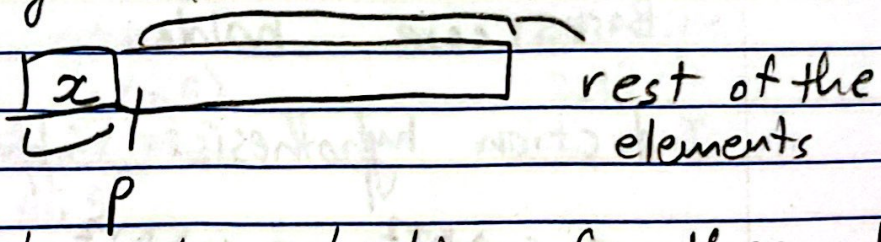
Exc 4

1 Worst case complexity for quicksort:

Worst case occurs when we already have a sorted array and the partition splits the array from the first element

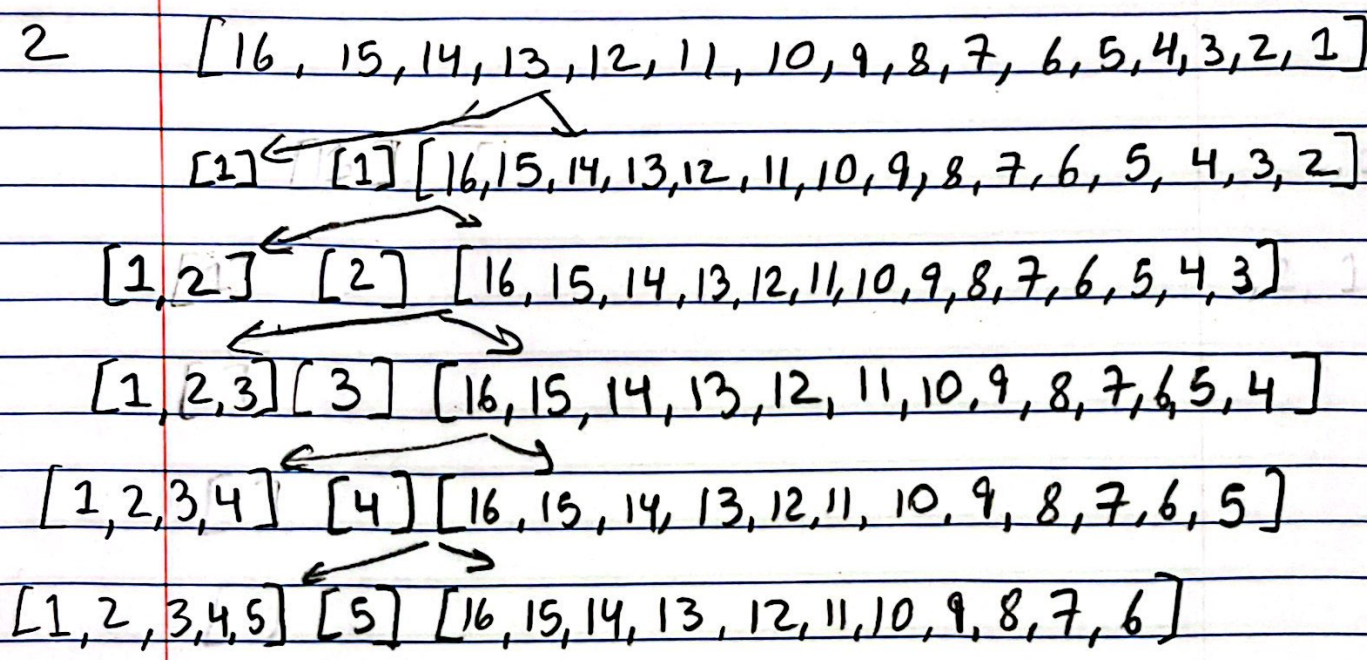


This step keeps repeating further and further down the array which leads to:

$$[N + (N-1) + (N-2) + (N-3) + \ldots + 2]$$

$$= \frac{N(N+1)}{2} - 1 = O(N^2)$$

2



This goes till the array is sorted for the next 10 instances.