LAB # 01

INTRODUCTION TO STRING POOL, LITERALS, AND WRAPPER CLASSES

OBJECTIVE: To study the concepts of String Constant Pool, String literals, String immutability and Wrapper classes.

LAB TASKS

1. **Input:**

```
//          Lab Task 01
            String s1 = "Hello";
            String s2 = "World";
            String s3 = new String("Java");
            String s4 = new String("Programming");
            String s5 = s3.intern();
            System.out.println(s1+",--> String1");
            System.out.println(s2+",--> String2");
            System.out.println(s3+",--> String3");
            System.out.println(s4+",--> String4");
            System.out.println(s5+",--> String5");
```

Output:

```
Hello,--> String1
World,--> String2
Java,--> String3
Programming,--> String4
Java,--> String5
----------------------------
BUILD SUCCESS
```

2. Input:

```
//        Lab Task 02
          int i1 = 5;
          double d1 = 4.0;
          char c1 = 'T';
          Integer i2 = i1;
          Double d2 = d1;
          Character c2 = c1;
          System.out.println("Primitive Integer: "+ i1);
          System.out.println("Wrapper Integer: " + i2);
          System.out.println("Primitive Double: "+ d1);
          System.out.println("Wrapper Double: "+ d2);
          System.out.println("Primitive Character: "+ c1);
          System.out.println("Wrapper Character: "+ c2);
```

Output:

```
Primitive Integer: 5
Wrapper Integer: 5
Primitive Double: 4.0
Wrapper Double: 4.0
Primitive Character: T
Wrapper Character: T
---------------------------
BUILD SUCCESS
```

3. **Input:**

```
//          Lab Task 03
        String s1 = "Welcome";
        String s2 = "To The";
        String s3 = "World";
        String s4 = "Of";
        String s5 = "Programming";
//          Concatenate
        String concat = s1+s2+s3+s4+s5;
        System.out.println(concat);
//          Uppercase
        String st_upper = s4.toUpperCase();
        System.out.println(st_upper);
//          SubString
        String sub_str = concat.substring(8);
        System.out.println(sub_str);
```

Output:

```
WelcomeTo TheWorldOfProgramming
OF
o TheWorldOfProgramming
-------------------------------
BUILD SUCCESS
```

4. Input:

```
//          Lab Task 04
        String word1 = "abc";
        String word2 = "pqr";
        String mergedStr = "";

        int i = 0, j = 0;
        while (i < word1.length() && j < word2.length()) {
            mergedStr += word1.charAt(i);
            mergedStr += word2.charAt(j);
            i++;
            j++;
        }
        while (i < word1.length()) {
            mergedStr += word1.charAt(i);
            i++;
        }
        while (j < word2.length()) {
            mergedStr += word2.charAt(j);
            j++;
        }
        System.out.println(mergedStr);
```

Output:

```
apbqcr
------------------
BUILD SUCCESS
```

5. Input:

```
//          Lab Task 05
        // Minimum and Maximum values of Integer
        int intMin = Integer.MIN_VALUE;
        int intMax = Integer.MAX_VALUE;

        System.out.println("Integer Minimum Value: " + intMin);
        System.out.println("Integer Maximum Value: " + intMax);

        // Minimum and Maximum values of Float
        float floatMin = Float.MIN_VALUE;
        float floatMax = Float.MAX_VALUE;

        System.out.println("Float Minimum Value: " + floatMin);
        System.out.println("Float Maximum Value: " + floatMax);

        // Minimum and Maximum values of Double
        double doubleMin = Double.MIN_VALUE;
        double doubleMax = Double.MAX_VALUE;

        System.out.println("Double Minimum Value: " + doubleMin);
        System.out.println("Double Maximum Value: " + doubleMax);
```

Output:

```
Integer Minimum Value: -2147483648
Integer Maximum Value: 2147483647
Float Minimum Value: 1.4E-45
Float Maximum Value: 3.4028235E38
Double Minimum Value: 4.9E-324
Double Maximum Value: 1.7976931348623157E308
------------------------------------------------
BUILD SUCCESS
```

HOME TASKS

1. Input:

```java
//      Home Task 01
        int intPrimitive = 100;
        Integer intWrapper = intPrimitive;

        float floatPrimitive = 12.5f;
        Float floatWrapper = floatPrimitive;

        double doublePrimitive = 45.67;
        Double doubleWrapper = doublePrimitive;

        System.out.println("Autoboxed Integer value: " + intWrapper);
        System.out.println("Autoboxed Float value: " + floatWrapper);
        System.out.println("Autoboxed Double value: " + doubleWrapper);

        int unboxedInt = intWrapper;
        float unboxedFloat = floatWrapper;
        double unboxedDouble = doubleWrapper;
        System.out.println("Unboxed Integer value: " + unboxedInt);
        System.out.println("Unboxed Float value: " + unboxedFloat);
        System.out.println("Unboxed Double value: " + unboxedDouble);

//        Method 01
        String numberStr = "123";
        int parsedInt = Integer.parseInt(numberStr);
        System.out.println("Parsed Integer from String: " + parsedInt);

//        Method 02
        String intToStr = intWrapper.toString();
        System.out.println("Integer to String using toString(): " + intToStr);

//        Method 03
        Integer valueOfInt = Integer.valueOf("456");
        System.out.println("Integer object using valueOf(): " + valueOfInt);
```

Output:

```
Autoboxed Integer value: 100
Autoboxed Float value: 12.5
Autoboxed Double value: 45.67
Unboxed Integer value: 100
Unboxed Float value: 12.5
Unboxed Double value: 45.67
Parsed Integer from String: 123
Integer to String using toString(): 100
Integer object using valueOf(): 456
----------------------------------------
BUILD SUCCESS
```

2. **Input:**

```java
//          Home Task 02
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter an integer: ");
        int number = scanner.nextInt();

        Integer evenCount = 0;
        Integer oddCount = 0;

        while (number != 0) {
            int digit = number % 10;

            if (digit % 2 == 0) {
                evenCount++;
            } else {
                oddCount++;
            }

            number /= 10;
        }

        System.out.println("Number of even digits: " + evenCount);
        System.out.println("Number of odd digits: " + oddCount);
```

Output:

```
Enter an integer: 6
Number of even digits: 1
Number of odd digits: 0
--------------------------
BUILD SUCCESS
```

3. **Input:**

```java
//        Home Task 03
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter a number: ");
        Double number = scanner.nextDouble();

        Double absValue = Math.abs(number);
        System.out.println("Absolute value: " + absValue);

        Double sqrtValue = Math.sqrt(number);
        System.out.println("Square root: " + sqrtValue);

        Double powerValue = Math.pow(number, 3);
        System.out.println(number + " raised to the power of 3 is: " + powerValue);
```

Output:

```
Enter a number: 8
Absolute value: 8.0
Square root: 2.8284271247461903
8.0 raised to the power of 3 is: 512.0
----------------------------------------
BUILD SUCCESS
```

4. Input:

```java
//        Home Task 04
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a string: ");
        String input = scanner.nextLine();

        char[] strArray = input.toCharArray();
        String vowels = "aeiouAEIOU";
        int left = 0, right = strArray.length - 1;

        while (left < right) {
            // Move left and right pointers to the next vowel
            if (vowels.indexOf(strArray[left]) == -1) {
                left++;
                continue;
            }
            if (vowels.indexOf(strArray[right]) == -1) {
                right--;
                continue;
            }
            // Swap vowels
            char temp = strArray[left];
            strArray[left] = strArray[right];
            strArray[right] = temp;

            left++;
            right--;
        }

        System.out.println("String after reversing vowels: " + new String(strArray));
```

Output:

```
Enter a string: Hello World
String after reversing vowels: Hollo Werld
------------------------------------------------
BUILD SUCCESS
```

5. Input:

```java
//        Home Task 05
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a sentence: ");
        String sentence = scanner.nextLine();

        // Split the sentence into words
        String[] words = sentence.split("\\s+");

        // Variable to hold the longest word
        String longestWord = "";

        // Loop through the words to find the longest one
        for (String word : words) {
            // Check if the current word is longer than the longest found so far
            if (word.length() > longestWord.length()) {
                longestWord = word;
            }
        }

        // Output the longest word
        System.out.println("The longest word is: " + longestWord);
```

Output:

```
Enter a sentence: Hi, I am Jarvis! Your Personal Assistant.
The longest word is: Assistant.
------------------------------------------------------------
BUILD SUCCESS
```