# **Chapter 03 Labs**

## **Part 1 – Using while loops**

## **Objective**

In this lab you'll gain some experience in the use of iteration control flow using while statements in Python.

### **Task1 - Squares**

1. Create a text file called **squares.py**
2. Write a while loop that starts at 1 and ends at 100
3. Calculates and displays each number and its square
4. End the loop if that square is bigger than 2000
5. Save and run.

### **Task 2 - Factorial**

1. Create a text file called **factorial.py**
2. Ask the user to input an integer.
3. Display the number's factorial using a while loop.  
      
   **Note:** the factorial of a number is that number multiplied by all the preceding numbers.

The factorial of 5 is = 5 x 4 x 3 x 2 x 1 = 120

or if you like = 1 x 2 x 3 x 4 x 5

1. Save and run.

## **Task 3 - Investment**

1. Create a text file called **investment.py**

1. Calculates how many years it will take an initial investment of £100 to grow to a target value of £1000 if the interest rate is 10%  
   **Tip:** Do not start writing code until you have a plan of action!
2. Save and run.
3. Make your calculation more usable by inputting the following values:  
    Initial investment   
    Target value   
    Interest rate
4. Save and run.

## **Task 4 –** **Input an integer between two limits**

In this part you'll ask the user to input an integer between a minimum and maximum values.

If the user fails to enter an acceptable value after three attempts then you stop asking!

1. Create a text file called **getint.py**
2. Create two variables for the *min* and *max* values.   
   Set two values for these variables such as 1 and 100.
3. Write a **while** loop that attempts to get an integer from the user between the limits of min and max values.
4. If the user tries three times and fails then print None.   
   If a valid value is entered, just end the loop and print its value.  
     
   Note: None is a valid keyword in Python which is equivalent to null

### **Task 5 - Count Vowels**

1. Create a text file called c**ountvowels.py**
2. Inputs a word (a string)
3. Counts how many vowels are in the word   
     
   **Tip:** You can scroll through every character of a string using its index.  
    For example, if **word = 'hello'** then word[0] is the letter **h** and word[1] is the letter **e**.  
    Use the len() function to find the length of a string. For example, in the above example, **len(word)** is 5.  
    Use simple if statement/s to detect if the character is 'a', 'e', 'i', 'o' or 'u'  
    Every time you find a vowel you must increase a counter (an integer variable)  
     
    In the next chapter (Lists) you'll discover a much easier way of performing this task.
4. Save and run

## **Task 6 -** **Exam Average**

1. Create a text file called **examaverage.py**
2. Code a program that:
   1. Has code to calculate the average of three exam marks
   2. If the average mark is >= 65 output a "**Pass**"
   3. If it is < 65 output a "**Fail**"
3. In the main body of the program input the marks for a student for Math, English and ICT exams
4. Marks should be an integer between 0 and 100
   1. Use a loop until the user enters a valid mark
   2. Calculate and display their average mark and overall result
   3. Please also display the average mark and print out the average.
5. Save and run.

\*\* END \*\*

## **Part 2 – Using FOR loops**

## **Objective**

In this lab you'll gain some experience in the use of iteration control flow using FOR statements in Python.

### **Task1 - Squares**

1. Add a new file: **Squares.py** and make it the startup file
2. Write a for loop that starts at 1 and ends at 100
3. Calculates and displays each number and its square
4. End the loop if that square is bigger than 2000
5. Save and run.

### **Task 2 - Factorial**

1. Add a new file: **Factorial.py** and make it the startup file
2. Inputs an integer.
3. Display the number's factorial.  
     
   **Tip:** the factorial of a number is that number multiplied by all the preceding numbers.  
    The factorial of 5 is = 5 x 4 x 3 x 2 x 1 = 120   
    or if you like = 1 x 2 x 3 x 4 x 5
4. Save and run.

**\*\* End \*\***