ASSIGNMENT – 9

Natnael Mengistu

1)

A = [11,7,6,48,30,12,75]

Partition (A,0,6) pivot = A[0] = 11

11 7 6 48 30 12 75 Here we move our L and R cursors to the middle by comparing
| | | them with 11. Values from the right are above 11 until we get to
P L R 6 and values from the left are less than 11 until 48 then we swap 11 with 6 .

6 7 11 48 30 12 75

After first partition 11 (P=2)

The two recursive equations we get after the first partition are

Quick Sort of [6,7] or QS(A,0, 1) Quick Sort of [48 , 30 , 12 , 75] or QS (A,3,6)

2)

we have n = 7 elements

```
        n
        /\
    3n/7  4n/7     Here we do not get a balanced partition (Skewed
     /      /\     recursive tree)
    1   3n/4  n/4
```

These skewed recursion tree generalises to n*(n-1)/2 thus the worst case running time of this Algorithm will be $O(n^2)$.

3)

Merge sort is preferred for sorting a linked list . This is mainly due to the memory allocation of Linked lists. Linked list nodes may not be adjacent in memory and merge sort can be implemented in O(1) time.The need of random access to a data is low in Merge sort.

While in arrays , Quick sort is recommended because we can do random access because elements are continuous to each other.

Merge sort is used to sort Linked Lists in **O(nlogn)** time.