Python Modules

A module is a **file** containing code you can include in your program. Modules can be built-in or your own code. Use "**import**" to include a module.

To find a list of the "**built-in**" modules available to Python type

```
print(help("modules"))
```

or visit: https://docs.python.org/3/py-modindex.html

An example module is "**math**" – to list all of the different **variables** and **functions** found within the **math module**, you can place the name of the module within the **help** function.

```
print(help("math"))
```

To use a module we must first import it:

```
import math #<-- allows access to everything contained in it
```

To access the variables and functions within the math module, for instance Pi (π):

```
import math
print(math.pi)
```

It is possible to give the module an alias:

```
import math as m  #<- changes module name to m
print(m.pi)
```

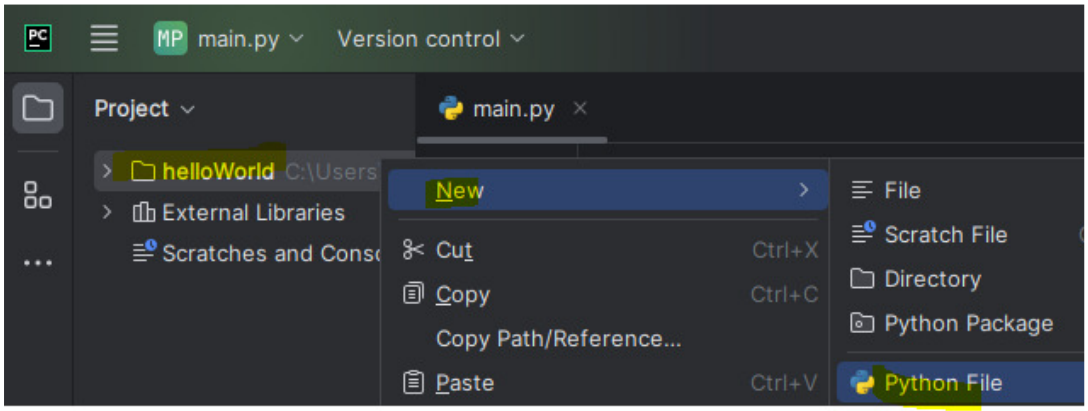
You can be specific about what you import from the module:

```
from math import pi #<- we no longer need the module name
print(pi)
```

To create a module

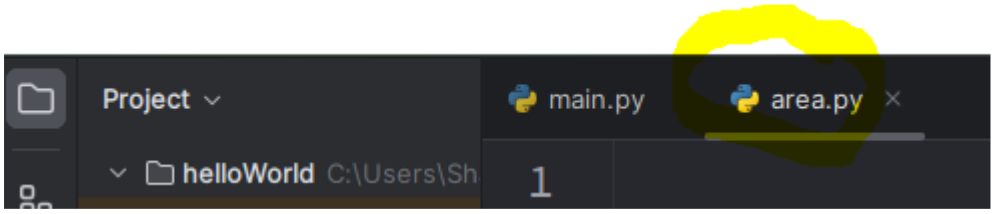
It can be useful to separate a program into individual files that perform specific tasks.

Right click our Python Folder → New… → Python File



Name the module “**area**” and select **Python file.**

We now have a new tab called **area.py**



We’ll create some functions to calculate area in the **area.py** file:

```
pi = 3.141592653589793

def square(l):
    return l ** 2

def circle(r):
    return pi * r ** 2

def triangle(b, h):
    return 0.5 * b * h

def rectangle(l, w):
    return l * w
```

In the **main.py** program we can import this module and immediately use these functions:

```
import area # <- imports our file area.py ready for use

area = area.square(5)
print(area)
```

result: 25

```
import area

area = area.circle(6)
print(area)
```

result: 113.09733552923255

```
import area

area = area.triangle(6, 3)
print(area)
```

result: 9.0

Exercise:

Extend this code to ask the user what type of area calculation they want to do, then depending on their choice, ask for the radius, length, width, height… and perform the correct calculation. Add functionality to also cater for perimeter.