



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATIONS 2009/2010
SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR
OF SCIENCE AND BACHELOR OF EDUCATION

SMA 390: SCIENTIFIC PROGRAMMING

DATE: Wednesday, 14th April, 2010

TIME: 8.00 a.m. – 10.00 a.m.

INSTRUCTIONS: Attempt question **ONE** and any other **TWO** questions.

Question One(30 marks)

- a) Given 10 integers , write a program in C++, that outputs the maximum value.
(10 marks)
- b) Write a program in C++ that converts degrees from Celsius to Fahrenheit
(10 marks)
- c) (10 marks)
- d) Write a program that calculates the wage of an employee given the hours worked and a rate. (10 marks)

Question Two(20 marks)

Given data in an array, write a program in C++ that sorts out this array in ascending order. The program should declare two arrays. Data is initially in one array. The program goes through the list and finds the smallest number and puts it in the first position in the second array. This is done repetitively until all the data is in the second array. (20 marks)

Question Three(20 marks)

A student does 8 units in a semester. For each unit three exams are done: namely two CATS which accounts for 30% and final exam which accounts for 70%. Write a program in C++ which accepts a students' marks, assigns a grade (as per KU assignments)per unit, and the overall grade for the student for that semester. The program should output the grade per unit for the 8 units and the overall grade. (20 marks)

Question Four(20 marks)

Given a set of data, write a program that calculates the standard deviation.

$$S = \sqrt{\frac{\sum f_i (x_i - \bar{x})^2}{\sum f_i}} \quad \text{where} \quad \bar{x} = \frac{\sum f_i x_i}{\sum f_i}$$

(20 marks)

Question Five.(20 marks)

Write a program in C++ that accepts the three sides of a triangle A,B and C in ascending order. The program then classifies this into one of the following classes:

No a triangle
Equilateral triangle
Isosceles.

Scalene.

If a triangle obtain the area.

The sides will form a triangle if $A+B > C$ otherwise it is not.

It is equilateral if $A=C$

It is isosceles if $A=B$ or $B=C$

Otherwise it is scalene.

The area of a triangle is calculated as $\sqrt{S(S-A)(S-B)(S-C)}$

where $S = \frac{1}{2}(A+B+C)$

(20 marks)