Mohammad Ali Jinnah University

Chartered by Government of Sindh - Recognized by HEC

Lab Task 3

Name: Muhamad Fahad

Id: FA19-BSSE-0014

Subject: Data Structures and Algorithms Lab (CS 2511)

Lab Title: Bubble Sorting

Section: AM

Teacher: MUHAMMAD MUBASHIR KHAN

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1) Implement Bubble Sort.

Code:

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

public class BubbleSorting1 {
   public static void main(String[] args) {
      System.out.println("1) Implement Bubble Sort.\n");

      int length;
      Scanner scan = new Scanner(System.in);

      System.out.print("Enter the Length of the array: ");
      length = scan.nextInt();
      int arr[] = new int[length];

      for (int i = 0; i < length; i++) {
         System.out.print("Enter the Value of index: "+i+" : ");
         arr[i] = scan.nextInt();
      }

      System.out.println("\nArray before bubble sorting: "+ Arrays.toString(arr));

      int swap;
      for (int i = 0; i < length-1; i++) {
         for (int j = 0; j < (length-i)-1; j++) {
            if (arr[j] > arr[j+1]) {
               swap = arr[j];
               arr[j] = arr[j+1];
               arr[j+1] = swap;
            }
         }
      }

      System.out.println("\nArray After bubble sorting: "+ Arrays.toString(arr));

   }
}
```

Output:

```
"C:\Program Files\Java\jdk-13.0.2\bin\java.exe" "-javaagent:C:\Program
1) Implement Bubble Sort.

Enter the Length of the array: 8
Enter the Value of index: 0 : 9
Enter the Value of index: 1 : 5
Enter the Value of index: 2 : 6
Enter the Value of index: 3 : 2
Enter the Value of index: 4 : 1
Enter the Value of index: 5 : 7
Enter the Value of index: 6 : 8
Enter the Value of index: 7 : 3

Array before bubble sorting: [9, 5, 6, 2, 1, 7, 8, 3]

Array After bubble sorting: [1, 2, 3, 5, 6, 7, 8, 9]
```

2) Implement Bubble Sort for descending order.

```
package com.company;

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

public class BubbleSorting2 {
    public static void main(String[] args) {
        System.out.println("2) Implement Bubble Sort for descending order.\n");

        int length;
        Scanner scan = new Scanner(System.in);

        System.out.print("Enter the Length of the array: ");
        length = scan.nextInt();
        int arr[] = new int[length];

        for (int i = 0; i < length; i++) {
            System.out.print("Enter the Value of index: "+i+" : ");
            arr[i] = scan.nextInt();
        }

        System.out.println("\nArray before descending order bubble sorting: "+ Arrays.toString(arr));

        int swap;
        for (int i = 0; i < length-1; i++) {
            for (int j = 0; j < (length-i)-1; j++) {
                if (arr[j] < arr[j+1]) {
                    swap = arr[j];
                    arr[j] = arr[j+1];
                    arr[j+1] = swap;
                }
            }
        }

        System.out.println("\nArray After descending order bubble sorting: "+ Arrays.toString(arr));

    }
}
```

Output:

```
"C:\Program Files\Java\jdk-13.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ
2) Implement Bubble Sort for descending order.

Enter the Length of the array: 10
Enter the Value of index: 0 : 1
Enter the Value of index: 1 : 5
Enter the Value of index: 2 : 3
Enter the Value of index: 3 : 5
Enter the Value of index: 4 : 8
Enter the Value of index: 5 : 0
Enter the Value of index: 6 : 6
Enter the Value of index: 7 : 7
Enter the Value of index: 8 : 1
Enter the Value of index: 9 : 06

Array before descending order bubble sorting: [1, 5, 3, 5, 8, 0, 6, 7, 1, 6]

Array After descending order bubble sorting: [8, 7, 6, 6, 5, 5, 3, 1, 1, 0]

Process finished with exit code 0
```

3) In Word Document

```
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;
import java.util.*;


public class BubbleSorting3 {
   public static void main(String[] args) throws IOException {
      int length,size,i,j;
      String temp[];

      BufferedReader scan = new BufferedReader(new InputStreamReader(System.in));
      temp = scan.readLine().split(" ");

      length = Integer.parseInt(temp[0]);
      size = Integer.parseInt(temp[1]);

      String UserInput[][] = new String[length][size];

      for (i = 0; i < length; i++) {
         temp = scan.readLine().split(" ");
         for (j = 0; j < size; j++) {
            UserInput[i][j] = temp [j];
         }
      }


      for (i = 0; i < length-1; i++) {
         for (j = 0; j < (length-i)-1; j++) {

            boolean match = (Integer.parseInt(UserInput[j][size-1])) <  (Integer.parseInt(UserInput[j+1][size-1]));
            boolean match2 = ((Integer.parseInt(UserInput[j][size-1])) ==  (Integer.parseInt(UserInput[j+1][size-1])))
&& (UserInput[j][0].charAt(0) > UserInput[j+1][0].charAt(0));

            if (match || match2) {
               temp = UserInput[j];
               UserInput[j] = UserInput[j+1];
               UserInput[j+1] = temp;
            }


         }
      }

      for (i = 0; i < 2; i++) {
         System.out.println(UserInput[i][0]);
      }
   }
}
```

Output:

```
"C:\Program Files\Java\jdk-13.0.2\bin\java.exe"
8 2
Ali 8
Umar 9
Bilal 9
Fahad 10
haider 5
asad 5
Ahmed 8
saad 8
Fahad
Bilal

Process finished with exit code 0
```