



COMSATS UNIVERSITY ISLAMABAD, ISLAMABAD CAMPUS
DEPARTMENT OF COMPUTER SCIENCE
Terminal Examination, SPRING 2023

Class:	BDS-2A	Marks:	50
Subject:	CSC103-Programming Fundamentals	Time:	3 Hours
Instructors:	Mr. Rizwan Rashid	Dated:	June 15, 2023

Instructions:

1. Attempt all questions.
2. Mobile phones or digital devices are not allowed.
3. Return question paper along with answer sheet.

[CLO-1: Explain the fundamental concepts of programming.]

Question-1: (5 + 5 = 10 Marks)

- a) Explain different programming paradigms with examples.
- b) Write the output of the following code snippets.

i.	<pre>String s1= new String("FinalTermSpring2023"); String s2= new String("FinalTermSpring2023"); if(s1==s2) System.out.println("Equal"); else System.out.println("Not Equal");</pre>	ii.	<pre>int[] source = {{1,2,3},{4,5,6}}; int[] dest = source; dest[1][0] = 30; for(int i=0; i<source.length; i++){ for(int j=0; j<source[i].length; j++){ System.out.print(source[i][j]+" "); } System.out.println(); }</pre>
iii.	<pre>String s1= "Ahmad Bin Salman"; String s2= "Zia ul Qamar"; if(s1.compareTo(s2)<0) System.out.println("Great"); else System.out.println("OK");</pre>	iv.	<pre>int value = 24; switch(value%2){ case 0: System.out.println("Even"); case 1: System.out.println("Odd"); }</pre>
v.	<pre>class FinalTerm { public static void main(String[] args) { int a[]={1,2,3,4,5}; int s=sumArray(a); System.out.println("The given array is"); for(int i=0;i<a.length;i++){ System.out.println(a[i]); } System.out.println("Sum= "+s); } static int sumArray(int array[]){ int sum=0; for(int i=0;i<array.length;i++){ sum+=array[i]; } return sum; } }</pre>		

[CLO-2: Employ basic programming constructs using a programming language.]

Question-2: [CLO-2] (5 Marks)

An online retailer sells five products whose retail prices are as follows: **Product-1: \$2.98, Product-2: \$4.50, Product-3: \$9.98, Product-4: \$4.49, and Product-5: \$6.87**
 Write a JAVA program that reads a series of pairs of numbers as follows:

- i. Product Number
- ii. Quantity Sold

Your program should calculate and display the total retail value of all products sold. The program should be terminated when user enter -99.

Question – 3

(5 + 5 = 10 Marks)

- a) In mathematics, the factorial of an integer n , denoted by $n!$ is the following product:

$$n! = 1 \times 2 \times \dots \times n = 1 \times 2 \times \dots \times n$$

Write a JAVA program that calculate the factorial of a given integer n using **recursion** and demonstrate the execution of recursive factorial function using **Call Stack**.

- b) Write JAVA programs that calculate the distance between two points in 2D and 3D space. In order to calculate distance in 2D space you should define a method **calculateDistance()** which take the coordinates (x_1, y_1) and (x_2, y_2) , and to calculate distance in 3D space, you should overload the above method and it should take the coordinates (x_1, y_1, z_1) and (x_2, y_2, z_2) .

Formula for calculating distance in 2D space: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Formula for calculating distance in 3D space: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$

Question – 4

(5+5+5 = 15 Marks)

- a) Write a function **evenOdd()** that takes a two arrays **list1** and **list2** as argument and return the array such that only numbers at odd index are picked from **list1** & numbers at even index from **list2**. Print the resulting **list3**.

List1 = [11, 49, 83, 7, 61, 35, 44, 3, 12, 19]

List2: [31, 19, 18, 71, 62, 25, 44, 53, 12, 14]

Sample Output:

List3 = [31, 49, 18, 7, 62, 35, 44, 3, 12, 19]

- b) Write a Java program that declare a ragged array with user-defined size and populate it with random integer values. The program should search a specific number (entered by user) in the ragged array.
- c) Suppose a school "Talented High School" is planning to develop exam management system which will efficiently manage and store student's subject marks. The system will help to streamline the process of recording and accessing exam scores for each student. Let's consider a class "Grade-10" consists of 20 students and each student is enrolled in five subjects: Mathematics, English, Computer Science, Chemistry and Physics. For this system, you will be writing a program, which allow teacher to enter marks obtained by each student in all five subjects. After entering marks, the system will display the result summary as
- Show the total marks of each student in all subject
 - Show the marks obtained by all students in each subject.
- In order to implement above system, you are required to use 2D array and three methods i.e. **studentResult()**, **subjectStats()** and **printResult()**.

Question – 5

(5 Marks)

Write a program with a function that accepts a sentence as an argument and returns the number of vowels it contains. The application should have another function that accepts the same sentence as an argument and returns the number of consonants it contains. The application should let the user enter a sentence and should display the number of vowels and the number of consonants.

[CLO-3: Handle programs utilizing refactoring, exceptions, and file I/O.]

Question – 6

(5 Marks)

Write a program that writes a series of random numbers to a text file (**number.txt**). Each random number should be in the range of 1 through 100. The application should let the user specify how many random numbers the file will hold. After writing random numbers to a file, you are required read the same text file in order to find maximum and minimum number. Use exception handling where appropriate.

Good Luck ☺