



TECHNICAL UNIVERSITY OF MOMBASA

INSTITUTE OF COMPUTING AND INFORMATICS

UNIVERSITY EXAMINATION FOR:

BACHELOR OF TECHNOLOGY IN INFORMATION AND COMMUNICATION TECHNOLOGY

BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

CSE 4101: INTRODUCTION TO PROGRAMMING

SERIES: SEPTEMBER 2018

TIME: 2 HOURS

DATE: Sep 2018

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

(a.) The memory space provided by the C compiler to a variable on declaration depends on the data type used, give the number of bytes for each of the following data types:

- (i.) int
- (ii.) long
- (iii.) float
- (iv.) double
- (v.) char

(5 marks)

(b.) (i.) What is a structure? Explain.

(ii.) Declare a structure call it student, that can store the first name, other names and the marks of five subjects for each student.

(6 marks)

- (c.) Define the term conditional expression and hence distinguish between the two types of conditional expressions: relational expression and logical expression. As you distinguish give the operators used in each of the expressions.

(9 marks)

- (d.) Write a function definition that accepts as its arguments; an array of integers 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:

```
int scanaary(int a[], int size)
```

(10 marks)

Question TWO

- (a.) Write definite iteration structure that perform each of the following single-dimensional array operations:
- Initialize the 10 elements of integer array `counts` to zeros.
 - Add 1 to each of the 15 elements of integer array `bonus`.
 - Read the 12 values of floating-point array `monthlyTemperatures` from the keyboard.

(6 marks)

- (b.) State the order of evaluation of the operators in each of the following C statements and show the value of `x` after each statement is performed.

- `x = 7 + 3 * 6 / 2 - 1;`
- `x = 2 % 2 + 2 * 2 - 2 / 2;`
- `x = (3 * 9 * (3 + (9 * 3 / (3))));`

(6 marks)

- (c.) Write a program that inputs three different integer values from the keyboard, then prints the sum, the average, the product, the smallest and the largest of these numbers.

(8 marks)

Question THREE

- (a.) Define the term loop. Distinguish between a definite loop structure and indefinite loop structure.

(3 marks)

- (b.) Define the term syntax. Give the syntax of the following constructs:

- while loop construct
- for loop construct

(iii.) do – while loop construct.

(6 marks)

(c.) Examine the following pseudo code:

```
1. let sum = 0
2. let x = 2
3. while x is less than 200 do
    add x to sum
    increment x by 2
4. display the value of sum
```

Using a suitable construct write a program to implement the above pseudo code.

(11 marks)

Question FOUR

(a.) Define each of the following terms as used in programming:

- (i.) source code
- (ii.) object code

(2 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.

Note the displayed output should be of the following format:

x	y
-3	y – value
-2	y – value
.	.
.	.
3	y – value

(8 marks)

(c.) Identify and correct the errors in each of the following statements:

- (i.) `scanf("d", value);`
- (ii.) `printf("The product of %d and %d is %d"\n, x, y);`
- (iii.) `firstNumber + secondNumber = sumOfNumbers`
- (iv.) `if (number => largest)`
`largest == number;`
- (v.) `/* Program to determine the largest of three integers */`
- (vi.) `Scanf("%d", anInteger);`
- (vii.) `printf("Remainder of %d divided by %d is\n", x, y, x % y);`
- (viii.) `if (x = y);`
`printf(%d is equal to %d\n", x, y);`
- (ix.) `print("The sum is %d\n," x + y);`
- (x.) `Printf("The value you entered is: %d\n, &value);`

(10 marks)

Question FIVE

- (a.) Briefly explain the steps that we use to solve a programming problem.
(5 marks)
- (b.) What constitutes a simple C program? Outline. As you outline, give the C program structure for a simple program.
(5 marks)
- (c.) What do we 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.) Explain the meaning of each of the following terms:
 - (i.) program
 - (ii.) variable
 - (iii.) declaration statement(3 marks)
- (e.) Define the term identifier and give the rules that we use when defining an identifier in C.
(4 marks)