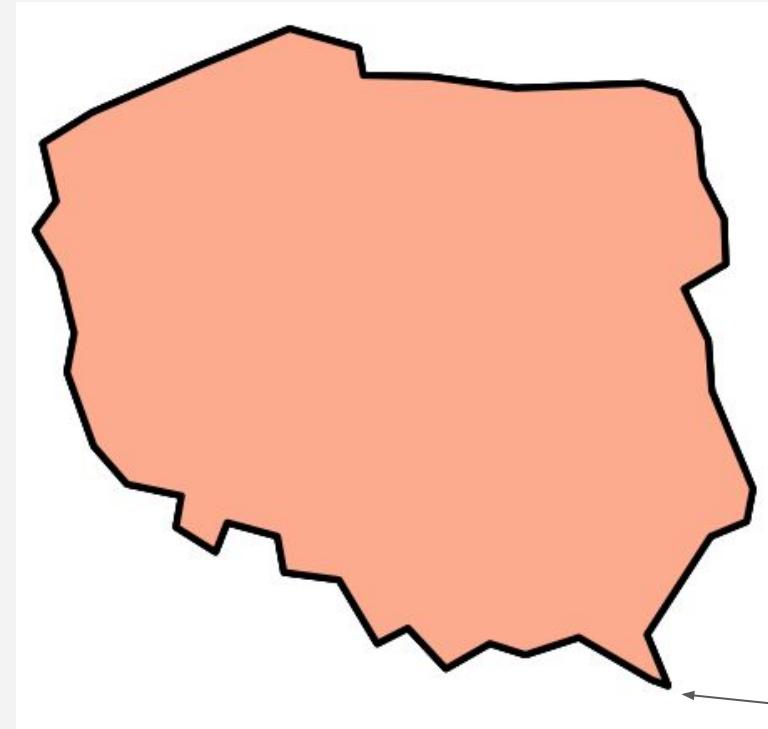


Choropleth





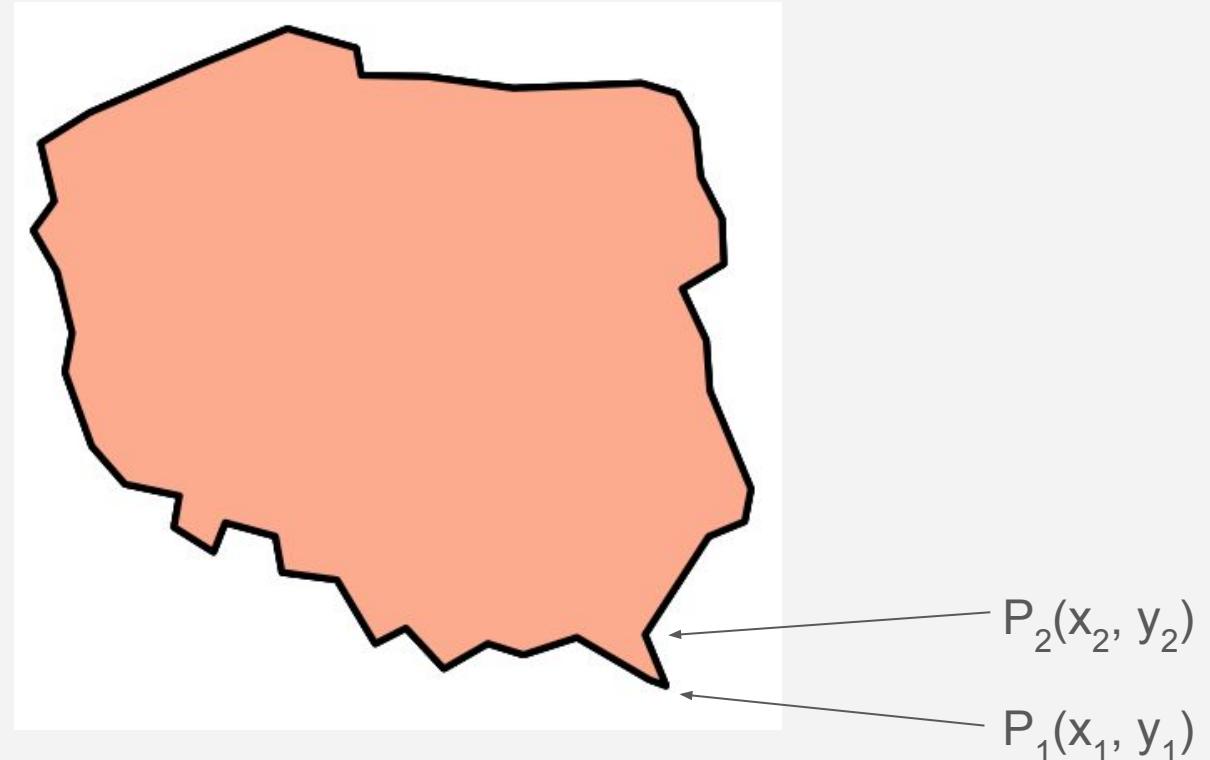
Choropleth



$P_1(x_1, y_1)$

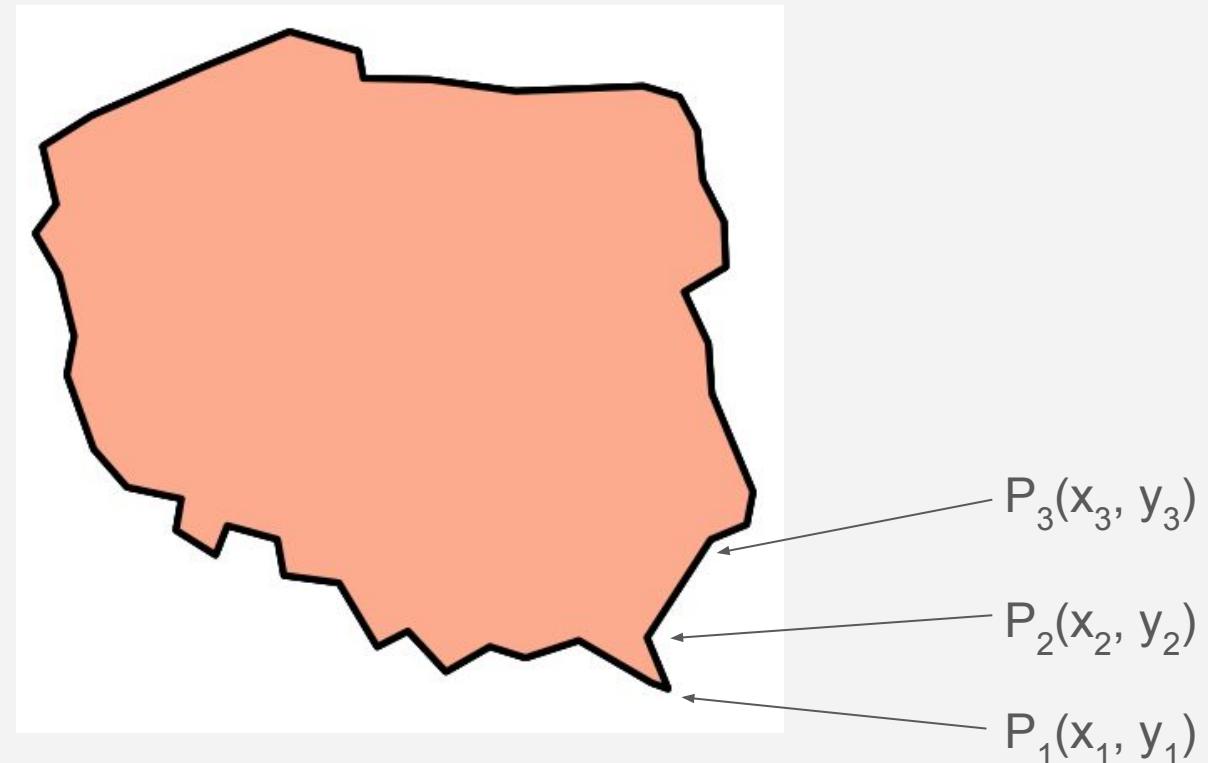


Choropleth



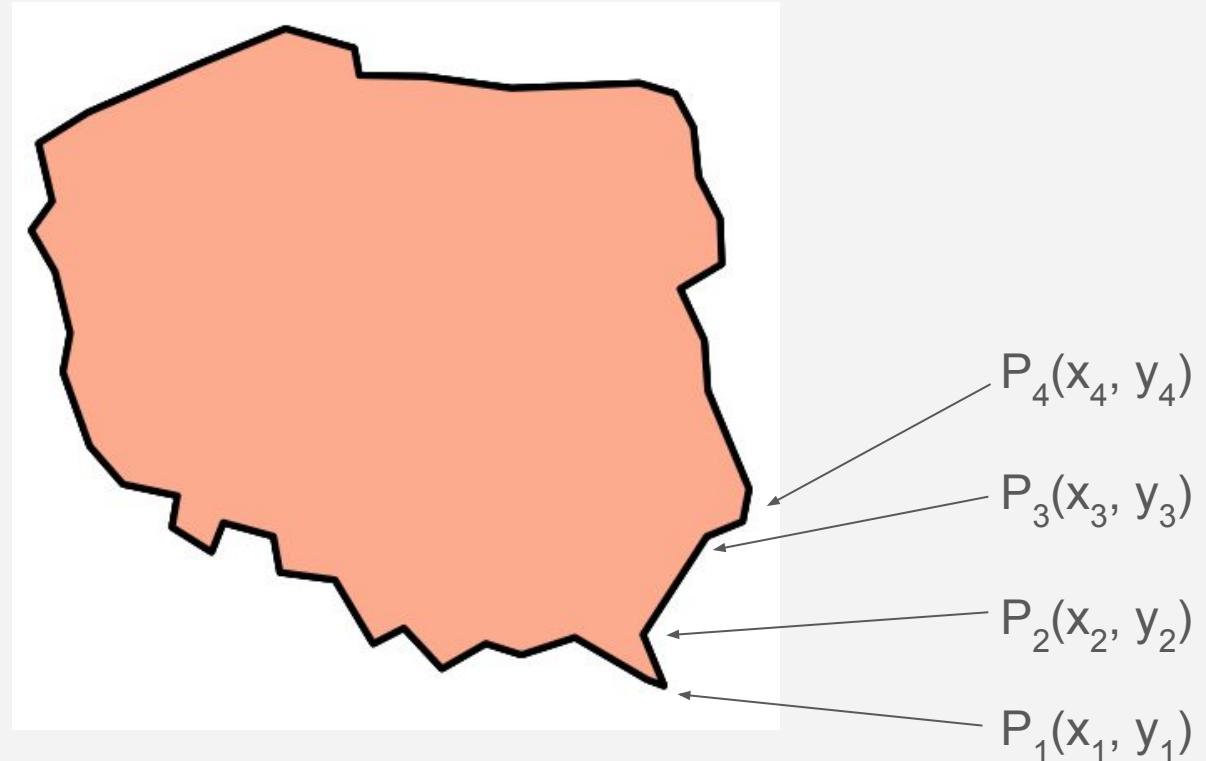


Choropleth





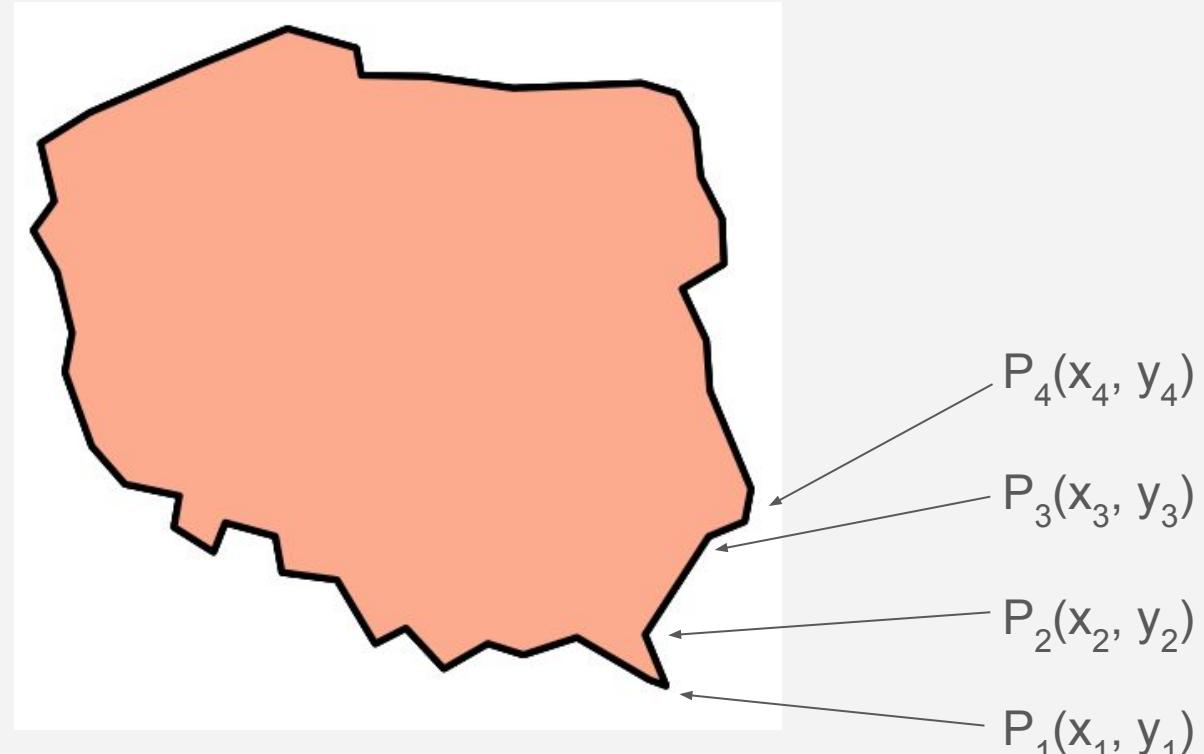
Choropleth





Choropleth

Poland = [
 $P_1(x_1, y_1),$
 $P_2(x_2, y_2),$
 ...,
 $P_n(x_n, y_n)$
]



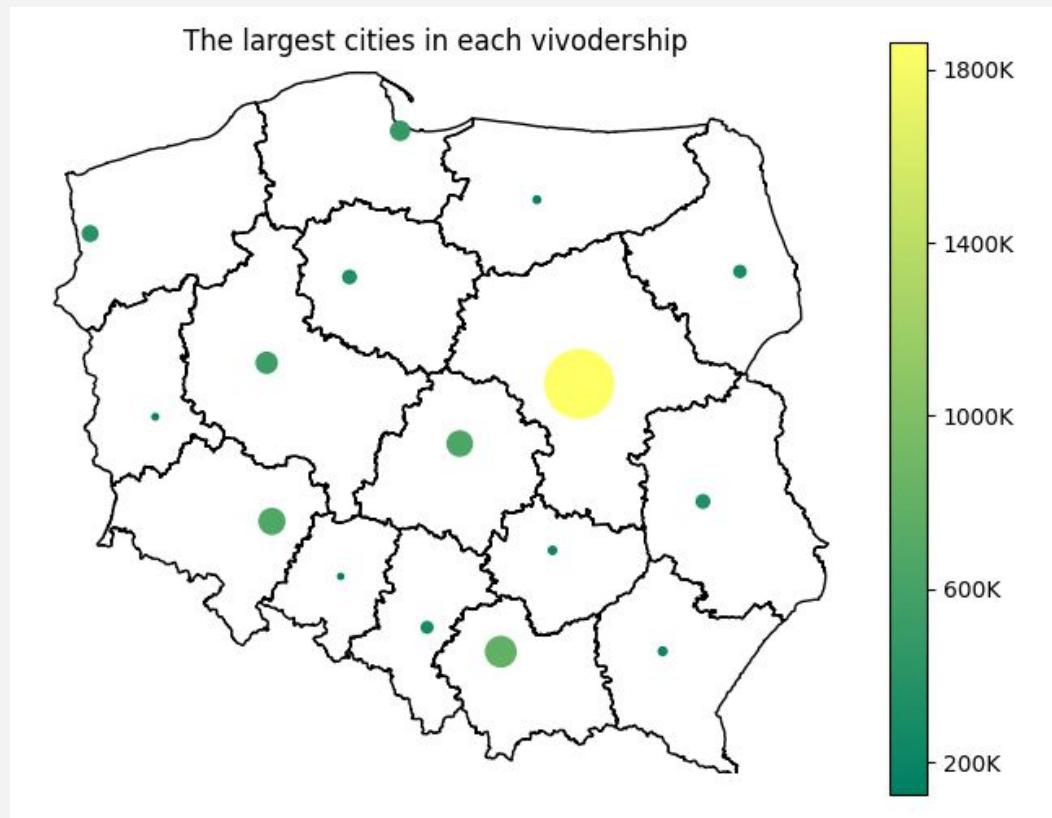


GeoJSON

```
{  
  "type": "FeatureCollection",  
  "features": [  
    {  
      "type": "Feature",  
      "properties": {"name": "Poland"},  
      "geometry": {  
        "type": "Polygon",  
        "coordinates": [[  
          [15.016996, 51.106674],  
          [14.607098, 51.745188],  
          ...,  
          [15.490972, 50.78473],  
          [15.016996, 51.106674]  
        ]]  
      },  
      "id": "POL"  
    },  
    ...  
  ]  
}
```

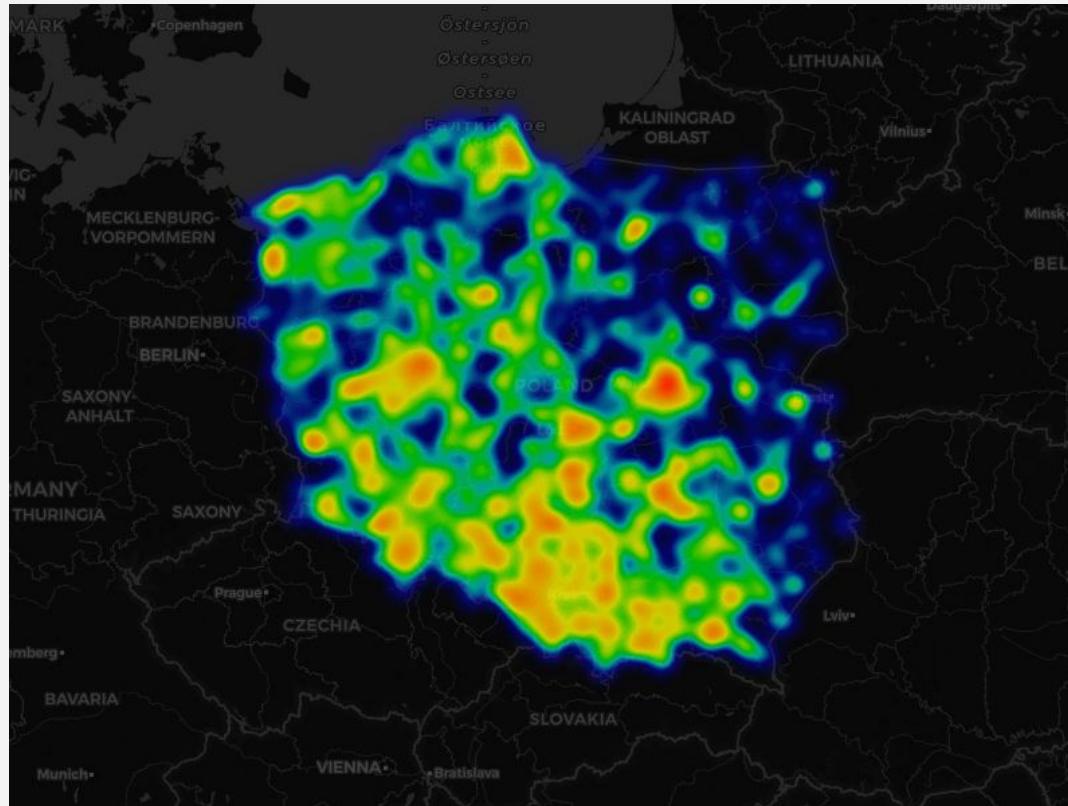


Bubble graph on map



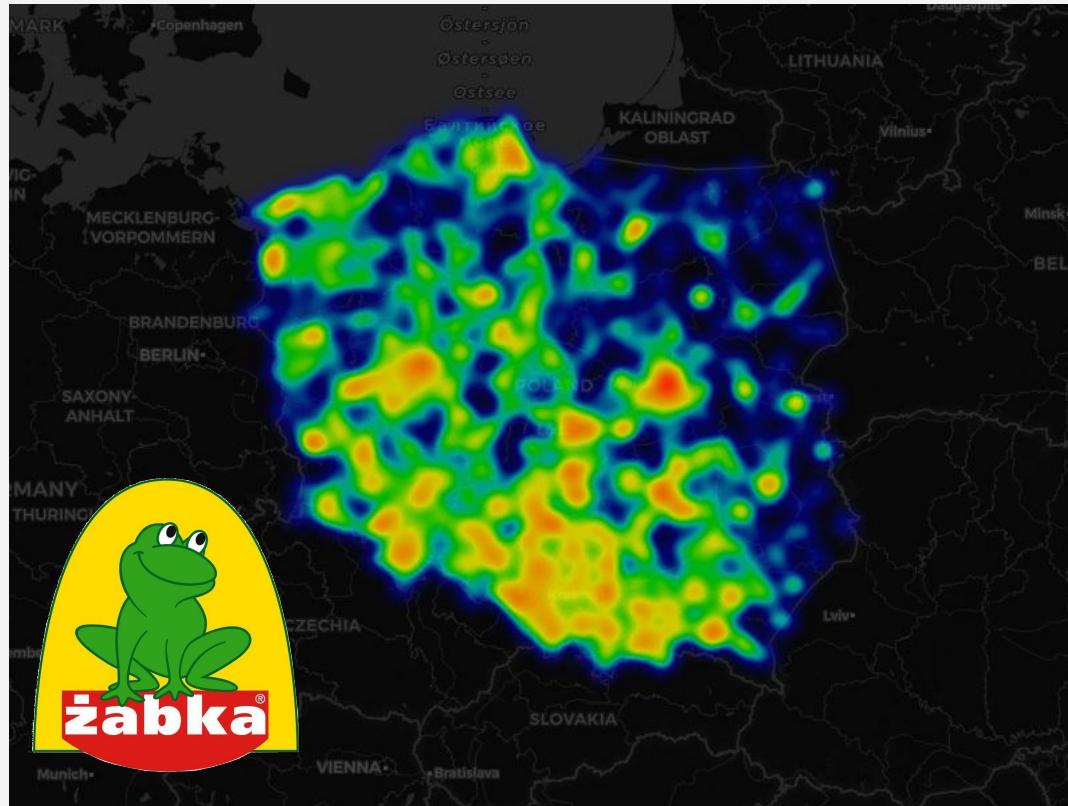


Cartogram heatmap

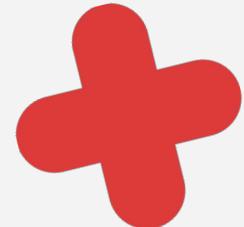




Cartogram heatmap



References



Information sources:

- [1] Wes McKinney, [Python for Data Analysis, 3E](#) (2022), Wes's Blog
- [2] Claus O. Wilke, [Fundamentals of Data Visualization](#) (2019), Claus Website
- [3] [Geoplot documentation](#)
- [4] [Map projection](#), Wikipedia, access date: 23.10.2024
- [5] [Mercator projection](#), Wikipedia, access date: 23.10.2024
- [6] [Albers projection](#), Wikipedia, access date: 23.10.2024
- [7] [List of map projections](#), Wikipedia, access date: 23.10.2024
- [8] [Cylindrical Projections Mercator, Miller and Pseudocylindrical](#) (2024), GISGeography
- [9] [Conic Projection Lambert, Albers and Polyconic](#) (2023), GISGeography

Data sources:

- [10] Rachael Tatman, [Chocolate Bar Ratings](#) (2017), Kaggle
- [11] Chris Riederer, [world.geo.json](#), Github
- [12] Piotr Patrzyk, [polska-geosjon](#), Github

Other:

- [13] [My private notes about data visualization an examples](#)