BACS1014 PROBLEM SOLVING AND PROGRAMMING
ASSIGNMENT

1.0 General Information

Objective:	Apply the programming concepts and skills that you learned to write a program.
Task Summary:	Design and develop a Bubble Sort program using two different modular programming methods, i.e. pass-by-value, and pass-by-address.
Assessment Weight:	**50 % of Coursework** component.
Team Size:	2 (**Team** assignment)
Submission Mode:	Softcopy (refer to Section **5.0 Report**).
Submission Date:	Friday of Week 6

2.0 Brief Description / Purpose

Sorting data is a common and important application in almost all aspects of our lives, more so in the computing world. As the name implies, we sort data by placing data in some particular order that we deem useful for our purposes. Bubble Sort is called as such because smaller values gradually 'bubble' their way upward to the top of the sequence like air bubbles rising in water.

In this assignment task, you are to use Bubble Sort to sort an array of data. You have been hired to develop **two Bubble Sort programs to sort in ascending order a data array of size 10. Each program uses different function call methods (modular programming) i.e. pass-by-value and pass-by-address.**

3.0 Scenario & Program Specifications

You are given the following 10 numbers: - 100, 33, 49, 23, 84, 2, 72, 17, 82, 64

Use Bubble Sort to sort these 10 numbers in ascending order. You must comply to the following requirements for each function call method: -

(a) Pass-by-value → No pointer or referencing is allowed.

→ Must create one or more functions (other than Main( ) function) in your program. No marks will be awarded if no functions are visible in your program.

→ For however many functions you created, must declare and show the function prototypes, function definitions, and function calls.

→ Do not use global variables. Only local variables are allowed.

(b) Pass-by-address → Must make use of pointers. Marks are deducted if you are unable to portray how pointers are used in your program.

→ Must create one or more functions (other than Main( ) function) in your program. No marks will be awarded if no functions are visible in your program.

→ For however many functions you created, must declare and show the function prototypes, function definitions, and function calls.

→ Do not use global variables. Only local variables are allowed.

4.0 Program Testing & Outputs

Run your final program using different sets of test data. Show your planned **test data and expected output** for *at least 3 runs*. Present the 3 runs in a table and the table must be included in your report.

You should cover as many different scenarios as possible (e.g. out of the 10 numbers, some are equal in value, or if you have more than 10 numbers, or if you have less than 10 numbers, etc). For each run, capture the screenshots to be included in your report. **Make sure the actual output of your program runs mirror exactly the test data and expected output.**

5.0 Report

Your **Assignment Report** should include:

- **Front Cover** TAR UC Name, Faculty Name, Course Code & Title, Assignment Title, Student Name, and Programme.
- **Declaration of Originality –** to be included in your report (Refer to Section 7.0).
- **Table of Content –** list of contents and their page numbers.
- **Brief Description / Purpose** of the program (Refer to Sections 2.0 & 3.0).
- **Overall Program Design** *Flow Chart* showing the structure of the whole program.
    - Your flowchart should NOT be a line-for-line version of your program. It should show the general steps in solving the problem.
- **Additional features** Describe what extra features you have included in the system. Explain why you think they are useful and also the motivation behind them.
- **Program Testing & Outputs** Tables of test data & expected outputs each followed by screenshots for the runs that you have planned (Refer to Section 4.0). There should be a minimum of 3 sets; each set should start on a new page.
    - Your screenshots should show what is displayed for the whole run.
    - Note on screen output
        - text should be displayed in black on a white background
        - remember to include those that show your additional features
- **Constants & variables** Include in your report the **definitions** / **declarations** of constants and variables from your program. Then, using 2 tables (one for constants and one for variables), list and describe each constant (value, data type, purpose) and variable (data type & purpose).
- **Program Listing** Include the source code **from Visual Studio** in your report.
    - Your program should be indented appropriately and have useful comments for the different parts or sections.
- The report should include a proper analysis of the program as well as discussions and an overall conclusion.
- The report should be tidily formatted and submitted as one entity. Insert the signed ***Declaration of Originality*** after the Cover Page.

6.0 Assessment Criteria

This assignment contributes 50% to the overall coursework, but is graded to a full 100% for ease of computation. The allocation of marks is shown below.

Areas	Marks Allocated (%)
a. Program design	20
b. Fulfilling the requirements of the task	20
c. Program efficiency & readability	20
d. Additional features	10
e. Report	30
Total	**100**

Marks will be deducted:

- if instructions are not followed, e.g: no soft copy, screenshots color unsuitable, incomplete report contents, etc.
- if you are found to have plagiarized work (refer to Section 7.0)

7.0 Ethics and Punctual Submission

7.1 Plagiarism and Collusion

All submitted work must be **original,** and not previously submitted for any assessment, nor outsourced to any party. Students found to have copied others' work, or used them without properly acknowledging the sources, will be penalized for plagiarism. The **Declaration for Originality** of work (refer below) must be **signed** and submitted with the Report.

It is not acceptable for a student to submit program(s) that are similar or identical to those of other students by simply and cosmetically disguising it with some modifications. In such a case, **both the students (who copied and who allowed others to copy) will be penalized**.

Declaration of Originality

I declare that this assignment is free from all forms of plagiarism and for all intents and purposes is my own work. I understand that I will be penalized if I have not complied with TAR UC's Plagiarism policy.

Signature: _____ Name: _____ Date: _____

7.2 Late Submission

This assignment should be submitted by the due date as stated unless as revised or approved by your lecturer. Marks will be deducted for late submission at **10%** per day late, unless approval is granted **before** the due date.