# Assignment #10 – Linux Shell Scripting 3 (Functions, Loops and Arrays) [3%]

This assignment relates to the following Course Learning Requirements:

CLR 3 – Work with the GUI and command-line interface

CLR 4 – Create and test shell scripts in Linux and Windows operating systems

Objective of this Assignment:

The objective of this assignment is to use functions, loops and arrays to implement a bubble sorting algorithm

# Pre-Assignment Instructions:

1. Launch the VMWare Workstation and run the Ubuntu Virtual Machine instance from last week.
2. Launch the Terminal Window.

**Assignment Tasks:**

You will create a script file for the purpose of implementing a sorting algorithm.

**Bubble Sort**

Bubble Sort is the simplest sorting algorithm that works by repeatedly swapping the adjacent elements if they are in wrong order.

**Example:**

**First Pass:**  
( **5** **1** 4 2 8 ) –> ( **1** **5** 4 2 8 ), Here, algorithm compares the first two elements, and swaps since 5 > 1.  
( 1 **5** **4** 2 8 ) –>  ( 1 **4** **5** 2 8 ), Swap since 5 > 4  
( 1 4 **5** **2** 8 ) –>  ( 1 4 **2** **5** 8 ), Swap since 5 > 2  
( 1 4 2 **5** **8** ) –> ( 1 4 2 **5** **8** ), Now, since these elements are already in order (8 > 5), algorithm does not swap them.

**Second Pass:**  
( **1** **4** 2 5 8 ) –> ( **1** **4** 2 5 8 )  
( 1 **4** **2** 5 8 ) –> ( 1 **2** **4** 5 8 ), Swap since 4 > 2  
( 1 2 **4** **5** 8 ) –> ( 1 2 **4** **5** 8 )  
( 1 2 4 **5** **8** ) –>  ( 1 2 4 **5** **8** )  
Now, the array is already sorted, but our algorithm does not know if it is completed. The algorithm needs one **whole** pass without **any** swap to know it is sorted.

**Third Pass:**  
( **1** **2** 4 5 8 ) –> ( **1** **2** 4 5 8 )  
( 1 **2** **4** 5 8 ) –> ( 1 **2** **4** 5 8 )  
( 1 2 **4** **5** 8 ) –> ( 1 2 **4** **5** 8 )  
( 1 2 4 **5** **8** ) –> ( 1 2 4 **5** **8** )

1. You will create a BASH script file called **bubble\_sort**using **vim**.
2. The first line of each of your script file should force the use of the **bash** shell.
3. On the top of the script file, there should be **a section of comments** that contains the Assignment number, your name, student number, lab section number, name of the script file, the date, and a description of what the script file does
4. Your script file should be **properly commented**.
5. Your program should accept between 4 and 12 integers in a mixed order.
6. The integers must be stored in an array.
7. Create a function that will swap any two elements in an array. A temporary variable may be used to perform the swap.
8. Using loops, iterate through the array list to perform swaps. After each swap, output the current state of the array list.
9. The loop should end when there are no more integers to swap.

Upload your script to Brightspace.