1920/203
STRUCTURED PROGRAMMING
July 2019
Time: 3 hours

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 FIVE 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. Outline **four** advantages of sub-programs in a computer program. (4 marks)

2. (a) State **two** classes of data types used in C language. (2 marks)

   (b) Explain the concept of *recursive function* as used in programming. (2 marks)

3. A student wrote a program in C language. Outline **four** modes that the student would use to open a data file in this program. (4 marks)

4. Write a program in C language that computes an absolute value of a given number. (4 marks)

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

6. Differentiate between *machine* and *assembly* languages as used in programming. (4 marks)

7. The following program was written by a student during a practical lesson. Use it to answer the question that follows.

```
#include<stdio.h>
main()
{
    int x;
    x=1;
    do
    {
        printf("x is %d\n",x);
        x+=1;
    } while (x>10);
}
```

   Explain the loop body. do while loop (4 marks)

8. Write a program in C language that prompts the user to enter the amount of fees paid. When the amount of fees paid is less that Ksh 20,000 the program displays a message 'Cyber services denied'. (4 marks)

9. Distinguish between *by value* and *by reference* parameter passing as used in programming. (4 marks)

10. Outline **four** characteristics of high level languages. (4 marks)

SECTION B (60 marks)

*Answer any **FOUR** questions in this section*

11. (a) Outline **three** reasons for compiling a program under development. (3 marks)

(b) Write a program in C language that determines if a character entered is a vowel. The program then displays an appropriate message. Use *switch* statement. (4 marks)

(c) A student wrote a program in C language. Outline **four** programming styles he could use to improve the readability of the program. (4 marks)

(d) Differentiate between *monolithic* and *modularity* approaches to programming. (4 marks)

12. (a) Outline **two** types of *test data* used during program testing. (2 marks)

(b) Explain **two** types of errors that are encountered when developing a program. (4 marks)

(c) Write a program in C language that prompts a user to enter five different marks for a test in an array. The program then computes and displays the average mark correct to two decimal places. (5 marks)

(d) Write a program in C language that generates the first ten positive numbers. Use a pretesting loop other than the *For* loop. (4 marks)

13. (a) Define each of the following terms as used in programming:

(i) Reserved word; (1 mark)

(ii) Dry run; (1 mark)

(iii) Order of priority. (1 mark)

(b) Write a program in C language that prompts a user to enter two integers. The program then divides the bigger by the smaller integer provided it is not a zero through a function. (5 marks)

(c) Write an algorithm that could be used to add an element in a *stack* data structure. (4 marks)

(d) John compiled documentation for a program he wrote. Outline **three** parts of the documentation that he could include to ease access to the information in the documentation. (3 marks)

14. (a) State **two** items contained in each of the following type of documentation:

(i) System; (2 marks)

(ii) Program. (2 marks)

(b) Outline **two** reasons a binary search technique is preferred. (2 marks)

(c) Write a program segment in C language to assign each of the following:

(i) 15 to an integer variable x through a pointer p; (2 marks)

(ii) The address of a float type 16.54 variable x to a pointer pt. (2 marks)

(d) Table 1 show the employee monthly bonus in a manufacturing company based on sales. Use it to answer the question that follows.

Sales	Bonus Rate (%)
Above 50,001	15
Between 25,001 and 50,000	10
Between 1 and 25,000	5

Table 1

Draw a flowchart for a program that prompts a user to enter the employee's basic salary and sales. The program then calculates the gross salary and outputs employee's basic salary, gross salary and bonus. (5 marks)

15. (a) Outline **four** advantages of using pseudo code during program design. (4 marks)

(b) (i) Mary created a data file in a C program. When trying to read this data file the *fopen()* returned *NULL*. Outline **two** possible causes of this. (2 marks)

(ii) Outline **two** functions that are used to randomly retrieve data in a C program data file. (2 marks)

(c) Draw a *binary* tree with nodes labelled **A** to **G**. Generate each of the following:

(i) Two sets of siblings; (1 mark)

(ii) Two ancestors; (1 mark)

(iii) Two forests. (1 mark)

(d) The data input to a program array is as follows; 54, 33, 76, 23, 15. The data is to be sorted in ascending order using the *insertion sort* method. Show all the steps to be taken to sort this data. (4 marks)

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