

Part I Answer the following - 1x10 = 10 marks

1. True or False? A linked list 'llist' with pointers llist->prev and llist->next is an example of a singly linked list.
2. True or False ? Binary trees are linear data structures
3. S.pop() data items from the Stack
4. Queues are used for traversal in a Graph,
5. In a Heap using an array 0..n, for any node i, its left child can be found at
6. sort uses counting sort in its algorithm.
7. For an AVL tree node, Balance Factor =
8. In a splay tree, if a node with key value 80 is inserted, what is the root of the tree after insertion?
9. In a Hash Table, insert, delete, search are all executed in time.
10. Leaf nodes in a B-Tree are all at the level

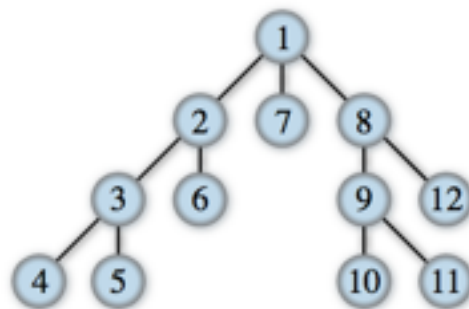
Part II Answer the following 10 marks each

11. Create a stack using an array or a linked list.

Write functions that perform the following operations on the stack:

- a. push a value on to the stack
- b. pop from the stack
- c. checks if the stack is empty
- d. peeks the top of the stack

12. Use the appropriate data structure to illustrate breadth-first-traversal in the graph below. Neatly label and illustrate each step.



13. Illustrate the different rotations - 5 marks each
 - a. in AVL Trees
 - b. in Splay Trees

14. Write functions only, not full programs for the following algorithms - 5 marks each

**Computer Science III Back paper Exam
June 2019**

Indian Statistical Institute

Total marks: 50

Duration: 1.5 Hrs

- a. Selection Sort
- b. Shell sort