Feedback — Elementary Sorts

Help Center

You submitted this quiz on **Sun 13 Sep 2015 4:39 PM EDT**. You got a score of **1.48** out of **3.00**. You can attempt again, if you'd like.

```
To specify an array or sequence of values in an answer, separate the value
s in
the sequence by whitespace. For example, if the question asks for the firs
t
ten powers of two (starting at 1), then the following answer is acceptabl
e:

     1 2 4 8 16 32 64 128 256 512

If you wish to discuss a particular question and answer in the forums, ple
ase
post the entire question and answer, including the seed (which can be used
by
the course staff to uniquely identify the question) and the explanation (w
hich
contains the correct answer).
```

Question 1

```
(seed = 882703)
Give the array that results after the first 4 exchanges when selection sort
ing the
following array:

    31 90 67 59 22 41 44 81 27 49

Your answer should be a sequence of 10 integers, separated by whitespace.
```

You entered:

22 27 31 41 90 59 44 81 67 49

Your Answer		Score	Explanation
22 27 31 41 90 59 44 81 67 49	✖	0.00	
Total		0.00 / 1.00	

Question Explanation

```
The correct answer is: 22 27 31 41 67 59 44 81 90 49

Here is the array after each exchange:

   31 90 67 59 22 41 44 81 27 49
1: 22 90 67 59 31 41 44 81 27 49
2: 22 27 67 59 31 41 44 81 90 49
3: 22 27 31 59 67 41 44 81 90 49
4: 22 27 31 41 67 59 44 81 90 49
```

Question 2

```
(seed = 196599)
The column on the left contains an input array of 16 strings to be sorted;
the column
on the right contains the strings in sorted order; each of the other 6 colu
mns contains
the array at some intermediate step during either insertion sort, selection
sort, or shellsort
(with different columns potentially corresponding to different algorithms).

    MUSE   MUSE   BLUR   BLUR   BLUR   BLUR   BLUR   BLUR
    CAKE   CAKE   BUSH   CAKE   BUSH   BUSH   BUSH   BUSH
    TOTO   TACO   CAKE   BUSH   CAKE   CAKE   CAKE   CAKE
    RUSH   RUSH   CARS   CARS   CARS   CARS   CARS   CARS
    BLUR   BLUR   CHER   CHER   KISS   MUSE   CHER   CHER
    WEEN   WEEN   KISS   PINK   MUSE   RUSH   WEEN   KISS
    BUSH   BUSH   MUSE   TACO   RUSH   TOTO   TOTO   MUSE
    CARS   CARS   PINK   RUSH   SOAD   WEEN   RUSH   PINK
    KISS   KISS   WEEN   KISS   TOTO   KISS   KISS   RUSH
    SOAD   SOAD   SOAD   SOAD   WEEN   SOAD   SOAD   SOAD
```

```
WHAM   WHAM   WHAM   TUFF   WHAM   WHAM   WHAM   TACO
TSOL   TSOL   TSOL   TOTO   TSOL   TSOL   TSOL   TOTO
CHER   CHER   TOTO   MUSE   CHER   CHER   MUSE   TSOL
PINK   PINK   RUSH   WEEN   PINK   PINK   PINK   TUFF
TUFF   TUFF   TUFF   WHAM   TUFF   TUFF   TUFF   WEEN
TACO   TOTO   TACO   TSOL   TACO   TACO   TACO   WHAM
----   ----   ----   ----   ----   ----   ----   ----
 0      ?      ?      ?      ?      ?      ?      4
```

Match up each column with the corresponding sorting algorithm from the given list:

0. Original input
1. Insertion sort
2. Selection sort
3. Shellsort (3x + 1 increments)
4. Sorted

You should use each choice at least once. Your answer should be a sequence of 8 integers
between 0 and 4 (starting with 0 and ending with 4), separated by whitespace.

Hint: think about algorithm invariants. Do not trace code.

You entered:

```
0 1 2 3 1 1 2 4
```

Your Answer		Score	Explanation
0	✔	0.12	
1	✖	0.00	
2	✔	0.12	
3	✔	0.12	
1	✔	0.12	
1	✔	0.12	
2	✔	0.12	

4	✔	0.12
Total		0.88 / 1.00

Question Explanation

```
The correct answer is: 0 3 2 3 1 1 2 4

 0: Original input
 3: Shellsort after 13-sorting
 2: Selection sort after 8 iterations
 3: Shellsort after 4-sorting
 1: Insertion sort after 11 iterations
 1: Insertion sort after 8 iterations
 2: Selection sort after 5 iterations
 4: Sorted
```

Question 3

```
(seed = 342879)
Which of the following statements about elementary sorting algorithms are t
rue? Check all that apply. Unless otherwise specified, assume that the sort
ing implementations are the ones from the lectures.
```

Your Answer		Score	Explanation
☐ Insertion sort uses only a constant amount of memory (other than the input array).	✖	0.00	This is a key property of insertion sort.
☑ Suppose that we modify insertion sort to use binary search to locate the position within the first i-1 entries of the array into which entry i should be in	✔	0.20	The total number of compares becomes linearithmic (but number of exchanges is still quadratic). This is still a worthwhile improvement.

serted. Then, the number of compares to insertion sort an array of N elements is ~ N lg N in the worst case.			
☐ The number of compares to selection sort a sorted array of N distinct keys is ~ N.	✔	0.20	Selection sort uses N(N-1)/2 compares to sort any array of N keys.
☑ The number of compares to insertion sort an array of N/2 keys in strictly increasing order followed by the same N/2 keys in strictly decreasing order (e.g., 0 1 2 3 4 4 3 2 1 0) is ~1/8 N^2.	✖	0.00	The number of inversions is 0 + 2 + 4 + 6 + ... + (N-2) ~ 1/4 N^2. Thus, the number of compares is ~ 1/4 N^2.
☑ The number of compares to selection sort a reverse-sorted array of N distinct keys is ~ 1/2 N^2.	✔	0.20	Selection sort uses N(N-1)/2 compares to sort any array of N keys.
Total		0.60 / 1.00	

Question Explanation