



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATIONS 2011/2012
FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE

EMM 201: COMPUTER PROGRAMMING I

DATE: Tuesday 6th December 2011

TIME: 11.00a.m – 1.00p.m

INSTRUCTIONS Answer Question One and Any Other Two questions

Question 1

- a) Differentiate the following
- i). High level languages and low level languages
 - ii). Modular and structured program
 - iii). Program and algorithm
 - iv). Constant and variable
- [8 marks]**
- b) Describe any two program design tools **[4 marks]**
- c) Write the mathematical expressions below as C++ statements:
- i). $Amt = p(f + y - j) - 20$
 - ii). $x = \sqrt{4ac + b^2}$
- [6 marks]**
- d) Write a program that generates cosine and tangent of angles between 1 and 180 inclusive. The program should also compute and display the square of each number. **[8 marks]**
- e) Write a program to evaluate the fuel consumption of a car. The mileage at the start and end of the journey should be read, and also the fuel level in the tank at the start and end of the journey. Calculate gallons of fuel used, kilometers traveled, and hence the overall fuel consumption in kilometers traveled per gallon of fuel. Your program should display computed values. **[4 marks]**

Question 2

- a) Briefly explain the following stages of program development
- i). Developing the outline into algorithm
 - ii). Transcription
 - iii). Testing and debugging
- [6marks]**
- b) Design a program that inputs three different numbers and outputs the smallest number **[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.

Question 3

[8 marks]

- 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
- ii) Write the program that implements the above algorithm

[8 marks]

Question 4

[9marks]

- a) Differentiate the following set of terms:
- i) Actual parameters and Formal parameters
- ii) Function prototypes and function definition
- 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:

[8 marks]

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**

Question 5

[12 marks]

- a) Discuss any three benefit of breaking program into functions
- 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]