University Institute of Information Technology
Faculty of Computing

Course Code:	CS-432	**Subject:**	MPL
Lab Manuals		**Class/Lab Instructor:**	

---------- LAB 04 ----------

Learning Objective:

1. Scanner library
2. String class and its built-in functions.
3. String buffer class and its built-in functions.
4. 1D Array & 2D Array
5. Searching & Sorting in array

Scanner library

The Scanner class is used to get user input, and it is found in the java.util package. To use the Scanner class, create an object of the class and use any of the available methods found in the Scanner class documentation.

Example# 1 Scanner Class

```java
import java.util.Scanner;

public class Week04 {

    public  static void  main(String[] strings)  {


        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter a Number : ");
        int num=scanner.nextInt();
        System.out.println("Your Number is :"+ num);
    }

}
```

String in JAVA

In Java, a string is an object that represents a number of character values. Each letter in the string is a separate character value that makes up the Java string object. Characters in Java are represented by the char class. Users can write an array of char values that will mean the same thing as a string.

```
// create strings
String first = "Java";
String second = "Python";
String third = "JavaScript";

// print strings
System.out.println(first); // print Java
System.out.println(second); // print Python
System.out.println(third); // print JavaScript
```

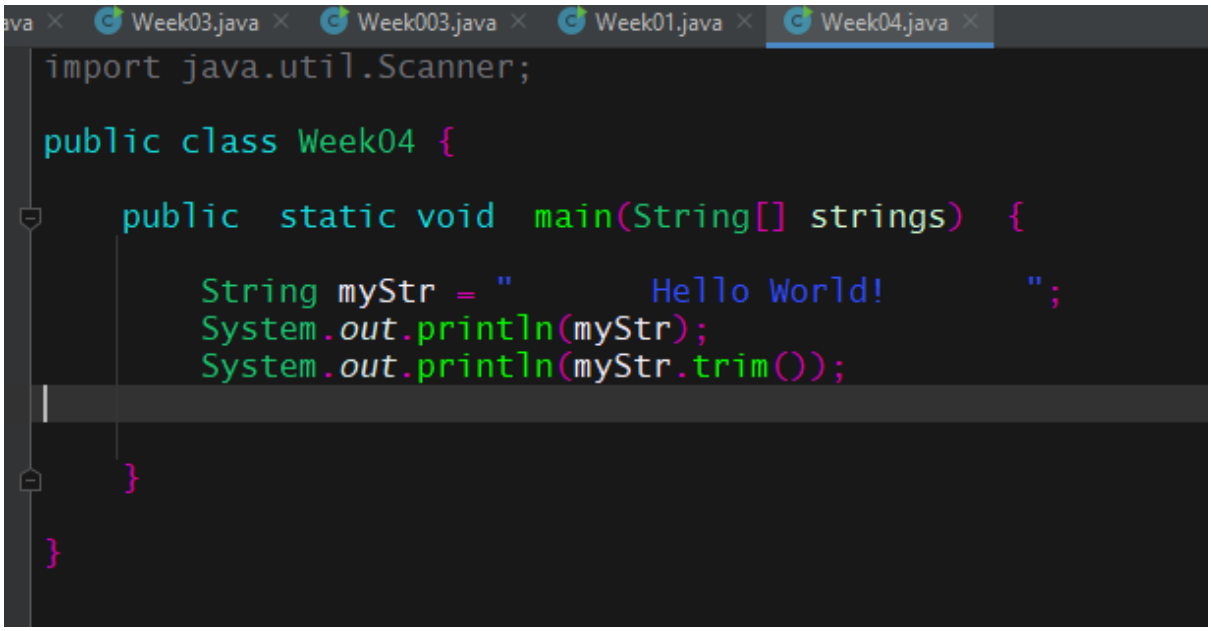
Built-in function

- toUpperCase()
- toLowerCase()
- trim()
- starsWith() and endsWith()
- charAt(index)
- length()
- substring()
- toCharArray()

Example# 2 toUpperCase(), toLowerCase()

```
public class Week04 {

    public  static void  main(String[] strings)  {

        String txt = "Hello World";
        System.out.println(txt.toUpperCase());
        System.out.println(txt.toLowerCase());

    }

}
```

Example# 3 trim()



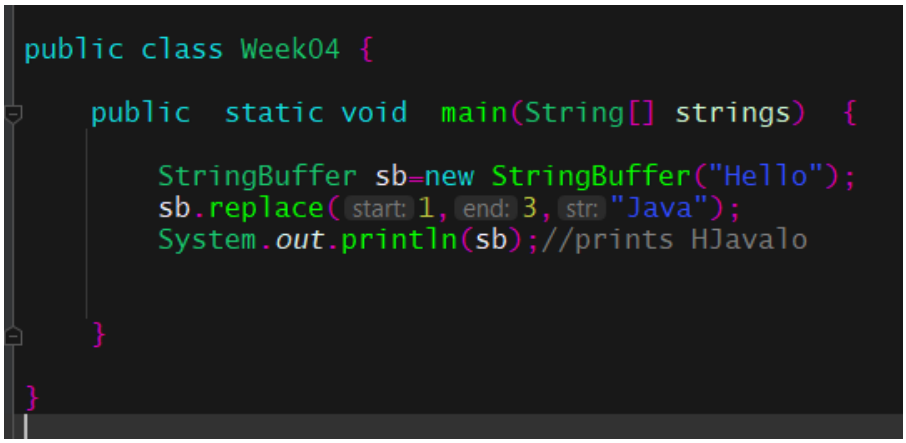
String Buffer

String Buffer mutable sequence of characters. A string buffer is like a String, but can be modified. At any point in time, it contains some particular sequence of characters, but the length and content of the sequence can be changed through certain method calls.

Built in Function

- replace()
- Append()
- reverse()
- delete()
- insert()

Example# 4 replace()



Example# 5 Append()

```java
import java.util.Scanner;

public class Week04 {

    public  static void  main(String[] strings)  {

        StringBuffer sb=new StringBuffer();
        System.out.println(sb.capacity());//default 16
        sb.append("Hello");
        System.out.println(sb.capacity());//now 16
        sb.append("javais my favourite language");
        System.out.println(sb.capacity());//now (16*2)+2=34 i.e (oldcapacity*2)+2

    }

}
```

Example# 6 insert()

```java
import java.util.Scanner;

public class Week04 {

    public  static void  main(String[] strings)  {

        StringBuffer sb=new StringBuffer("Hello ");
        sb.insert( offset: 1, str: "Java");//now original string is changed
        System.out.println(sb);//prints HJavaello


    }

}
```

1D & 2D Array in Java

1D arrays are just one row of values, while 2D arrays contain a grid of values that has several rows/columns.

Example# 71D Array

```java
import java.util.Scanner;

public class Week04 {

    public  static void  main(String[] strings)  {

        int[] a=new int[3];//declaration
        a[0]=10;//initialization
        a[1]=20;
        a[2]=30;
//printing array
        System.out.println("One dimensional array elements are");
        System.out.println(a[0]);
        System.out.println(a[1]);
        System.out.println(a[2]);



    }

}
```

Example# 8 2D Array

```java
public class Week04 {

    public  static void  main(String[] strings)  {

        Scanner sc=new Scanner(System.in);
        System.out.println("Enter Row length of an array : ");
        int row=sc.nextInt();
        System.out.println("Enter column length of an array : ");
        int column=sc.nextInt();
        int a[][]=new int[row][column];//declaration
        System.out.print("Enter " + row*column + " Elements to Store in Array :\n");
        for (int i = 0; i < row; i++)
        {
            for(int j = 0; j < column; j++)
            {
                a[i][j] = sc.nextInt();
            }
        }
        System.out.print("Elements in Array are :\n");
        for (int i = 0; i < row; i++)
        {
            for(int j = 0; j < column; j++)
            {
                System.out.println("Row ["+i+"]:  Column ["+j+"] :"+a[i][j]);
            }
        }

    }
}
```

Example# 9 Searching in Array

```java
import java.util.Arrays;
import java.util.Scanner;

public class Week04 {

    public  static void  main(String[] strings)  {

        // Sorted Array
        int array[] = { 0,1, 2, 3, 4, 5, 6, 7, 8, 9, 10 };

        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter element to find in the given array :");
        int num=scanner.nextInt();
        // Using binarySearch to search for desired element
        int index = Arrays.binarySearch(array, num);

        // Printing result
        if (index >= 0)
            System.out.println("Element " + num +"  found at index: " + index);
        else
            System.out.println("Element not found");
    }
}
```

Example# 10 Sorting array in descending order

```java
import java.util.Scanner;
public class Week04 {
    public  static void  main(String[] strings)  {
        int n, temp;
        Scanner s = new Scanner(System.in);
        System.out.print("Enter the number of elements: ");
        n = s.nextInt();
        int a[] = new int[n];
        System.out.println("Enter the elements of the array: ");
        for (int i = 0; i < n; i++)
        {
            a[i] = s.nextInt();
        }
        for (int i = 0; i < n; i++)
        {
            for (int j = i + 1; j < n; j++) {
                if (a[i] < a[j]) {
                    temp = a[i];
                    a[i] = a[j];
                    a[j] = temp;
                }
            }
        }
        System.out.println("Array elements in descending order:");
        for (int i = 0; i < n - 1; i++)
        {
            System.out.println(a[i]);
        }
        System.out.print(a[n - 1]);
    }
}
```

Lab Task(s)

1. Write a Java program using scanner class.
    - Input an integer number and display the table of given number
2. Write a Java program to create 10 numbers of array and sum of them.
3. Write a Java Program repeat example 10 with soring array in ascending order.
4. Write a Java program to calculate the average value of array elements.
    - Size of array is 5
5. Write a Java program to find the index of an array element.
    - 23,34,45,56,67
    - Print the index value of 45
6. Write a Java program String Buffer function is “delete()” and “reverse()”