THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

STAGE ONE SEMESTER EXAMINATIONS

APRIL/MAY 2010 SERIES

COMPUTER PROGRAMMING INCH

TIME: 2 HOURS

Instructions to Candidates

Answer Question **ONE** and any other **TWO** Questions.

Question ONE (30 Marks)

(a). Explain the meaning of each of the following terms:

(i). Program
(ii). Source code
(iii). Compiler
(iv). Objet code
(v). Declaration statement

(5 Marks)

(b). Define the term variable and give the **TWO** ways which we can get data into and out of a variable. **(5 Marks)**

(c). What do mean by the term comment as used in programming? Explain. As you explain give the general syntax for each of the two forms of a comment in C++. **(3 Marks)**

(d). Rewrite the code – segment using each of the following specified alternative constructs:
(i). do-while loop
(ii). for loop

```
...
index =1;
while (index <10)
{

        cout<< "The value of the current index is "<< index; index++;
}
```

(6Marks)

(e). (i). Briefly explain what we mean by the term pre-processor directive.

(ii). As you explain in (i). above, give two examples of a pre-processor directive that you know.

(3 Marks)

(f). (i). Define the term control structure. **(2 Marks)**

(ii). Distinguish between the **TWO** control structure: selection structure and iteration structure. **(2 Marks)**

(iii). An infinite loop structure is a variant of the indefinite loop structure. With the aid of an example explain this fact. **(4 Marks)**

Question TWO (20 Marks)

(a). (i). Define the term array and give the general syntax of its declaration. **(3 Marks)**

(ii). We say that arrays in C++ are zero indexed data structure. What do we mean by this statement? What are its implications when it comes to referencing array elements? Explain. **(2 Marks)**

(b). Write a program to read data items into each of two integer arrays X and Y of size 20. Compare each of the elements of X to the corresponding element Y. In the corresponding element of a third array Z, store:

+1	If X is larger than Y
0	If X is equal to Y
-1	If X is less than Y

Print the number of elements of X that exceed Y, and the number of elements that are less than Y.

(15 Marks)

Question THREE (20 Marks)

(a). Write a program to compute and print the fractional powers of 2(two) in decimal form. You program should print two columns of information as shown below:

Power	**Fraction**
1	0.5
2	0.25
3	0.125
4	0.0625
.	.
.	.
.	.
.	.

The program should terminate when the decimal fraction becomes les than or equal to 0.000001.

(10 Marks)

(b). Students are recommended for graduate fellowships according to their overall undergraduate average. The nature of recommendation is based on the following table:

Average	Recommendation
≥90%	Highest recommendation
≥80% but <90%	Strong recommendation
≥70% but <80%	Recommended
<70%	Not recommended

Write a program to input a students' average mark and output the corresponding recommendation. **(10 Marks)**

Question FOUR

(a). (i). How does C++ implement a subroutine since we know that the basic structure of a C++ program is a function? Explain. **(2 Marks)**

(ii). The return type for a function in C++ is optional. What data type does it default to when we decide not to include a return type in a function definition? Outline. **(1 Mark)**

(iii). Give the general syntax of function definition. As you outline, briefly explain the major parts of your syntax. **(7 Marks)**

(b). Write a function definition that accepts as its arguments; an array of integer values and the size of the array. The function should scan the array and determine the position (note: not the index) of the element in the array having the smallest value. The function should return the position of the element that has the smallest value. Hint the function header may be as follows: **(10 Marks)**

Question FIVE

(a). Examine the following pseudo code:

1. Let sum = 0
2. Let x = 2

3. While x is less than 200 do
   add x is sum
   increment x by 2
4. Display the value of sum

Using a suitable construct write a program to implement the above pseudo code.
(10 Marks)

(b). Given the quadratic equation:

$$y = x^2 + 3x + 5$$

You are required to process a number of y values given that the x values range from x=-3 to x=3 and output the x values together with the corresponding y values. Note the interval difference for the x values is 1(one). Write a program for this problem.

x	**y**
-3	y-value
-2	y-value
.	.
.	.
3	y-value

(10 Marks)

(c). Explain the difference between procedures and functions. **(4 Marks)**