Data structures and algorithms (3rd semester)

1. What is data structure?
2. Why do we use data structure?
3. Classification of data structures
4. Asymptotic notation
5. Linked list
    a. Singly linked list
    b. Doubly linked list
    c. Circular list
    d. Doubly circular linked list
6. Stack
    a. Stack using array
    b. Stack using linked list
    c. Infix to postfix conversion (algorithm, evaluation)
    d. Parenthesis matching
7. Queue
    a. Queue using array
    b. Queue using linked list
    c. Infix to prefix conversion (algorithm, evaluation)
8. Circular queue
9. Tree
    a. Different terminology
    b. Binary tree
        i. Almost complete binary tree
        ii. Strict binary tree
        iii. Complete binary tree
        iv. Tree traversal
            1. Inorder traversal
            2. Preorder traversal
            3. Postorder traversal
10. Properties of binary tree and proof
11. Binary search tree
    a. Definition
    b. Search
    c. Insert
    d. Delete
12. Threaded binary tree
13. AVL tree and rotations
14. Hashing

    a. Introduction
    b. Hash functions
        i. Division
        ii. Mid-square
        iii. Folding
15. Graph
    a. Definition
    b. Traversal
        i. Breadth-first search (BFS)
        ii. Depth-first search (DFS)
16. Searching
    a. Linear search
    b. Binary search
17. Sorting
    a. Bubble sort
    b. Insertion sort
    c. Selection sort
    d. Quick sort
    e. Merge sort
    f. Count sort(optional)