



**MURANG'A UNIVERSITY COLLEGE**

**(A Constituent College of Jomo Kenyatta University of Agriculture and Technology)**

University Examinations 2013/2014

**FIRST YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF  
BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER SCIENCE  
ICS 2102: INTRODUCTION TO COMPUTER PROGRAMMING**

**COURSE: BSc Maths and Comp. Science.**

**TIME: 2HRS**

**DAY/TIME: Tuesday 2:00 – 4:00 p.m.**

**DATE: 17/12/2013**

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*Instructions: Answer Question 1 and Any Other Two.*

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**Question ONE: (30 marks) - Compulsory**

- (a) Define the following terms as used in programming
- i) Coding
  - ii) Debugging
  - iii) Algorithm
  - iv) Deploying
  - v) Dry running [10 marks]
- (b) Explain two types of algorithms that one can develop before coding, using some examples [6 marks]
- (c) Describe three types of errors that a programmer can encounter when programming. [6 marks]
- (d) Differentiate the following problem solving strategies, and state when each is appropriate
- i) Top-down decomposition
  - ii) Bottom-up decomposition [8 marks]

**Question TWO (20 marks)**

- (a) State what the following translators do and describe how they work.
- i) Assembler
  - ii) Compiler
  - iii) Interpreter [12 marks]
- (b) Write a simple program in C to calculate the average of any two numbers typed in through the keyboard. [8 marks]

**Question THREE (20 marks)**

- (a) Explain some FIVE characteristics of a good algorithm. [5 marks]
- (b) Explain the advantages of using a pseudocode over a flowchart [2 marks]
- (c) Design a flowchart for a program to calculate the average of the first 20 integers starting from the largest to the least, using a loop. [6 marks]
- (d) Use any available loop structure in C programming language to implement the above algorithm (in a) [7 marks]

**Question FOUR (20 marks)**

Your Mathematics lecturer wants to write a program to solve the following quadratic equation.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Required:

- (a) Develop a pseudocode for the above problem [6 marks]
- (b) Draw an equivalent flowchart from the above pseudocode in (a) [6 marks]
- (c) Write a program in C programming language to implement the above problem. [8 marks]

**Question 5 (20 marks)**

- (a) Compare and contrast the following pairs of terms
  - i) Object code and source code
  - ii) Program and algorithm [8 marks]
- (b) Develop an algorithm for a program to accept the student marks (one input only) and assign the grade according to the table below:

Marks	Grade
0 – 39	F
40 – 49	D
50 – 59	C
60 – 69	B
70 -100	A
Any other marks	Invalid

- [6 marks]
- (c) Write a C program for the above algorithm. [6 marks]