

Assignment #1 Test Exhibits

Question 1 Output from Driver as submitted:

```
BlueJ: Terminal Window - Question 1

Starting array: 9 6 8 12 3 1 7

Sorting:
9 3 8 12 6 1 7
9 3 1 12 6 8 7
9 3 1 7 6 8 12
7 3 1 9 6 8 12
3 7 1 9 6 8 12
3 1 7 9 6 8 12
3 1 7 6 9 8 12
3 1 7 6 8 9 12
1 3 7 6 8 9 12
1 3 6 7 8 9 12

Sorted array: 1 3 6 7 8 9 12

Starting array: 4 93 74 31 18 60 26 31 11 99

Sorting:
4 26 74 31 18 60 93 31 11 99
4 26 31 31 18 60 93 74 11 99
4 26 31 11 18 60 93 74 31 99
4 11 31 26 18 60 93 74 31 99
4 11 18 26 31 60 93 74 31 99
4 11 18 26 31 60 31 74 93 99
4 11 18 26 31 60 74 93 99

Sorted array: 4 11 18 26 31 31 60 74 93 99

Starting array: 530 78 646 837 310 486 738 925 205 553 948 31 279 761 271 207 176 633 947 682

Sorting:
530 31 646 837 310 486 738 925 205 553 948 78 279 761 271 207 176 633 947 682
530 31 279 837 310 486 738 925 205 553 948 78 646 761 271 207 176 633 947 682
530 31 279 761 310 486 738 925 205 553 948 78 646 837 271 207 176 633 947 682
530 31 279 761 271 486 738 925 205 553 948 78 646 837 310 207 176 633 947 682
530 31 279 761 271 207 738 925 205 553 948 78 646 837 310 486 176 633 947 682
530 31 279 761 271 207 176 925 205 553 948 78 646 837 310 486 738 633 947 682
530 31 279 761 271 207 176 633 205 553 948 78 646 837 310 486 738 925 947 682
207 31 279 761 271 530 176 633 205 553 948 78 646 837 310 486 738 925 947 682
207 31 279 205 271 530 176 633 761 553 948 78 646 837 310 486 738 925 947 682
207 31 279 205 271 530 78 633 761 553 948 176 646 837 310 486 738 925 947 682
207 31 279 205 271 530 78 633 761 310 948 176 646 837 553 486 738 925 947 682
207 31 279 205 271 530 78 633 761 310 486 176 646 837 553 948 738 925 947 682
207 31 279 205 271 486 78 633 761 310 530 176 646 837 553 948 738 925 947 682
207 31 271 205 279 486 78 633 761 310 530 176 646 837 553 948 738 925 947 682
207 31 271 205 78 486 279 633 761 310 530 176 646 837 553 948 738 925 947 682
207 31 271 205 78 486 279 310 761 633 530 176 646 837 553 948 738 925 947 682
207 31 271 205 78 486 279 310 530 176 761 633 646 837 553 948 738 925 947 682
207 31 271 205 78 486 279 310 530 176 646 633 761 837 553 948 738 925 947 682
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207 31 271 205 78 486 279 310 530 176 646 633 553 837 738 948 761 925 947 682
207 31 271 205 78 486 279 310 530 176 646 633 553 837 738 925 761 682 947 948
207 31 78 205 271 486 279 310 530 176 646 633 553 837 738 925 761 682 947 948
207 31 78 205 271 310 279 176 530 486 646 633 553 837 738 925 761 682 947 948
207 31 78 205 271 310 279 176 530 486 553 633 646 837 738 925 761 682 947 948
207 31 78 205 271 310 279 176 530 486 553 633 646 837 738 682 761 925 947 948
78 31 207 205 271 310 279 176 530 486 553 633 646 837 738 682 761 925 947 948
78 31 207 205 271 176 279 310 530 486 553 633 646 837 738 682 761 925 947 948
78 31 207 205 271 176 279 310 530 486 553 633 646 682 738 837 761 925 947 948
78 31 207 176 271 205 279 310 530 486 553 633 646 682 738 837 761 925 947 948
31 78 207 176 271 205 279 310 530 486 553 633 646 682 738 837 761 925 947 948
31 78 176 207 271 205 279 310 530 486 553 633 646 682 738 837 761 925 947 948
31 78 176 207 205 271 279 310 530 486 553 633 646 682 738 837 761 925 947 948
31 78 176 207 205 271 279 310 486 530 553 633 646 682 738 761 837 925 947 948
31 78 176 205 207 271 279 310 486 530 553 633 646 682 738 761 837 925 947 948

Sorted array: 31 78 176 205 207 271 279 310 486 530 553 633 646 682 738 761 837 925 947 948
```

Can only enter input while your programming is running

Question 2 Output from Driver as submitted:

```
BlueJ: Terminal Window - Question 2

Start Program

Starting sorted array: 0 10 20 30 40 50 60 70 80 90

Showing passes with the bubbleSort method:

0 10 20 30 40 50 60 70 80 90
0 10 20 30 40 50 60 70 80 90
0 10 20 30 40 50 60 70 80 90
0 10 20 30 40 50 60 70 80 90
0 10 20 30 40 50 60 70 80 90
0 10 20 30 40 50 60 70 80 90
0 10 20 30 40 50 60 70 80 90
0 10 20 30 40 50 60 70 80 90
0 10 20 30 40 50 60 70 80 90
0 10 20 30 40 50 60 70 80 90
0 10 20 30 40 50 60 70 80 90
0 10 20 30 40 50 60 70 80 90

Sorted array after sorting: 0 10 20 30 40 50 60 70 80 90

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Starting sorted array: 0 10 20 30 40 50 60 70 80 90

Showing passes with the bubbleSort2 method:

0 10 20 30 40 50 60 70 80 90

Sorted array after sorting: 0 10 20 30 40 50 60 70 80 90

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Starting random array: 95 83 49 33 99 26 96 5 74 53

Showing passes with the bubbleSort method:

83 49 33 95 26 96 5 74 53 99
49 33 83 26 95 5 74 53 96 99
33 49 26 83 5 74 53 95 96 99
33 26 49 5 74 53 83 95 96 99
26 33 5 49 53 74 83 95 96 99
26 5 33 49 53 74 83 95 96 99
5 26 33 49 53 74 83 95 96 99
5 26 33 49 53 74 83 95 96 99
5 26 33 49 53 74 83 95 96 99
5 26 33 49 53 74 83 95 96 99

Random array after sorting: 5 26 33 49 53 74 83 95 96 99

-----

Starting random array: 95 83 49 33 99 26 96 5 74 53

Showing passes with the bubbleSort2 method:

95 83 49 33 99 26 96 5 74 53
83 49 33 95 26 96 5 74 53 99
49 33 83 26 95 5 74 53 96 99
33 49 26 83 5 74 53 95 96 99
33 26 49 5 74 53 83 95 96 99
26 33 5 49 53 74 83 95 96 99
26 5 33 49 53 74 83 95 96 99
5 26 33 49 53 74 83 95 96 99
5 26 33 49 53 74 83 95 96 99
5 26 33 49 53 74 83 95 96 99

Random array after sorting: 5 26 33 49 53 74 83 95 96 99

-----

End.

Can only enter input while your programming is running
```

Question 3 Output from Driver as submitted:

```
BlueJ: Terminal Window - Question 3
Array size 10 unsorted

Shell sort:
Total comparisons: 61
Total swaps: 15

Bubble sort:
Total comparisons: 45
Total swaps: 29

Bubble sort 2:
Total comparisons: 45
Total swaps: 29

-----

Array size 10 pre-sorted

Shell sort:
Total comparisons: 22
Total swaps: 0

Bubble sort:
Total comparisons: 45
Total swaps: 0

Bubble sort 2:
Total comparisons: 9
Total swaps: 0

-----

Array size 100 unsorted

Shell sort:
Total comparisons: 2899
Total swaps: 470

Bubble sort:
Total comparisons: 4950
Total swaps: 2506

Bubble sort 2:
Total comparisons: 4914
Total swaps: 2506

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Can only enter input while your programming is running
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```
BlueJ: Terminal Window - Question 3
Array size 100 pre-sorted

Shell sort:
Total comparisons: 503
Total swaps: 0

Bubble sort:
Total comparisons: 4950
Total swaps: 0

Bubble sort 2:
Total comparisons: 99
Total swaps: 0

-----

Array size 1000 unsorted

Shell sort:
Total comparisons: 56569
Total swaps: 7513

Bubble sort:
Total comparisons: 499500
Total swaps: 241116

Bubble sort 2:
Total comparisons: 499395
Total swaps: 241116

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Array size 1000 pre-sorted

Shell sort:
Total comparisons: 8006
Total swaps: 0

Bubble sort:
Total comparisons: 499500
Total swaps: 0

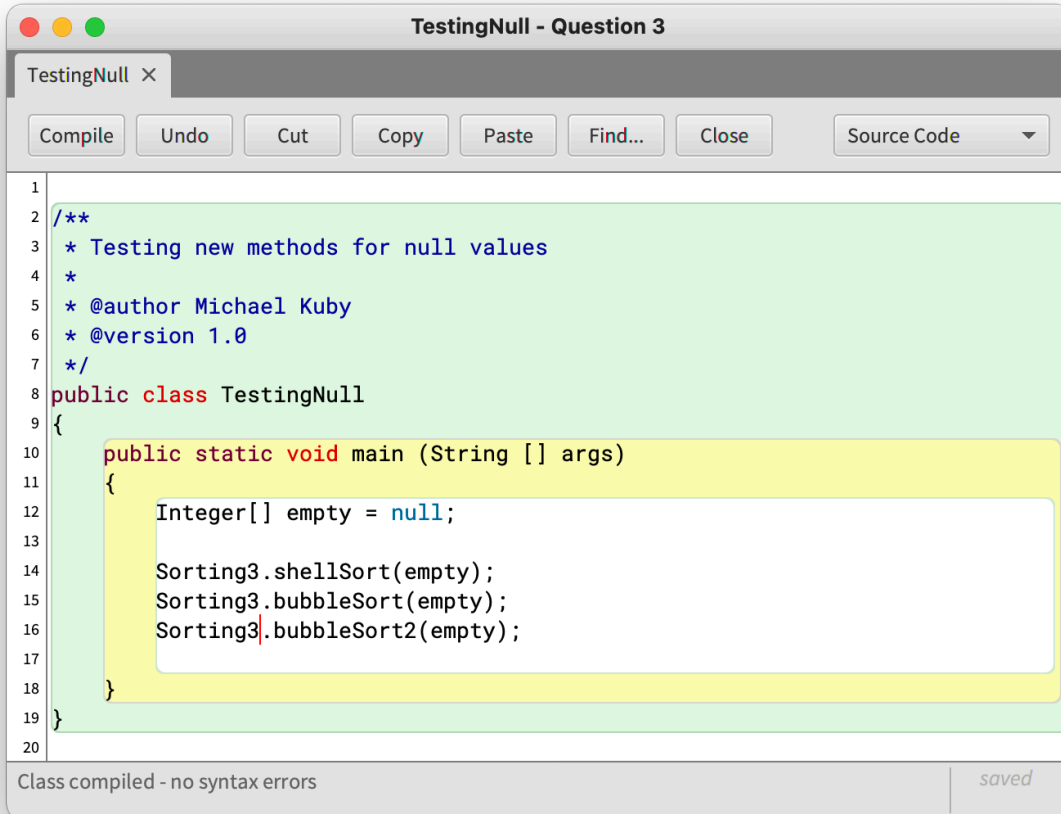
Bubble sort 2:
Total comparisons: 999
Total swaps: 0

-----

Can only enter input while your programming is running
```

Testing each method for null values:

Driver:

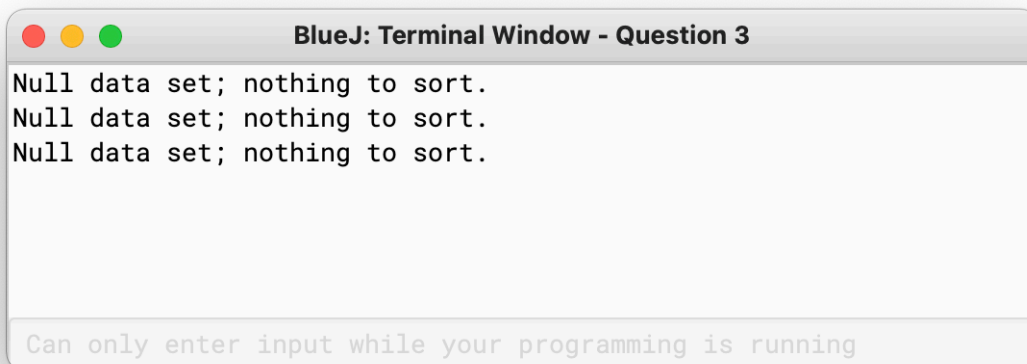


The screenshot shows a Java IDE window titled "TestingNull - Question 3". The window contains a single file named "TestingNull.java". The code is as follows:

```
1  /**
2  * Testing new methods for null values
3  *
4  * @author Michael Kuby
5  * @version 1.0
6  */
7  public class TestingNull
8  {
9      public static void main (String [] args)
10     {
11         Integer[] empty = null;
12
13         Sorting3.shellSort(empty);
14         Sorting3.bubbleSort(empty);
15         Sorting3.bubbleSort2(empty);
16     }
17 }
18
19
20
```

The IDE shows a status bar at the bottom indicating "Class compiled - no syntax errors" and a "saved" status.

Output:



The screenshot shows a BlueJ Terminal Window titled "BlueJ: Terminal Window - Question 3". The window displays the output of the program, which consists of three lines of text:

```
Null data set; nothing to sort.
Null data set; nothing to sort.
Null data set; nothing to sort.
```

At the bottom of the window, there is a message: "Can only enter input while your programming is running".