

BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE

BSc HONOURS DEGREE IN COMPUTER SCIENCE (HBScCSc), INFORMATION TECHNOLOGY (HBScIT), SOFTWARE ENGINEERING (HBScSWE), NETWORK ENGINEERING (HBScNWE), PHYSICS (HBScPH) AND ENGINEERING.

JUN 2023

CS102/EEN1204/SWE102/NWE102: INTRODUCTION TO COMPUTER PROGRAMMING

DURATION:3 HOURS.....

TOTAL MARKS: ...100.....

INSTRUCTIONS TO CANDIDATES

1. Answer all questions.
2. Use the answer booklet for section A questions and the computer for section B.
3. Create a folder on the desktop named as <your registration number.CS102>
4. All programming to be in C.

SECTION A (Theory use an answer booklet) [30 marks]

Question 1

In C programming, the following data record of Footballers can be created by making use of structures:

RecordNumber	NameOfPlayer	Age	ClubName
1	Lionel Messi	35	Paris Saint
2	Cristiano Ronaldo	37	Manchester United
3	Mo Salah	30	Liverpool FC
4	Kylian Mbappe	24	Paris Saint
5	Sadio Mane	30	Liverpool FC

- a) What is a Structure? [2]
- b) Write a C code snapshot for a structure definition of the record above. [8]
- c) Why are the variable names **RecordNumber**, **NameOfPlayer** and **ClubName** written as one word? [3]

- d) Write a statement to declare an instance of this structure that makes it capable of holding five records. [2]
- e) Write a C code snapshot to display such a record in full. [5]

Question 2

An Armstrong number is one whose sum of digits cubed (raised to the power of three) equals the number itself. For example 371 is an Armstrong number because

$$3^3 + 7^3 + 1^3 = 371.$$

$$27 + 343 + 1 = 371$$

Draw a flowchart diagram for determining whether an integer is Armstrong or not. [10]

SECTION B (Practical, use a Computer) [70 marks]

Question 3

Write a program to accept a three digit positive integer and display whether the number is armstrong or not. [20]

Question 4

For every new course, one of the duties of a Lecturer is to create a class register. Write a menu based program with an option to capture student details (Reg Number, FirstName, LastName, Gender, Address, CellNumber, E-mail, Programme and Level) for any class size and save them to file, ClassRegister.txt and another option for displaying the register (all the file contents). You are free to add other menu options but an option for sorting the register by LastName in ascending order is mandatory. [40]

NB Be guided by the following hints for the Expected solution

Menu implementation - switch case may be used - 5 marks

Structure definition for the student details - 5 marks

An array of the structure with class size- 2marks

A function for capturing student details and -5marks

writing them to the file ClassRegister.txt - 3 marks

A function for reading the file and displaying contents on the screen - 5 marks

A function for sorting and displaying sorted register -5 marks

Running program, Functionality-correctness and performing according to expectations -5marks

Documentation and user friendliness/ User interface design, Validation -5marks

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Question 5

Write a C program using nested for statements or while loops to display the following pattern

[10]

```

1
2  2
3  3  3
4  4  4  4
5  5  5  5  5
  
```

Nb, No hard coding is required i.e directly printing the numbers in the program using printf e.g. printf(" 2 2");

*****END OF PAPER*****