Candidate's Name: _____ Index Number: _____

Candidate's Signature: _____ Date of Examination: _____

2920/103
STRUCTURED PROGRAMMING
July 2012
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY

MODULE I

STRUCTURED PROGRAMMING

3 hours

INSTRUCTIONS TO CANDIDATES:

*Write your **name** and **index number** in the spaces provided above.*
*Sign and write the **date of examination** in the spaces provided above.*
*Answer any **FIVE** of the following **EIGHT** questions.*
All questions carry equal marks.

For Official Use Only

Question	1	2	3	4	5	6	7	8	Total Marks
Marks									

This paper consists of 18 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

1. (a) (i) Outline **three** types of *errors* that can occur during program development. (3 marks)

Syntax / Compilation errors

Run-time Errors

logic errors

(ii) Describe **two** hardware requirements necessary for installation of programming software in a computer. (4 marks)

(b) Differentiate between a *robust program* and a *legible program* as used in program design. (4 marks)

(c) With the aid of an example, describe the term *escape sequence* as used in C programming language (3 marks)

(d) Write a Pascal program that allows the user to key in an amount of money in Kenya shillings. The program should then calculate the equivalent of the amount in either dollars or pounds through the use of functions and output the amount keyed in and dollar or pound equivalent. Use the rates: 1 dollar= Ksh 80 and 1 pound= Ksh 120. (6 marks)

2. (a) Define the term *identifier* as used in programming. (1 mark)

An identifier is a series of characters consisting of letters digits and underscores that does not begin with a digit

(b) (i) Describe the term *structure chart* as used in program development. (2 marks)

(ii) Explain **two** advantages and **two** disadvantages of using a flowchart in program design. (4 marks)

I (i) Joseph would like to write a program which can read all the records from a text file. State **two** control structures that he would use to achieve his objective. (2 marks)

(ii) The following is a Pascal program segment. Use it to answer the question that follows.

```
Begin
Writeln('enter the value of x');
Readln(x);
For i:=1 to 5 do
     For j:=1 to 5 do
     Begin
          Y:=x + 5;
          Write(y,'    ');
     End;
     Writeln;
End.
```

Given that the value of x input from the keyboard is 0, determine the expected output after the segment is executed. (5 marks)

(d) Write a C program that accepts the total number of words in a book, number of words per page and through the use of a function calculates the number of pages the book has. The program should then output the number of words entered, number of words per page and the number of pages.
Hint: number of pages = number of words in a book /number of words per page. (6 marks)

3. (a) (i) Define the term *symbolic constant* as used in C programming. (1 mark)

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(ii) Describe each of the following programming design concepts:

I. modular; (2 marks)

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II. bottom up. (2 marks)

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(b) Differentiate between a *procedure* and a *function* as used in Pascal programming. (4 marks)

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(c) With the aid of a flowchart, describe the flow of instruction in a *repeat until* loop as used in programming. (4 marks

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(d) Write a C program that accepts 10 integers from the keyboard, stores them in an array and then accepts an integer search element, searches through the array to check whether the search element exits. The program should then output the 10 numbers and a comment on whether the element is found or not. (7 marks)

4. (a) (i) List **two** examples of *Internet based programming* languages. (1 mark)

Java

Html.

(ii) Outline **two** advantages of compiling a program. (2 marks)

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(b) Explain **two** functions of a *user manual* as used in programming. (4 marks)

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(c) (i) Differentiate between *binary* search and *sequential* search. (4 marks)

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(ii) With the aid of an example, outline the general format of a *record* as used in Pascal programming. (4 marks)

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(d) Write a Pascal program that accepts two integers and through the use of a procedure determines which one is greater, outputs the two numbers and an appropriate comment. (5 marks)

5. (a) (i) Define the following terms as used in Pascal:

I. compound statement; (1 mark)

II. comment. (1 mark)

(ii) State the function of the *main()* statement as used in C programming language. (2 marks)

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(b) Explain the result got from each of the following pointer arithmetic:

(i) ptr--; (2 marks)

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(ii) ptr=+7. (2 marks)

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(c) The following is a C program. Use it to answer the question that follows.

```
                  Used Stdio.h>
#include<iostream.h>
{
      Integer I, j, y;
      For(i=1; i<n;i++)
          y:=i*y;
}
```

Identify **four** errors in the program. (4 marks)

- No main() function
- Header file should be <stdio.h>
- Case sensitive : Y ≠ y

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(d) The following data represents students marks stored in a text file named exam located in the root directory of drive C. Use it to answer the question that follows.

Student name	Maths	Comp Appl	OS	Total	Average
Peter	56	60	75		
Lawrence	46	65	90		

Write a Pascal program that can read each student record and calculate the total and average of the scores. The program should then output the name, scores, total and average for each student.

(8 marks)

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

I. endless loop; (1 mark)

II. nested loop; (1 mark)

III. branching loop. (1 mark)

(ii) Outline the typical format of a *switch* statement as used in C programs. (2 marks

switch (expression)
{
case item1
statements
break;
case item2
statements
break;
case itemn
default:
statements
}

(b) Describe the term *formal parameter* as used in programming. (2 marks

(c) (i) Under what circumstance would an *extreme* data be used during program testing. (3 marks

(ii) The following is a list of reserved words in programming languages. Use the list to answer the question that follows:

int, real, float, char, longinteger, switch, typedef

Classify each of the words as either Pascal or C programming reserved word. (3 marks)

Int ⇒

real ⇒ Pascal typedef ⇒ C

float - Pascal

long integer

Switch ⇒ C

(d) The following is a list of marks scored in a computer subject by five students. Use it to answer the question that follows.

80 56 90 45 69 marks

Write a Pascal program that accepts the scores and then determines the highest among them. The program should then output all the scores and state the highest. Use arrays. (7 marks)

7. (a) (i) Define the term *index* as used in program documentation. (1 mark)

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(ii) Distinguish between *signed* and *unsigned* integers as used in C programs. (4 marks

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(b) Peter executed a Pascal program in his computer and got the following error:
…..Stack overflow ….
He was advised to dry run all the procedures which had a stack data structure.
State **two** reasons that may justify this advise. (3 marks

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(c) Upendo society intends to develop a computerized system that accepts member's name, membership number, and number of months a member has been in the society. The system then calculates the amount of dividends paid to members as follows:

- 6% to those members whose shares exceed kshs. 50,000 and have been members for 6 months
- 4% to those members whose shares do not exceed kshs. 50,000 and have been members for 6 months.

Write a pseudo code to represent the program logic. (6 marks

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(d) Write a C program to produce the following output. Use *for ... loop*.

```
5   4   3   2   1
5   4   3   2
5   4   3
5   4
5
```

(6 marks)

8. (a) (i) State **two** advantages of *quick sort* data structure as used in programming. (2 marks)

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(ii) Differentiate between a *structure* and a *union* as used in C programming. (4 marks)

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(b) State **two** reasons that justify the use of *data files* in programming. (2 marks)

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(c) (i) Outline **three** advantages of using *subprograms* in a program development. (3 marks)

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(ii) With the aid of an example, explain the function of the *comma operator* as used in C programming. (3 marks)

(d) Ann a programming student would like to design a program that accepts two numbers and an operator(+,-,/*), computes the result depending on the operator entered, and then outputs the numbers, the operator and the result. Draw a flowchart to represent the logic of the program. (6 marks)