# DSA Tutorial

1. What is the difference between data type and data structure?
2. What is abstract data type (ADT), what is the importance of ADT in software development?
3. Write an algorithm to push and pop data on to a stack?
4. Convert the following infix expression to postfix **A+ (B*C-(D/E^F)*G)*H** using stack.
5. Evaluate the following postfix expression using stack **6 2 3 + - 3 8 2 / + * 2 \$ 3 +**
6. Write an algorithm to Enqueue() and Dequeue() values on to queue.
7. What are the limitation of linear queue how this can be corrected using circular queue.
8. What is priority queue explain its types.
9. What is the major advantage of using dynamic list(linked list) instead of using static list (array)
10. Write an algorithm to insert a node at nth pitosition in doubly circular linked list.
11. Write an algorithm to delete the last node of a linear circular linked list.
12. Write an algorithm to add two polynomial using Linked list.
13. Write code and algorithm for Tower of Hanoi (TOH).
14. Draw recursion tree for TOH when number of disk n=3
15. Perform In-order ,pre-order and post-order tree traversal.
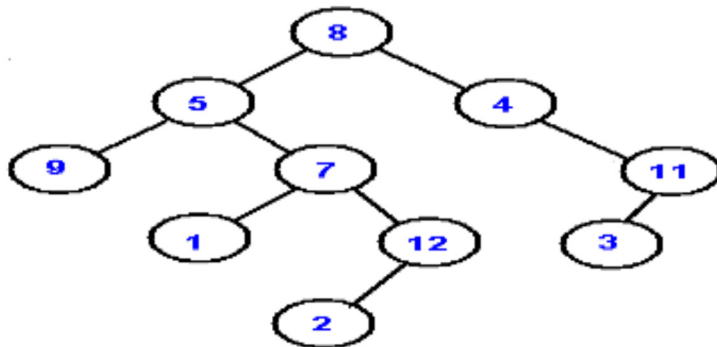
16.Construct the tree from given values

Preorder Traversal: 1 2 4 8 9 10 11 5 3 6 7
Inorder Traversal: 8 4 10 9 11 2 5 1 6 3 7

17.Construct Huffman Tree for following values

Value	E	A	C	F	D	B
Frequency	4	5	7	12	15	25

18. Construct an AVL tree for following values

10,12,3,42,16,18,27,30,6,89,22,7,33

19. Construct a B-tree of order 5

1,2,33,44,51,12,19,7,6,82,91,45,62,11,13,70,20,29,39,59,62,83,35,7

20. Use binary search technique to find a key =40 in this following sequence

1,8,12,13,24,30,34,40,50,60,80,90,92

21. Input the following data in to hash table of size 10

Input sequence: 1, 27, 6, 87, 47, 7, 8, 17, 37, 67
Hash Function: key mod 10
Collision Handling: H(key) + f(i) where f(i) = i

Input sequence: 1, 27, 6, 87, 47, 7, 8, 17, 37, 67
Hash Function: key mod 10
Collision Handling: H(key) + f(i) where f(i) = i*i

Input sequence: 1, 27, 6, 87, 47, 7, 8, 17, 37, 67
Hash Function: key mod 10
Collision Handling: H1(key) + f(i) where f(i) = i * H2(key)
and H2(key) = 7 - (key mod 7)

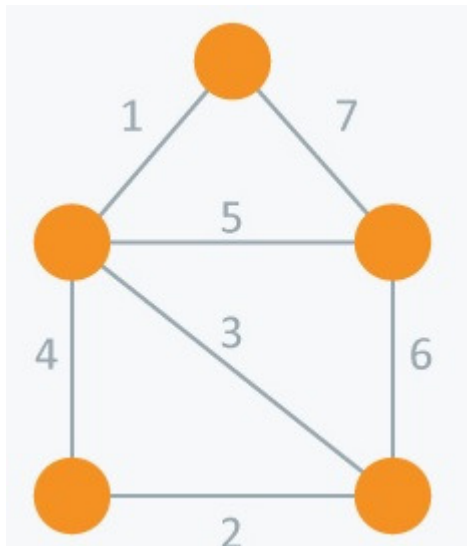22. Sort the following sequence of number using quick sort and Heap Sort

12,2,24,56,19,17,13,90,44,61,27,45

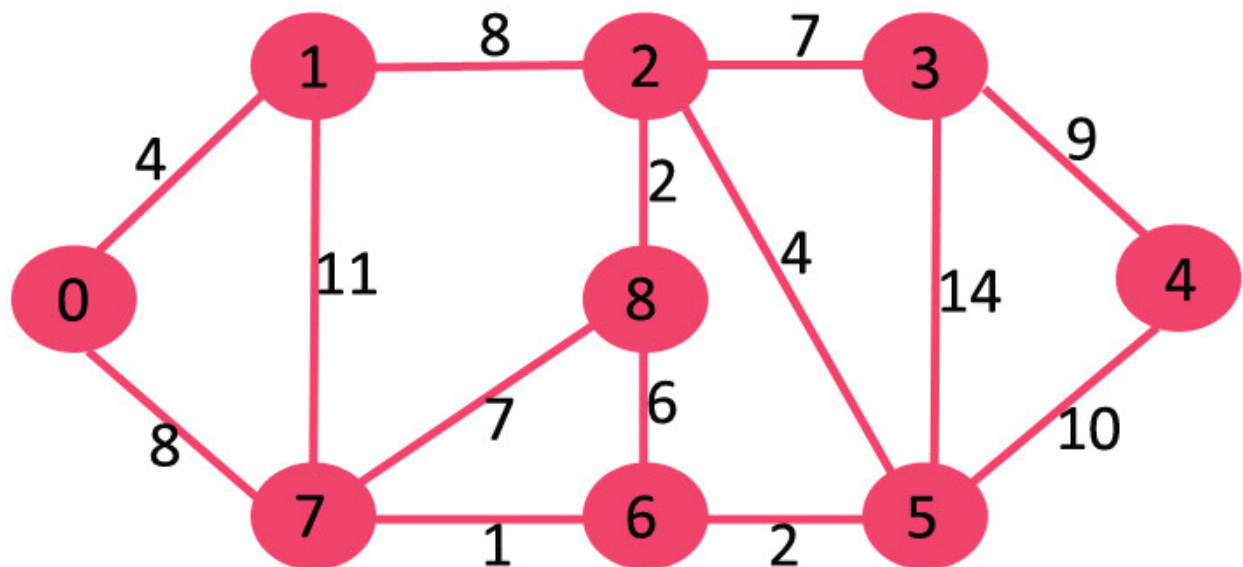23. What is sorting explain the difference between following

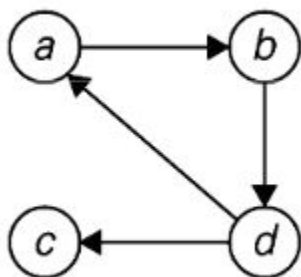a) Internal and External sorting

b) Stable and Unstable sort

24. Find the MST for following graph using Prims and Kruskal Algorithm

25. Find the shortest path in the following graph using Djkstra Algorithm

26. Find transitive closure of following graph

27. What is Big O notation and how it is useful to measure an efficiency of an algorithm.

28. Explain divide and conquer strategy algorithm.