Programming Paradigms Laboratory

B.Tech. 4th Semester

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Faculty	Engineering & Technology
Programme	B. Tech. in Computer Science and Engineering
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Name of the Laboratory	Programming Paradigms Laboratory
Laboratory Code	19CSL217A

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

Algorithm 2.1 Program to check the input number is positive or negative.

```
Step 1: start
Step 2:   input a number, say num
Step 3:  if num > 0 or equal to 0
     3.1 then, print "number is positive"
Step 4: else:
     4.1 print "number is negative"
Step 5: stop
```

Algorithm 2.2 Program to reverse the input number using for and while loop.

```
Step 1: start
Step 2: input a number, say num
Step 3: assign another variable rev = 0
Step 4: while (num not equal to 0):
     4.1 rev = rev * 10
     4.2 rev = rev + num % 10
     4.3 num = num / 10
```

```
Step 5: print rev
Step 6: stop
```

Algorithm 2.3 Program to compute the factorial of the input number

```
Step 1: start
Step 2: input a number, say num
Step 3: assign a variable fact = 1
Step 4: for (i=1 ; i <= n ; i++):
        4.1 fact = fact * i
Step 5: print fact
Step 6:  stop
```

Algorithm 2.4 Program to check whether the input year is leap or not

```
Step 1: start
Step 2: input the year, say variable 'year'
Step 3: if ((year % 4 == 0 and year % 100 != 0) or year %
400 == 0):
        3.1 then, print "leap year"
Step 4: else:
        4.1 print "not a leap year"
Step 5: stop
```

3. Presentation of Results

```java
import java.util.*;

public class PosNeg {
    public static void main(final String[] args) {

        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the Number :");
        int num = sc.nextInt();
        if (num <= 0) {
            System.out.println("Negative Number");
        } else {
            System.out.println("Positive Number");
        }
        sc.close();
    }
}
```

```
PS D:\RUAS-sem-04\PP\Java\lab01> cd "d:\RUAS-sem-04\PP\Java\lab01\" ;
Enter the Number :5
Positive Number
PS D:\RUAS-sem-04\PP\Java\lab01> cd "d:\RUAS-sem-04\PP\Java\lab01\" ;
Enter the Number :-6
Negative Number
PS D:\RUAS-sem-04\PP\Java\lab01>
```

Figure 1 Program to check the input number is positive or negative.

```java
import java.util.*;

public class ReverseNo {

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

        System.out.print("Enter the number : ");
        int num = sc.nextInt();
        int n = num;
        int rev = 0;
        // reverse using while loop
        while (num != 0) {
            rev = rev * 10;
            rev = rev + num % 10;
            num = num / 10;
        }
        System.out.println("the reverse of the number using while-loop is " + rev);
        // reverse using for loop
        int r = 0;
        for (int i = n; i > 0; i = i / 10) {
            r = r * 10;
            r = r + i % 10;
        }

        System.out.println("the reverse of the number using for-loop is " + r);
        sc.close();
    }
}

```

```
PS D:\RUAS-sem-04\PP\Java\lab01> cd "d:\RUAS-sem-04\PP\Java\lab01\" ;
Enter the number : 13579
the reverse of the number using while-loop is 97531
the reverse of the number using for-loop is 97531
PS D:\RUAS-sem-04\PP\Java\lab01>
```

Figure 2 Program to reverse the input number using for and while loop.

```java

import java.util.*;

public class Factorial {

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

        System.out.print("Enter the number : ");
        int n = sc.nextInt();
        int fact = 1;

        for (int i = 1; i <= n; i++) {
            fact = fact * i;
        }
        System.out.println("the factorial of " + n + " is " + fact);
        sc.close();
    }
}
```

```
PS D:\RUAS-sem-04\PP\Java\lab01> cd "d:\RUAS-sem-04\PP\Java\lab01\" ;
Enter the number : 6
the factorial of 6 is 720
PS D:\RUAS-sem-04\PP\Java\lab01>
```

Figure 3 Program to compute the factorial of the input number

```java
import java.util.Scanner;

public class LeapYear {

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

        System.out.print("Enter year : ");
        int year = sc.nextInt();

        if ((year % 4 == 0 && year % 100 != 0) || year % 400 == 0) {
            System.out.print("Leap Year");
        } else {
            System.out.print("not Leap Year");
        }

        sc.close();
    }
}
```

```
PS D:\RUAS-sem-04\PP\Java\lab01> cd "d:\RUAS-sem-04\PP\Java\lab01\" ;
Enter year : 2000
Leap Year
PS D:\RUAS-sem-04\PP\Java\lab01> cd "d:\RUAS-sem-04\PP\Java\lab01\" ;
Enter year : 1994
not Leap Year
PS D:\RUAS-sem-04\PP\Java\lab01>
```

Figure 4 Program to check whether the input year is leap or not.

4. Conclusions

   Learning happened:

   - The Java programming language includes five arithmetic operators, i.e. + (addition), - (subtraction), * (multiplication), / (division), and % (modulo).
   - Object reference variables are initialized to null.
   - A number is by default an int literal, a decimal number is by default a double literal
   - Java has 8 primitive data types. i.e. Boolean, byte, short, char, int, long, float and double

5. Limitations of Experiments and Results

   5.1 we could detect if the number input is positive, negative or zero.

   5.2 the program only does palindrome for integers; it does not work for strings.

   5.3 the datatype of fact is integer, hence factorial of large numbers will not be supported.