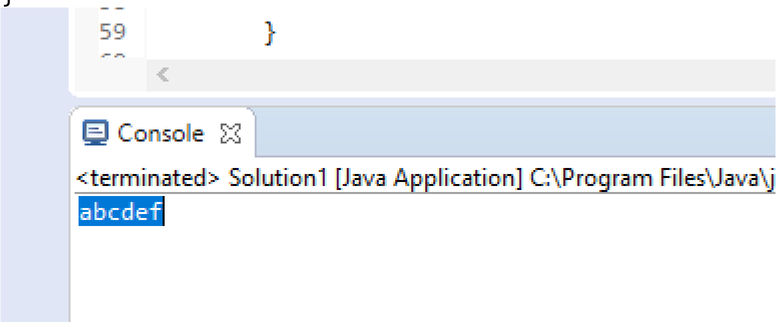
```java
package problem1;

import java.util.ArrayList;


public class Solution1 {
    public static String[] PivotHelper(String[] array, String pivot, Boolean
less) {

        ArrayList<String> temp = new ArrayList<String>();
        if (array.length <= 1 || array == null) {

            return temp.toArray(new String[temp.size()]);

        }

        for (int i = 0; i < array.length; i++) {
            if (less) {

                if (array[i].hashCode() < pivot.hashCode())
                {
                    temp.add(array[i]);
                }
            }

            else {
                if (array[i].hashCode() > pivot.hashCode())
                {
                    temp.add(array[i]);
                }
            }

        }

        return temp.toArray(new String[temp.size()]);

    }

    public static String[] JoinHelper(String[] left, String pivot, String[]
right) {
        ArrayList<String> temp = new ArrayList<String>();
        for (int i = 0; i < left.length; i++)
        {
            temp.add(left[i]);

        }
        temp.add(pivot);
        for (int i = 0; i < right.length; i++) {
            temp.add(right[i]);

        }
        return temp.toArray(new String[temp.size()]);

    }
    public static String[] quickSort(String[] array) {

        if (array.length <= 1) {
            return array;

        }

        String  pivot = array[0];

        String[] left = quickSort(PivotHelper(array, pivot, true));

        String[] right = quickSort(PivotHelper(array, pivot, false));

        return JoinHelper(left, pivot, right);

    }


    public static void main(String[] args)
    {

        String  string1="ace";
        String   string2= "bdf";
        String  temp= string1+string2;
        String[] listBase =temp.split("");
        String[] result = quickSort(listBase);

        StringBuilder builder = new StringBuilder();

        for (String string : result) {


            builder.append(string);
        }




        System.out.println(  builder );

    }

}
```

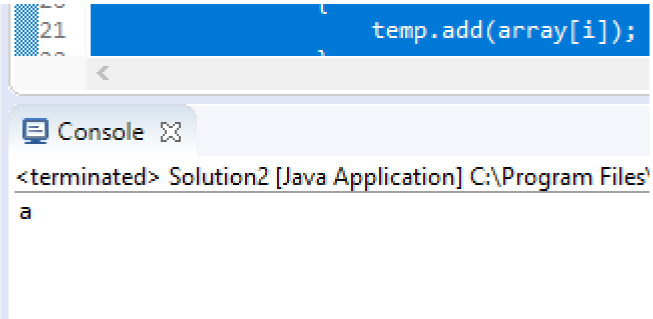


```
        }
```

```
<terminated> Solution1 [Java Application] C:\Program Files\Java\j
abcdef
```

Problem2

```
package problem2;

import java.util.ArrayList;

public class Solution2 {

    public static String[] PivotHelper(String[] array, String pivot, Boolean
less) {

        ArrayList<String> temp = new ArrayList<String>();
        if (array.length <= 1 || array == null) {

            return temp.toArray(new String[temp.size()]);

        }

        for (int i = 0; i < array.length; i++) {
            if (less) {

                if (array[i].hashCode() < pivot.hashCode())
                {
                    temp.add(array[i]);
                }
            }

            else {
                if (array[i].hashCode() > pivot.hashCode())
                {
                    temp.add(array[i]);
                }
            }

        }

        return temp.toArray(new String[temp.size()]);

    }

    public static String[] JoinHelper(String[] left, String pivot, String[]
right) {
        ArrayList<String> temp = new ArrayList<String>();
        for (int i = 0; i < left.length; i++)
        {
            temp.add(left[i]);

        }
        temp.add(pivot);
        for (int i = 0; i < right.length; i++) {
            temp.add(right[i]);

        }
        return temp.toArray(new String[temp.size()]);
        }

        public static String[] quickSort(String[] array) {

                if (array.length <= 1) {
                        return array;

                }

                String  pivot = array[0];

                String[] left = quickSort(PivotHelper(array, pivot, true));

                String[] right = quickSort(PivotHelper(array, pivot, false));

                return JoinHelper(left, pivot, right);

        }


        public static void main(String[] args)
        {

                String  string1="akel";

                String[] result = quickSort(string1.split(""));

                System.out.println(  result[0] );


        }

}
```

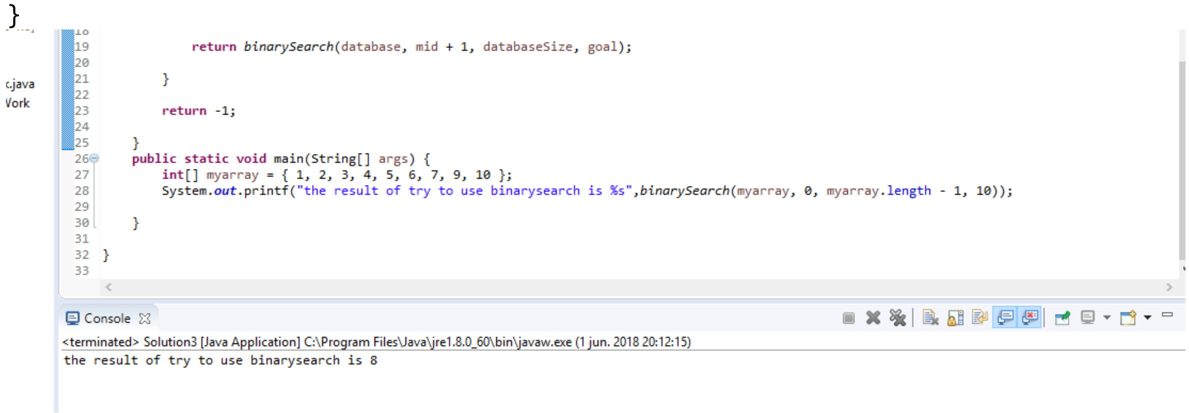


```
temp.add(array[i]);
```

```
<terminated> Solution2 [Java Application] C:\Program Files\
a
```

Problem3

```
 package Problem3;

public class Solution3 {

    public static int binarySearch(int[] database, int index, int
databaseSize, int goal)

    {
        if (databaseSize >= index) {
            int mid = index + (databaseSize - index) / 2;

            if (database[mid] == goal) {
                return mid;
            }

            if (database[mid] > goal) {
                return binarySearch(database, index, mid - 1, goal);
            }

            return binarySearch(database, mid + 1, databaseSize, goal);

        }

        return -1;

    }
    public static void main(String[] args) {
        int[] myarray = { 1, 2, 3, 4, 5, 6, 7, 9, 10 };
        System.out.printf("the result of try to use binarysearch is
%s",binarySearch(myarray, 0, myarray.length - 1, 10));

    }

}
```

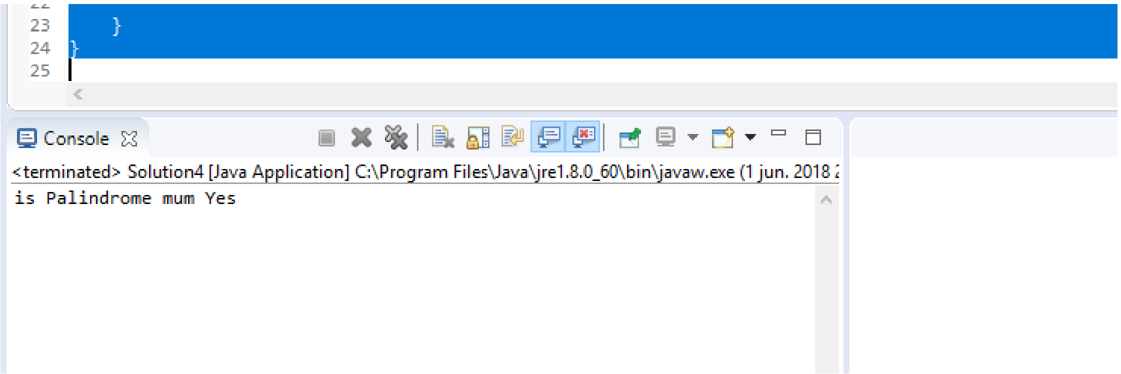


```
            return binarySearch(database, mid + 1, databaseSize, goal);

        }

        return -1;

    }
    public static void main(String[] args) {
        int[] myarray = { 1, 2, 3, 4, 5, 6, 7, 9, 10 };
        System.out.printf("the result of try to use binarysearch is %s",binarySearch(myarray, 0, myarray.length - 1, 10));

    }

}
```

```
<terminated> Solution3 [Java Application] C:\Program Files\Java\jre1.8.0_60\bin\javaw.exe (1 jun. 2018 20:12:15)
the result of try to use binarysearch is 8
```

Problem4

```
package Problem4;

public class Solution4 {

	public static Boolean isPalindrome(String string)
	{
		StringBuilder builder = new StringBuilder();
		for (int i = string.length() -1 ; i !=-1 ; i--)
		{
			builder.append( String.valueOf(string.charAt(i)));
			
			
			
		}
		
		return string.equalsIgnoreCase(builder.toString()) ;
	}
	public static void main(String[] args)
	{
		String string= "mum";
		System.out.printf("is Palindrome %s %s",string , (
isPalindrome(string) ?  "Yes" : "No" ));
		
	}
}
```



```
	}
}
```

```
<terminated> Solution4 [Java Application] C:\Program Files\Java\jre1.8.0_60\bin\javaw.exe (1 jun. 2018
is Palindrome mum Yes
```

Problem5

import static org.junit.Assert.*;

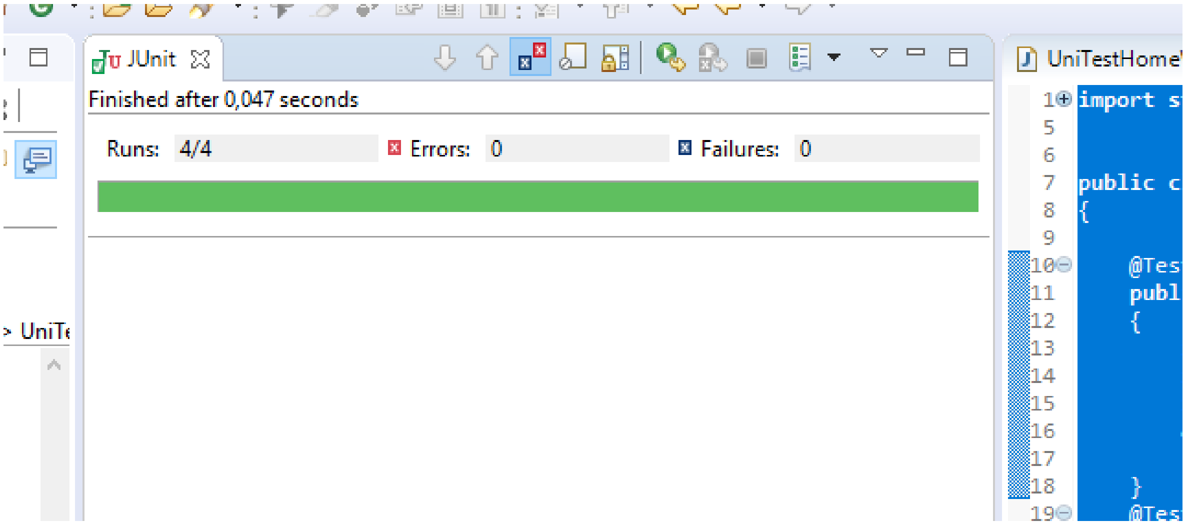
import org.junit.Test;

import Problem3.Solution3;

import Problem4.Solution4;

```
public class UniTestHomeWork

{


        @Test

        public void goodBinarySearch()

        {

                int[] database = { 1, 2, 3, 4, 5, 6, 7,8, 9, 10 };

                int find = 10 ;

                int expected = 9;

                assertEquals(expected, Solution3.binarySearch(database, 0, database.length,
find));


        }

        @Test

        public void badBinarySearch()

        {

                int[] database = { 1, 2, 3, 4, 5, 6, 7,8, 9, 10 };

                int find = 10 ;

                int expected =8;

                assertNotEquals(expected, Solution3.binarySearch(database, 0, database.length,
find));


        }


        @Test

        public void badProblem4()

        {

                assertNotEquals(false, Solution4.isPalindrome("Mum"));

        }
```

```
    @Test

    public void goodProblem4()

    {

        assertEquals(true, Solution4.isPalindrome("Mum"));

    }



}
```



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Runs: 4/4 Errors: 0 Failures: 0

```
import s

public c
{
    @Tes
    publ
    {

    }
    @Tes
```