

7.2-2.

What is the running time of QUICKSORT when all elements of array A have the same value?

Answer.

The PARTITION procedure returns r when all elements of array $A[p..r]$ have the same value, as shown in Exercise 7.1-2. In other words, the partitioning is maximally unbalanced with one subproblem with $n - 1$ elements and one with 0 elements at every recursive level of the algorithm and costs $\Theta(n)$ time. So the running time of QUICKSORT in this case is $\Theta(n^2)$.

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