**DSAL MOCK ASS. LIST**

1 Consider the student database of N students and their marks. Make use of a hash table implementation to quickly insert and lookup students' PNR and marks. Implement collision handling techniques:

1. linear probing

2. Implement delete operation in collision handling using linear probing

3. linear probing with chaining without replacement

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2. Implement collision handling using Quadratic probing

4. The dictionary file consists of a list of more than 100 correctly spelt lowercase words, separated by whitespace. The words are inserted into the hash table. Handle collision using **separate chaining.** After the reading of the dictionary file is complete, the program prompts the user for input. After input is obtained, each word that the user enters into the program is looked up within the hash table to see if it exists. If the entered word exists within the hash table, then that word is spelt correctly.

5. Beginning with empty binary search tree Construct BST by inserting the values in given order. After construction a binary tree do:

1. Insert new node. 2. Find number of nodes from longest path from root. Search a specific value and display comparisons required.

6. Create binary tree/binary search tree with n nodes, do following operation

1. Insert a node 2. Delete a node from BST

3. All traversals (recursive and iterative)

7. Create binary tree/binary search tree with n nodes, do following operation

1. Insert a node 2. Find the height of a tree.

3. Create clone of a tree and then erase all nodes in a original tree.

4. create a Mirror image of a tree.

8 Create binary tree/binary search tree with n nodes, do following operation

1. Insert a node

2. construct a binary tree from inorder and preorder traversal

3. Check whether two trees are equal.

9. Create inorder threaded binary search tree and implement following operations

1. Insert a new node 2. Inorder and preorder traversal

3. Convert given binary search tree into threaded binary search tree.

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11. Write a c++ program to implement Huffman coding text compression algorithm. Build the huffman Tree using characters and their frequencies input from user. Encode a given string by using codes generated from huffman tree and decode the bit sequence entered by the user.

|  |  |
| --- | --- |
| **Character** | **Frequency** |
| a | 4 (01) |
| b | 7 (11) |
| c | 3 (101) |
| d | 2 (100) |
| e | 4 (00) |

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|  |  |
| --- | --- |
| **Character** | **Frequency** |
| A | 12 (00) |
| B | 15 (10) |
| C | 7 (110) |
| D | 13 (01) |
| E | 9 (111) |

13 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. Solve the problem by suggesting appropriate data structures and using **prim’s algorithm**

14 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. Solve the problem by suggesting appropriate data structures and using  **kruskal's** algorithm

15 Tour operator organizes guided bus trips across the Maharashtra. Tourists may have different preferences. Tour operator offers a choice from many different routes. Every day the bus moves from starting city S to another city F as chosen by client. On this way, the tourists can see the sights alongside the route travelled from S to F. Client may have preference to choose route. There is a restriction on the routes that the tourists may choose from, the bus has to take a short route from S to F or a route having one distance unit longer than the minimal distance. Two routes from S to F are considered different if there is at least one road from a city A to a city B which is part of one route, but not of the other route**. (Dijkstra’s Algo)**

16 A Dictionary stores keywords & its meanings. Provide facility for adding new keywords, Deleting keywords, updating values of any entry. Provide facility to display whole data sorted in ascending/ Descending order. Also find how many maximum comparisons may require for finding any keyword. Use **Height balance tree (AVL)** and find the complexity for finding a keyword.

17. Represent a given graph using adjacency list representation to perform **DFS**  traversal on graph.

18. Represent a given graph using adjacency list representation to perform  **BFS** traversal on graph.

19 Given sequence k = k1<; k2<..... kn of n sorted keys, with a search probability pi for each key ki . Build the Binary search tree that has the least search cost given the access probability for each key. Test your program for following example

p1 = 3, p2 = 3, p3 = 1, p4 = 1

q0 = 2, q1 = 3, q2 = 1, q3= 1, q4 = 1

20 Implement the Heap sort algorithm implemented in Java demonstrating heap data structure with modularity of programming language

21 Department maintains student information. The file contains rollno, name, division and address. Allow user to add, delete, insert and search information of student. use sequential file to maintain the data

22 Write a c++ program to perform topological sort on a graph.