Feedback — Elementary Sorts

Help Center

You submitted this quiz on **Sun 13 Sep 2015 4:05 PM EDT**. You got a score of **1.60** 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 = 758866)
Give the array that results after the first 4 exchanges when selection sort
ing the
following array:

    30 43 66 28 24 56 31 52 94 73

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

You entered:

```
24  28 30 31 43 66 56 52 94 73
```

Your Answer		Score	Explanation
24 28 30 31 43 66 56 52 94 73	✖	0.00	
Total		0.00 / 1.00	

Question Explanation

```
The correct answer is: 24 28 30 31 66 56 43 52 94 73

Here is the array after each exchange:

   30 43 66 28 24 56 31 52 94 73
1: 24 43 66 28 30 56 31 52 94 73
2: 24 28 66 43 30 56 31 52 94 73
3: 24 28 30 43 66 56 31 52 94 73
4: 24 28 30 31 66 56 43 52 94 73
```

Question 2

```
(seed = 433026)
Give the array that results immediately after the 4-sorting phase
(not necessarily after 4 exchanges) of Shellsort using Knuth's 3x+1 increme
nts
(...-121-40-13-4-1) on the following array:

    36 99 25 52 20 22 83 30 78 17

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

You entered:

20 17 25 30 36 22 83 52 78 99

Your Answer		Score	Explanation
20 17 25 30 36 22 83 52 78 99	✔	1.00	

Total 1.00 / 1.00

Question Explanation

```
The correct answer is: 20 17 25 30 36 22 83 52 78 99

Here is the array after each exchange in the 4-sorting phase:

   36 99 25 52 20 22 83 30 78 17
1: 20 99 25 52 36 22 83 30 78 17
2: 20 22 25 52 36 99 83 30 78 17
3: 20 22 25 30 36 99 83 52 78 17
4: 20 22 25 30 36 17 83 52 78 99
5: 20 17 25 30 36 22 83 52 78 99
```

Question 3

```
(seed = 105248)
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
☐ `In selection sor t, each nontrivi al exchange (an exchange of a[i] and a[j] with i not equal to j) decreases the nu mber of inversio ns by one (or mo re).`	✖	0.00	If selection sort exchanges a[i] and a[j], then they are an inversion prior to the exchange. Exchanging them will decrease the number of inversions by at least one.
☑ `The number of co mpares to insert ion sort an arra`	✖	0.00	The number of inversions is (N/2)*(N/2) = 1/4 N^2. Thus, the number of compares is ~ 1/4 N^2.

y of N/2 1s foll owed by N/2 0s (e.g., 1 1 1 1 1 0 0 0 0 0) is ~ 1/2 N^2.			
☐ If two items a a nd b have equal keys and a appea rs before b in t he input array, then a appears b efore b in the a rray after selec tion sorting the array.	✔	0.20	Consider an array with three items { (B, 1), (B, 2), (A, 1) }, where the key is the letter A or B. After selection sort, the array is { (A, 1), (B, 2), (B, 1) }. This property is known as stability. Stay tuned for the mergesort lecture.
☐ The number of co mpares to insert ion sort an arra y of N/2 1s inte rleaved with N/2 0s (e.g., 1 0 1 0 1 0 1 0 1 0) i s ~ 1/4 N^2.	✔	0.20	The number of inversions is 1 + 2 + 3 + ... + N/2 ~ 1/8 N^2. Thus, the number of compares is ~ 1/8 N^2.
☑ Suppose that we modify insertion sort to use bina ry search to loc ate the position within the first i-1 entries of t he array into wh ich entry i shou ld be inserted. Then, the number of compares to i nsertion sort an array of N eleme nts is ~ N lg N in the worst cas	✔	0.20	The total number of compares becomes linearithmic (but number of exchanges is still quadratic). This is still a worthwhile improvement.

e.

Total	0.60 / 1.00

Question Explanation