OOP Lab-04 Tasks

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Designing and implementing Java programs that deal with:

1. **Static Methods**
2. **Recursion**

Exercises

Exercise 1 *(PatientInfo.java)*

Consider you are a receptionist at hospital and whenever the patient comes you're to take his following info P_number, P_Name, P_age , P_email, P_contact, P_Complain and P_bill then print the receipt for customer so method responsible for taking customer's info is called as Take_Patient_data() and method responsible print receipt is called as Print_Receipt()

Hint: Create global variable that is outside of the main method and use them in both methods for taking and printing customer's details

NOTE: These functions must not be static

Code:

Patient Class:

```
package com.mycompany.mavenproject2;
import java.util.Scanner;

public class Patient {
   String p_name,p_email,p_complain;
   int p_number,p_age,p_bill,p_contact;

   public void takePatientRecord(){
      Scanner p_input = new Scanner(System.in);
      System.out.print("Enter your'e Name : ");
      p_name = p_input.nextLine();
       System.out.print("Enter your'e Email : ");
      p_email = p_input.nextLine();
       System.out.print("Enter your'e Complain : ");
      p_complain = p_input.nextLine();
       System.out.print("Enter your'e Patient ID : ");
      p_number = p_input.nextInt();
       System.out.print("Enter your'e Age : ");
```

```
        p_age = p_input.nextInt();
         System.out.print("Enter your'e Contact no : ");
        p_contact = p_input.nextInt();
        p_input.nextLine();
         System.out.print("Enter your'e Bill : ");
        p_bill = p_input.nextInt();
    }

    public void printReceipt(){
        System.out.println("==================== Reciept ====================");
        System.out.println("Patient's Name : "+ p_name);
        System.out.println("Patient's Email : "+ p_email);
        System.out.println("Patient's Complain : "+ p_complain);
        System.out.println("Patient's ID : "+ p_number);
        System.out.println("Patient's Age : "+ p_age);
        System.out.println("Patient's Contact : "+ p_contact);
        System.out.println("Patient's Bill : "+ p_bill);

System.out.println("================================================");


    }
}
```

Application Class:

```
package com.mycompany.mavenproject2;
import java.util.Scanner;

public class Mavenproject2 {

    public static void main(String[] args) {
//        Task--01
        Patient obj = new Patient();
        obj.takePatientRecord();
        obj.printReceipt();
}
}
```

Output:

```
Enter your'e Name : Syed Raza Ali
Enter your'e Email : asyedraza85632
Enter your'e Complain : fever
Enter your'e Patient ID : 134231
Enter your'e Age : 19
Enter your'e Contact no : 127182
Enter your'e Bill : 20000
====================== Reciept ======================
Patient's Name : Syed Raza Ali
Patient's Email : asyedraza85632
Patient's Complain : fever
Patient's ID : 134231
Patient's Age : 19
Patient's Contact : 127182
Patient's Bill : 20000
=====================================================
-----------------------------------------------------
BUILD SUCCESS
```

Exercise 2 *(Sum.java)*

Write the following 2 static methods:

`public static int ComputeOddSum(int input)`

`public static int ComputeEvenSum(int input)`

The method **`ComputeOddSum`** find the sum of all odd numbers less than input (should be recursive function).

The method **`ComputeEvenSum`** find the sum of all even numbers less than input.

Code:

Task2 Class:

```
package com.mycompany.mavenproject2;
public class Task2 {
    static int i = 0;
    static int sum = 0;

    //for Odd Numbers
    public static int computeOddSum(int number){
        if(i<number){
            if(i%2 != 0){
                sum+=i;
            }
            i+=1;
            computeOddSum(number);
        }
        i = 0;
        return sum;
    }

    //For Even Numbers
     public static int computeEvenSum(int number){
        if(i<number){
            if(i%2 == 0){
                sum+=i;
            }
            i+=1;
            computeEvenSum(number);
        }
        i = 0;
        return sum;
    }
}
```

Application class:

```
package com.mycompany.mavenproject2;
import java.util.Scanner;

public class Mavenproject2 {

    public static void main(String[] args) {
        //task---02
        Scanner input = new Scanner(System.in);
        System.out.println("Enter an integar ");
        int number = input.nextInt();
        System.out.println("The sum of all Odd numbers = "+Task2.computeOddSum(number));
        System.out.println("The sum of all Even numbers = "+Task2.computeEvenSum(number));
}
}
```

Output:

```
Enter an integar
20
The sum of all Odd numbers = 100
The sum of all Even numbers = 190
------------------------------------
BUILD SUCCESS
------------------------------------
```

Exercise 3 *(MatrixTest.java)*

Create a Matrix named as Mat_1 of size 3x3 and ask user to insert values take another matrix named as Mat_2 of size 3x3 again and then implement following equations

1. (Mat_1*3)+(Mat_2)*2
2. (Mat_2 -3) *2
3. (Mat_2*5) – (Mat_1-2)

Code:

Task3 Class:

```
package com.mycompany.mavenproject2;
import java.util.Scanner;

    class Task3{
    int[][] mat_1 = new int[3][3];
    int[][] mat_2 = new int[3][3];
    Scanner input = new Scanner(System.in);

    //for tasking inputs in arrays
    void inputInArrays(){
        //For mat_1
        System.out.println("Enter the elements of mat_1");
        for(int i = 0;i<mat_1.length;i++){
            for(int j = 0;j<mat_1.length;j++){
                System.out.print("Enter the value of position "+i+""+j+" : ");
                mat_1[i][j] = input.nextInt();
            }
        }

         //For mat_2
                System.out.println("Enter the elements of mat_2");

        for(int i = 0;i<mat_2.length;i++){
            for(int j = 0;j<mat_2.length;j++){
                System.out.print("Enter the value of position "+i+""+j+" : ");
                mat_2[i][j] = input.nextInt();
            }
        }

        //printing arrays
        System.out.println("================== Arrays After Taking Input
==================");
```

```
    System.out.println("mat_1 is given as : ");
    for(int i = 0; i<mat_1.length; i++){
        for(int j = 0; j<mat_1.length; j++){
            System.out.print(mat_1[i][j] + "\t");
        }
        System.out.print("\n");
    }

    System.out.println("mat_2 is given as : ");
      for(int i = 0; i<mat_2.length; i++){
        for(int j = 0; j<mat_2.length; j++){
            System.out.print(mat_2[i][j] + "\t");
        }
        System.out.print("\n");
    }

}

//For Equation1
void equation1(){
    //mat_1 * 3
    for(int i = 0; i<mat_1.length; i++){
        for(int j = 0; j<mat_1.length; j++){
            mat_1[i][j] = (mat_1[i][j]) * 3;
        }
    }

    //mat_2 * 2
       for(int i = 0; i<mat_2.length; i++){
        for(int j = 0; j<mat_2.length; j++){
           mat_2[i][j] = (mat_2[i][j]) * 2;
        }
    }
```

```
        //adding both arrys
        int[][] mat_ans = new int[3][3];
        for(int i = 0; i<mat_ans.length; i++){
            for(int j = 0; j<mat_ans.length; j++){
                mat_ans[i][j] = mat_1[i][j] + mat_ans[i][j];
            }
        }

        //printing result
        System.out.println("================== Arrays After Performing Eq1
==================");
        System.out.println("(Mat_1*3) + (Mat_2*2)");
        for(int i = 0; i<mat_ans.length; i++){
            for(int j = 0; j<mat_ans.length; j++){
                System.out.print(mat_ans[i][j] +"\t");
            }
            System.out.print("\n");
        }
    }

    //for equation 2
    void equation2(){
        //mat_2 - 3
        for(int i = 0; i<mat_2.length; i++){
            for(int j = 0; j<mat_2.length; j++){
                mat_2[i][j] = (mat_2[i][j]) - 3;
            }
        }

        //mat_2-3 *2
        int[][] mat_ans = new int[3][3];
        for(int i = 0; i<mat_ans.length; i++){
            for(int j = 0; j<mat_ans.length; j++){
                mat_ans[i][j] = mat_2[i][j] * 2;
            }
        }
```

```
        //printing final array
        System.out.println("================== Arrays After Performing Eq2
==================");
        System.out.println("(Mat_2-3)*2");
        for(int i = 0; i<mat_ans.length; i++){
            for(int j = 0; j<mat_ans.length; j++){
                System.out.print(mat_ans[i][j] +"\t");
            }
            System.out.print("\n");
        }
    }


    //for equation3
     void equation3(){
        //mat_2*5
        for(int i = 0; i<mat_2.length; i++){
            for(int j = 0; j<mat_2.length; j++){
            mat_2[i][j] = (mat_2[i][j]) * 5;
        }
        }

        //mat_1-2
        for(int i = 0; i<mat_1.length; i++){
            for(int j = 0; j<mat_1.length; j++){
                mat_1[i][j] = (mat_1[i][j]) - 2;
            }
        }

        //for final array
        int[][] mat_ans = new int[3][3];
        for(int i = 0; i<mat_ans.length; i++){
            for(int j = 0; j<mat_ans.length; j++){
                mat_ans[i][j] = mat_2[i][j] - mat_1[i][j];
            }
```

```
        }


        //printing final array
        System.out.println("================== Arrays After Performing Eq3 ==================");
       System.out.println("(Mat_2*5)-(Mat_1*2)");
       for(int i = 0; i<mat_ans.length; i++){
          for(int j = 0; j<mat_ans.length; j++){
             System.out.print(mat_ans[i][j] +"\t");
          }
          System.out.print("\n");
       }
     }

}
```

Application class:

```
package com.mycompany.mavenproject2;
import java.util.Scanner;

public class Mavenproject2 {

   public static void main(String[] args) {
       //task---03
       Task3 obj = new Task3();
       obj.inputInArrays();
       obj.equation1();
       obj.equation2();
       obj.equation3();
}
}
```

Output (For eq1):

```
Enter the elements of mat_1
Enter the value of position 00 : 12
Enter the value of position 01 : 34
Enter the value of position 02 : 65
Enter the value of position 10 : 3
Enter the value of position 11 : 78
Enter the value of position 12 : 4
Enter the value of position 20 : 2
Enter the value of position 21 : 98
Enter the value of position 22 : 12
Enter the elements of mat_2
Enter the value of position 00 : 65
Enter the value of position 01 : 45
Enter the value of position 02 : 123
Enter the value of position 10 : 90
Enter the value of position 11 : 435
Enter the value of position 12 : 23
Enter the value of position 20 : 23
Enter the value of position 21 : 87
Enter the value of position 22 : 45
================== Arrays After Taking Input ======
mat_1 is given as :
12      34      65
3       78      4
2       98      12
mat_2 is given as :
65      45      123
90      435     23
23      87      45
================== Arrays After Performing Eq1 ====
(Mat_1*3) + (Mat_2*2)
36      102     195
9       234     12
6       294     36
------------------------------------------------------
BUILD SUCCESS
```

Output (For eq2):

```
Enter the elements of mat_1
Enter the value of position 00 : 2
Enter the value of position 01 : 8
Enter the value of position 02 : 4
Enter the value of position 10 : 0
Enter the value of position 11 : 12
Enter the value of position 12 : 5
Enter the value of position 20 : 87
Enter the value of position 21 : 32
Enter the value of position 22 : 6
Enter the elements of mat_2
Enter the value of position 00 : 76
Enter the value of position 01 : 12
Enter the value of position 02 : 9
Enter the value of position 10 : 4
Enter the value of position 11 : 69
Enter the value of position 12 : 15
Enter the value of position 20 : 34
Enter the value of position 21 : 1
Enter the value of position 22 : 1
================== Arrays After Taking Input ==============
mat_1 is given as :
2       8       4
0       12      5
87      32      6
mat_2 is given as :
76      12      9
4       69      15
34      1       1
================== Arrays After Performing Eq2 ============
(Mat_2-3)*2
146     18      12
2       132     24
62      -4      -4
------------------------------------------------------------
BUILD SUCCESS
```

Output (For eq3):

```
Enter the elements of mat_1
Enter the value of position 00 : 1
Enter the value of position 01 : 2
Enter the value of position 02 : 4
Enter the value of position 10 : 2
Enter the value of position 11 : 6
Enter the value of position 12 : -1
Enter the value of position 20 : 56
Enter the value of position 21 : 0
Enter the value of position 22 : 4
Enter the elements of mat_2
Enter the value of position 00 : -11
Enter the value of position 01 : 3
Enter the value of position 02 : 2
Enter the value of position 10 : 67
Enter the value of position 11 : 4
Enter the value of position 12 : 36
Enter the value of position 20 : -34
Enter the value of position 21 : 5
Enter the value of position 22 : 7
================== Arrays After Taking Input ===============
mat_1 is given as :
1       2       4
2       6       -1
56      0       4
mat_2 is given as :
-11     3       2
67      4       36
-34     5       7
================== Arrays After Performing Eq3 =============
(Mat_2*5)-(Mat_1*2)
-54     15      8
335     16      183
-224    27      33
------------------------------------------------------------
BUILD SUCCESS
```

Exercise 4 (Recursion) *(prodcut.java)*

Write a recursive method to get multiply of all number from 1 up to given number. E.g. Number = 5 Result must be sum (1*2*3*4*5)

Code:

Task4 Class:

```
package com.mycompany.mavenproject2;
import java.util.Scanner;
class Task4 {
    int i = 1;
    int product = 1;
    int number = 0;
    public void input(){
        System.out.print("Enter an integar : ");
        Scanner input = new Scanner(System.in);
         number = input.nextInt();
    }
    public int computeProduct() {
        if (number != 0) {
            if (i <= number) {
                product = product * i;
                i = i + 1;
                computeProduct();
            }
        }
        return product;
    }
}
```

Application class:

```
package com.mycompany.mavenproject2;
import java.util.Scanner;

public class Mavenproject2 {

    public static void main(String[] args) {
        Task4 obj = new Task4();
        obj.input();
        System.out.println("The Final product is : "+obj.computeProduct());
}
}
```

Output:

```
Enter an integar : 12
The Final product is : 479001600
------------------------------------
BUILD SUCCESS
------------------------------------
```

Exercise 5 (Recursion) *(NumberSum.java)*

Write a recursive function that takes two int as arguments and compute the sum of all number between provided two positive integers for example

If 1 and 20 are passed to the function answer should be 210.

Code:

Task5 Class:

```
package com.mycompany.mavenproject2;
import java.util.Scanner;
class Task5{
    int a,b;
    int i = 0,sum = 0;
    void input(){
        Scanner input = new Scanner(System.in);
        System.out.print("Enter a positive integar : ");
        a = input.nextInt();
        System.out.print("Enter another positive integar : ");
        b = input.nextInt();
    }

    int computeSum(){
        if(a>=0 && b>=0 && a<=b){
            if(i<=b){
                sum+=a;
                a+=1;
                computeSum();
            }
        }

        return sum;
    }
}
```

Application class:

```
package com.mycompany.mavenproject2;
import java.util.Scanner;

public class Mavenproject2 {

    public static void main(String[] args) {
```

```
        Task5 obj = new Task5();
        obj.input();
        System.out.print("The sum of all positive numbers between "+obj.a+" and "+obj.b+" is :
"+obj.computeSum());
}
}
```

Output:

```
Enter a positive integar : 1
Enter another positive integar : 20
The sum of all positive numbers between 1 and 20 is : 210
------------------------------------------------------------------------
BUILD SUCCESS
```