



CICT PART II SECTION 3

STRUCTURED PROGRAMMING

THURSDAY: 2 September 2021.

Time Allowed: 3 hours.

Answer ALL questions. Marks allocated to each question are shown at the end of the question.

ALL programs written should be in C programming language.

QUESTION ONE

- (a) Summarise the process of creating and executing a C program. (5 marks)
- (b) Define the following programming terms:
- (i) Branching. (1 mark)
 - (ii) Spaghetti code. (1 mark)
 - (iii) Structured programming. (1 mark)
- (c) Formulate two questions that a mobile application developer should ask himself before developing an app. (2 marks)
- (d) Highlight four details contained in a user documentation. (4 marks)
- (e) Write a program that reads from a text file named mambo.txt located in C: drive. (6 marks)
- (Total: 20 marks)**

QUESTION TWO

- (a) State the purpose of each of the following symbols used in a C program.
- (i) [] (1 mark)
 - (ii) { } (1 mark)
- (b) Citing three examples, describe a data structure in the context of C programming. (4 marks)
- (c) Linked lists are dynamic data structures that use pointers for their implementation. Outline two advantages and two disadvantages of linked lists. (4 marks)
- (d) Below is a student structure defined in C.

```
struct Student {
    char name [50];
    char class [50];
    char course [100];
    int student_id;
} student;
```

Demonstrate how to declare a variable of type student and initialise its details. (Use any appropriate initial variables). (3 marks)

- (e) A programmer has declared a variable “ch” and character pointer “pCh” in his program. He later initialises the pointer variable “pCh” with the address value of char “ch”.

Required:

Write a well documented program that shows how to access the value and address of “ch” using the pointer.

(7 marks)

(Total: 20 marks)

QUESTION THREE

- (a) (i) A program is correct if it does what we would like it to do.
Examine three conditions that a program should fulfil for it to be considered correct. (6 marks)
- (ii) A program is proved correct using (a) (i) above, but gives incorrect results.
Describe four elements that could be the cause of incorrect results. (8 marks)
- (b) Write a C program which generates 20 random numbers between 1 and 150. (6 marks)
- (Total: 20 marks)

QUESTION FOUR

- (a) (i) Draw a flow chart that enables a user to output the message “I am a Hero” several number of times. The system should ask the user to input the number of times the message should be repeated on the screen. (5 marks)
- (ii) Write a C code to represent the scenario in a (i) above. (5 marks)
- (b) Examine six factors that should be considered when selecting a programming language. (6 marks)
- (c) A program is required such that if the temperature of a patient is at least 35° but less than 37°, the variable “comment” is assigned the value “normal” otherwise it is assigned the value “abnormal”.

Required:

Write C code for the above problem.

(4 marks)

(Total: 20 marks)

QUESTION FIVE

- (a) (i) Assume a structure named Dec with members x (an integer) and y (a character).
Write the declaration for this structure. (3 marks)
- (ii) Create an instance of the structure created in (a) (i) above named “month”. (2 marks)
- (b) Write a C program that accepts an integer number and determines if it is evenly divisible by 5. The program should then display an appropriate message.
(Hint: An integer is evenly divisible by 5 if it is divisible by 5 and at the same time it is even). (6 marks)
- (c) Explain the significance of the following statements as used in C programming:
- (i) #include<stdio.h> (2 marks)
- (ii) #define letter k (2 marks)
- (d) Write a C program that calls a function called sum to calculate the sum of two integer numbers entered by a user. The function returns the value to the calling function which displays the results. (5 marks)
- (Total: 20 marks)
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