

1920/203
STRUCTURED PROGRAMMING
July 2023
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: Section 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 5 printed pages.

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

Section A (40 marks)

Answer All the questions in this section

1. (a) State **four** examples of third generation programming languages. (2 marks)
(b) Explain the function of a *loader* as used in programming. (2 marks)
2. State the difference between */ operator* and *% operator* as used in a C program. (4 marks)
3. Outline **four** characteristics of a C programming language. (4 marks)
4. Kennedy considered the following factors when choosing a programming language:
(a) efficiency;
(b) elasticity of a language
Explain a reason for each of this consideration. (4 marks)

5. Explain a circumstance that would necessitate the use of each of the following format strings in a C program:
(a) %d
(b) %f (4 marks)

6. The following is a program written in C programming language. Use it to answer the questions that follow:

```
#include<stdio.h>
main()
{
    printf("My country is Kenya");
}
```

Explain the function of each of the following in the code:

- (a) main()
(b) printf() (4 marks)
7. Jared used the following keywords in a C program that he developed.
(a) goto statement;
(b) break statement;
Explain the function of each of the key words in the program. (4 marks)

8. The following is a statement used in a C program. Use it to answer the questions that follow:

```
for (k=1; k<=20; k++)
```

- (a) Identify the logical expression in the statement. (2 marks)
(b) State the function of the statement k++. (2 marks)

9. With the aid of an illustration, state the difference between a *one-dimensional array* and a *two-dimensional array* as used in C programming language. (4 marks)
10. Describe each of the following data structures as used in programming language. (4 marks)
- (a) stack;
 - (b) linked list.

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Section B (60 marks)

Answer any FOUR questions in this section

11. (a) Describe each of the following tools as used in programming:
- (i) decision tree;
 - (ii) flow chart. (4 marks)
- (b) Marion intends to develop an application in C programming language. Describe **two** types of software other than the operating system she would require to achieve her goal. (4 marks)
- (c) (i) Explain *merge sort* technique as used in C programming. (2 marks)
- (ii) The following are elements in an array. Use it to answer the questions that follow.
- | | | | | | | |
|---|----|----|----|----|----|----|
| 6 | 11 | 16 | 21 | 26 | 31 | 37 |
|---|----|----|----|----|----|----|
- Using a binary search algorithm, write a pseudo-code to find the element 26 in the array. (5 marks)
12. (a) (i) Explain the term *binary file* as used in C programming. (2 marks)
- (ii) Outline **two** advantages of using a binary file in C programming. (2 marks)
- (b) Sally documented a program that she developed. Explain **three** types of documentations that she could have considered. (6 marks)
- (c) Write a program using C programming language that would display all integers from 20 to 50. Use a *for loop* statement. (5 marks)
13. (a) Explain the function of each of the following *function prototype* statements in a C program:
- (i) float area(int, int)
 - (ii) int void sum(int) (4 marks)
- (b) State a program development phase where each of the following activities may be performed: (5 marks)
- (i) writing the actual program;
 - (ii) stating the requirements of the program to be developed;
 - (iii) enhancing the operation of the program;
 - (iv) checking if the program meets its requirement specifications;
 - (v) drawing a flowchart to show the logic of a program.
- (c) The volume of a sphere is given by $V = \frac{4}{3} \times \pi \times r^3$, where V is the volume and r is the radius. Write a C program that would compute and display the volume of a sphere with a radius 20cm. (6 marks)

14. (a) Outline **three** advantages of sub programs in programming. (3 marks)
- (b) With an aid of an example, differentiate between a *single character constant* and a *string character constant* as used in C programming. (4 marks)
- (c) The following is a program in C programming language. Use it to answer the questions that follow.

```
#include <stdio.h>
int g;
int main ()
{
int a, b;
a = 10;
b = 20;
g = a + b
printf ("value of a = %d, b = %d and g = %d\n", a, b, g);
return 0;
}
```

- (i) State **two** statements that have been used to initialise variables in the program. (2 marks)
- (ii) Explain the function of `\n` in the `printf` statement. (2 marks)
- (iii) Explain the *scope* of each of the following variables declared in the program:
- (I) `g`;
- (II) `a`. (4 marks)
15. (a) State the difference between "`a`" command mode and "`w+`" command mode as used in C programming files. (4 marks)
- (b) Explain the function of each of the following in C programming language. 12
- (i) escape sequence;
- (ii) nested loop;
- (iii) `clrscr()` command. (6 marks)
- (c) Write a C program that would accept a string of 10 characters through an input statement. The program should then print the first character and last character of the string on the screen. (5 marks)

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