Lab 04 – Methods & Recursion

Task 01:

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:

```
package Tasks;
import java.util.Scanner;

public class task01 {
    static int pNum = 0, pAge = 0, pContact = 0;
    static String pName, pComplain, pEmail;
    static float pBill;

    static void  getPatientInfo(){
        Scanner sc = new Scanner(System.in);

        System.out.print("Enter patient's number: ");
        pNum = sc.nextInt();
        sc.nextLine(); // flushing the leftover enter pressed by after
entering number (nextInt() do not take enter)
        System.out.print("Enter patient's name: ");
        pName = sc.nextLine();
        System.out.print("Enter patient's age: ");
        pAge = sc.nextInt();
        sc.nextLine();
        System.out.print("Enter patient's email: ");
        pEmail = sc.nextLine();
        System.out.print("Enter patient's contact number: ");
        pContact = sc.nextInt();
        sc.nextLine();
        System.out.print("Enter patient's complain: ");
        pComplain = sc.nextLine();
        System.out.print("Enter patient's bill amount: ");
        pBill = sc.nextFloat();

        sc.close();
    }

    static void printInfo(){
        System.out.println();
        System.out.println("-----Patient's Receipt-----");

        System.out.println("Patient's number: " + pNum);
        System.out.println("patient's name: " + pName);
```

```
        System.out.println("Patient's age: " + pAge);
        System.out.println("Patient's email: " + pEmail);
        System.out.println("Patient's contact: " + pContact);
        System.out.println("Patient's complain: " + pComplain);
        System.out.println("Patient's bill: " + pBill);
    }

    public static void main(String[] args) {
        getPatientInfo();
        printInfo();
    }
}
```

Output:

```
"C:\Program Files\Java\jdk-24\bin\java.exe" "-javaagent:C:\Program Files\Jet
Enter patient's number: 53
Enter patient's name: Hasan
Enter patient's age: 19
Enter patient's email: random@gmail.com
Enter patient's contact number: 678678
Enter patient's complain: fever
Enter patient's bill amount: 9090

-----Patient's Receipt-----
Patient's number: 53
patient's name: Hasan
Patient's age: 19
Patient's email: random@gmail.com
Patient's contact: 678678
Patient's complain: fever
Patient's bill: 9090.0

Process finished with exit code 0
```

Task 02:

Write the following 2 static methods:

public static int ComputePrimeSum(int input)
(print all the prime number till the input number)

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

public static int ComputeEvenSum(int input)
find the sum of all even numbers less than input.

Now, test these 2 methods by prompting the user to input a number each time until a negative number is entered.

Code:

```
package Tasks;
import java.util.Scanner;

public class task02 {
    public static int computePrimeSum(int n){
         int sum = 0;

        for(int i = 1; i < n; i++){
            int count = 0;

            // checking if it is prime or not
            for(int j = 1; j <= i; j++){
                if(i % j == 0)  count++;
            }

            if(count == 2) sum += i;
        }

        return sum;

    }

    public static int computeEvenSum(int n){
        int sum = 0;

        for(int i = 1; i < n; i++){
            if(i % 2 == 0) sum += i;
        }
        return sum;
    }

    public static int computeOddSum(int n){
        int sum = 0;

        for(int i = 1; i < n; i++){
```

```
            if(!(i % 2 == 0)) sum += i;
        }
        return sum;
    }

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

        int n = 0;

        while(n >= 0){
            System.out.print("Enter a number (negative to quit): ");
            n = sc.nextInt();

            if(n < 0){
                System.out.println("You entered a negative number.
Quiting.");
                continue;
            }

            System.out.println("Sum of all prime numbers less than " + n + "
is: " + computePrimeSum(n));
            System.out.println("Sum of all even numbers less than " + n + "
is: " + computeEvenSum(n));
            System.out.println("Sum of all odd numbers less than " + n + "
is: " + computeOddSum(n));
        }

        sc.close();
    }
}
```

Output:

```
"C:\Program Files\Java\jdk-24\bin\java.exe" "-javaagent:C:\Program Files\Jet
Enter a number (negative to quit): 6
Sum of all prime numbers less than 6 is: 10
Sum of all even numbers less than 6 is: 6
Sum of all odd numbers less than 6 is: 9
Enter a number (negative to quit): -6
You entered a negative number. Quiting.

Process finished with exit code 0
```

Task 03:

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:

```
package Tasks;
import java.util.Scanner;

public class task03 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        int[][] m1 = new int[3][3];
        int[][] m2 = new int[3][3];

        // getting elements of 1st matrix
        System.out.println("Enter elements of Matrix 1");
        for(int i = 0; i < 3; i++){
            System.out.println("\tRow: " + (i+1));
            for(int j = 0; j < 3; j++){
                System.out.print("\t\tEnter value of coloumn " + (j+1) + ":
");
                m1[i][j] = sc.nextInt();
            }
        }

        // getting elements of 2nd matrix
        System.out.println();
        System.out.println("Enter elements of Matrix 2");
        for(int i = 0; i < 3; i++){
            System.out.println("\tRow: " + (i+1));
            for(int j = 0; j < 3; j++){
                System.out.print("\t\tEnter value of coloumn " + (j+1) + ":
");
                m2[i][j] = sc.nextInt();
            }
        }

        // displaying original matrices
        System.out.println();
        System.out.println("Original matrix 1:");
        for(int i = 0; i < 3; i++){
            for(int j = 0; j < 3; j++){
                System.out.print(m1[i][j] + " ");
            }
            System.out.println();
        }

        System.out.println("Original matrix 2:");
        for(int i = 0; i < 3; i++){
```

```
            for(int j = 0; j < 3; j++){
                System.out.print(m2[i][j] + " ");
            }
            System.out.println();
        }

        sc.close();
    }
}
```

Output:

```
"C:\Program Files\Java\jdk-24\bin\java.exe" "-javaagent:C:\Program Files\Jet
Enter elements of Matrix 1
    Row: 1
        Enter value of coloumn 1: 1
        Enter value of coloumn 2: 2
        Enter value of coloumn 3: 3
    Row: 2
        Enter value of coloumn 1: 4
        Enter value of coloumn 2: 5
        Enter value of coloumn 3: 6
    Row: 3
        Enter value of coloumn 1: 7
        Enter value of coloumn 2: 8
        Enter value of coloumn 3: 9

Enter elements of Matrix 2
    Row: 1
        Enter value of coloumn 1: 9
        Enter value of coloumn 2: 8
        Enter value of coloumn 3: 7
    Row: 2
        Enter value of coloumn 1: 6
        Enter value of coloumn 2: 5
        Enter value of coloumn 3: 4
```

```
    Row: 2
        Enter value of coloumn 1: 6
        Enter value of coloumn 2: 5
        Enter value of coloumn 3: 4
    Row: 3
        Enter value of coloumn 1: 3
        Enter value of coloumn 2: 2
        Enter value of coloumn 3: 1

Original matrix 1:
1 2 3
4 5 6
7 8 9
Original matrix 2:
9 8 7
6 5 4
3 2 1

Process finished with exit code 0
```

Task 04:

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:

```
package Tasks;
import java.util.Scanner;

public class task04 {
    static int sum(int n){
        if(n == 0) return
        return n+sum(n-1);
    }

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

        System.out.print("Enter a number: ");
        int n = sc.nextInt();

        System.out.println("Sum of all numbers till " + n + " is: " +
sum(n));
        sc.close();
    }
}
```

Output:

```
"C:\Program Files\Java\jdk-24\bin\java.exe" "-javaagent:C:\Program Files\Jet
Enter a number: 10
Sum of all numbers till 10 is: 55

Process finished with exit code 0
```

Task 05:

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:

```
package Tasks;
import java.util.Scanner;

public class task05 {


    static int middleNumsSum(int start, int end){
        if(start == end) return start;
        return start+middleNumsSum(start+1, end);
    }

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

        System.out.print("Enter the starting number: ");
        int start = sc.nextInt();
        System.out.print("Enter the ending number: ");
        int end = sc.nextInt();

        System.out.println("Sum of all numbers between " + start + " and " +
end +" is: " + middleNumsSum(start, end));

        sc.close();
    }
}
```

Output:

```
"C:\Program Files\Java\jdk-24\bin\java.exe" "-javaagent:C:\Program Files\Jet
Enter the starting number: 1
Enter the ending number: 20
Sum of all numbers between 1 and 20 is: 210

Process finished with exit code 0
```