DAA Hands On 6

Q3 Average Runtime Complexity of Non-Random Quick sort.

1. Partitioning → Each partition step takes linear time, $O(n)$.

2. Recursive Calls: The depth of the recursion will depend on how balanced the partitions are. On average, the pivot divides the array into two halves

This leads to the recurrence relation:

$$T(n) = T\left(\frac{n}{2}\right) + T\left(\frac{n}{2}\right) + O(n)$$

Solving gives us:

$$T(n) = 2T\left(\frac{n}{2}\right) + O(n)$$

$$= O(n \log n)$$

So, the average runtime complexity of the non-random version of quicksort is $O(n \log n)$