

Wrestling With Python (2014) Lab 1: Introducing Python

Aim

The aim of this lab is to introduce you to Python. Python is an easy language to learn as a beginner primarily because it is interpreted on the fly by the python shell. This allows you to freely experiment with different commands and see the results immediately. In this lab you will learn how to use the python shell to execute commands. You will learn how to edit, save and load files in a separate window and how to run these files in the python shell from the separate window.

Header

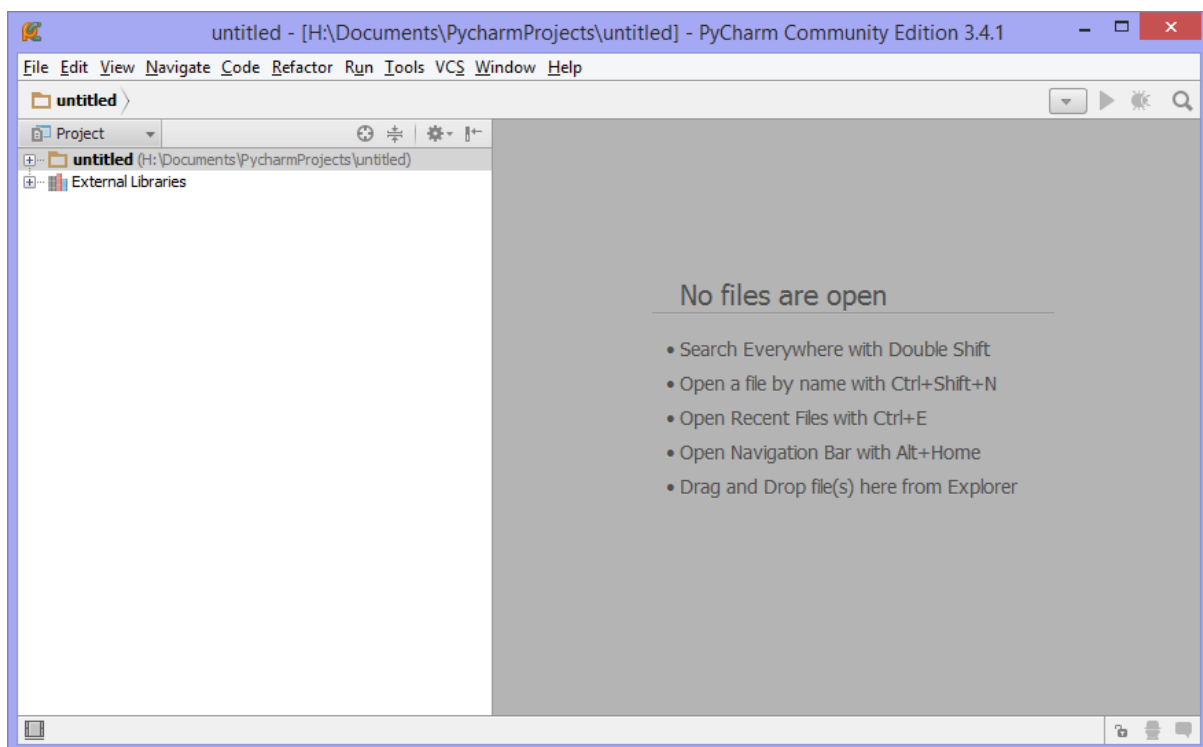
Throughout the labs it is assumed that you will follow a similar folder hierarchy to the one shown in the labs. Your code will be stored in a folder C:\Users\<<**Your Login**>>\PycharmProjects\.

Remember, if you are struggling ask for help!

Coding in PyCharm

To launch PyCharm press the windows key and type “pyc”, then select PyCharm.

You should see a window that is similar to the one below:



Click Tools -> Run Python Console...

In the lower window type Hello, World!

You should see lots of red error messages. This is because Python thinks you are trying to refer to a variable called Hello. Try again, this time type “Hello, World!”

This time the Python Shell should say 'Hello, World!' back to you. Try typing `2 + 2`. This time the shell has something that it can process. It should give you the answer to `2 + 2`. Try some other combinations. The shell can handle all the normal maths functions. Multiply is achieved using the `*` symbol (e.g. `3 * 3` gets the result 9) and powers (such as squaring a number, cubing a number etc) can be calculated using `**` (e.g. `2 ** 3` means `2 * 2 * 2` so the result is 8).

Variables

Try typing `a + 3`. You should get an error which says "NameError: name 'a' is not defined. That means that Python is looking for a variable called a. A variable is like some data with a name to refer to it.

Try typing `a = 2`. Nothing appears to happen, but you've actually just created a variable a and assigned the value 2 to it. Now if you type `a + 3` you should get a result.

Saving your code

One of the reasons python is so successful as a language, apart from the fact that it is interpreted rather than compiled is because you can build prototypes in python very quickly.

Click File -> New Project. Give the project a name e.g. Lab 1. Check the project name displayed in the top left corner of the screen.

In the project window (left hand side of the screen), right click on the Lab1 and select New -> Python File. Give the file a name. e.g. Hello World

A new window called 'Hello World.py' should appear. You can type multiple commands in this window.

Start by typing

```
print("Hello, World!")
```

Then right click on the 'Hello World.py' in the project window and select Run

This will run the current file in the shell window. Your file will automatically be saved.

You should see that the output of the code is shown in the lower window.

You can rerun your code by clicking the green triangle in the lower window

Getting user input

Change your code to read as follows:

```
name = input("Please enter your name")  
  
print("Hello, " + name + "!")
```

This create a variable called name. It prompts the user to enter their name and then prints a personalised hello message back to the user. Test the code by running. Enter your name when prompted in the lower window.

Changing types of data

In this section you're going to write a program prompts the user for the radius of a circle and prints out the circle's radius, diameter, circumference and area. The data that you get from the user is a "string" of characters. It's text data. If you want to change that data to a number you need to "cast" that number.

Select Lab1 in the project window and create a new python file called Circle.py and add the following code:

```
radiusString = input("Enter the radius of a circle")
```

```
radiusNumber = int(radiusString)
```

```
print("Circle Radius: " + str(radiusNumber) + "\n")
```

Test your project by right clicking on the 'Circle.py' in the project window and selecting Run

Modify this program to report the diameter, area and circumference of the circle. In order to do this you will need to import a maths module. Add the line `import math` to the top of your code. The diameter is twice the radius, the circumference is twice the radius multiplied by Pi and the area is Pi times the radius squared. The value of Pi can be found in the math module by typing `math.pi`.

