**Tutorial of Quick Sort and Heap Sort**

Q1. Given the pseudo code of Quick Sort in lecture note, for the array ***A***= {3, 8, 4, 0, 11, 1, 9, 12, 7, 6, 13, 2, 5, 14, 10}.

(1) if we call ***MEDIAN3*** function, what the array will be like?

(2) In the 1st iteration, after we call ***PARTITION*** function (Lec 07, page 26), what the array will be like, and what’s the value of ***i***and ***j***?

Q2. If we use Quick Sort algorithm to sort an array, ***A***, with elements are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 (These array elements may be arranged in an unordered manner).

(1) Try to analyze the algorithm complexity of the best case for ***A***?

(2) Try to analyze the algorithm complexity of the worst case for ***A***?

(3) Analyze the algorithm complexity of average case.

Q3. If we use the pseudo code of ***INSERTION*** function to construct a max heap for the array ***A***= {3, 8, 4, 0, 11, 1, 9, 12, 7}.

(1) Show each step of ***INSERTION*** (especially for the changes of the heap)

(2) Based on the final step of (1), if we use post-order traversal to traverse the heap, what will be the result?

(3) Show each step of ***DELETEMAX*** (including the changes of heap and ***A***)