We import python modules using the import keyword.

We can rename modules to shorten their names and import sub-modules of larger packages.

We can import specific functions and variables making them simpler to use in our programs.

\*

Let’s revisit the python module, Numpy

\*

Numpy gives us a new type of data structure, the Numpy array.

In pure python, we must iterate through a data structure to apply an operation to each of its elements.

An operation applied directly to a Numpy array, is automatically applied to each of its elements.

There are many ways to create a Numpy array and the most suitable method will depend on the application.

\*

Numpy gives access to lots of useful functionality including trigonometric, exponential and logarithmic functions…

… testing for zeros in an array

… finding instances of a value in an array

… linear algebra such as matrix operations

… and random number generators

\*

Pause the video now and attempt these exercises.

Videos showing worked solutions, and the code, can be found on blackboard.

\*

Let’s review Matplotlib

\*

On this course we only studied the pyplot sub-module of the matplotlib package.

This only covers a small part of its extensive functionality.

The simplest line plot can be created using the plot function.

In Spyder, plots appear in the Plots window, but when using the terminal or some other IDEs, the Show function generates the plot in a separate window.

\*

To produce a line graph, we import the relevant modules

Generate or import some data to plot

And use the Plot function

We can then format the graph, for example setting the axis limits and labelling the axes

Lastly, we display the plot

\*

Generating a scatter plot is similar but we replace the function Plot, with the funcions Scatter.

\*

Generating a bar chart is little different.

We take some data

And create a range of numbers to represent each field/bar

We then plot a bar chat using the value of each bar

And replace the range of numbers with the field names

We can then do any formatting like adding axis labels

Lastly, as always, we display the plot.

\*

Lastly, let’s look at hisotgrams

We need some data, in this case just a set of random numbers

We group the data by value into a specified number of bins of equal size.

And that’s it! We can add labels etc if we want to

Before displaying the graph

\*

Pause the video now and attempt these exercises.

Videos showing worked solutions, and the code, can be found on blackboard.

\*

We have only scratched the surface of the functionality of numpy and matplotlib.

Exploring them further will give you access to useful tools to use in your further studies.

There are many other python packages and modules.

A few that you might find useful are listed here.