



# MACHAKOS UNIVERSITY

University Examinations for 2017/2018

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR FIRST SEMESTER EXAMINATION FOR  
BACHELOR OF SCIENCE IN COMPUTER SCIENCE

SCO102: INTRODUCTION TO PROGRAMMING

DATE: 13/12/2017

TIME: 2:00 – 4:00 PM

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## INSTRUCTIONS

*This paper consists of **FIVE** questions.*

*Answer **QUESTION ONE** and other **TWO** questions in this paper.*

### QUESTION ONE (COMPULSORY) (30 MARKS)

- a)
  - i) Define the term *programming language* as used in computer programming. (2 marks)
  - ii) Describe each of the following program translators:
    - I. Compiler;
    - II. Interpreter. (4 marks)
- b) Tom, a computer science student wrote an algorithm for a program. Explain **three** characteristics of algorithms he could have considered. (6 marks)
- c)
  - i) During a programming lesson, students incorporated comments in their program.
    - I. Explain the term comment as used in the statement. (2 marks)
    - II. Identify two ways through which comments are included in a C program. (2 marks)
  - ii) Explain **three** types of documentation that a programmer would include in a programming project. (6 marks)

- d) i) Define the term *inbuilt function*. (2 marks)
- ii) Write a program in C language that would prompt a user to enter an integer. The program then checks whether the integer entered is odd or not and outputs the result. (6 marks)

### QUESTION TWO (20 MARKS)

- a) i) Explain the term *data structure* as used in programming. (2 marks)
- ii) State the cause of each of the following types of errors in programming. (2 marks)
- I. Syntax error;
- II. Runtime error.
- b) i) Computer programming has evolved over time. Discuss **two** paradigms that have been part of this evolution. (4 marks)
- ii) Outline **two** advantages of using machine code when writing a program. (2 marks)
- c) i) Distinguish between *pass by value* and *pass by reference* as used in programming. (4 marks)
- ii) Write a program in C language that would accept monetary value in Kenya Shillings. The program then converts the value entered into US dollars through a function and outputs the result. (1 US dollar = 105 KES). (6 marks)

### QUESTION THREE (20 MARKS)

- a) The following are variable names used by a student in a C language program.
- i Myfirst Program
- ii Summation
- iii CProgram
- iv Switch
- State the validity of each of the variables giving a reason for your answer. (4 marks)
- b) Explain each of the methods of program testing: (6 marks)
- i) Dummy data testing;
- ii) Stress testing;
- iii) Unit testing.

- c) Study the following output that was generated when a program was executed.

```
1
2    2
3    3    3
```

Write a program in C language that would generate the output. (4 marks)

- d) i) Define the term *function call* as used in programming. (2 marks)
- ii) A program accepts two integers, it checks which of the two integers is larger than the other and outputs the result. Draw a flow chart to represent the program logic. (4 marks)

#### QUESTION FOUR (20 MARKS)

- a) Outline **three** qualities of a good program. (3 marks)
- b) Explain each of the following terms as used in programming: (6 marks)
- (i) Bottom-up design;
  - (ii) Record;
  - (iii) Queue.
- c) (i) Explain *sentinel value* as used in programming. (2 marks)
- (ii) Distinguish between *conditional* and *unconditional* looping. (4 marks)
- d) A student was tasked with creating a program that would accept the grade scored by a student in an examination. The program would then output a remark of 'PASS' if the grade entered is either A, B or C and a remark of 'FAIL' otherwise. Write a pseudocode to represent this logic. (5 marks)

#### QUESTION FIVE (20 MARKS)

- a) i) Define the term pointer as used in C language programming. (2 marks)
- ii) Write a C language statement that would implement pointers. (2 marks)
- b) Explain **three** components of a *fourth-generation* programming language. (6 marks)
- c) The following is C language program statement. Study and use it to answer the question that follows.
- 1. `#include <stdio.h>`
  - 2. `int main ()`
  - 3. `{`

```

4.    int Myarray[ 4 ]={ 10,20,30,40};

5.    int i,j;
6.    for (j = 3; j >= 0; j-- )
7.    {
8.        printf("Element[%d] = %d\n", j, Myarray[j] );
9.    }
10.   return 0;
11.   }

```

Trace the program. (4 marks)

- d) Table 1 show the criteria used by a ABC bank to approve loans to applicants. Use it to answer the question that follows.

| <b>Evaluation Result</b> | <b>Amount Approved</b> |
|--------------------------|------------------------|
| 1                        | 1,000,000              |
| 2                        | 750,000                |
| 3                        | 500,000                |
| 4                        | 250,000                |
| Default                  | 100,000                |

Table 1

Write a program in C language that would prompt a user to enter the evaluation result. The program then outputs the amount approved. Use switch control structure. (6 marks)