DIT UNIVERSITY DEHRADUN

B.TECH (CSE) END TERM EXAMINATION, ODD SEM 2024-25 (SEM III)

Roll No. | | | | | | | | | | |

Subject Name: Introduction to Java Programming

Time: 3 Hours **Total Marks: 100**

Note: No student is allowed to leave the examination hall before the completion of the exam.
Answers from a section must be written together and must not be mixed with answers from other section.

SECTION 1: Attempt any five questions in SECTION 1: **[5 x 8= 40]**

Q.1.1) Elaborate the significance of Throwable in java. Explain exception handling hierarchy with in detail with help of diagram. **[2+6 marks]**

Q.1.2) **a.** Develop a java code for a class with three parametrized constructors. In the same code, demonstrate the constructor chaining using this(). **[3 marks]**
b. Explain the difference between method overloading and method overriding with the help of suitable example**.** **[5 marks]**

Q.1.3) **Analyze the following codes. If any error is found, mention it with reason, otherwise write the output:** **[2*4 = 8 marks]**

class Test
{ public static void main(String[] args)
{ try { int a[]= {1, 2, 3, 4};
{ System.out.println (a[10]; } }
catch (Exception e) { }
catch(ArrayIndexOutOfBoundsException e) {} } }
	class Main {
	public static void main(String args[]) {
	try { throw 10; }
	catch(int e) {
	System.out.println("Got the Exception " + e); } } }

public class Main {
public static void main(String[] args) {
String str = "Java"; str.concat(" Programming");
System.out.println(str); } }
	String str = "Hellow";
	System.out.println(str.indexOf('t'));

Q.1.4) **a.** Write a program that meets the following requirements:
a. Creates an array with 20 randomly chosen integers.
b. Prompts the user to enter the index of the element of array, then displays the corresponding element value along with highest and lowest integer number of array. **[4 marks]**

b. Develop a java code for functioning of following methods of StringBuilder:
append(), insert(), delete(),reverse(),replace(),capacity() **[4 marks]**

Q.1.5) Let **s1** be **" Welcome "** and **s2** be **" welcome "**. Write the code for the following statements: **[2*4=8 marks]**
(a) Check whether **s1** is equal to **s2** and assign the result to a Boolean variable **isEqual**.
(b) Check whether **s1** is equal to **s2**,ignoring case, and assign the result to a Boolean variable **isEqual**.
(c) Assign the first character of **s1** to a **char** variable **x**.
(d) Create a new string **s3** that combines **s1** with **s2**.

Q.1.6) **a.** Write a java program that finds the number of occurrences of a specified character in a string using following: **[4 marks]**

public static int count(String st , char c) For example, count("Anand",'a') returns 2.

b. Write a java program using nested for loop to print following pattern: **[4 marks]**

```
        1
      1 3 1
    1 3 9 3 1
  1 3 9 27 9 3 1
```

SECTION 2: Attempt any four questions in SECTION 2: [4 x 15= 60]

Q.2.1) **a.** Create a recursive method to return the number of uppercase letters in an array of characters. You need to define the following two methods.
public static int count(char[] chars)
public static int count(char[] chars, int h)
Write the code that prompts the user to enter a list of characters in one line and displays the number of uppercase letters in the list. **[7 marks]**

b. Develop a program that reads integers, finds the largest of them, and counts its occurrences. Assume that the input ends with number **0**.
Suppose that you entered 1 **8 3 8 8 8 0**; the program finds that the largest is **8** and the occurrence count for **8** is **4**. **[8 marks]**

Q.2.2) **a.** Develop a program to create an abstract class called Shape2d that has two data members of type double and two abstract methods area() and display(). Create two derived classes Rectangle and Triangle. In both classes define the method area() to compute the area of that shape and return it as a double value and define the method display() to display the value of the data members with appropriate caption and the calculated area. Create a class calledShape2dDemo and provide main method to instantiate the objects of Rectangle and Triangle for demonstration of the above classes**.** **[8 marks]**

b. Design an interface called Shape with methods draw() and getArea(). Further design two classes called Circle and Rectangle that implements Shape to compute area of respective shapes. What is marker interface? **[6+1 marks]**

Q.2.3) **a.** Develop a java program which reads a 3-by-4 matrix and displays the sum of each column. Here is sample run: **[8 marks]**

```
1.5  2  3  4        Sum of the elements at column 0 is 16.5
5.5  6  7  8        Sum of the elements at column 1 is 9.0
9.5  1  3  1        Sum of the elements at column 2 is 13.0
                    Sum of the elements at column 3 is 13.0
```

b. Write a java program to illustrate the working of merges sort **[7 marks]**

Q.2.4) **a.** What are the advantages and disadvantages of cloning? Write a java code for cloning of an object using Object.clone(). **[2+6=8 marks]**

b. Compare and contrast the throw and throws with the help of code. **[7 marks]**

Q.2.5) **a.** Write the binarytoDec(String binaryString) method to convert a binary string into a decimal number. Implement the binarytoDec method to throw a NumberFormat Exception if the string is not a binary string**.** **[8 marks]**

b. Write a program that causes the JVM to throw an OutOfMemoryError and catches,handles it. **[7 marks]**

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