

**Practical Lab 7**

The tasks below are based around the gap notes entitled *Functions*. In a number of cases you are directed to programs on Blackboard. In each case you should save a copy of the code to your own folder before editing.

1. A copy of `multiple_args.py` is available on blackboard.

(a) Modify the code so that the user is asked to input the two numbers s/he wants multiplied together.

(b) Write a new function `show_average(x, y, z)` which takes the arguments `x`, `y` and `z` and prints their average.

2. A copy of `coin_toss.py` is available on blackboard. Modify the code to

(a) Allow the user to specify the number of tosses.

(b) Print the number of times heads and tails have occurred in each run.

(c) Run the coin function repeatedly for sets of 10 tosses until a run obtains 10 heads, or tails in a row, and then print the number of runs which were required.

3. A copy of `temp_converter.py` is available on blackboard.

(a) Modify the program to print a converter table for temperatures from Centigrade to Fahrenheit in 10°C intervals between 0°C and 100°C.

(b) Write a new function `centigrade(temp)` which takes the temperature in Fahrenheit and converts it to Centigrade. The process for this conversion is to subtract 32 from the temperature in Fahrenheit and then multiply by 5/9.

(c) Use your function from (b) to print a converter table for temperatures from Fahrenheit to Centigrade in 10°F intervals between 0°F and 100°F.

4. An example of a value returning function which returns a Boolean is given in `is_even.py` on blackboard. Write further code to check this function is working.

Write two other functions `is_negative(number)`, which returns a `True` if the number is less than zero, and `False` otherwise, and

`is_too_big(number)` which returns a `True` if the number is greater than 100 and a `False` otherwise.

5. The file `circle.py` (available on Blackboard) contains two functions `area(radius)` and `circumference(radius)` which return the area and circumference of a circle given its radius. Use the `import` command to use `circle.py` as a module, and write a short program which prompts the user to enter a radius of a circle and which then returns the area and circumference.

Modify your program so that the user is prompted with a menu asking if they would like to

- (a) Calculate the area of a circle
- (b) Calculate its circumference
- (c) End the program

If the user enters a or b s/he is then prompted for the circle's radius and then given the result. If the user enters c the program ends.

Writing the program in this way is an example of a **menu driven program**.

6. The program `draw_squares.py`, available on blackboard draws three squares using the turtle. Modify the code so that the three squares are drawn at random positions, and of random size, on the screen.

Modify the code further to enable a user specified set of squares.

7. Write a program to simulate a **random walk** using turtle. At each new 'step' the walker randomly changes direction, and then walks a random distance (between 10 and 20). The user should be able to specify how many steps to be taken.