

Feedback — Elementary Sorts

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You submitted this quiz on **Sun 13 Sep 2015 4:48 PM EDT**. You got a score of **2.55** 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 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 = 945670)

Give the array that results after the first 4 exchanges when selection sorting the following array:

18 48 28 87 39 15 70 27 32 41

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

You entered:

15 18 27 28 39 48 70 87 32 41

Your Answer**Score****Explanation**

15 18 27 28 39 48 70 87 32 41



1.00

Total

1.00 / 1.00

Question Explanation

The correct answer is: 15 18 27 28 39 48 70 87 32 41

Here is the array after each exchange:

```

      18 48 28 87 39 15 70 27 32 41
1: 15 48 28 87 39 18 70 27 32 41
2: 15 18 28 87 39 48 70 27 32 41
3: 15 18 27 87 39 48 70 28 32 41
4: 15 18 27 28 39 48 70 87 32 41

```

Question 2

(seed = 801625)

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 columns contains the array at some intermediate step during either insertion sort, selection sort, or shellsort (with different columns potentially corresponding to different algorithms).

path	edge	edge	hash	path	edge	flow	edge
hash	flow	flow	java	hash	flow	hash	flow
sort	hash	hash	left	loop	hash	edge	hash
left	heap	java	list	left	heap	left	heap
java	java	left	path	java	java	java	java
root	left	list	root	root	left	root	left
list	list	path	size	list	list	heap	list
size	load	root	sort	size	size	load	load
flow	sort	size	flow	flow	sort	path	loop
swim	swim	sort	swim	swim	swim	swim	path

edge	path	swim	edge	edge	path	list	push
load	size	load	load	load	load	size	root
push	push	push	push	push	push	push	size
trie	trie	trie	trie	trie	trie	trie	sort
heap	root	heap	heap	heap	root	loop	swim
loop	loop	loop	loop	sort	loop	sort	trie
----	----	----	----	----	----	----	----
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 2 1 1 2 3 4

Your Answer		Score	Explanation
0	✓	0.12	
2	✓	0.12	
2	✗	0.00	
1	✓	0.12	
1	✗	0.00	
2	✓	0.12	
3	✓	0.12	

4	✓	0.12
Total		0.75 / 1.00

Question Explanation

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

- 0: Original input
- 2: Selection sort after 8 iterations
- 1: Insertion sort after 11 iterations
- 1: Insertion sort after 8 iterations
- 3: Shellsort after 13-sorting
- 2: Selection sort after 7 iterations
- 3: Shellsort after 4-sorting
- 4: Sorted

Question 3

(seed = 603736)

Which of the following statements about elementary sorting algorithms are true? Check all that apply. Unless otherwise specified, assume that the sorting implementations are the ones from the lectures.

Your Answer	Score	Explanation
<input checked="" type="checkbox"/> 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.
<input checked="" type="checkbox"/> The number of compares to selection sort an array of length N depends only on N (and not on the items in the array).	✓ 0.20	Selection sort always uses $N(N-1)/2$ compares.

<input type="checkbox"/>	✗ 0.00	The number of inversions is $0 + 2 + 4 + 6 + \dots + (N-2) \sim 1/4 N^2$. Thus, the number of compares is $\sim 1/4 N^2$.
<hr/>		
<input checked="" type="checkbox"/>	✓ 0.20	Selection sort uses $N(N-1)/2$ compares to sort any array of N keys.
<hr/>		
<input type="checkbox"/>	✓ 0.20	Insertion sort uses $\sim N$ compares to sort a sorted array and $\sim 1/2 N^2$ compares to sort a reverse-sorted array.
<hr/>		
Total	0.80 /	
	1.00	

Question Explanation