Feedback — Quicksort

You submitted this quiz on **Mon 17 Mar 2014 7:24 PM PDT**. 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, you must separate
 the values by a single space character (with no punctuation and with no
leading or trailing whitespace). For example, if the question asks for th
e first ten powers of two (starting at 1), the only accepted answer is:

1 2 4 8 16 32 64 128 256 512

If you wish to discuss a particular question and answer in the forums, pl
ease post the entire question and answer, including the seed (which is us
ed by the course staff to uniquely identify the question) and the explana
tion (which contains the correct answer).
```

Question 1

```
(seed = 76624)
Give the array that results after applying the standard 2-way partitioning
algorithm from lecture to the following array:

    49 64 82 90 31 53 12 76 51 99 30 72

Recall, in the standard 2-way partitioning algorithm, the leftmost entry i
s the partitioning item.
```

You entered:

31 30 12 49 90 53 82 76 51 99 64 72

Your Answer		Score	Explanation
31 30 12 49 90 53 82 76 51 99 64 72	✔	1.00	

Total	1.00 / 1.00

Question Explanation

```
The correct answer is:31 30 12 49 90 53 82 76 51 99 64 72

Here is the array before and after each exchange:

  i   j   0   1   2   3   4   5   6   7   8   9  10  11
 ---------------------------------------------------------
  0  12   49  64  82  90  31  53  12  76  51  99  30  72
  1  10   49  64  82  90  31  53  12  76  51  99  30  72
  1  10   49  30  82  90  31  53  12  76  51  99  64  72
  2   6   49  30  82  90  31  53  12  76  51  99  64  72
  2   6   49  30  12  90  31  53  82  76  51  99  64  72
  3   4   49  30  12  90  31  53  82  76  51  99  64  72
  3   4   49  30  12  31  90  53  82  76  51  99  64  72
  4   3   31  30  12  49  90  53  82  76  51  99  64  72
      3   31  30  12  49  90  53  82  76  51  99  64  72
```

Question 2

```
(seed = 343991)
Give the array that results after applying the standard 2-way partitioning
algorithm from lecture to the following array:

    B B B B A A A B B A B B

Recall, in the standard partitioning algorithm, the leftmost entry is the
partitioning
item and the scan stops on either side upon a key equal to the key in the
partitioning item.
```

You entered:

B B A B A A A B B B B B

Your Answer	Score	Explanation

```
B B A B A A A B B B B B
```
                                                    ✖   0.00

Total   0.00 / 1.00

Question Explanation

The correct answer is:B B B A A A A B B B B B

Here is the array before and after each exchange:

```
 i   j   0  1  2  3  4  5  6  7  8  9 10 11
-------------------------------------------
 0  12   B  B  B  B  A  A  A  B  B  A  B  B
 1  11   B  B  B  B  A  A  A  B  B  A  B  B
 1  11   B  B  B  B  A  A  A  B  B  A  B  B
 2  10   B  B  B  B  A  A  A  B  B  A  B  B
 2  10   B  B  B  B  A  A  A  B  B  A  B  B
 3   9   B  B  B  B  A  A  A  B  B  A  B  B
 3   9   B  B  B  A  A  A  A  B  B  B  B  B
 7   8   B  B  B  A  A  A  A  B  B  B  B  B
 7   8   B  B  B  A  A  A  A  B  B  B  B  B
 8   7   B  B  B  A  A  A  A  B  B  B  B  B
     7   B  B  B  A  A  A  A  B  B  B  B  B
```

Question 3

```
(seed = 269779)
Which of the following statements about quicksort are true? Check all that
 apply. Unless otherwise specified, assume that quicksort refers to the re
cursive, randomized version of quicksort (with no extra optimizations) and
 uses the 2-way partitioning algorithm described in lecture.
```

Your Answer		Score	Explanation
☑ The expected number of compares to find a median of an array of N distinct keys using quickselect is	✖	0.00	The expected number of compares is ~ (2 + 2 ln 2) N. In fact, no compare-based algorithm can find a median using fewer than 2N compares.

~ 2N.

☑

The number of compar
es to 3-way quicksor
t an array of N item
s with only three di
stinct keys is linea
r.

✔ 0.20   The number of partitioning steps is no more than the
           number of distinct keys.

☐

Suppose that quickso
rt is modified to us
e an explicit stack
instead of recursion
 and always recur on
 the subarray with m
ore items before the
 subarray with fewer
 items. Then, the ma
ximize size of the s
tack is no larger th
an lg N.

✔ 0.20   It will be linear if the array is sorted (after the random
           shuffle). If the modified algorithm always chooses
           the smaller subarray first, then the maximize size will
           be logarithmic.

☑

Consider any two con
secutive items in th
e array that results
 after quickselectin
g the median from an
 array of N distinct
 keys. Then, those t
wo items were compar
ed against one other
 at some point durin
g the algorithm.

✖ 0.00   As an extreme case, suppose that the partitioning
           item is the median. Then, all compares involve the
           median key.

☐

The expected number
of compares to quick
sort an array of N k
eys (not necessarily
 all distinct) depen
ds only on the size
of the array (and no
t the items in the a

✔ 0.20   If all the keys are distinct, it is ~ 2 N ln N; if the keys
           are all equal, it is ~ N lg N.

e the items in the a
rray).

Total	0.60 / 1.00

Question Explanation