Session-2 Lab Set=6

Assignment

1. Write a program to find out all the armstrong numbers within a given range using a method named printArmstrongNumber(int start, int end) by taking input from the user. The program should print the Armstrong number in a given range starting from "start" and ending with "end".

   Armstrong Number Example: 153 1 3+5 3+3 3 =153 (Number which is equal to the sum of the cubes of its digits)

   Note: input should be taken from the keyboard. Use a loop to calculate the Armstrong number from "start" to "end". Also use loops to calculate the cube of a number. Do not use the Math.pow() function.

Source code

```java
package anudip.java.lab;

import java.util.Scanner;

public class ArmStrong{

    // Method to print Armstrong numbers in the given range
    public static void printArmstrongNumber(int start, int end) {
        for (int num = start; num <= end; num++) {
            if (isArmstrong(num)) {
                System.out.println(num);
            }
        }
    }

    // Method to check if a number is Armstrong or not
    public static boolean isArmstrong(int num) {
        int sum = 0;
        int temp = num;

        while (temp > 0) {
            int digit = temp % 10;
            sum += cube(digit);
            temp /= 10;
        }
        return sum == num;
    }
```

```java
    // Method to calculate cube of a digit using loop (without Math.pow)
    public static int cube(int digit) {
        int cube = 1;
        for (int i = 1; i <= 3; i++) {
            cube *= digit;
        }
        return cube;
    }

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

        System.out.print("Enter start of range: ");
        int start = sc.nextInt();

        System.out.print("Enter end of range: ");
        int end = sc.nextInt();

        System.out.println("Armstrong numbers between " + start + " and " + end + " are:");
        printArmstrongNumber(start, end);

        sc.close();
    }
}
```

Output

```
<terminated> ArmStrong [Java Application] C:\Users\Preetham
Enter start of range: 1
Enter end of range: 500
Armstrong numbers between 1 and 500 are:
1
153
370
371
407
```

2. Write a program to calculate the gross salary of a group of employees. Basic salary should be taken from the user. If the basic salary is greater than 15000, HRA=20% and DA=60% will be given, else HRA=3000 and DA 70% will be given to the employee. Note: Input of basic salary will be taken from the keyboard. After calculating the salary of one employee, the program will ask for the user's choice as int. If "-1" is entered then the loop will continue and the loop will exit for other int inputs.

Output

```
<terminated> Salary [Java Application] C:\Users\Preetham\.p2\pool\plugins\org.eclipse
Enter the basic salary of the employee: 45120
Gross Salary: 81216.00
Enter -1 to continue or any other number to exit: -1
Enter the basic salary of the employee: 56800
Gross Salary: 102240.00
Enter -1 to continue or any other number to exit: -1
Enter the basic salary of the employee: 98000
Gross Salary: 176400.00
Enter -1 to continue or any other number to exit: 23
Program exited.
```

Source code

```java
package anudip.java.lab;

import java.util.Scanner;

public class Salary {

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

        do {
            // Taking input for basic salary
            System.out.print("Enter the basic salary of the employee: ");
            double basicSalary = scanner.nextDouble();
            double HRA, DA, grossSalary;

            // Calculating HRA and DA based on the basic salary
            if (basicSalary > 15000) {
                HRA = 0.20 * basicSalary; // 20% of basic salary
                DA = 0.60 * basicSalary;  // 60% of basic salary
            } else {
                HRA = 3000;                // Fixed HRA
                DA = 0.70 * basicSalary;  // 70% of basic salary
            }

            // Calculating gross salary
            grossSalary = basicSalary + HRA + DA;

            // Displaying the gross salary
            System.out.printf("Gross Salary: %.2f\n", grossSalary);

            // Asking the user if they want to continue
            System.out.print("Enter -1 to continue or any other number to exit: ");
            choice = scanner.nextInt();

        } while (choice == -1); // Continue if user enters -1

        // Closing the scanner
        scanner.close();
        System.out.println("Program exited.");
    }
}
```

3. Write a program to count and print the total number of odd and even numbers from user inputs. Program will ask for user inputs in a loop. Loop will terminate if -1 is entered as input.

Source code

```java
1 package anudip.java.lab;
2
3 import java.util.Scanner;
4
5 public class Counter {
6
7     public static void main(String[] args) {
8         Scanner scanner = new Scanner(System.in);
9         int evenCount = 0;
10        int oddCount = 0;
11        int number;
12
13        System.out.println("Enter numbers to count odd and even numbers. Enter -1 to terminate.");
14
15        while (true) {
16            // Taking input from the user
17            System.out.print("Enter a number: ");
18            number = scanner.nextInt();
19
20            // Check for termination condition
21            if (number == -1) {
22                break; // Exit the loop if -1 is entered
23            }
24
25            // Counting odd and even numbers
26            if (number % 2 == 0) {
27                evenCount++; // Increment even count
28            } else {
29                oddCount++; // Increment odd count
30            }
31        }
32
33        // Displaying the results
34        System.out.println("Total even numbers: " + evenCount);
35        System.out.println("Total odd numbers: " + oddCount);
36
37        // Closing the scanner
38        scanner.close();
39    }
40 }
```

Output

```
<terminated> Counter [Java Application] C:\Users\Preetham\.p2\pool\plugins\org.eclipse.justj.oper
Enter numbers to count odd and even numbers. Enter -1 to terminate.
Enter a number: 45
Enter a number: 15
Enter a number: 85
Enter a number: 569
Enter a number: 1548
Enter a number: 6325
Enter a number: 4856
Enter a number: 1457
Enter a number: 1259
Enter a number: 357
Enter a number: 4589
Enter a number: -1
Total even numbers: 2
Total odd numbers: 9
```