

# COM6018 Data Science with Python

## Lab 5: Using Matplotlib

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## In this lab

- Reading datasets from CSV files
- Making complex figures with subplots
- Exploring distributions with scatter plots
- Pie charts and stackplot
- Plotting geographic data
- Plotting a contour map of a mathematical function

## The Task

- You are provided with some complex data sets
- For each dataset you are shown a plot or plots that you need to reproduce.
- You need to write Matplotlib code to produce something as similar as possible.

## The Data

We will be using comes from three separate datasets

- `data/renewable_energy.csv` - Renewable energy production in the UK

<https://ourworldindata.org/renewable-energy>

- `data/iris.csv` - Measurements of Iris flowers

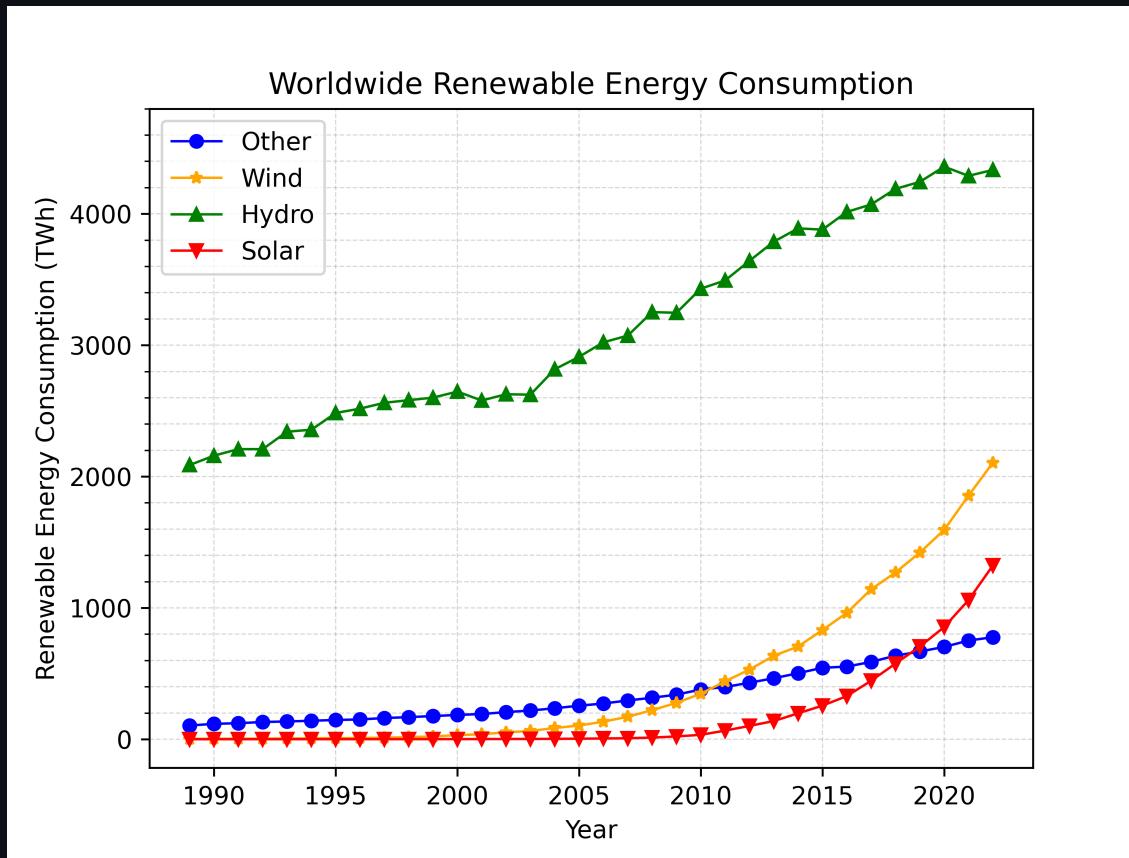
<https://archive.ics.uci.edu/ml/datasets/iris>

- `data/wind_farms_uk.csv` - Locations of wind farms in the UK

[https://en.wikipedia.org/wiki/List\\_of\\_offshore\\_wind\\_farms\\_in\\_the\\_United\\_Kingdom](https://en.wikipedia.org/wiki/List_of_offshore_wind_farms_in_the_United_Kingdom)

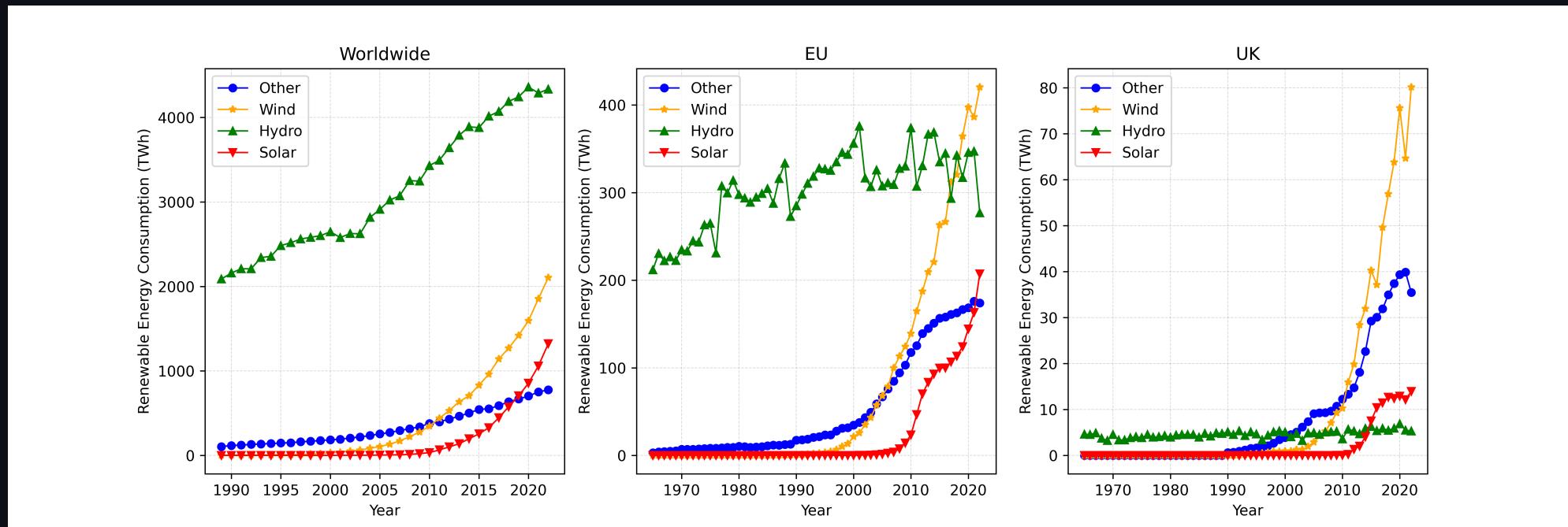
# Plot 1

Global renewable energy production over time.



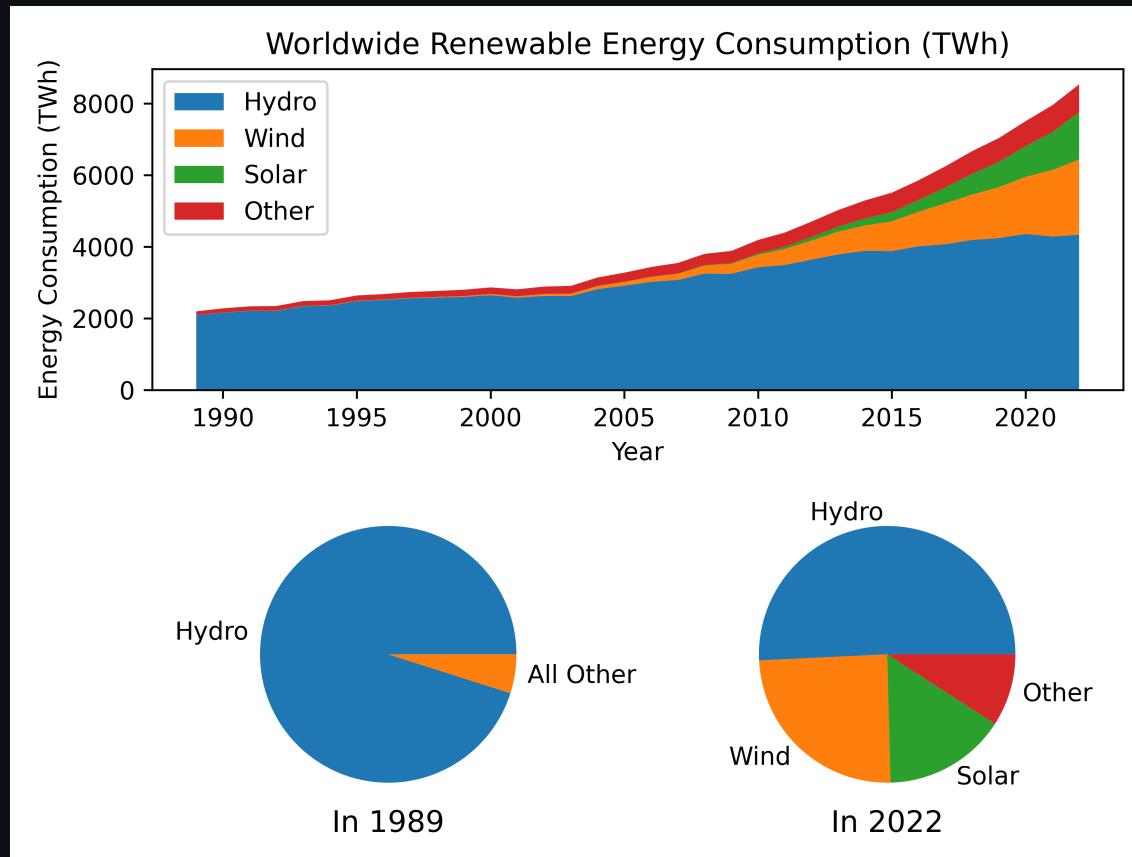
## Plot 1b

Renewable energy production broken down by region.



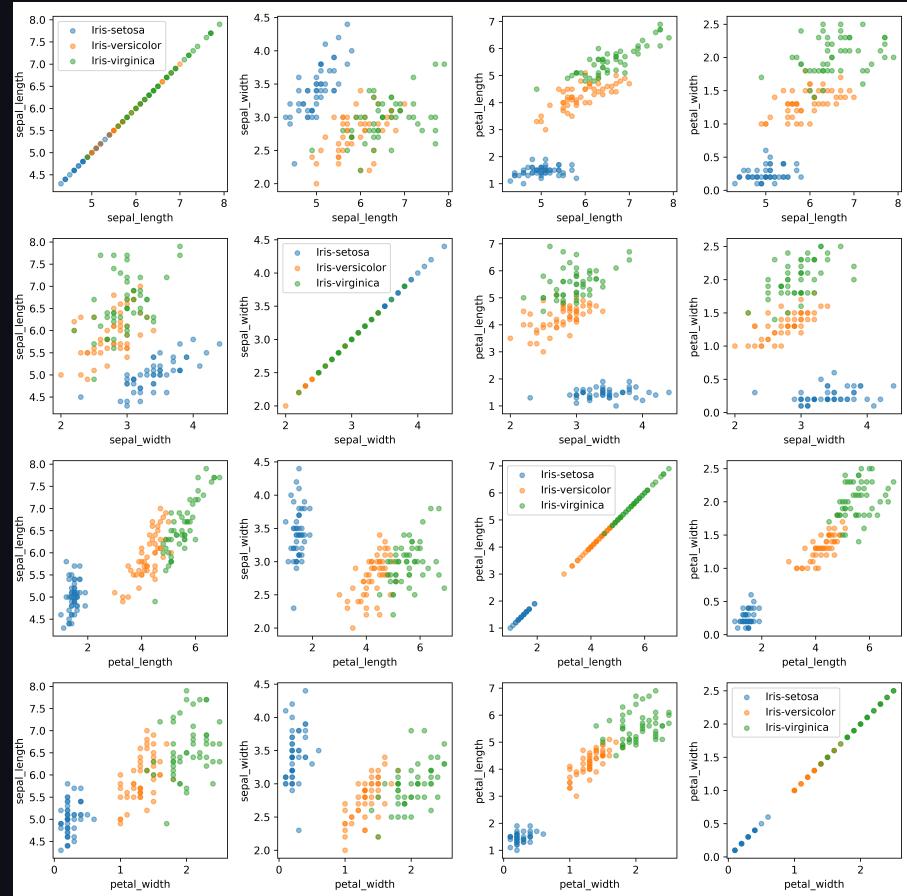
## Plot 2

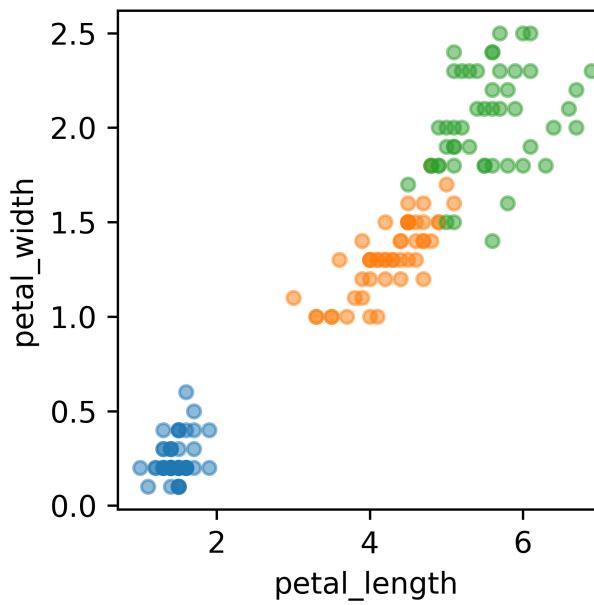
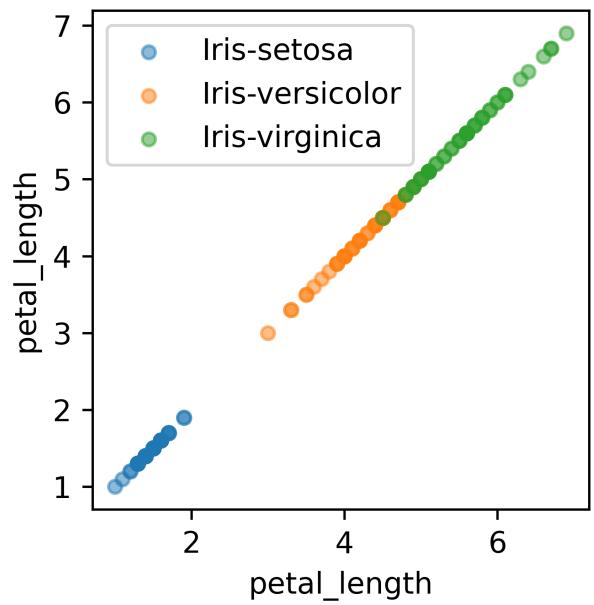
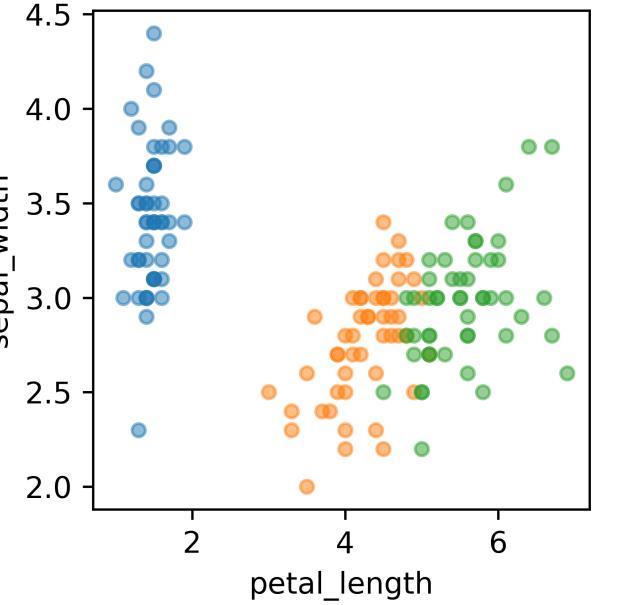
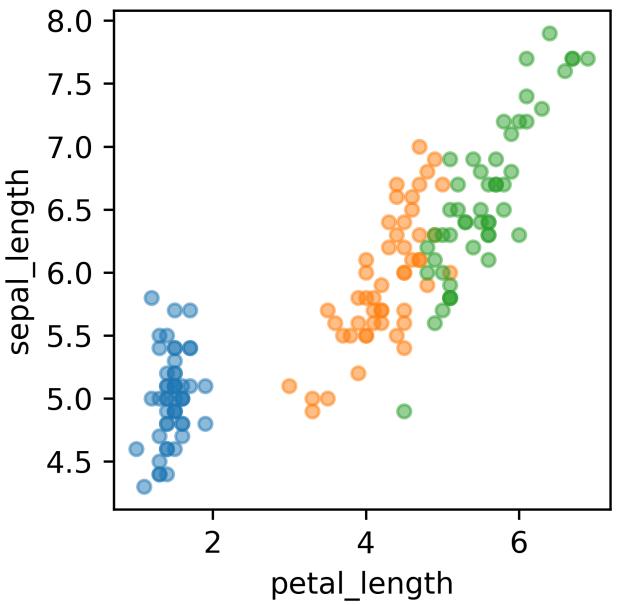
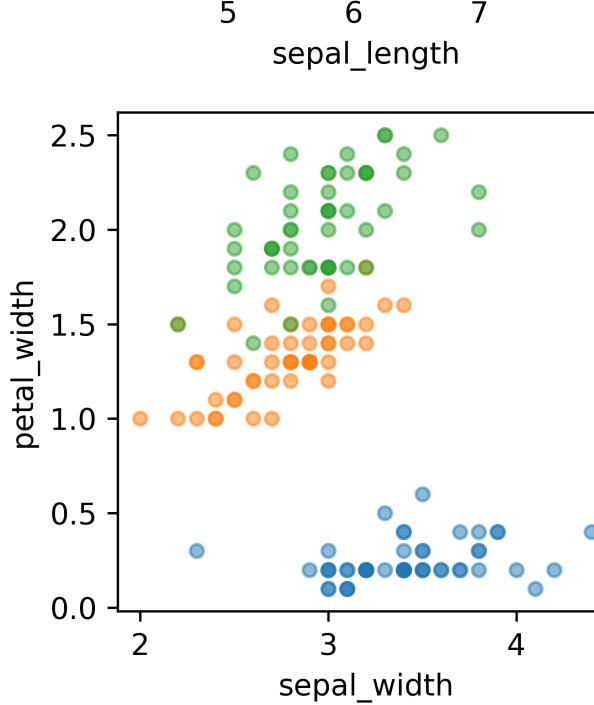
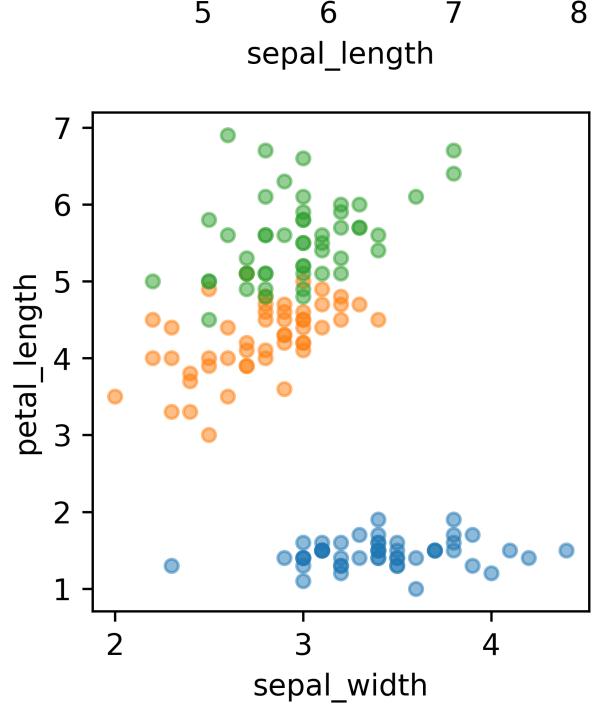
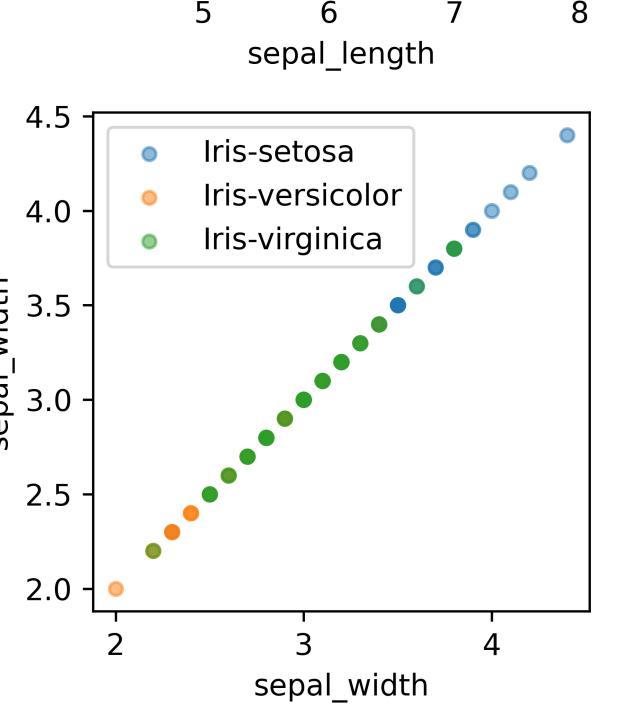
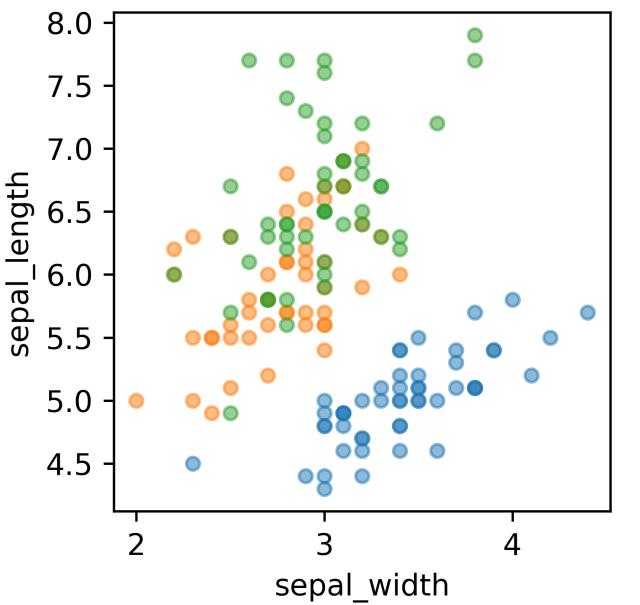
The share of renewable energy sources changing over time.



## Plot 3

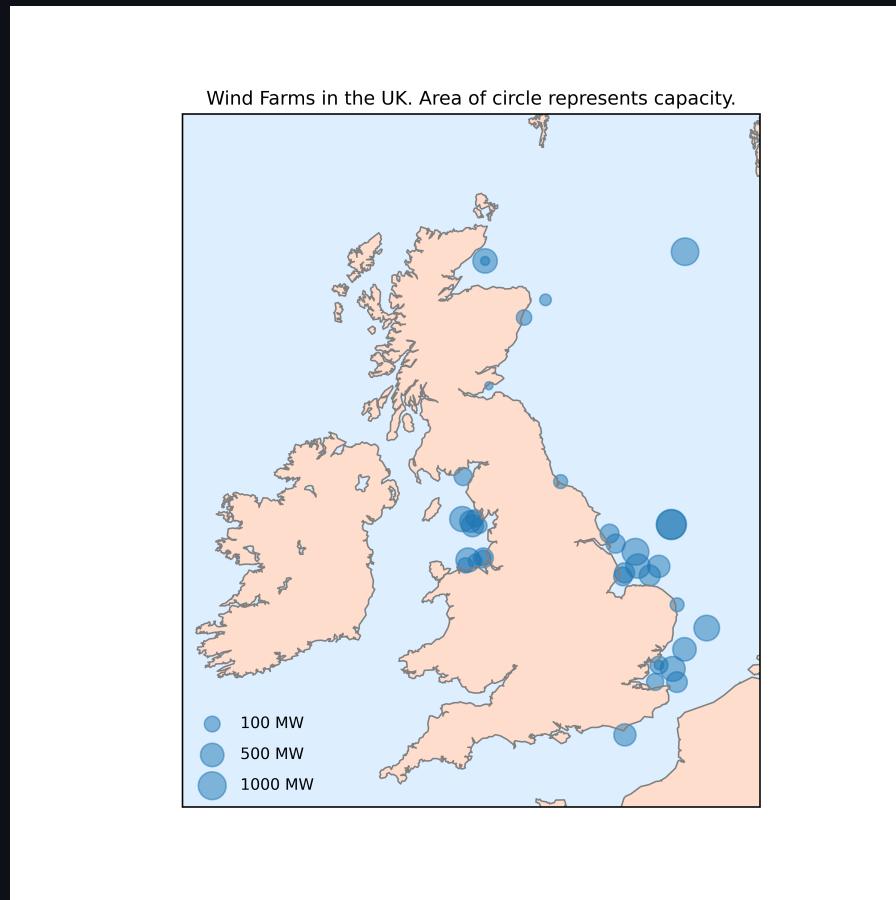
Using the Iris data. Distribution of petal and sepal, lengths and widths.





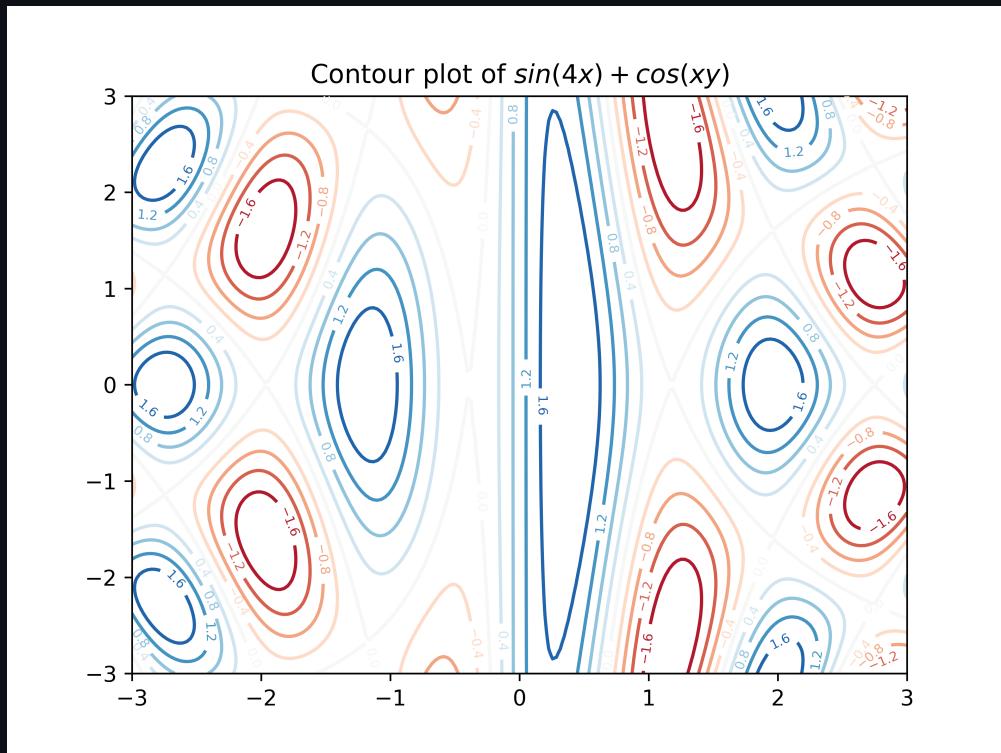
## Plot 4

Using the wind farm data. Location and size of wind farms in the UK.



## Plot 5

Visualising the function  $f(x, y) = \sin(4x) + \cos(xy)$ .



## Obtaining the Jupyter Notebook

If you have cloned and pulled the module's GitHub repository then you should see,

```
materials/labs/
├── 050_using_matplotlib.ipynb
└── ... etc
    └── data
        ├── data/renewable_energy.csv
        ├── data/iris.csv
        ├── data/wind_farms_uk.csv
        └── ... etc
```

The lab is `050_using_matplotlib.ipynb` and it will need the data files  
`data/renewable_energy.csv`, `data/iris.csv` and `data/wind_farms_uk.csv`,

Or you can download the notebook and data via links on Blackboard.

## Getting Help

- If you are stuck just raise a hand to ask for help.
- Feel free to discuss the lab with your neighbours.
- Re-read the Matplotlib tutorial notes
  - In the Git repo at `tutorials/050_Introducing_Matplotlib.ipynb`
  - or online at <https://uos-com-6018.github.io/COM6018>
- Use the Matplotlib <https://matplotlib.org/> documentation for reference.