

**COMSATS UNIVERSITY ISLAMABAD (CUI)**

DEPARTMENT OF COMPUTER SCIENCE
TERMINAL EXAMINATION FALL - 2022
BS (DS/SE) - II SEMESTER

Course: CSC103-Programming Fundamentals

Maximum Marks: 50

Dated: January 21, 2023

Instructor: Mr. Rizwan Rashid

Time Allowed: 180 Minutes

- All questions are self-explanatory and require no further explanations during exam time.
- Make sure that you have signed the attendance sheet before leaving the examination room.
- Return the question paper along with the answer sheet.
- Attempt all questions.

(CLO - 2: Employ basic programming constructs using a programming language.)

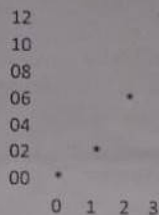
Q.# 1.

- a. For each of the following code fragments, determine the value that will be output. If there is error(s), find and fix the error(s). Are there **circumstances** (conditions/situations) when it should not be done? [Marks 10]

<pre>int total = 1; while (total < 80) { System.out.print(total + " "); total = total + total; } System.out.println(total);</pre>	<pre>int product = 1; for (int i = 1; i < 4; i++) { int sum = 0; for (int j = 1; j <= i; j++) { sum += j; System.out.print(sum + " "); } product *= sum; System.out.println(product); } System.out.println(product);</pre>
<pre>int result = 4; int limit = 100; do { result *= 2; } while (result != limit); System.out.println(result);</pre>	<pre>int x = 4; int y = 9; if (x % 2 == 1) y *= 2; y += 2; System.out.println(y);</pre>
<pre>int sum = 0; for (int i = 1; i <= 12; i += 3) { sum += i; System.out.print(sum + " "); }</pre>	<pre>char p; char myString[] = "abcdefg"; p = myString; p += 5</pre>
<pre>String str = "Carnegie"; for (int i = 1; i <= str.length(); i += 2) { System.out.print(str.charAt(i)); }</pre>	<pre>int x = 0; for (x = 1; x < 4; x++) print("x=%d\n", x)</pre>
<pre>while () { sum += item; item -= 0.1; } System.out.println(sum);</pre>	<pre>boolean rain = true; boolean snow = false; if (!rain snow) System.out.println("HAPPY"); else System.out.println("SAD");</pre>

b. Write a program to plot a graph of function $f(X) = X^n + X^{n+1}$. Your Program should take a maximum absolute value of X as well as positive integer n as input. You will plot a graph for the range $[0, X]$. You should label the Y -axis according to the maximum value of X . Sample output: for $X=3$ and $n=2$, you should have the following output.

[Marks 03]



Q.#2. Write a Three different programs using recursion and Draw Complete Stack diagram.

a. Factorial of each digit of a 3 digit number given through the keyboard.

b. power of X^Y

c. Sum of all Prime Numbers in the Range (1 to N) where N is given by the user.

[Marks: 4+4+4]

Q.#3. Write a program that calculates the occupancy rate for a hostel. The program should start by asking the user how many floors the hostel has. A for loop should then iterate once for each floor. In each iteration, the loop should ask the user for number of rooms on the floor and how many of them are occupied. After all the iterations, the program should display how many rooms the hostel has, how many of them are occupied, how many are unoccupied, and the percentage of rooms that are occupied.

[4 Marks]

Q.#4. a. Write a program to initialize a 2D array of 5×5 . Write a method named SumArray(...) which will return sum of each row and sum of each diagonal. ?

b. Write a method named void Transpose (...) which will convert row to columns and vice versa.

c. Declare a ragged array and fill it by taking input from the user, and then find the specific number and display its index and occurrence.

[6 Marks: 2+2+2]

Q.#5. Write a Program to overload a function num_calc() as follows:

a. With one integer argument and one character argument, computes the square of integer argument if choice ch is 's' otherwise finds its cube.

b. With two integer arguments and one character argument. It computes the product of integer arguments if ch is 'p' else adds the integers.

c. With two string arguments, which prints whether the strings are equal or not. [6 Marks: 2+2+2]

(CLO – 3: Handle programs utilizing refactoring, exceptions, and file I/O.)

Q.#6. a. Write a Java program that will read a file named given by the user. This file contains student ID and the scores of the student. Two lines of the file are shown below:

1234 67.5

1235 89.0

Print out the total number of students and the average score. Find the number of students who obtains score above the average score. Your program must use proper Exception handling where required.

a. Write the above output in another file named AvgScore.txt.

[7+2 Marks]

*****BEST OF LUCK*****