Show all work clearly and in order. Justify your answers whenever possible; You have 20 minutes to take this 10 point quiz.

1. **(3 points)** Consider the following array \( A = [14, 3, 21, 5, 6, 5, 9, 1] \).
   - Build a max-heap from \( A \). Show steps to earn full points.
   - Exact the max value from the heap. Show steps to earn full points.

2. **(3 points)** Quick sort the following array \( A = [14, 3, 21, 5, 6, 5, 9, 1] \). Show steps using the first elements as the pivots.

3. **(3 points)** Assuming that we know the values in \( A \) are in the range of 5 and 15. Use counting sort to sort the following array \( A = [7, 9, 11, 5, 6, 5, 9, 1, 12] \). Show steps to earn full points.

4. **(1 point)** In Chapter 9, we discuss methods, called “Select”, to find the \( k \)-th smallest value in linear time. Another way of finding the \( k \)-th smallest value is by sorting. Provide a case that finding by sorting will be more efficient than the “Select” method.