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A situation in which a quicksort algorithm is at it BEST and WORST case;

1. An algorithm is said to be at its Best case when the pivot element divides the list into two equal halves by coming exactly in the middle position, this happens generally when the list is in completely random manner. For example: 1 3 2 8 4 6 4 10 2
2. An algorithm is said to be at its WORST case when the list is either arranged in ascending or descending order. For example: 1 2 3 4 5 6 7 8 9 10 or 10 9 8 7 6 5 4 3 2 1

Analysis in terms of time complexity of the BEST and WORST case

1. The worst case occurs when the partition process always picks greatest or smallest elements as pivot. If we consider above partition strategy where last element is always picked as pivot, the worst case would occur where the array is already sorted in increasing or decreasing order, the following is recurrence for worst case;

T(n) = T (0) + T(n-1) + Ө(n) which is equivalent to T(n) = T(n-1) + Ө(n) hence giving a time complexity as 0(n^2)

1. The best case occurs when partition process always picked the middle element as pivot. The recurrence for best case scenario is T(n) = 2T(n/2) + Ө(n) giving us time complexity as 0(nlogn)