For the programming problems below, include in your hardcopy submission a printout of your algorithm and of the output. Please follow attached submission instructions.

1. (U&G-required) [40 points]
   Implement in C/C++ an algorithm to rearrange elements of a given array of \( n \) real numbers so that all its negative elements precede all its positive elements. Your algorithm should be both time- and space-efficient. Show how your algorithm works on the following input: \( A = [4 \ 3 \ -2 \ 0 \ 2 \ 9 \ -1 \ 10 \ 0 \ 5 \ 23 \ -4] \).

2. (U&G-required) [20 points] Answer the following question: is Quicksort a stable sorting algorithm? If yes, give a justification. If not, provide a counterexample.

3. (U & G-required) [20 points]
   (a) [10 points] Exercise 7.1-1 (page 173).
   (b) [10 points] Give an argument to show that RANDOMIZED-SELECT never makes a recursive call to a 0-length array.

4. (U & G-required) [20 points] Exercise 9.3-5 (page 223).

5. (G-required) [20 points] Exercise 9.2-4 (page 220).

Extra credit: