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. Write a program that initialize five different strings using all the above mentioned ways, i.e., **a) string literals b) new keyword** also use intern method and show string immutability.

CODE :

```java
public class BSE038 {
    public static void main(String[] args) {
        String str1 = "Hello";
        String str2 = "World";
        String str3 = new String("Hello");
        String str4 = new String("World");
        String str5 = str3.intern();

        System.out.println("str1 == str2: " + (str1 == str2));
        System.out.println("str1 == str3: " + (str1 == str3));
        System.out.println("str1 == str5: " + (str1 == str5));

        System.out.println("Original str1: " + str1);
        str1 = str1.concat(" Java");
        System.out.println("Modified str1: " + str1);

        System.out.println("After modification, str1 == \"Hello\": " + ("Hello" == str1));
    }
}
```

OUTPUT :

```
str1 == str2: false
str1 == str3: false
str1 == str5: true
Original str1: Hello
Modified str1: Hello Java
After modification, str1 == "Hello": false
```

2. Write a program to convert primitive data type Double into its respective wrapper object.

CODE :

```java
public class BSE038 {
    public static void main(String[] args) {
        double primitiveDouble = 10.5;
        Double wrapperDouble = Double.valueOf(primitiveDouble);
        System.out.println("Wrapper object: " + wrapperDouble);
    }
}
```

Output :

```
Wrapper object: 10.5
```

3. Write a program that initialize five different strings and perform the following operations. a. Concatenate all five stings. b. Convert fourth string to uppercase. c. Find the substring from the concatenated string from 8 to onward

CODE:

```java
public class BSE038 {
    public static void main(String[] args) {
        String str1 = "Hello";
        String str2 = "World";
        String str3 = "Java";
        String str4 = "Programming";
        String str5 = "Language";

        String concatenatedString = str1 + str2 + str3 + str4 + str5;
        String uppercaseStr4 = str4.toUpperCase();
        String substringFrom8 = concatenatedString.substring(8);

        System.out.println("Concatenated String: " + concatenatedString);
        System.out.println("Fourth String in Uppercase: " + uppercaseStr4);
        System.out.println("Substring from 8 onward: " + substringFrom8);
    }
}
```

Output :

```
Concatenated String: HelloWorldJavaProgrammingLanguage
Fourth String in Uppercase: PROGRAMMING
Substring from 8 onward: ldJavaProgrammingLanguage
```

4. You are given two strings word1 and word2. Merge the strings by adding letters in alternating order, starting with word1. If a string is longer than the other, append the additional letters onto the end of the merged string. Return the merged string.

Code:

```java
public class MergeStrings {
    public static void main(String[] args) {
        String word1 = "abc";
        String word2 = "pqr";
        String result = "";

        int i = 0;
        while (i < word1.length() || i < word2.length()) {
            if (i < word1.length()) result += word1.charAt(i);
            if (i < word2.length()) result += word2.charAt(i);
            i++;
        }

        System.out.println("Merged String: " + result);
    }
}
```

Output:

```
Merged String: apbqcr
```

5. Write a Java program to find the minimum and maximum values of Integer, Float, and Double using the respective wrapper class constants.

Code:

```java
public class BSE038 {
    public static void main(String[] args) {
        System.out.println("Integer Min: " + Integer.MIN_VALUE);
        System.out.println("Integer Max: " + Integer.MAX_VALUE);

        System.out.println("Float Min: " + Float.MIN_VALUE);
        System.out.println("Float Max: " + Float.MAX_VALUE);

        System.out.println("Double Min: " + Double.MIN_VALUE);
        System.out.println("Double Max: " + Double.MAX_VALUE);
    }
}
```

Output:

```
Integer Min: -2147483648
Integer Max: 2147483647
Float Min: 1.4E-45
Float Max: 3.4028235E38
Double Min: 4.9E-324
Double Max: 1.7976931348623157E308
```

HOME TASKS

1. Write a JAVA program to perform Autoboxing and also implement different methods of wrapper class.

   Code:

```java
public class BSE038 {
    public static void main(String[] args) {
        int primitiveInt = 10;
        Integer wrapperInt = primitiveInt;

        System.out.println("Autoboxed Integer: " + wrapperInt);
        System.out.println("Byte Value: " + wrapperInt.byteValue());
        System.out.println("Double Value: " + wrapperInt.doubleValue());
        System.out.println("Integer to String: " + wrapperInt.toString());
        System.out.println("Parsed Integer from String: " + Integer.parseInt("20"));
        System.out.println("Compare with 15: " + wrapperInt.compareTo(15));
    }
}
```

Output:

```
Autoboxed Integer: 10
Byte Value: 10
Double Value: 10.0
Integer to String: 10
Parsed Integer from String: 20
Compare with 15: -1
```

2. Write a Java program to count the number of even and odd digits in a given integer using Autoboxing and Unboxing.

   Code:

```java
public class BSE038 {
    public static void main(String[] args) {
        int number = 123456789;
        int evenCount = 0;
        int oddCount = 0;
        while (number > 0) {
            int digit = number % 10;
            if (digit % 2 == 0) {
                evenCount++;
            } else {
                oddCount++;
            }
            number /= 10;
        }
        System.out.println("Even digits: " + evenCount);
        System.out.println("Odd digits: " + oddCount);
    }
}
```

Output:

```
Even digits: 4
Odd digits: 5
```

3. Write a Java program to find the absolute value, square root, and power of a number using Math class methods, while utilizing Autoboxing and Wrapper classes.

Code:

```java
public class BSE038 {
    public static void main(String[] args) {
        Double number = -16.0;
        Double absoluteValue = Math.abs(number);
        Double squareRoot = Math.sqrt(absoluteValue);
        Double power = Math.pow(absoluteValue, 2);

        System.out.println("Absolute Value: " + absoluteValue);
        System.out.println("Square Root: " + squareRoot);
        System.out.println("Power (number^2): " + power);
    }
}
```

Output:

```
Absolute Value: 16.0
Square Root: 4.0
Power (number^2): 256.0
```

4. Write a Java program to reverse only the vowels in a string

Code:

```java
public class BSE038 {
    public static void main(String[] args) {
        String input = "hello";
        char[] chars = input.toCharArray();
        int left = 0, right = chars.length - 1;
        String vowels = "aeiouAEIOU";

        while (left < right) {
            if (vowels.indexOf(chars[left]) != -1 && vowels.indexOf(chars[right]) != -1) {
                char temp = chars[left];
                chars[left] = chars[right];
                chars[right] = temp;
                left++;
                right--;
            }
            if (vowels.indexOf(chars[left]) == -1) left++;
            if (vowels.indexOf(chars[right]) == -1) right--;
        }

        System.out.println(new String(chars));
    }
}
```

Output:

```
holle
```

5. Write a Java program to find the longest word in a sentence.

Code:

```java
public class LongestWord {
    public static void main(String[] args) {
        String sentence = "Find the longest word in this sentence";
        String[] words = sentence.split(" ");
        String longestWord = "";
        for (String word : words) {
            if (word.length() > longestWord.length()) {
                longestWord = word;
            }
        }
        System.out.println("Longest Word: " + longestWord);
    }
}
```

Output:

```
Longest Word: sentence
```