

## **Week 4 Studio**

### **Assessed Preparation**

Problem 1:

- a) The worst case complexity of Quicksort is  $O(n^2)$  when we select the first element of the sequence because every element will be on the right of the pivot.
- b) Selecting the minimum element of the array results in having  $O(n)$  levels of recursions and  $O(n)$  work to do the partition. It will run in  $O(n^2)$ .
- c)  $O(n \log n)$  because selecting the median as the pivot is the ideal case because one half of the array is greater than the pivot and the other half is less. It results in  $\log(n)$  levels of recursions since array is halved at each level.
- d) 90<sup>th</sup> percentile :  $(9/10)^d * n = 1$   
$$d = \log_{0.9} n$$
$$O(n \log_{0.9} n) = O(n \log n)$$