

**Problem Statement No: 1**

Consider telephone book database of N clients. Make use of a hash table implementation to quickly look up client's telephone number. Make use of Linear Probing technique for collision resolution.

**Problem Statement No: 2**

Consider telephone book database of N clients. Make use of a hash table implementation to quickly look up client's telephone number. Make use of Double Hashing technique for collision resolution.

**Problem Statement No: 3**

For given set of elements create skip list. (note: Decide the level of element in the list Randomly with some upper limit)

**Problem Statement No: 4**

Beginning with an empty binary search tree, construct binary search tree by inserting the values in the order given. After constructing a binary tree -

- i. Insert new node
- ii. Find number of nodes in longest path from root
- iii. Minimum data value found in the tree.

**Problem Statement No: 5**

Beginning with an empty binary search tree, construct binary search tree by inserting the values in the order given. After constructing a binary tree –

- i. Insert new node
- ii. Change a tree so that the roles of the left and right pointers are swapped at every node.
- iii. Search a value

**Problem Statement No: 6**

Construct an expression tree from the given prefix expression eg.  $+-a*bc/def$  and traverse it using post order traversal (non recursive) and then delete the entire tree.

**Problem Statement No: 7**

Convert given binary tree into threaded binary tree. Analyze time and space complexity of the algorithm.

**Problem Statement No: 8**

There are flight paths between cities. If there is a flight between city A and city B then there is an edge between the cities. The cost of the edge can be the time that flight take to reach city B from A, or the amount of fuel used for the journey. Represent this as a graph. The node can be represented by airport name or name of the city. Use adjacency list representation of the graph.

**(Adjacency List representation of Graph)**

**Problem Statement No: 9**

You have a business with several offices; you want to lease phone lines to connect them up with each other; and the phone company charges different amounts of money to connect different pairs of cities. You want a set of lines that connects all your offices with a minimum total cost.

**(Minimum Spanning Tree using Prim's algorithm)**

**Problem Statement No: 10**

Given sequence  $k = k_1 < k_2 < \dots < k_n$  of  $n$  sorted keys, with a search probability  $p_i$  for each key  $k_i$ . Build the Binary search tree that has the least search cost given the access probability for each key?

**(OBST)**

**Problem Statement No: 11**

A Dictionary stores keywords and its meanings. Provide facility for adding new keywords, deleting keywords. Provide facility to display whole data sorted in ascending. Use Height balance tree.

**(Add, Delete and display operation on AVL tree)**

**Problem Statement No: 12**

A Dictionary stores keywords and its meanings. Provide facility for adding new keywords, updating values of any entry. Provide facility to display whole data sorted in ascending. Use Height balance tree.

**(Add, update and display(ascending) operation on AVL tree)**

**Problem Statement No: 13**

A Dictionary stores keywords and its meanings. Provide facility for adding new keywords, updating values of any entry. Provide facility to display whole data sorted in descending order. Use Height balance tree.

**(Add, update and display(descending) operation on AVL tree)**

**Problem Statement No: 14**

Department maintains a student information. The file contains roll number, name, division and address. Allow user to add, delete and display the information of student. Use sequential file to main the data.

**(Add, delete and display operation on Student data)**

**Problem Statement No: 15**

Department maintains a student information. The file contains roll number, name, division and address. Allow user to add and display the information of student. If record of student does not exist an appropriate message is displayed. If it is, then the system displays the student details. Use sequential file to main the data.

**(Add, display and Search operation on Student data)**

**Problem Statement No: 16**

Company maintains employee information as employee ID, name, designation and salary. Allow user to add, delete information of employee. Display information of particular employee. Use index sequential file to maintain the data.

**(Add, delete and display operation on Employee data)**

**Problem Statement No: 17**

Company maintains employee information as employee ID, name, designation and salary. Allow user to add and display the information of employee. If employee does not exist an appropriate message is displayed. If it is, then the system displays the employee details. Use index sequential file to maintain the data.

**(Add, display and Search operation on Employee data)**

**Problem Statement No: 18**

Read the marks obtained by students and find out maximum and minimum marks. Use heap