Programming Paradigms Laboratory

B.Tech. 4th Semester

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Faculty	Engineering & Technology
Programme	B. Tech. in Computer Science and Engineering
Year/Semester	2nd Year / 4th Semester
Name of the Laboratory	Programming Paradigms Laboratory
Laboratory Code	19CSL217A

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Laboratory 1

Title of the Laboratory Exercise: Introduction to Java programming environment with variables, data types and arithmetic operators

1. Questions

    a. Develop a Java program to check the input number is positive or negative.
    b. Develop a Java program to reverse the input number using for and while loop.
    c. Develop a program to compute the factorial of the input number.
    d. Develop a Java program to check whether the input year is leap or not.

2. Calculations/Computations/Algorithms:

    Q1:-

```java
package lab1;
import java.util.Scanner;

public class Lab1 {
    public static void main(String[] args) {
        Scanner sc =new Scanner(System.in);
        System.out.println("enter a number:- ");
        int num=sc.nextInt();
        if(num>0){
            System.out.println(num+" is a positive number");
        }
        else if(num==0){
            System.out.println(num+" is equal to zero");
        }
        else{
            System.out.println(num+" is a negative number");
        }
    }
}
```

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Q2:-

```java
package lab1;
import java.util.Scanner;
public class Lab1 {

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("enter a number:- ");
        int num = sc.nextInt();
        int rev = 0;
        int n = num;
        System.out.printf("reverse using while loop:-");
        while (num > 0) {
            if (num % 10 == 0) {
                System.out.printf("0");
            }
            rev = (rev * 10) + (num % 10);
            num /= 10;
        }
        System.out.printf("%d\n", rev);
        rev = 0;
        System.out.printf("reverse using for loop:- ");
        for (; n != 0; n /= 10) {
            if (n % 10 == 0) {
                System.out.printf("0");
            }
            rev = (rev * 10) + (n % 10);
        }
        System.out.printf("%d\n",rev);
    }
}
```

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Q3:-

```java
package lab1;
import java.util.Scanner;
public class Lab1 {
    static int fact(int n){
        if(n==0)
            return 1;
        else
            return n*fact(n-1);
    }

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("enter a number:- ");
        int num = sc.nextInt();
        System.out.println("factorial of "+num+" is "+fact(num));
    }
}
```

Q4:-

```
package lab1;
import java.util.Scanner;
public class Lab1 {
    static void leapcheck(int y){
        if((y%4==0)&&(y%100==0)&&(y%400==0)){
            System.out.println(y+" is a leap year ");
        }
        else if((y%4==0)&&(y%100!=0)){
            System.out.println(y+" is a leap year ");
        }
        else{
            System.out.println(y+" is Not a leap year ");
        }
    }

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("enter a number:- ");
        int num = sc.nextInt();
        leapcheck(num);
    }
}
```

3. Presentation of Results:-

Q1:-

```
run:
enter a number:-
-34
-34 is a negative number
BUILD SUCCESSFUL (total time: 4 seconds)
```

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Q2:-

```
run:
enter a number:-
35456
reverse using while loop:-65453
reverse using for loop:- 65453
BUILD SUCCESSFUL (total time: 3 seconds)
```

```
run:
enter a number:-
900
reverse using while loop:-009
reverse using for loop:- 009
BUILD SUCCESSFUL (total time: 3 seconds)
```

Q3:-

```
run:
enter a number:-
5
factorial of 5 is 120
BUILD SUCCESSFUL (total time: 3 seconds)
```

Q4:-

```
run:
enter a number:-
2020
2020 is a leap year
BUILD SUCCESSFUL (total time: 3 seconds)
```

```
run:
enter a number:-
100
100 is Not a leap year
BUILD SUCCESSFUL (total time: 3 seconds)
```

4. Conclusions

   - In Q2, reverse of a number can be found by rev=rev*10+number%10 and then decrementing the number by n=n/10.
   - In Q3,factorial is found using recursion where the base condition is (n==0).
     And recursive statement is n*factorial (n-1)
   - In Q4, a year is said to be leap year if it is divisible by 4,100 & 400 altogether or it is divisible by 4 and not divisible by 100.

5. Limitations of Experiments and Results:-

   All the programs have been executed successfully. “Reverse of a num” program had a little bug if the number is 700 then reverse is going to be just 7, although 007==7 but reverse should be printed as 007. This problem have been cured in the solution of Q2 by if statement.