



Strathmore
UNIVERSITY

SCHOOL OF COMPUTING AND ENGINEERING SCIENCES
BACHELOR OF SCIENCE IN COMPUTER NETWORKS AND CYBERSECURITY
END OF SEMESTER EXAMINATION
CNS 1102: INTRODUCTION TO PROGRAMMING

DATE: 9th October 2023

Time: 3:30pm – 5:30pm

Instructions

1. This examination consists of **FIVE** questions.
2. Answer **Question ONE (COMPULSORY)** and any other **TWO** questions.

Question One (30 marks)

- a. Distinguish between the following terms as used in programming:
 - i. Arithmetic Operators and Relational Operators (**2 marks**)
 - ii. Variable and Array (**2 marks**)
 - iii. Compiler and Debugger (**2 marks**)
- b. What is the output of this program? Explain your answer (**2 marks**)

```
int i;  
i = -5;  
do  
{  
    cout << i << endl;  
    i = i - 1;  
}  
while (i > 0);
```

- c. Interpreting involves translation of source code line by line. Give 2 advantages of this mode of translation compared to compiling. (**2 marks**)
- d. Rewrite the following snippet of code in C++ (**5 marks**)

```
is_graduate = str(input("Are you the first graduate of the  
family? (y/n): "))
```

```

if (is graduate == 'y'):
    math = int(input("Enter maths score: "))
    phy = int(input("Enter physics score: "))
    chem = int(input("Enter chemistry score: "))
    average = (math + phy + chem) / 3
    if (average == 98):
        print("Student is eligible")
    else:
        print("Student is ineligible")
else:
    print("Student is ineligible")

```

- e. Define a function called maximum that receives 3 values of type float and returns the maximum of the three values **(6 marks)**
- f. The following is pseudocode for a program being designed.

```

BEGIN
    SET sum TO 0, x TO 20
    REPEAT
        ADD x TO sum
        ADD 2 TO x
    UNTIL
        x IS EQUAL TO 30
    DISPLAY sum
END

```

- i. What is the expected output of the program? Show your working **(3 marks)**
- ii. Implement the program in C++ code. **(6 marks)**

Question Two (15 marks)

- a. Rewrite the following C++ code using an if-else structure **(3 marks)**

```

switch(grade) {
    case 'A': //
        cout<<" Distinction";
    case 'B':
        cout<<" Credit";
    case 'C':
        cout<<" Pass";
    default:
        cout<<" REPEAT";
}

```

- b. Aisha buys various items from an online electronics store. if the total cost of the items ordered at one time is more than KES 7,500, the handling and postage fee is free. Otherwise, the handling and postage fee is KES 250 per item. Draw a flowchart for a program that prompts Aisha for the price of an item, she can purchase as many items as she desires. The program makes use of a repetition structure to get the price of each item and lastly calculates the total amount and handling and postage fee. A typical run is illustrated below **(6 marks)**

```
Please enter price of item 44 99
Do you want to enter another item price? y
Please enter price of item 250 00
Do you want to enter another item price? y
Please enter price of item 20 00
Do you want to enter another item price? n
Total sales = 314.99 and Handling and Postage = 30
```

- c. Write a C++ program that implements the algorithm illustrated by question (b). **(6 marks)**

Question Three (15 marks)

- a. Using code snippets, illustrate any 2 differences in syntax between Python and C++ programming languages **(4 marks)**
- b. Write a C++ program that does the following:
- Declare an array of 8 double precision numbers. **(2 marks)**
 - Allows a user to input 8 values to populate the array. **(5 marks)**
 - Finds the sum of array values and displays the sum as the output. **(4 marks)**

Question Four (15 marks)

- a. Briefly explain the difference between AND (&&) and OR (||) operators as used in conditional structures **(2 marks)**
- b. Use a do-while loop to write a C++ program that calculates the sum of all even numbers between 0 and a value `val` that a user enters. Include appropriate comments in your code. **(8 marks)**
- c. Rewrite the program in question 4(b) using a while loop in Python. **(5 marks)**

Question Five (15 marks)

- a. The purpose of programming is to develop software to solve problems. Identify three ways in which programming can be used in promoting environmental conservation. **(3 marks)**

- b. Inspect this snippet of C++ code:

```
int sum=0, num;
cin<<num;
for (num; num!0; num--) {
    sum = num;
    if (num%2=0) {
        sum=sum+num*(num-1);
    }
    cout<<"sum = ">>sum <<endl;
}
```

- i. Debug this code by rewriting it without any errors. Assume all variables are declared and initialised properly **(4 marks)**
- ii. What is the expected output if the input is 7? [Show your working] **(4 marks)**
- iii. Rewrite the correct program as in question 5(b) part (i) using a for loop in Python. **(4 marks)**