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**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**COURSEWORK FOR BACHELOR OF ELECTRONIC AND ELECTRICAL ENGINEERING WITH HONOURS; YEAR 1**

**ACADEMIC SESSION SEPTEMBER 2023;**

**PROGRAMMING ASSIGNMENT #2**

**ETC1013: PROGRAMMING FOR ENGINEERS**

**DEADLINE: 22th DECEMBER 2023 5.00 PM**

**STUDENT (NAME/IC or Passport NO):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**INSTRUCTIONS TO CANDIDATES**

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# This assignment will contribute 15% to your final grade. It is an individual assignment.

**IMPORTANT**

# The University requires students to adhere to submission deadlines for any form of assessment. Penalties are applied in relation to unauthorized late submission of work.

# Coursework submitted after the deadline but within 1 week will be accepted for a maximum mark of 40%.

# Work handed in following the extension of 1 week after the original deadline will be regarded as a non-submission and marked zero.

**Lecturer’s Remark** (Use additional sheet if required)

I (Names and IDs stated above) received the assignment and read the comments

……………………………………………........................................................... (Signature/date)

**Academic Honesty Acknowledgement**

“I ...............................................................................................................(student names). verify that this paper contains entirely my own work. I have not consulted with any outside person or materials other than what was specified (an interviewee, for example) in the assignment or the syllabus requirements. Further, I have not copied or inadvertently copied ideas, sentences, or paragraphs from another student. I realize the penalties *(refer to page 16, 5.5, Appendix 2, page 44 of the student handbook diploma and undergraduate programme)* for any kind of copying or collaboration on any assignment.”

………………………………………………….................................. (Student’s signature / Date)

[This paper contains TWO questions printed on ONE page]

**Description of the assignment (15 marks)**

For this assignment, you are required to analyse and design a software solution using C programming for the given problems.

Each solution should include:

1. Usage of any suitable problem-solving planning tools (PAC, Interactivity Chart, Flow Chart etc.)
2. Elaboration of the thinking process towards a viable solution
3. The software solution written in C code (source code)

Any other materials/documents needed to clarify/elaborate the solution are allowed, when necessary.

**Submission:**

A Microsoft Word document with this cover page and the written elaborations should be named as ***ETC1013\_assignment2\_student-id.docx***. Submit both this document and the source code stored in a folder as a Zip file named as ***ETC1013\_assignment2\_student-id.zip***.

**Questions 1 (10 marks):**

Write a program that allows users to enter the dimensions of two matrices, and perform a desired operation on the matrices (addition, subtraction, multiplication etc. check out <https://byjus.com/jee/matrix-operations/>).

Design the program to be interactive so that one can use it to perform simple matrix calculations/ operations.

**Questions 2 (20 marks):**

Write a program for each of the tasks below, based on the given csv file (StudentScore.csv) and carry out the following analysis:

1. Implement a function to calculate the average score for each student and print the results. The results should be saved in csv file format.
2. Create a function to find and print the student with the highest overall score (sum of all three scores).
3. Implement a function to identify and print students who have total scores above a certain threshold (let the user input this threshold). The results should be saved in csv file format.

Your program should read the file, parse the data, and store it in a suitable data structure. In your written report, please include the graphs or charts generated using Excel reading from your CSV files. You may also include additional analysis based on the data given in your written report.

Note: The csv file given contains student ID, Student Name, Gender, Marks for Test 1, Test 2 and Test 3.

**Appendix 1: Rubrics for Assessment**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Categories** | **Novice** | **Adequate** | **Good** | **Excellent** |
|  | **10-20%** | **30-50%** | **60-80%** | **90-100%** |
| **Code Quality (25%)** | Code contains error during compilation and does not seem complete at all. | Code seems complete but still won’t compile due to existing error. | Code contains no error, can be compiled, and executed. | Code contains no error, can be compiled and executed. |
| **Effectiveness (25%)** | Many redundant or incomplete implementation that could easier be replaced/ improved. | Small number of redundant or inefficient implementation of code or algorithm but code can solve the given problem/task. | Good design of code/ algorithm that efficiently solve the given problem/ task. | Algorithm designs are not taught during lessons and has exceeded the expectation of the lecturer. |
| **Elaboration (Problem solving ability) (40%)** | Demonstrated minimal ability to solve problem accurately. | Demonstrated genuine effort to solve the given problem but was not fully successful and problem-solving ability was not convincing. | Demonstrated ability to appropriate solve the given problem logically and systematically. | Demonstrated in depth and accurate problem-solving ability by using techniques/approaches beyond what’s taught in the class.  . |
| **Documentation and Mechanical (10%)** | Minimal effort in applying best practices and documenting the code. | Adequate/sufficient effort in applying best practices and documenting the code. | Good effort in applying best practices and documenting the code. | Almost professional level of best practices and documentation of the code. |