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Answer the question number-1

Quicksort (A, Left, Right)

① If Left < Right
② then q = Partition (A, Left, Right)
③ Quicksort (A, Left, q-1)
④ Quicksort (A, q+1, Right)
⑤ END

Partition (A, Left, Right)

① x = A[Right]
② i = Left - 1
③ For j = Left to Right - 1
④ do if A[j] <= x
⑤ then i = i+1
⑥ swap (A[i], A[j])

⑦ Swap (A[i+1], A[Right])

⑧ Return (i+1)

Analyze 3 case of complexities

① worst Case :- The worst case occurs if the input is presorted or in reverse order and if the first or the last element is chosen as pivot. In this case pivot provides a poor partition because all elements go into one partition and the other partition is empty. The worst case running time is $O(n^2)$

2. Average Case :- The average running time of Quick short is obtained by Averaging the run time of all possible

subproplems sizes. That means it occurs from the fact that on average each reduction step of the algorithm produ two subsets. So, the average running time is $O(n \log n)$

(3.) Best Case :-

The best case occurs when the partitio always splits into two subsets with equal of elements. So, the running time is $O(n \log n)$

Answer the question number 2

The main difference between divide and conquer and dynamic programming is that the divide and conquer combines

the solutions of the subproblems to obtain the solution of the main problem while dynamic programming uses the result of the subproblems to find the optimum solution of the main problem

conquer technique is used by fibonacci search. fibonacci search works on sorted array as the binary seacch, in fibonacci there is no use a/u operator insted of this, It uses + and - operator,

$F(n) = F(n-1) + F(n-2)$, $F(0)=0$, $F(1)=1$ is the way to define fibonacci number recursively.