

**Module Code:**

**ES2C4**

**Module Title:**

**Computer Architecture and Systems**

**Assessment Setter:**

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**Assessment Weighting:**

**20%**

**Submission Deadline:**

**12 noon (mid-day) Thursday Week 20**

**Target Learning Outcome:**

- Represent different types of data in binary and perform arithmetic operations on them.
- Write microcontroller programs in C that go beyond a single iteration loop, taking advantage of interrupts and timers, and communicating with external peripherals.

**Feedback:**

**Brief comments in the feedback textbox on Tabula.**

## 1. Introduction

This assessment is designed to allow you to demonstrate your understanding of the concepts presented in C programming lectures and labs of the ES2C4 Computer Architecture and Systems module. It will assess your ability to efficiently use computing resources, represent different types of data in binary and carry out some basic computation. The styling and correctness of your program will also be considered. Remember to expand your creativity beyond the lectures and the labs by consulting the reading list for example.

All design tasks are to be written in the C programming language only.

**Your report must be in a Microsoft word document. Do not submit a pdf document!**

**Each question must begin on a new page. Please use the format shown below:**

Student ID

The solution to (i):

*Enter the text of your code here. Do not paste screenshots or images. Paste your code with source formatting as shown below.*

```
int main (){  
    printf("ES2C4")  
}
```

The solution to (ii):

*Enter your code here as described for (i) above.*

The solution to (iii):

*Enter your text here.*

## 2. Tasks

- (i) Write a program that takes two separate words from a user and checks if the words are an anagram. The program should tell the user if the strings are an anagram or not. An Anagram is a word or phrase formed by rearranging the letters of a different word or phrase, typically using all the original letters exactly once. For example, the word 'listen' could be rearranged to form 'silent'. Therefore both words must be of the same length. The program should accept words with up to 10 characters.

*(40 marks)*

- (ii) Write a program that takes a number (up to 255) from the user and returns the factorial of the given number.

*(30 marks)*

- (iii) When designing a C program, the programmer should ensure that the program is efficiently designed, functionally correct and properly styled. How have you achieved this requirement in your solution to the task (i) above?

*(30 marks)*