Lab1

Topics: print(), println(), Scanner class, 1-D, 2-D array, jagged array

Question 1

- Write a Java program to display “Hello World”.

> Code

```
import java.util.*;

class HelloWorld {
    public static void main(String args[]) {
        System.out.println("Hello World");
    }
}
```

```
E:\SEM4 CE\Java\Lab1>java HelloWorld
Hello World
```

Question 2

- Write a Java program to print numbers between 1 to n which are divisible by 3, 5 and by both(3 and 5) by taking n as an input from the user.

> Code

```
import java.util.*;

class PrintNumbers {
    public static void main(String args[]) {
        int n;
        Scanner sc = new Scanner(System.in);
        n = sc.nextInt();
```

```
        for (int i = 1; i <= n; i++) {
            if (i % 3 == 0 || i % 5 == 0)
                System.out.println(i);
        }
    }
}
```

```
E:\SEM4 CE\Java\Lab1>javac Q2.java

E:\SEM4 CE\Java\Lab1>java PrintNumbers
40
3
5
6
9
10
12
15
18
20
21
24
25
27
30
33
35
36
39
40
```

Question 3

- Write a class named Greeter that prompts the user for his or her name, and then prints a personalized greeting. As an example, if the user entered "Era", the program should respond "Hello Era!".

> Code

```
import java.util.*;

class Greetings {
    public static void main(String args[]) {
        Scanner sc = new Scanner(System.in);
        String name;
```

```
        name = sc.nextLine();
        System.out.println("Hello " + name);
    }
}
```

```
E:\SEM4 CE\Java\Lab1>javac Q3.java

E:\SEM4 CE\Java\Lab1>java Greetings
Darshan
Hello Darshan
```

Question 4

- Write a Java program that takes Name, Roll No and marks of 5 subjects as input and gives a formatted output as: Name: ABCD Roll No. : 1 Average: 84 Also display the grade (e.g. A, B, C...etc) using the average.

> Code

```
import java.util.*;

class DetailsStudent {
    public static void main(String args[]) {
        Scanner sc = new Scanner(System.in);
        String name;
        int rollNo;
        List<Integer> li = new ArrayList<>();
        name = sc.nextLine();
        rollNo = sc.nextInt();
        for (int i = 0; i < 5; i++) {
            li.add(sc.nextInt());
        }
        int sum = 0;
        int avg = 0;
        for (int i = 0; i < 5; i++)
            sum += li.get(i);
        avg = sum / 5;
        System.out.println("Name:" + name);
        System.out.println("Roll No:" + rollNo);
        System.out.println("Average:" + avg);
        if (avg > 90) {
            System.out.println("Grade :A");
        } else if (avg < 90 && avg > 75) {
            System.out.println("Grade :B");
        } else if (avg < 75 && avg > 60) {
            System.out.println("Grade :C");
        } else
            System.out.println("Grade :F");
```

```
    }
}
```

```
E:\SEM4 CE\Java\Lab1>javac Q4.java

E:\SEM4 CE\Java\Lab1>java DetailsStudent
Darshan
107
90
95
92
99
100
Name:Darshan
Roll No:107
Average:95
Grade :A
```

Question 5

- Calculate and return the sum of all the even numbers present in the numbers array passed to the method calculateSumOfEvenNumbers. Implement the logic inside calculateSumOfEvenNumbers() method. Test the functionalities using the main() method of the Tester class.

> Code

```
import java.util.*;

class Sum {
    static public int calculateSumOfEvenNumbers(int arr[]) {
        int sum = 0;
        for (int i = 0; i < arr.length; i++) {
            if (arr[i] % 2 == 0)
                sum += arr[i];
        }
        return sum;
    }

    public static void main(String args[]) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int arr[];
        arr = new int[n];
        for (int i = 0; i < n; i++) {
            arr[i] = sc.nextInt();
```

```
        }
        int ans = Sum.calculateSumOfEvenNumbers(arr);
        System.out.println("Sum is " + ans);
    }
}
```

```
E:\SEM4 CE\Java\Lab1>javac Q5.java

E:\SEM4 CE\Java\Lab1>java Sum
8
68 79 86 99 23 2 41 100
Sum is 256
```

Question 6

- Write a program to perform matrix addition and matrix multiplication on two given matrices. Use for-each form of for loop to display the matrices.

> Code

```
import java.util.*;

class Matrix {
    static public int[][] Addition(int mat1[][], int mat2[][]) {
        int row1 = mat1.length;
        int col1 = mat1[0].length;
        int row2 = mat2.length;
        int col2 = mat2[0].length;

        if (row1 != row2 || col1 != col2) {
            System.out.println("Not a valid matrix");
            int[][] o = null;
            return o;
        }

        int[][] result = new int[row1][col1];
        for (int i = 0; i < row1; i++) {
            for (int j = 0; j < col1; j++) {
                result[i][j] = mat1[i][j] + mat2[i][j];
            }
        }
        return result;
    }


    static public int[][] Multiplication(int mat1[][], int mat2[][]) {
        int row1 = mat1.length;
        int col1 = mat1[0].length;
```

```
        int row2 = mat2.length;
        int col2 = mat2[0].length;

        if (col1 != row2) {
            System.out.println("Matrices cannot be multiplied");
            return null;
        }

        int[][] result = new int[row1][col2];
        for (int i = 0; i < row1; i++) {
            for (int j = 0; j < col2; j++) {
                for (int k = 0; k < col1; k++) {
                    result[i][j] += mat1[i][k] * mat2[k][j];
                }
            }
        }
        return result;
    }

    public static void main(String args[]) {
        Scanner sc = new Scanner(System.in);
        int row1, col1;
        int row2, col2;
        System.out.println("Enter dimensions of first matrix:");
        row1 = sc.nextInt();
        col1 = sc.nextInt();
        System.out.println("Enter dimensions of second matrix:");
        row2 = sc.nextInt();
        col2 = sc.nextInt();

        if (row1 != row2 || col1 != col2) {
            System.out.println("Matrices dimensions do not match");
            return;
        }

        int[][] mat1 = new int[row1][col1];
        int[][] mat2 = new int[row2][col2];

        System.out.println("Enter elements of first matrix:");
        for (int i = 0; i < row1; i++) {
            for (int j = 0; j < col1; j++) {
                mat1[i][j] = sc.nextInt();
            }
        }

        System.out.println("Enter elements of second matrix:");
        for (int i = 0; i < row2; i++) {
            for (int j = 0; j < col2; j++) {
                mat2[i][j] = sc.nextInt();
            }
        }

        int[][] add = Addition(mat1, mat2);
        int[][] mul = Multiplication(mat1, mat2);
```

```
        System.out.println("Resultant matrix after addition:");
        for (int i = 0; i < add.length; i++) {
            for (int j = 0; j < add[0].length; j++) {
                System.out.print(add[i][j] + " ");
            }
            System.out.println();
        }
        System.out.println("Resultant matrix after multiplication:");
        for (int i = 0; i < mul.length; i++) {
            for (int j = 0; j < mul[0].length; j++) {
                System.out.print(mul[i][j] + " ");
            }
            System.out.println();
        }
    }
}
```

```
E:\SEM4 CE\Java\Lab1>javac Q6.java

E:\SEM4 CE\Java\Lab1>java Matrix
Enter dimensions of first matrix:
3
3
Enter dimensions of second matrix:
3
3
Enter elements of first matrix:
1
1
1
1
1
1
1
1
1
Enter elements of second matrix:
1
1
1
1
1
1
1
1
1
Resultant matrix after addition:
2 2 2
2 2 2
2 2 2
Resultant matrix after multiplication:
3 3 3
3 3 3
3 3 3
```

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