Assignment 01

1(a) full credit given to correct algorithm

1(b) O(n^3)

1(c) full credit given to correct algorithm

1(d) O(n^2 logn)

2 full credit give to correct proof

3(a) True

3(b) False

4(a) O(i)

4(b)  …   n(n-1)/n! + (n+1)/(n)!

4(c) O(e)

5(a)

1 2 3

1 3 2

2 1 3

2 3 1

3 2 1

3 1 2

5(b) T(n) = n \* ( O(1) + T(n-1) + O(1) )

5(c) T(n) = O((n+1)!)  or n!

6(a) Pair (1,5)=2>1, pair (2,5)=3>1, pair (3,4) =8>6, pair (3,5) =8>1, air (4,5) =6>1

6(b) O (n^2)

6(c) Any justification that implies that runtime is directly proportional to number of inversions

6(d) full credit given to correct algorithm

7(a) O(n^2)

7(b) O(n^2)

Assignment 02

Partial Solutions:

1)      Showing that the run time for Quicksort it O(n^2)

2a) Appropriate explanation of the functioning of Quicksort

2b) Explaining hoe the stack depth of Quicksort by Horde partitioning or equivalent

2c) Appropriate code

3a) [6 2 9 5 12 8 7 4 11] and [19 13 21] are the two subarrays after A is partitioned at index j = 8.

3b) Describing all three cases wrt x treated as smallest, largest or between i and j.

3c) Explain based on 3b how p <= j < r

4) Minimum number of elements = 2^h

Maximum number of elements = [2^(h+1)]-1

5) Appropriate code

6) n-1