1920/203
STRUCTURED PROGRAMMING
November 2016
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** in the answer booklet provided.*
*Answer **any FOUR** of the **FIVE** questions in **section B** in the answer booklet provided.*
Candidates should answer the questions in English.

This paper consists of 6 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. Outline **four** circumstances that would necessitate the development of a program in an organisation. (4 marks)

2. John compiled a program written using a structured programming language. Outline **four** activities that would occur during this process. (4 marks)

3. Describe the type of translator required for each of the following programming languages:
   (a) high level language; (2 marks)
   (b) assembly language. (2 marks)

4. Explain each of the following terms as used in programming:
   (a) scope of a variable; (2 marks)
   (b) built-in-function. (2 marks)

5. Differentiate between *selection* and *bubble* sort techniques as used in programming. (4 marks)

6. Outline **four** reasons for the popularity of C programming language. (4 marks)

7. Write the output generated when each of the following program segment codes in a program are executed: (4 marks)

   (a)

```
int i,j;
i=7;
i+=2;
j= sqrt(i);
printf("value of i is %d and j is %d", i,j);
```

   (b)

```
int x,y;
x=5;
y=abs(6-x*2);
printf("value of x is %d and y is %d", x,y);
```

8. Outline **four** circumstances that may necessitate program maintenance. (4 marks)

9. Jane was tasked with the preparation of documentation for a program she had developed. Outline **four** factors that she should consider when preparing this document. (4 marks)

10. Outline the purpose of each of the following file function commands as used in C programming language:

(a) getw() (1 mark)

(b) fprintf() (1 mark)

(c) fseek() (1 mark)

(d) putch() (1 mark)

SECTION B (60 marks)

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

11. (a) Explain the term *dry running* as used in programming. (2 marks)

(b) Describe each of the following type of program testing:

(i) unit; (2 marks)

(ii) system. (2 marks)

(c) Figure 1 shows a binary tree drawn by a student during a lesson. Use it to answer the questions that follow.

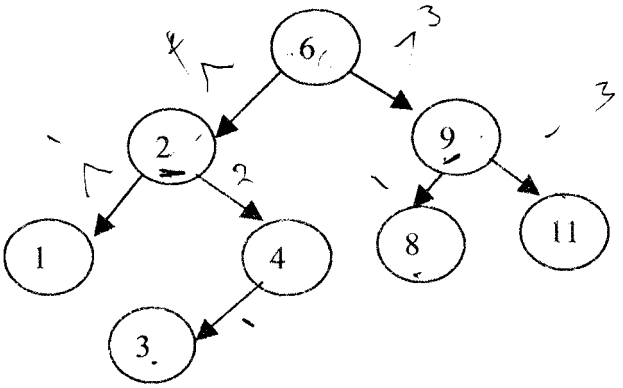

Figure 1

(i) State the relationship that exists in each of the following nodes:

(I) node 2 and node 9 with respect to node 6; (1 mark)

(II) node 3 with respect to node 6, node 2 and node 4; (1 mark)

(III) node 8 with respect to the whole tree structure. (1 mark)

(ii) Write the output generated when the tree is traversed using the *preorder* strategy.

(2 marks)

(d) Write a C program that would prompt a user to enter two numbers then output the greater of the two numbers. (4 marks)

12. (a) Outline **three** challenges of using scanf() to capture data in C programming language. (3 marks)

(b) Differentiate between *dynamic* and *static* array data structures. (4 marks)

(c) Write a C program that prompts a user to enter a character. The program then displays a message "*It is a vowel*" if the character entered is a vowel, otherwise "*Not a vowel*". Use switch statement. (5 marks)

(d) John opted to use pointers when creating a data structure. Outline **three** benefits of this approach. (3 marks)

13. (a) Outline **two** reasons of closing a file as soon as the file operations are done. (2 marks)

(b) Explain the use of a *default* statement in control structures. (2 marks)

(c) Write a C program that prompts a user to enter a number. The program then computes and displays the cube of the number through the use of a function. (5 marks)

(d) Write a C program that would prompt a user to enter 10 numeric values into an array. The program then computes the average of the values and displays the result. (6 marks)

14. (a) Outline **four** merits of using flowcharts during program design. (4 marks)

(b) Write a C programming language segment code that assigns a numeric value 16 to an integer variable x through a pointer named *prt.* (3 marks)

(c) The following is a segment code in a C program.

```
for (i=0; i<2; i++)
     for (j=0; j<3; j++)
{
scanf("%f", &A[i][j]
}
```

Interpret the code. (3 marks)

(d) Write a C program that prompts a user to enter distance in meters. The program then converts the distance into kilometres and displays the results. (5 marks)

15. (a) Outline **four** reasons for preparing documentation in all the stages of program development. (4 marks)

(b) Ann, a programmer detected a logical error in a program. State **two** characteristics that the program exhibited for this conclusion. (2 marks)

(c) Differentiate between *user manual* and *technical manual* as used in programming. (4 marks)

(d) Figure 2 shows a flowchart used to solve a particular problem. Use it to answer the question that follows. (5 marks)

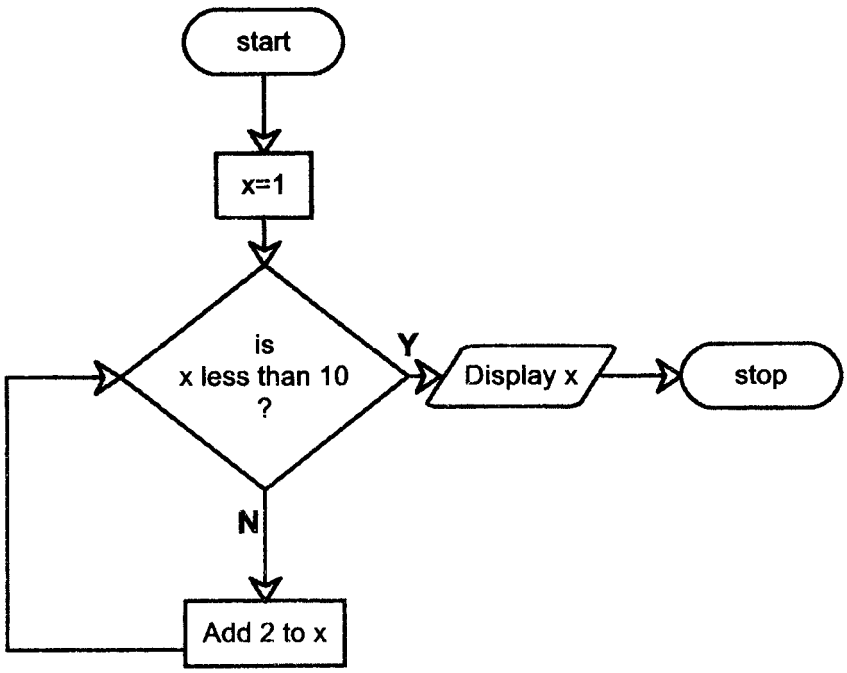

Figure 2

Write a C program to implement the logic represented in figure 2.

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