DO NOT WRITE ANYTHING ON QPAPER EXCEPT ROLL NO.

**2022-2023**

**Sessional Test I – April, 2023**

Roll No: ……………… [Total No. of Pages: 9]
**Programme:** B.E. (CSE) **Time: 90 minutes**
**Course Title:** Core Java
**Course Code:** CS109 **Max. Marks: 40**

**General Instructions:**

- Follow the instructions given in each section.

## Section – A

***(Q 1 to 10: Each Qcarries 1 mark)***

**Q1.** How do you determine the number of elements in an array?
int buses[] = new int[5];

a. buses.length
**b. buses.length()**
c. buses.size
d. buses.size()

**Q2.** Which of the following is a valid declaration of a char?

**a. char ch = '\u220F';**
b. char ca = 'tea';
c. char cr = \u0h223;
d. char cc = '\itea';

**Q3.** How many arguments can be passed to main()?

**a. Infinite**
b. Only 1
c. System Dependent
d. None of the mentioned

**Q4.** Multiple inheritance is not supported in Java because?

**a. To remove ambiguity and provide more maintainable and clear design.**
b. Java is a Object oriented language.
c. Multiple inheritance is not an important feature.
d. All of above

**Q5.** What is the output of the below code?

```
public class Test {
 public static void main(String[] args) {
    String str = null;
    System.out.println(str.valueOf(10));
 }
}
```

a. This program will result in a compiler error.
b. This program will print null in the console.
**c. This program will print 10 in the console.**
d. None of these

**Q6.** What is the output of the below Java code?

```
public class Strequal
 { public static void main(String[] args)
      { String s1 = "hello";
     String s2 = new String("hello");
      String s3 = "hello";
      if (s1 == s2)
     { System.out.println("s1 and s2 equal"); }
```

```
                    else { System.out.println("s1 and s2 not equal"); }
                    if (s1 == s3) { System.out.println("s1 and s3 equal"); }
                    else { System.out.println("s1 and s3 not equal"); } }}
```

a. s1 and s2 equal s1 and s3 equal  
b. s1 and s2 equal s1 and s3 not equal  
**c. s1 and s2 not equal s1 and s3 equal**  
d. s1 and s2 not equal s1 and s3 not equal

**Q7.** Which of the following is a garbage collection technique?

a. Sweep model  
**b. Mark and sweep model**  
c. Space management model  
d. Cleanup model

**Q8.** What is the output of the below Java program with a decrement operator and WHILE-loop?

```
int a=4;
while(a>0)
{
 System.out.print(a + " ");
 a--;
}
```

**a. 4 3 2 1**  
b. 3 2 1  
c. 1 2 3 4  
d. None

**Q9.** What is the output of the below Java code?

```
class selection_statements
 {
    public static void main(String args[])
    {
       int var1 = 5;
       int var2 = 6;
       if ((var2 = 1) == var1)
          System.out.print(var2);
       else
          System.out.print(++var2);
    }
 }
```

a. 1  
**b. 2**  
c. 3  
d. 4

**Q10.** Which of the following is a method having same name as that of it’s class?

a. finalize  
b. delete  
c. class  
**d. Constructor**

## Section - B

***(Q 11 to 15 : Each Qcarries 2 marks)***

**Q1.** What will be the output of the following code?

```
public class work
{
public static void main(String args[])
{
int x = -128;
x= x>>>31;
System.out.print(x);
}
}
```

a. 0

**b. 1**

c. 2

d. 3

**Q2.** What will be the error in the following code?

```
byte b = 30;
b = b * 30;
```

a. b cannot contain value 30

b. b cannot contain value 100, limited by its range

c. No error in this code

d. **operator has converted b * 30 into int, which cannot be converted to byte without casting**

**Q3.** What will be the output of the following java code?

```
class A {
public void aMethod()
{
System.out.println("a Method from A");
}
}
class B extends A
{
public void aMethod()
{
System.out.println("a Method from B");
}
}
public class Main
{
public static void main(String ar[])
{
A a = new B();
a.aMethod();
}
}
```

a. a Method from A

**b. a Method from B**

c. Compilation Error

d. Runtime Exception

**Q4.** What will be the output of the following Java program?

```
class bitwise_operator
{
public static void main(String args[])
{
int a = 3;
int b = 6;
int c = a | b;
int d = a & b;
System.out.println(c + " " + d);
}
}
```

**a. 7 2**

b. 7 7

c. 7 5

d. 5 2

**Q5.** What will be the output of the following code?

```
public class variable_status
{
                public static void main(String args[])
    {
                                int x;
                                x = 4;
        {
                int y = 5;
                System.out.print(x + " " + y);
        }
        System.out.println(x + " " + y);
    }
}
```

**a. Compilation Error**
b. Runtime Error
c. 4 5 4 5
d. 4 5

**Section - C**

***(Q 16 to 17: Each Qcarries 5 marks)***

Q16. Write a program to check if a number is Neon Number or not and print the result. A neon number is a number where the sum of digits of the square of the number is equal to the number. The task is to check and print the neon number.

**Input format:**

First line of the input contains a number entered by the user.

**Output format:**

On a single line of output print if it is a neon number or not
0 <= n <= 100

**Sample Input:**

0

**Sample Output:**

Given number is a Neon number

**Sample Input:**

8

**Sample Output:**

Given number is not a Neon number

**Test Cases:**

| **Input** | **Output** |
|---|---|
| 0 | Given number is a Neon number |
| 50 | Given number is not a Neon number |
| 1 | Given number is a Neon number |
| 9 | Given number is a Neon number |
| 99 | Given number is not a Neon number |

**Solution:**

```
import java.io.*;
import java.util.*;

class Neon {
        public static boolean checkNeon(int n)
        {
        int square = n * n;
        int sum = 0;
        while (square > 0) {
        int r = square % 10;
        sum += r;
        square = square / 10;
        }
        if (sum == n)
        return true;
        else
        return false;
        }

        public static void main(String[] args)
        {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        if (checkNeon(n))
        System.out.println("Given number is a Neon number");
        else
        System.out.println("Given number is not a Neon number");
        sc.close();
        }
}
```

**Q17:** Write a program that takes an integer N and prints the number of 1 bits it has.

**Input Format**

The one and only line contains an integer N.

**Output format**

Print the number of 1 bits it has.

**Constraints**

0<=N<=4294967295

**Time Limit**

1 second

**Example**

**Sample Input**

11

**Sample Output**

3

**Sample test case explanation**

11 is represented as 1101 in binary so, it has 3 1’s

**Test Cases:**

| **Test case 1** | **Test case 2** | **Test case 3** | **Test case 4** |
|---|---|---|---|
| **Input**<br>10 | **Input**<br>1827389 | **Input**<br>42949612 | **Input**<br>429496 |
| **Output**<br>2 | **Output**<br>13 | **Output**<br>16 | **Output**<br>10 |

**Solution**

```
import java.util.*;
import java.io.*;
public class Main {
        public static void main(String[] args) throws IOException {
        Scanner sc = new Scanner(System.in);
        //System.out.print("Enter a non-negative integer: ");
        int A = sc.nextInt();
        sc.close();
        int count = 0;
        while (A != 0) {
        if ((A & 1) == 1) {
                count++;
        }
        A = A >> 1;
        }
        System.out.println(count);
        }
        }
```

## Section - D

***(Q 18: Qcarries 10 marks)***

Q18: Write a program in Java to implement an integer array and perform following operations in form of functions one after another in same sequence as mentioned:

1. Create an integer array having length of five (05) elements.
2. Input all five elements one after another.
3. Find maximum element from the input array.
4. Find minimum element from the input array.
5. Find Subtraction of all elements of the input array consecutively, i.e., Subtract second element from first, third element from result obtained from last subtraction and so on.
    a. Print message "Subtraction result is greater than or equal to Zero", if subtraction result is positive or zero.
    b. Print message "Subtraction result is less than Zero", if subtraction result is less than zero.

**Input format:**

First line of the input contains elements of array of five integers separated with a space.

**Constraints:**

Entered elements should be greater than 0 and lesser than 10 (1>= Arr[i] >= 9)

**Output format:**

Output contains the following

1. Maximum element of input array,

2. Minimum element of input array,
3. Result of consecutive subtraction as discussed above
4. Do the following based on result of consecutive subtraction,
    a. If subtraction result is zero or positive, then print message “Subtraction result is greater than or equal to Zero”, and
    b. If subtraction result is negative, then print message “Subtraction result is less than Zero”,

**Sample Input 1**:

```
1 2 3 4 5
```

**Sample Output 1:**

```
5
1
-13
Subtraction result is less than Zero
```

**Explanation:**

1. Code should able to identify maximum and minimum elements of input array as 5 and 1 shown in above example.
2. Code should able to find subtraction and also able to print message as discussed above.

For example: If array elements are 1 2 3 4 5 then

1 - 2 = - 1
-1 - 3 = - 4
-4 - 4 = - 8
-8 - 5 = - 13

**Sample Input 2**:

```
15 2 3 4 5
```

**Sample Output 2:**

```
15
2
1
Subtraction result is greater than or equal to Zero
```

**Default Code:**

```
import java.util.Scanner;
public class Main
{
        public static final MyArray myarr = new MyArray();
        public static void main(String[] args)
        {
                myarr.input();
                myarr.max();
                myarr.min();
                myarr.subfn();

        }
   }
```

**Test Cases:**

| **Input** | **Output** |
|---|---|

| | |
|---|---|
| 9 1 1 1 1 | 9<br>1<br>5<br>Subtraction result is greater than or equal to Zero |
| 4 3 6 5 8 | 8<br>3<br>-18<br>Subtraction result is less than Zero |
| 8 4 2 1 1 | 8<br>1<br>0<br>Subtraction result is greater than or equal to Zero |
| 7 3 2 1 1 | 7<br>1<br>0<br>Subtraction result is greater than or equal to Zero |
| 5 4 3 2 1 | 5<br>1<br>-5<br>Subtraction result is less than Zero |

**SOLUTION:**

```
class MyArray
{
        Scanner sc = new Scanner(System.in);
        public static final int[] Arr = new int[5];


        public void input()
        {
                for(int i=0; i<5; i++)
                {
                        Arr[i]=sc.nextInt();
                }
        }

        public void max()
        {
                int max = 0;
                for (int i =0 ;i<5;i++)
                {
                        if (Arr[i] > max)
                        {
                                max = Arr[i];
                        }
        }
        System.out.println(max);
    }
    public void min()
    {
        int min = 10;
        for (int i =0 ;i<5;i++)
        {
            if (Arr[i] < min)
            {
                min = Arr[i];
            }
        }
        System.out.println(min);
    }
    public void subfn()
    {
        int sub = Arr[0];
        for (int i =1 ;i<5;i++)
        {
            sub = sub - Arr[i];
        }
        System.out.println(sub);
        if (sub<0)
        {
            System.out.print("Subtraction result is less than Zero");
        }
        else
        {
            System.out.print("Subtraction result is greater than or equal to Zero");
        }
    }
}
```