Feedback — Elementary Sorts

Help Center

You submitted this quiz on **Sun 13 Sep 2015 11:57 AM EDT**. You got a score of **2.50** 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 = 20279)
Give the array that results after the first 6 exchanges (not iterations!)
when insertion sorting the following array:

    11 21 34 59 94 86 18 80 33 72

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

You entered:

```
11 18 21 34 59 86 94 80 33 72
```

Your Answer		Score	Explanation
11 18 21 34 59 86 94 80 33 72	✔	1.00	
Total		1.00 / 1.00	

Question Explanation

```
The correct answer is: 11 18 21 34 59 86 94 80 33 72

Here is the array after each exchange:

   11 21 34 59 94 86 18 80 33 72
1: 11 21 34 59 86 94 18 80 33 72
2: 11 21 34 59 86 18 94 80 33 72
3: 11 21 34 59 18 86 94 80 33 72
4: 11 21 34 18 59 86 94 80 33 72
5: 11 21 18 34 59 86 94 80 33 72
6: 11 18 21 34 59 86 94 80 33 72
```

Question 2

```
(seed = 166922)
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).

    slug   bear   duck   bear   bear   hake   boar   bear
    goat   boar   erne   boar   boar   goat   deer   boar
    boar   deer   bear   deer   deer   boar   goat   deer
    deer   duck   deer   duck   goat   deer   hoki   duck
    hoki   erne   hake   erne   hoki   hoki   slug   erne
    moth   goat   goat   goat   moth   moth   moth   goat
    bear   hake   boar   hake   oryx   bear   bear   hake
    oryx   hawk   hawk   oryx   slug   oryx   oryx   hawk
    duck   moth   hoki   moth   duck   duck   duck   hoki
```

```
erne   hoki   moth   hoki   erne   erne   erne   mink
puma   puma   mule   puma   puma   puma   puma   moth
hawk   oryx   mink   hawk   hawk   hawk   hawk   mule
toad   toad   toad   toad   toad   toad   toad   oryx
hake   slug   slug   slug   hake   slug   hake   puma
mule   mule   puma   mule   mule   mule   mule   slug
mink   mink   oryx   mink   mink   mink   mink   toad
----   ----   ----   ----   ----   ----   ----   ----
 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 2 1 2 2 1 3 4

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

3	✖	0.00
4	✔	0.12
Total		0.50 / 1.00

Question Explanation

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

 0: Original input
 2: Selection sort after 8 iterations
 3: Shellsort after 4-sorting
 2: Selection sort after 7 iterations
 1: Insertion sort after 8 iterations
 3: Shellsort after 13-sorting
 1: Insertion sort after 5 iterations
 4: Sorted
```

Question 3

```
(seed = 704156)
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
☐ The number of compares to Shellsort (with Knuth's 3x+1 increments) a sorted array of N distinct keys is ~ N.	✔	0.20	It uses ~ N log_3 N compares. Each pass uses approximately N compares. There are ~ log_3 N passes because the increments go up by (roughly) a factor of 3.
☑ The number of compares to insertion sort a reverse-sorted arr	✔	0.20	This is a worst case input for insertion sort.

ay of N distinct keys is ~ 1/2 N^2.			
☑ Immediately before the 4-sorting pass in Shellsort (with Knuth's 3x+1 increments), the array is both 13-sorted and 40-sorted.	✔	0.20	During Shellsort, a g-sorted array remains g-sorted after h-sorting it.
☑ 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 inserted. Then, the number of compares to insertion sort an array of N elements is ~ N lg N in the worst case.	✔	0.20	The total number of compares becomes linearithmic (but number of exchanges is still quadratic). This is still a worthwhile improvement.
☐ The order of growth of the number of compares to Shellsort (with Knuth's 3x+1 increments) a sorted array of N distinct keys is N^(3/2).	✔	0.20	It uses ~ N log_3 N compares. Each pass uses approximately N compares. There are ~ log_3 N passes because the increments go up by (roughly) a factor of 3.
Total		1.00 / 1.00	

Question Explanation