Feedback — Elementary Sorts

You submitted this quiz on **Fri 19 Feb 2016 6:19 PM PST**. You got a score of **3.00** out of **3.00**.

To specify an array or sequence of values in an answer, separate the values in the sequence by whitespace. For example, if the question asks for the first ten powers of two (starting at 1), then the following answer is acceptable:

```
1 2 4 8 16 32 64 128 256 512
```

If you wish to discuss a particular question and answer in the forums, please 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 (which contains the correct answer).

Question 1

(seed = 486703)
Give the array that results after the first 4 exchanges when selection sorting the following array:

```
32 25 68 93 61 63 76 94 73 27
```

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

You entered:

25 27 32 61 93 63 76 94 73 68

Your Answer		Score	Explanation
25 27 32 61 93 63 76 94 73 68	✔	1.00	
Total		1.00 / 1.00	

Question Explanation

The correct answer is: 25 27 32 61 93 63 76 94 73 68

Here is the array after each exchange:

```
   32 25 68 93 61 63 76 94 73 27
1: 25 32 68 93 61 63 76 94 73 27
2: 25 27 68 93 61 63 76 94 73 32
3: 25 27 32 93 61 63 76 94 73 68
4: 25 27 32 61 93 63 76 94 73 68
```

Question 2

(seed = 804485)
Give the array that results immediately after the 4-sorting phase
(not necessarily after 4 exchanges) of Shellsort using Knuth's 3x+1 increments
(...-121-40-13-4-1) on the following array:

86 36 94 84 32 99 59 87 29 17

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

You entered:

29 17 59 84 32 36 94 87 86 99

Your Answer		Score	Explanation
29 17 59 84 32 36 94 87 86 99	✔	1.00	
Total		1.00 / 1.00	

Question Explanation

```
The correct answer is: 29 17 59 84 32 36 94 87 86 99

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

   86 36 94 84 32 99 59 87 29 17
1: 32 36 94 84 86 99 59 87 29 17
2: 32 36 59 84 86 99 94 87 29 17
3: 32 36 59 84 29 99 94 87 86 17
4: 29 36 59 84 32 99 94 87 86 17
5: 29 36 59 84 32 17 94 87 86 99
6: 29 17 59 84 32 36 94 87 86 99
```

Question 3

```
(seed = 410426)
Which of the following statements about elementary sorting algorithms are true? Check all that apply. Unles
s otherwise specified, assume that the sorting implementations are the ones from the lectures.
```

Your Answer		Score	Explanation
☐ The number of compares to insertion sort an array of N distinct keys is equal to the number of inversions in the array.	✔	0.20	The number of compares = number of inversions + (N-1).
☑ If two items a and b have equal keys and a appears before b in the input array, then a appears before b in the array after insertion sorting the array.	✔	0.20	Only adjacent items are compared during insertion sort and the items are not exchanged if their keys are equal. This property is known as stability. Stay tuned for the mergesort lecture.
☐ 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.
☑ Insertion sort uses only a constant amount of memory (other than the input array).	✔	0.20	This is a key property of insertion sort.

☐ `Each exchange during an h-sorting phase of Shellsort decreases the number of inversions by exactly h.`	✔	0.20	This is true if h = 1 but false in general. For example if h = 3, then the first exchange when h-sorting { 4, 1, 2, 3 } will decreases the number of inversions from 3 to 2.
Total		1.00 / 1.00	