Complexity

1. Max-min (loop) = O(n)
   Max-min (divide & conquer) = O(n)

2. Quick Sort
   Time Complexity
   Best Case = $O(n \log n)$

   Worst Case = $O(n^2)$
   Average Case = $O(n \log n)$

   Space Complexity
   $O(1)$

3. Merge Sort
   Time Complexity
   Best Case = Worst Case = Average Case = $O(n \log n)$

   Space Complexity
   $O(n)$

4. Heap Sort
   Time Complexity
   Best Case = $O(n)$
   Average Case = Worst Case = $O(n \log n)$

   Space Complexity
   $O(1)$

5. Breadth First Search (BFS) and Depth First Search (DFS)
   Time and Space Complexity
   Adjacency matrix = $O(|v|^2)$
   Adjacency list = $O(|v| + |e|)$

6. Fractional Knapsack

   <u>Time Complexity</u>
   Depends on the sorting algorithm

   <u>Space Complexity</u>
   $O(n)$

7. Job Scheduling Algorithm

   <u>Time Complexity</u>
   Using Gantt Chart = $O(n^2)$
   Using heap = $O(n \log n)$

   <u>Space Complexity</u>
   $O(n)$

8. Kruskal Algorithm

   <u>Time Complexity</u>
   Adjacency list = $O(|e| \log|e| + |e| \log|v|)$
   Adjacency matrix = $O(|v|^2)$

   <u>Space Complexity</u>
   $O(|e|) = O(|v|^2)$

9. Prims Algorithm

   <u>Time Complexity</u>
   Adjacency list = $O((|v| + |e|) \log|v|)$
   Adjacency matrix = $O(|v|^2)$

   <u>Space Complexity</u>
   $O(|e|) = O(|v|^2)$

10. Dijkstra Algorithm
    Time Complexity
    Adjacency list = $O((|v| + |e|) \log|v|)$
    Adjacency matrix = $O(|v|^2)$

    Space Complexity
    $O(|v| + |e|)$

11. Bellman Ford
    Time Complexity
    Best case = $O(|e|)$
    Average case = Worst Case = $O(|v||e|)$

    Space Complexity
    $O(|e|)$

12. Matrix Chain Multiplication
    Time Complexity
    $O(n^3)$
    Space Complexity
    $O(n^2)$

13. Floyd Warshall
    Time Complexity
    $O(|v|^3)$

    Space Complexity
    $O(|v|^2)$

14. N-Queen
    Time Complexity

$$O(n^n)$$

    Space Complexity
    Using DKM's algorithm = $O(n)$
    Otherwise $O(n^2)$

15. M-Coloring
    Time Complexity

$$O(n \times m^n), \quad n = vertices, \; m = number\; of\; colors$$

    Space Complexity
    $O(n)$