1920/203
STRUCTURED PROGRAMMING
November 2021
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

CRAFT CERTIFICATE IN INFORMATION TECHNOLOGY

INSTRUCTIONS TO CANDIDATES

This paper consists of 15 (FIFTEEN) questions in TWO Sections: A and B
Answer ALL the questions in section A and any FOUR in section B in the answer booklet provided.
Candidate 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 questions in this section

1. (a) Outline **three** types of *C tokens* used in a C program. (3 marks)

   (b) Outline the use of each of the following operators in a C program:

   (i) relational;

   (ii) logical; (2 marks)

2. State **three** differences between a *character* and a *string* constant as used in a C program. (3 marks)

3. Outline **three** disadvantages of *a low level* programming language. (3 marks)

4. Joan used *linked list* data structures in her program. Outline **four** advantages she is likely to realise from using this data structures. (4 marks)

5. Explain **one** reason that would make a programmer use of each of the following escape sequence operators in a C program:

   (i) /n

   (ii) /r (4 marks)

6. The surface area of a cuboid is obtained by using the formula *2(width x length + length x height + height x width)*. Write a C program that would declare the dimesions and compute the surface area of the cuboid and display on the screen given that the length =10,width =20 and height = 40. (4 marks)

7. Johnson intends to name *identifiers* when writing a C program. Outline **three** rules that he should observe. (3 marks)

8. Explain **two** ways of defining constants in a C program. (4 marks)

9. Distinguish between a *pointer* and *an iterator* as used in C programming. (4 marks)

10. (a) Outline **three** advantages of using a *call by reference* method as used in a C programming language. (3 marks)

    (b) John a programming student opted to use an objected oriented programming language to write a program. Outline **three** features of this language that he is likely to use. (3 marks)

SECTION B (60 marks)

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

11. (a) (i) Explain the term *sorting* as used in C programming data structures. (1 mark)

(ii) State **four** examples of sorting techniques used in data structures. (2 marks)

(b) Figure 1 shows a binary tree having the nodes A, B, C, D and E. Use it to answer the questions that follow.

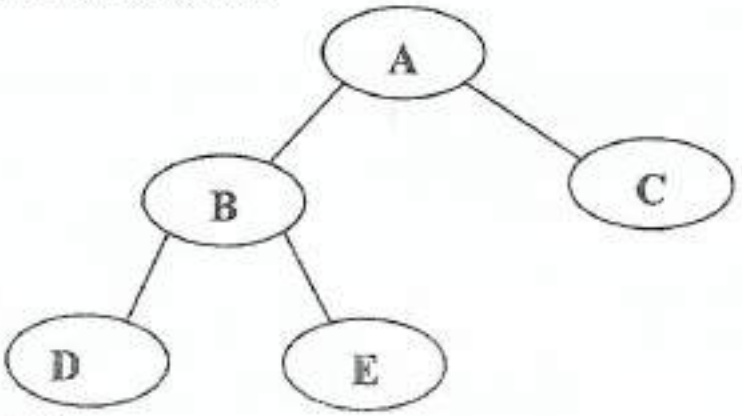

Figure 1

Using the figure, state **two** characteristics of the binary tree. (2 marks)

(c) Differentiate between an *assembler* and a *compiler* as used in programming. (4 marks)

(d) Explain **three** disadvantages of not following *a program development life cycle* during the development of software. (6 marks)

12. (a) State the format specifics used with a *printf* statement to display each of the following:

(i) a value of an integer;

(ii) a string variable;

(iii) a hexadecimal value. (3 marks)

(b) Distinguish between *top down* and *bottom up* program design approach as used in programming. (4 marks)

(c) State one reason for performing each of the following program testing when developing a program:

(i) security;

(ii) functional. (4 marks)

(d) Anne would like to include *pointers* in a program she is writing. Outline **four** advantages of using pointers. (4 marks)

13. (a) The following is a syntax of a structure statement in a C program. Use it to answer the question that follows:

```
Student.firstname
```

State the function of the dot(.) operator in the statement. (2 marks)

(b) Explain the function of each of the following declared function prototype statements in a C program:

(i) float area(int,int)

(ii) int sum(int). (4 marks)

(c) A student used expressions in a C program that he developed. Outline **three** types of expressions that he may have used. (3 marks)

(d) Write a C program that would prompt for 5 numbers one after the other and print the sum of the numbers using an array. (6 marks)

14. (a) Outline **three** advantages of structures in a C program. (3 marks)

(b) Jane documented a program she developed using a C programming language. Describe **three** types of documentations she may have included. (6 marks)

(c) Write a C program that would display the following pattern when executed. Use a for loop statement.

1 1
2 2
3 3
4 4

(6 marks)

15. (a) Distinguish between *printf()* and *putchar()* function as used in C programming language. (4 marks)

(b) Explain the function of each of the following commands in a C program:

(i) curly braces;

(ii) return 0;

(iii) #include <stdio.h> (6 marks)

(c) Write a C program that accepts a string of 10 characters and prints the first and last character of the string. (5 marks)

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