ALGORITHM
Due Date: 9:20AM, November 22
Autumn, 2012
The following problem sets are all from CLRS.

Homework 7

1. Show that QUICKSORT's worse-cast running time is $O(n^2)$.

2. Show that QUICKSORT's best-cast running time is $\Omega(n \lg n)$.

3. Show that average-case running time of RANDOMIZED-QUICKSORT is $O(n \lg n)$.

4. What is the running time of QUICKSORT when all elements of array A have the same value?

5. Show that $q^2 + (n - q - 1)^2$ achieves a maximum over $q = 0, 1, \ldots, n - 1$ when $q = 0$ or $q = n - 1$.

6. Suppose that the **for** loop header in line 9 of the COUNTING-SORT procedure is rewritten as

   9 **for** $j \leftarrow 1$ to $length[A]$

   Show that the algorithm still works properly. Is the modified algorithm stable?