

# Computer Algorithm

## Tutorial No.- 2 on Unit I

1. Write note on “Divide and Conquer” algorithm design technique
2. Give algorithms for binary search. Compute its complexity  
Give Iterative / Recursive algorithm for binary search  
Prove that average case complexity of binary search is  $O(\log n)$  for successful search  
Prove that complexity of binary search is  $O(\log n)$  for unsuccessful search
3. Give algorithms for ternary search. Compute its complexity
4. Give straightforward algorithm to find minimum and maximum number from given list. Compute its complexity
5. Write algorithm to find min-max from given numbers using divide and conquer approach. Compute its complexity
6. Prove that algorithm using divide and conquer approach to find min-max saves 25% efforts compared to straightforward approach to find min-max
7. Write algorithm to sort numbers using merge sort. Compute its complexity  
Prove that complexity of merge sort in best case, average case and worst is  $O(n \log n)$
8. Write algorithm to sort numbers using quick sort. Compute its complexity  
Prove that complexity of quick sort in best case and average case is  $O(n \log n)$  and in worst case is  $O(n^2)$
9. Compare merge sort with combination of merge-insertion sort
10. Give select/selection algorithm to find  $n^{\text{th}}$  smallest element from list.  
Compute its complexity
11. Give Quickhull algorithm to find convex hull
12. Give algorithm using Graham's scan to find convex hull
13. Give  $O(n \cdot \log(n))$  divide and conquer algorithm to find convex hull