KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN ELECTRICAL AND ELECTRONICS ENGINEERING

EEE 102: COMPUTER PROGRAMMING I

DATE: WEDNESDAY 18TH APRIL 2012 TIME: 11.00 A.M. – 1.00 P.M.

INSTRUCTIONS

Answer Question ONE and any other Two questions.

Question 1

a) Define the following terms
   i). Programming language
   ii). Control structures
   iii). Programs' algorithm
   iv). Variable scope

[8 marks]

b) Describe any two program design tools [4 marks]

c) Write the mathematical expressions below as C++ statements:
   i). discount=p(f+y-j)-(20n)
   ii). $x=\sqrt{((a+b^2)+g)}$

[6 marks]

d) Write a program that generates odd numbers between 10 and 280. The program should also compute and display the square of each number.

[8 marks]

e) Write a program to computer depreciation of a machine. The buying price (BP) is entered, number of complete services (CS) together with years of services (YS) are also captured. Use the formula $D=\sqrt{(BP/YS)-CS*10}$

[4 marks]

Question 2

a) Briefly explain role of the following in computer program. Give an example in each case.
   i). Arrays
   ii). structure

[6marks]

b) Write a program that inputs length, width and height of a building in centimetres and determine number of tiles to be used if the floor and walls are to be covered by tiles. Your program should also display number of tile boxes to be used if each tile is of size 12*12 centimetres and each boxes contain 17 pieces.

[6 marks]

c) Write a C++ program that allows the user to enter and store the student score in three subjects. The program then computes and displays the lowest score, the highest score, sum and average scores using a suitable format. **[8 marks]**

Question 3

a) Outline any three characteristics of a good programming language **[3 marks]**

b) A program is required to calculate the average of a set of marks and to count the number of failing marks. The program prompts the user the number of marks and reads the value entered. The program then reads each mark and determines the failing marks as those below 40 counting each failing mark. Your program should display the sum, average and number of failing marks

Required:

i) Draw a flowchart for your solution

[8 marks]

ii) Write the program that implements the above algorithm

[9marks]

Question 4

a) Differentiate the following set of terms:

i) Actual parameters and Formal parameters

ii) Function prototypes and function definition

[8 marks]

b) Write a program that uses four functions namely **input, getGrade, output** and **main** to read in the average marks scored by a student and output the grade attained. The **input** function is used to read the average mark (out of 100) for a student. This function should only accept values that fall within the range 0-100. The mark is then passed as a parameter to the getGrade function which uses it to assign a grade based on the following classification:

Mark	Grade
75 and above	A
60 and below 75	B
50 and below 60	C
40 and below 50	D
Below 40	E

The mark and computed grade are the passed as parameters to the output function, which outputs the appropriately. All functions **input, getGrade** and **output** are called from **main**

[12 marks]

Question 5

a) Discuss any three benefit of modular programming.

[6 marks]

b) The following details are available for a student: **Student Number, Name, Mark1, Mark2 and Mark3**. Write a C program to include a structure called **'Students'** to store the student details and display the same along with average mark and "Pass", if average mark is greater than or equal to 50 or "Fail" otherwise

The program should record details of as many students as the user desires. The maximum number of students should not exceed 50.

[14 marks]