

## Instructions

This aim of this lab is to familiarise yourself with:

- Logging on to lab machines
- Running PyCharm, creating a project, python files, and running simple programs
- Using online learning tutorials for Python
- Accessing webcourses (Caveat: you may not be registered in the module yet)

Before you begin, take out a pen and paper. Put a title of Lab 1 on it and the date. Answer the questions below and make any notes or questions or comments or thoughts on your page. Don't worry if you don't finish everything during the lab but try to finish them before the next lab and bring your answer and notes page.

1. (*1 point*) There is a link to the PyCharm IDE on the desktop, start up PyCharm. What is an IDE?
  2. (*1 point*) Create a sub-directory on your student shared network storage and call it "pythonlabs" or something similar. Now create a new python project in a subfolder of this folder called "lab1". Why are we creating all of these folders/directories?
  3. (*1 point*) Create a python file called circle.py in your project. It could be called anything but having names that make sense is a good habit for programming. Why?
  4. (*2 points*) Type the code from listing 1 into the circle.py file and save it. Run the program. What answer does it give for a circle with radius 12?
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### Listing 1: circle.py

```
from math import pi

r = 12
area = pi * r ** 2
print("The area of a circle with radius", r,"is", area)
```

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5. (*2 points*) Change the code to also print out the circumference of the circle (the circumference,  $c$  is calculated from the radius,  $r$  as  $c = 2\pi r$ )
6. (*2 points*) Change the code to add some bugs, i.e. code that will break the program and cause errors. What errors can you get the IDE to report?

**7. (2 points)** Create a new python file called madlib.py and input listing 2. Run the program (this can be done by right clicking madlib.py and clicking on run). Can you change this program so it will output another sentence which is grammatically correct but with a different word order?

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**Listing 2: madlib.py**

```
# madlib.py
#

adjective = input("Enter an adjective: ")
noun = input("Enter an noun: ")
verb = input("Enter an verb: ")
adverb = input("Enter an adverb: ")
print("A", adjective, noun, "should never", verb, adverb)
```

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**8. (2 points)** Create a program spherevolume.py. The volume,  $v$ , of a sphere with radius  $r$ , is  $v = \frac{4}{3}\pi r^3$ . What is the volume of a sphere with radius 5? Modify your program so that the user can enter a different radius each time the program runs.

**9. (2 points)** Suppose the cover price of a book is €24.95, but bookstores get a 40% discount. Shipping costs €3 for the first copy and 75 cents for each additional copy. What is the total wholesale cost for 60 copies? Create a program called bookstore.py to work out the answer. Modify your program so that the user can enter a different price and different number of copies.

**10. (1 point)** Write a program called convertpounds.py that takes a currency value in pounds sterling as input and converts it into euros and prints the result. (Conversion rate 1 pound = 1.37001 Euros)

**11. (1 point)** Write a program called temperatureconvert.py that converts temperatures in Celsius to Fahrenheit.

**12. (1 point)** Write a program called perimeter.py that gets the length and width of a rectangle from the user and calculates the area and perimeter.

**13. (1 point)** Take a look at these online tutorials and work through some of the exercises. Some of the syntax is slightly different in the tutorials as they are working with Python 2.7 instead of Python 3.x. What does different syntax mean?

- <http://learnpythonthehardway.org/book/intro.html>
- <https://www.codecademy.com/tracks/python>
- <http://www.tutorialspoint.com/python/index.htm>

**14. (1 point)** Complete the first 4 exercises in <https://www.codecademy.com/tracks/python>. What is the value that variable `my_int` is set to at the end of exercise 4 of the syntax section?