University of HUDDERSFIELD

python powered

CFS2160: Programming Stream

Tutorial/Practical 2

First Complete Programs

Introduction

We have now seen enough Python to allow us to write some complete, even useful, programs. This week you will write programs that take input from a user, do some processing on the values provided, and then produce results.

As usual, activities marked ⇶ should be included in your logbook for assessment.

Again, as usual, activities in *italics* are for those who find the rest straightforward. They are entirely optional.

Purpose

This week we will write some complete programs.

By the end of the week you should:

- Be able to write programs that take input from the user.
- Understand how to process values to provide results.
- Have programs that display useful results.

As you try these programs, remember to use the Python console to check that your statements do what you expect.

And as usual:

If in doubt - Ask!

Activities

1. Make a copy of your program from last week that divided up sweets for pupils, and amend it so that the user is asked to enter the number of pupils and the number of sweets to be shared.
   For now, do not worry if the user provides input that is not valid.

2. ⇶
   Create a table of values (put it in your logbook) that could be used to test your program.

The leftmost column is the number of pupils, the next is the number of sweets; the remaining two should show the expected results from that number of pupils and sweets (i.e. the number of sweets each pupil will receive and the number of sweets left over).
Add at least three rows to the table, and take screenshots of your program's results to show that it works. Include these, along with the program itself, in your logbook.

3. Write a program that prompts the user to enter the length of two adjacent sides of a rectangle, and then displays the area of that rectangle.
Hint: The area is just the lengths of the sides multiplied together.

4. Write a program that prompts the user to enter the radius of a circle, and then displays the area of that circle.
Hint: The area of a circle with radius "r" is πxr^2, where π (Pi) can be approximated very roughly as 22 divided by 7.

5. Type the following at a Python prompt (console) and find out what is happening!
```
>>> import math
>>> print (math.pi)
>>> print (math.sqrt (2))
>>> from math import pi
>>> pi
```
Now write a version of your program from the previous activity that uses a much more accurate value for π.

6. Write two programs. One converts a temperature in Celsius to the equivalent in Fahrenheit. The other does the calculation the other way around. Test your program with some suitable values. In both programs the user should be asked to enter the temperature to be converted (a floating-point number).

7. ⇶
Your first program in the very first practical printed the message "Hello World" (or something similar). Take a copy, and amend it so that it prompts the user to enter their name, and then displays a personalised greeting. It might work something like this:
```
Hello, who are you? Arthur
Hello, Arthur. It is good to meet you.
```
Include a screenshot showing your program working in your logbook.

8. *Amend the program from the previous activity so that if the name entered is blank the program simply outputs "Hello World", as before.*

9. Write a program that prompts the user to enter four temperature readings. Once done, the program should display the highest, lowest and average reading.
Note: This is not a challenge activity, but it is tricky. We have seen everything you need to do this in the lecture or in previous practicals.

10. *Amend the previous program so that the user can enter any number of readings (including none at all), terminating their list by entering any value that is not a number.*
Note: Doing this neatly is tricky! It is certainly the trickiest extra task so far.