SCIE1000,   Computing Tutorial Week 3,   Semester 1, 2011.

Aims

The aims of this computing tutorial are:

- To understand "true or false" logical (Boolean) statements in Python, since they provide us with a way of controlling the flow of execution in conditional statements.

- To learn how use *conditional statements* in your Python programs, providing the ability to execute different parts of a program depending on whether some condition is True or False.

- To help you to fully understand the concept of conditional execution, which is very important in computing.

Overview

[Ref: Appendix A of the Lecture notes, Section A.4, Pages 406–411.]

As we start to write more sophisticated Python programs, it is critical that you understand the idea of the "flow of execution or control" in a computer program. This may sound technical but the concept is quite simple:

- When you write a simple Python program (as we have been doing in recent weeks) and "run" it, the computer interprets each instruction in your program and executes them one at a time, in the order that they are written in the file, and then exits.

Conditional statements allow us to control whether or not certain Python instructions are executed when a program is run. This means that some instructions are "skipped over" in the flow of execution.

1   Questions

[Ref: Appendix A of the Lecture notes, Sections A.4.1–A.4.3]

1. Look at the following Boolean expressions (conditions), written using mathematical representation (note that you need to use "==" in Python to test whether two things are equal). Evaluate whether or not each expression is True or False and then use Python to check your answer.

   (a) $-3.0 = 0.0$

   (b) $-18 < -15$

   (c) $-6 \neq -6$

   (d) $(4.2 \geq 5)$ and $(6 \leq 7)$

   (e) $(4.2 \geq 5)$ or $(6 \leq 7)$

   (f) $(5 \geq 4.2)$ and $(6 \leq 7)$

2. Last week we developed a Python program that uses two formulae to estimate the human body surface area (BSA) given the weight and height of a person. This week we will extend what this program does. First, take a copy of your program from last week and give it a new name. We will work on this new copy of the program.

   (a) Modify your program so that it:

– prints the following menu at the start:

```
Please select from this list of options:
   Enter 1 to calculate body surface area.
   Enter 2 to calculate the Widmark value, r.
Your choice?
```

– uses an `input` statement to allow the user to input their choice (that is, 1 or 2).

(b) Modify your program so that:

– if the user enters `1` then the program calculates BSA, using both the Mosteller formula and the Dubois & Dubois formula, and the difference in calculated BSA values (this code should already be in your program from last week)

– if the user enters `2` then the program calculates the value of r. You will need to ask the user to input whether the individual is male or female.

– if the user enters any other value (than 1 or 2) then the program prints out the message "OK, bye." and exits.

3. **Assessment Question (1.5%): BSA/Widmark r program.** Make sure that your program from the previous question is commented, and has sensible variable names. Test your program on the following cases, comparing the output values with hand calculations you have done previously.

Case	Weight (kg)	Height (cm)	gender
BSA	38.5	155	female
BSA	107	188	male
r	38.5	155	female
r	107	188	male

This program will contribute 1.5% towards your final assessment for SCIE1000. **To receive these marks, you must demonstrate your program and its output to a tutor during your tutorial.** Program output, including text messages and correct values, are together worth up to 1.0%. Appropriate comments and variable names are together worth 0.5%.

4. Consider the following fragment of a Python program:

```
c = a
if a and b:
    print 'Apple'
elif ((c or b) and b) or a:
    print 'Banana'
else:
    print 'I hate fruit!'
```

What output will be produced when this program is run if:

(a) a is `True` and b is `False`.

(b) a is `True` and b is `True`.

(c) a is `False` and b is `False`.

(d) a is `False` and b is `True`.