Question - 1

SCORE: **5 points**

Question 1

Suppose we are sorting an array of eight integers using quicksort, and we have just finished the first partitioning with the array looking like this: 2 5 1 7 9 12 11 10 Which statement is correct?

- (●) The pivot could be either the 7 or the 9
- ( ) The pivot could be the 7, but it is not the 9
- ( ) The pivot is not the 7, but it could be the 9
- ( ) Neither the 7 nor the 9 is the pivot.

Question - 2

SCORE: **5 points**

Question 2

Which of the following sort algorithms are guaranteed to be O(n log n) even in the worst case?

- ( ) Shell Sort
- (●) Merge Sort
- ( ) Insertion Sort
- ( ) Quick Sort

Question - 3

SCORE: **5 points**

Question 3

Which of the following is not a stable sorting algorithm in its typical implementation.

- ( ) Insertion Sort
- ( ) Merge sort
- ( ) Bubble sort
- (●) Quick sort

Question - 4

SCORE: **5 points**

Question 4

A sorting technique is called stable if it:

- Takes O(nlogn) time
- Maintains the pre-existing order of occurrence of elements with equal keys
- Uses divide-and-conquer paradigm
- Takes O(n) space

Question - 5

SCORE: **30 points**

Merge Sort

Implement merge sort.

Question - 6

SCORE: **5 points**

Bonus, this question can make up for your mistakes: selection sort

Explain why selection sort (classic implementation we discussed in class) is not stable.

Question - 7

SCORE: **5 points**

Bonus, this question can make up for your mistakes: insertion sort

Is it possible insertion sort is faster than quick sort? Briefly explain your answer.