THE KENYA NATIONAL EXAMINATIONS COUNCIL

CRAFT CERTIFICATE IN INFORMATION TECHNOLOGY

MODULE II

STRUCTURED PROGRAMMING

3 hours

INSTRUCTIONS TO CANDIDATES

*This paper consists of **TWO** sections; A and B.*
*Answer **ALL** the questions in section A and any **FOUR** from section B in the answer booklet provided.*
Candidates should answer the questions in English.

This paper consists of 4 printed pages.

Candidates should check the question paper to ascertain that all the
pages are printed as indicated and that no questions are missing.

Turn over

SECTION A (40 marks)

*Answer **ALL** the questions in this section.*

1. With the aid of a diagram, describe a *stack data structure*. (4 marks)

2. Explain **two** reasons for documenting a program. (4 marks)

3. A student intends to write a computer program in C programming language. Outline **three** software applications that the student would use to complete the program. (3 marks)

4. Write a program in C language that could compute the sum of even numbers between 1 and 100. Use while loop. (5 marks)

5. Explain each of the following approaches to programming:

    (i) monolithic; (2 marks)

    (ii) visual. (2 marks)

6. Differentiate between *logical* and *relational* operators as used in programming. (4 marks)

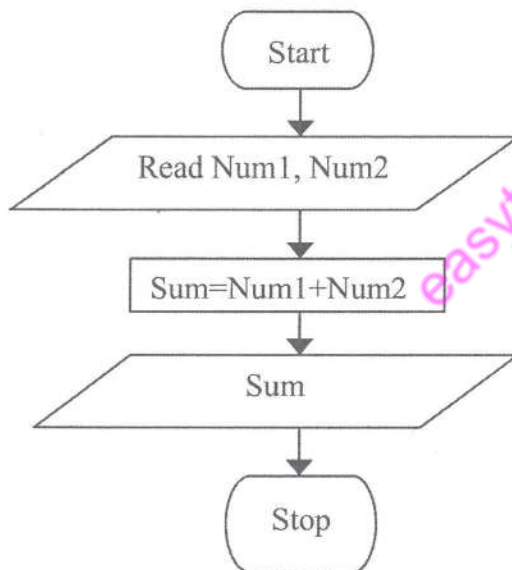7. Figure 1 is a flowchart for a program. Use it to answer the question that follows.

Figure 1

Write a program in C language to implement the logic depicted by the flowchart. (4 marks)

8. James, a student at Ujuzi Institute created a program that used an array to store data. Outline **four** properties that this data store possesses. (4 marks)

9. Differentiate between *bubble* and *selection* sort techniques. (4 marks)

10. Write a program in C language that computes a factorial of a number. (4 marks)

SECTION B (60 marks)

Answer any FOUR questions from this section.

11. (a) Outline **four** disadvantages of low level programming languages. (4 marks)

    (b) Write a program in C language that creates a ticket data file for railway reservation with the following structure:

    > Train number
    > Destination
    > Passenger name
    > Rate.

    (6 marks)

    (c) A student used a pseudocode to design a program. State **two** benefits that the student may realise from using this design tool. (2 marks)

    (d) . Describe the *switch* statement syntax as used in C programming language. (3 marks)

12. (a) Outline **three** reasons for *unit testing* in a structured programming language. (3 marks)

    (b) Explain **two** error detecting methods that could be used during program development other than testing. (4 marks)

    (c) Write a program in C language that prompts a user to enter an integer. The program then determines whether the number is divisible by 2 and outputs the message "it's even" otherwise "it's odd". (5 marks)

    (d) A student would like to improve the readability of a program. Outline **three** approaches that he could use to achieve this objective. (3 marks)

13. (a) Outline **three** factors to consider when selecting a programming language. (3 marks)

    (b) An item is sold at Ksh.100 when 5 or more are bought, otherwise the price is Ksh.150. Write a program in C language that prompts a user to enter the number of items bought. The program then computes and displays the total price for the items. (6 marks)

    (c) State the difference between *{}* and *[]* delimiters as used in C programming language. (2 marks)

    (d) Write a program in C language that computes the area of a triangle given that height is 10 and base is 5. Hint: Area of a triangle is ½ base x height. (4 marks)

14. (a) State **three** structured programming languages other than C language. (3 marks)

    (b) Outline **two** traversal strategies that could be used in a binary tree data structure.

    (2 marks)

    (c) Write an algorithm that could be used to search an element in a one-dimensional array using binary search technique. (6 marks)

(d)   The following C program was created by a student. Use it to answer the question that follows.

```
#include <iostream.h>
float main( ) {

    char str[50];
    int i;

    printf("Enter a value :');
    scanf("%s %f", str, &i);

    printf("\n You entered: %c %d ", str, i);

    return 0
}
```

Rewrite the program correctly.

(4 marks)

15.   (a)   Outline **three** characteristics of run-time errors.

(3 marks)

(b)   John created a program that used the concept of passing the parameter by value. Outline **two** characteristics of such a program.

(2 marks)

(c)   Tegemeo Institute is made up of several autonomous departments. You have been approached to assist in a program development process.

(i)   Describe the most appropriate programming approach for this scenario.

(2 marks)

(ii)   Explain **two** reasons for the approach in (i).

(4 marks)

(d)   Write a program in C language that uses an array to store marks scored by a student in 5 different subjects namely; 50, 60, 45, 70 and 58. The program then calculates and outputs the average mark.

(4 marks)

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