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DSA Lab 06

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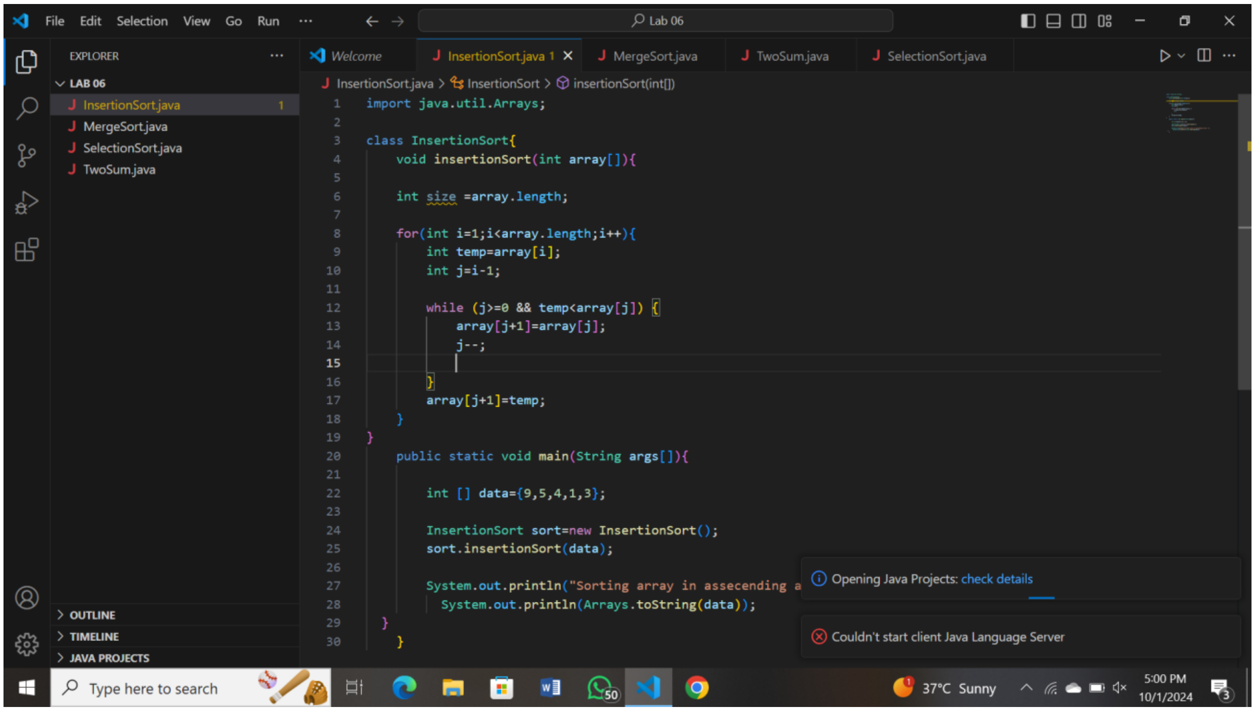
DSA LAB 06 SOLUTION || SUBMITTED TO MA'AM MARINA

1. Implement selection sort and insertion sort.



```java
import java.util.Arrays;

class InsertionSort{
    void insertionSort(int array[]){

    int size =array.length;

    for(int i=1;i<array.length;i++){
        int temp=array[i];
        int j=i-1;

        while (j>=0 && temp<array[j]) {
            array[j+1]=array[j];
            j--;

        }
        array[j+1]=temp;
    }
}
    public static void main(String args[]){

        int [] data={9,5,4,1,3};

        InsertionSort sort=new InsertionSort();
        sort.insertionSort(data);

        System.out.println("Sorting array in assecending a
          System.out.println(Arrays.toString(data));
    }
      }
```

Opening Java Projects: check details

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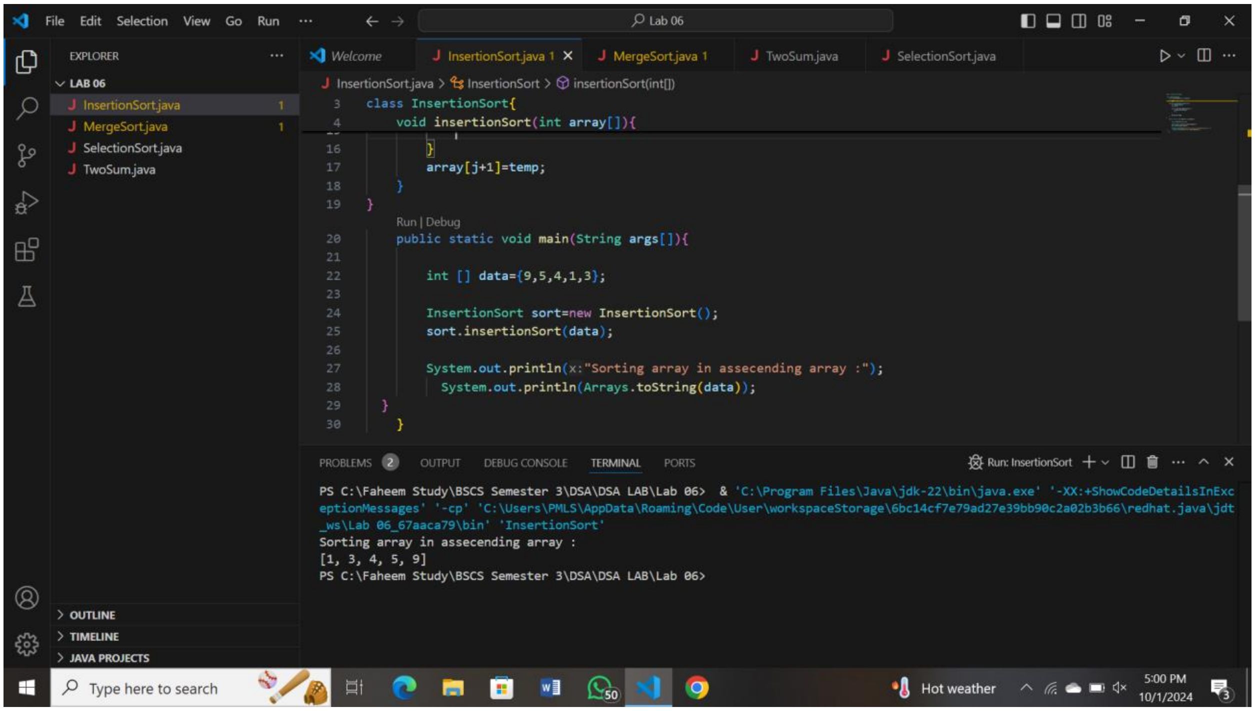
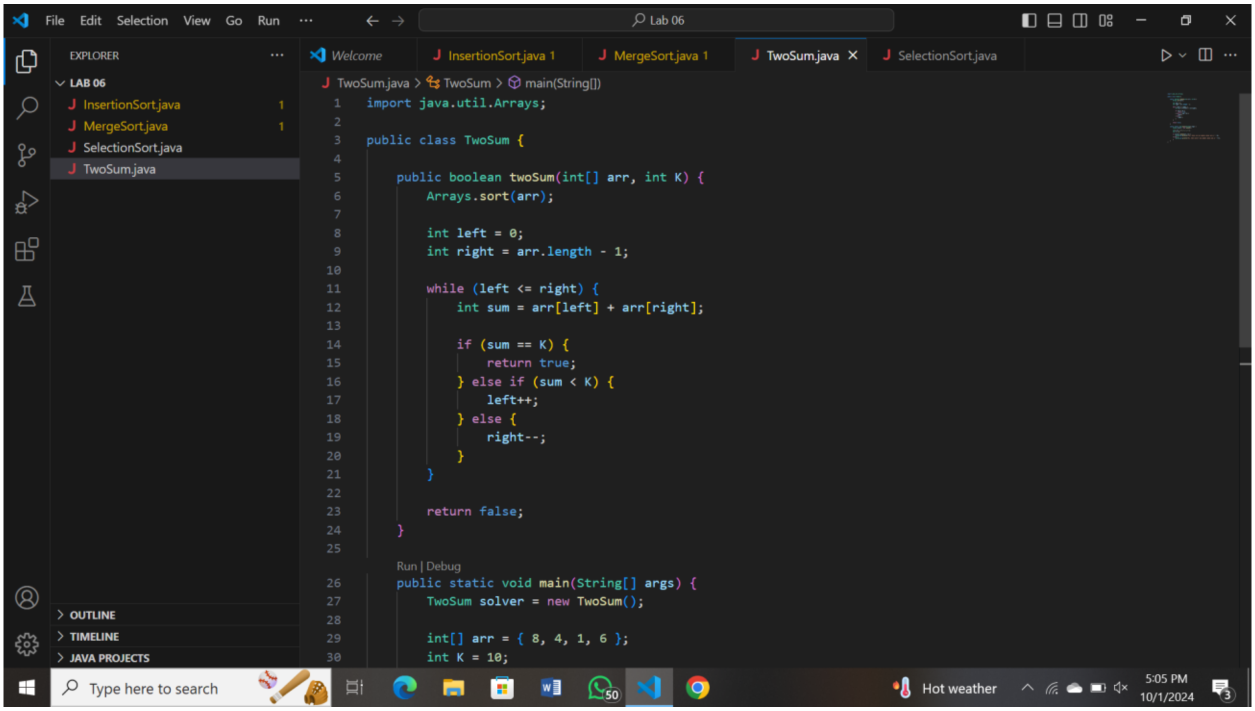


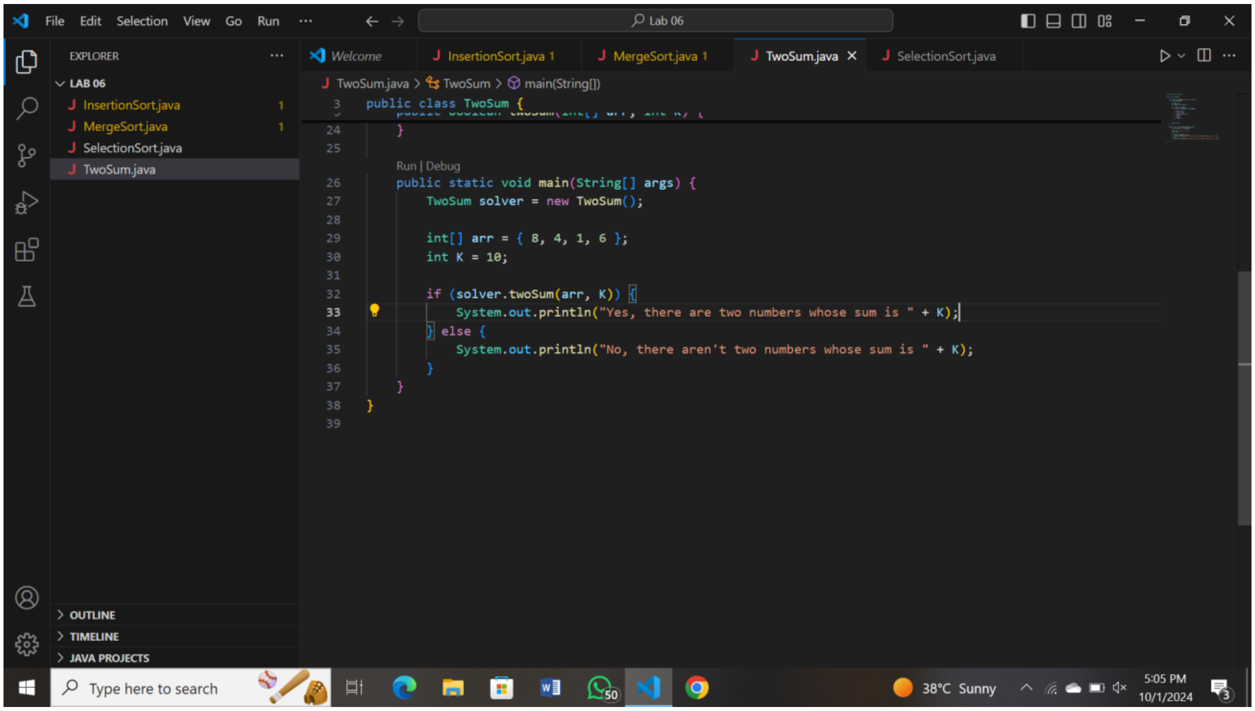
```java
class InsertionSort{
    void insertionSort(int array[]){
        }
        array[j+1]=temp;
    }
}
    Run | Debug
    public static void main(String args[]){

        int [] data={9,5,4,1,3};

        InsertionSort sort=new InsertionSort();
        sort.insertionSort(data);

        System.out.println(x:"Sorting array in assecending array :");
          System.out.println(Arrays.toString(data));
    }
      }
```

```
PS C:\Faheem Study\BSCS Semester 3\DSA\DSA LAB\Lab 06>  & 'C:\Program Files\Java\jdk-22\bin\java.exe' '-XX:+ShowCodeDetailsInExc
eptionMessages' '-cp' 'C:\Users\PMLS\AppData\Roaming\Code\User\workspaceStorage\6bc14cf7e79ad27e39bb90c2a02b3b66\redhat.java\jdt
_ws\Lab 06_67aaca79\bin' 'InsertionSort'
Sorting array in assecending array :
[1, 3, 4, 5, 9]
PS C:\Faheem Study\BSCS Semester 3\DSA\DSA LAB\Lab 06>
```

4. (Solve in NlogN): We are given an array that contains N numbers. We want to determine if there are two numbers whose sum equals a given number K. For instance, if the input is 8, 4, 1, and 6, and K is 10, then the answer is yes (4 plus 6 is 10). A number n may appear more than once in the input array; in that case and only in that case the sum may have the form n + n.

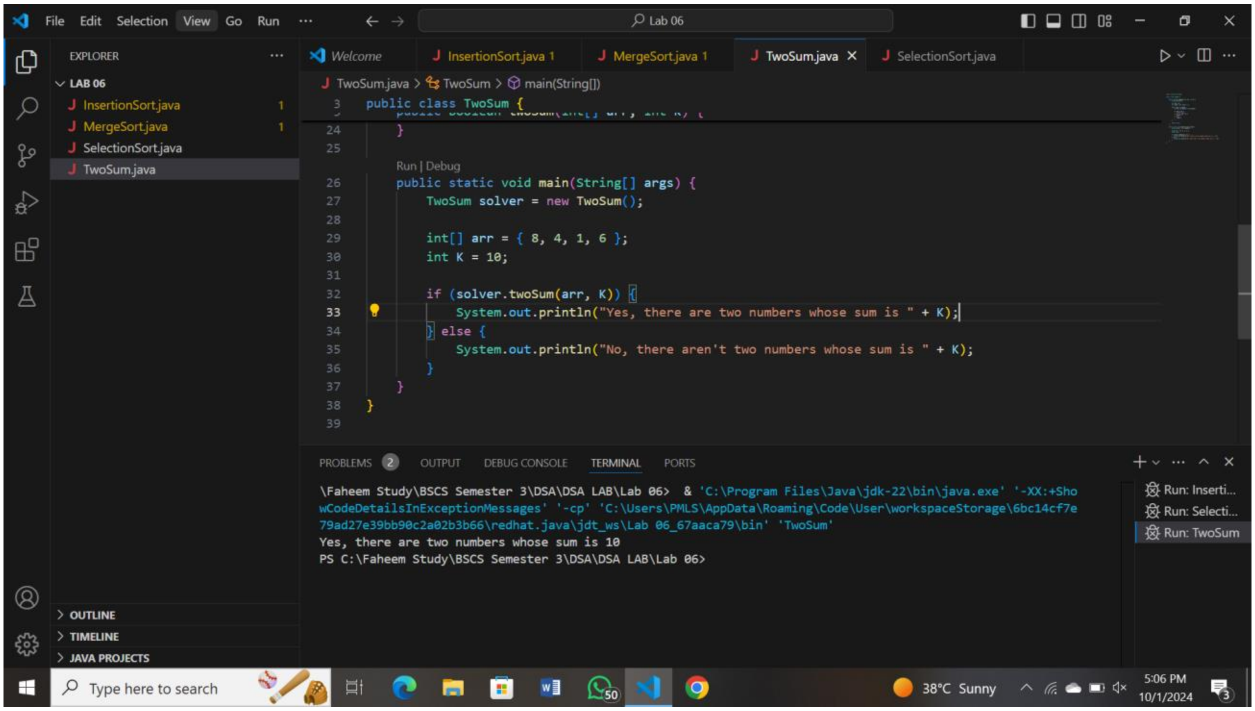


```java
import java.util.Arrays;

public class TwoSum {

    public boolean twoSum(int[] arr, int K) {
        Arrays.sort(arr);

        int left = 0;
        int right = arr.length - 1;

        while (left <= right) {
            int sum = arr[left] + arr[right];

            if (sum == K) {
                return true;
            } else if (sum < K) {
                left++;
            } else {
                right--;
            }
        }

        return false;
    }

    public static void main(String[] args) {
        TwoSum solver = new TwoSum();

        int[] arr = { 8, 4, 1, 6 };
        int K = 10;
```



```java
public class TwoSum {
    }

    public static void main(String[] args) {
        TwoSum solver = new TwoSum();

        int[] arr = { 8, 4, 1, 6 };
        int K = 10;

        if (solver.twoSum(arr, K)) {
            System.out.println("Yes, there are two numbers whose sum is " + K);
        } else {
            System.out.println("No, there aren't two numbers whose sum is " + K);
        }
    }
}
```

Task 4 Output:



```java
public class TwoSum {
    }

    public static void main(String[] args) {
        TwoSum solver = new TwoSum();

        int[] arr = { 8, 4, 1, 6 };
        int K = 10;

        if (solver.twoSum(arr, K)) {
            System.out.println("Yes, there are two numbers whose sum is " + K);
        } else {
            System.out.println("No, there aren't two numbers whose sum is " + K);
        }
    }
}
```

```
\Faheem Study\BSCS Semester 3\DSA\DSA LAB\Lab 06>  & 'C:\Program Files\Java\jdk-22\bin\java.exe' '-XX:+Sho
wCodeDetailsInExceptionMessages' '-cp' 'C:\Users\PMLS\AppData\Roaming\Code\User\workspaceStorage\6bc14cf7e
79ad27e39bb90c2a02b3b66\redhat.java\jdt_ws\Lab 06_67aaca79\bin' 'TwoSum'
Yes, there are two numbers whose sum is 10
PS C:\Faheem Study\BSCS Semester 3\DSA\DSA LAB\Lab 06>
```