



MACHAKOS UNIVERSITY

University Examinations for 2022/2023 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

SIT 122: STRUCTURED PROGRAMMING

DATE: 19/4/2023

TIME: 11:00 – 1:00 PM

Instructions

This paper consists of FIVE questions

*Answer **question one** and other **two questions** in this paper*

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Distinguish the following terms: -
- i. Operand and Operator (2 marks)
 - ii. Selection and Iteration (2 marks)
 - iii. Variable and Constant (2 marks)
- b) Using C++, illustrate the while and for loop syntax (6 marks)
- c) Write a C++ program that fills an array with 25 integers between 0-9. The program should then ask the user for a number and print the number of occurrences of that number in the array. (5 marks)
- d) Using strings, write a program that encrypts a text, i.e. distorts it to unreadability (5 marks)
- e) Write the output of the following program. (6 marks)
- ```
#include <iostream>
using namespace std;
int func(int &x, int y = 10)
```

```

{
 if (x % y == 0)
 return ++x;
 else
 return y--;
}

int main()
{
 int p = 20, q = 23;
 q = func(p, q);
 cout << p << " " << " " << q << endl;
 p = func (q);
 cout << p << " " << " " << q << endl;
 q = func (p);
 cout << p << " " << " " << q << endl;
 return 0;
}

```

- f) Explain the use of \* operator for pointers in C++ (2 marks)

## QUESTION TWO (20 MARKS)

- a) A student declared a variable in a program, outline FOUR rules he could have observed. (4 marks)
- b) A startup company in Nairobi has decided to increase the number of vacation days for their employees. Write a program that asks user to enter number of days allowed for vacations for 3 employees, each on a separate line, then using a function, the program should add 5 to each employee number of vacation days and display message ‘The adjusted days for vacation is xxx days’ (7 marks)
- c) Write a program that uses a function called *Average* to read three numbers of type double and computes their averages, one pair at a time. (6 marks)

- d) Given the following code segment, identify which lines(s) have syntactical errors, showing how each would be corrected. (3 marks)

```
1. #define double PI 3.14
2. void main()
3. {
4. double R=4.5,H=1.5;
5. A=2*PI*R*H + 2*PIpow(R,2);
6. cout("Area is %f", A);
7. }
```

### QUESTION THREE (20 MARKS)

- a) Write a language program in C++ which accepts the user's first and last name and print them in reverse order with a space between them (7 marks)
- b) Using appropriate examples, explain 3 escape sequences used in C++ programming language (6 marks)
- c) In order to write an efficient program in C++ that generates random numbers, a certain procedure needs to be followed, using a valid example demonstrate this. (7 marks)

### QUESTION FOUR (20 MARKS)

- a) Explain how can a pointer be used to access individual elements of an array. Hence, illustrate using an example the procedure for swapping two strings using pointers. (5 marks)
- b) An institution based in machakos town allocates hostels to students on first come first served basis. A student first registers for the semester, pays fees and then applies for a hostel room. A room is allocated to students who meet this criterion. Draw JSP graph to represent the logic in the narrative (6 marks)
- c) Write a C++ program to allocate memory using new operator. (4 marks)
- d) Write a program that asks for a character and then prints the character 10 times at the same line. (5 marks)

### QUESTION FIVE (20 MARKS)

- a) State FOUR string related functions available in C++ programming language. (4 marks)
- b) Explain THREE file access methods used in structured programming. (6 marks)
- c) Table 1 shows the criteria used by a student funding board to allocate loans to applicants. Use it to answer the question that follows.

| Evaluation Result | Amount Approved |
|-------------------|-----------------|
| 1                 | 160,000         |
| 2                 | 150,000         |
| 3                 | 140,000         |
| 4                 | 130,000         |
| Default           | 50,000          |

Table 1

Write a program in C++ language that would prompt a user to enter the evaluation result.

The program then outputs the amount approved. Use switch statement. (6 marks)

- d) James intends to write a program that would compute the average of integers between 10 and 50. Draw a JSP graph that could be used to design the program (4 marks)