Ve281 Data Structures and Algorithms
Written Assignment Two

This assignment is announced on Oct. 11, 2018. It is due by 5:40 pm on Oct. 19, 2018. The assignment consists of three problems.

1. (40%) Sort 3, 7, 4, 1, 8, 9, 2, 6, 5, 10 using quick sort. The pivot is chosen as the median of the first, the middle (or the left-to-middle element if the array size N is even), and the last element. Use the in-place partitioning strategy discussed in class (Note that you should swap the selected pivot with the first element of the array as the first step of the partitioning). Assume that if the subarray size is less than or equal to three, insertion sort will be called to sort the subarray. Show the intermediate steps, such as the pivot you choose, the array after partitioning, etc. Do not just write the final sorted result.

2. (30%) Apply radix sort to sort the sequence of decimal numbers 189, 479, 032, 538, 446, 526, 943, 738, 632, 379. Show the intermediate steps. Do not just write the final sorted result.

3. (30%) In the deterministic linear-time selection algorithm, instead of partitioning all the inputs into a number of groups of size 5, we partition the inputs into a number of groups of size 7. The rest steps of the algorithm are similar to the original version. Will the runtime of this new algorithm still be $O(n)$, where n is the input size? Prove your claim.