

Data Structures Fall20 Project Report

We are considering a scenario where the data is not located on a single machine but rather stored on multiple machines geo-distributed across the Internet. In such a scenario, searching or retrieval of data is very challenging, as it is hard to determine on which machine the required data is stored. The data structures used for efficiently search data stored on a single machine such as hash tables cannot be directly employed in a distributed environment.

Group Details:

Section: BSCS-3G

- 1) Ahmed Ibrahim Khan (19K-0312)
- 2) Talha (19I-2049)
- 3) Syed Iftikhar Mehdi (19I-0657)

Program Structure:

- Distributed Hash-Table is implemented using a Singly Circular Linked List.
- SHA1 Encryption is used for generating Hash-Key. SHA1 header in the program is included through open source and Copyrights are cited in the Header File.
- Each Node in Singly Circular list represents a machine which maintains separate AVL Trees for storing Data and Separate Finger-Tables for maintaining Shortcut Machine pointers.
- Finger-Tables/Routing Tables are implemented using Doubly Linked List.
- Each Machine has its own file in the file system. Keys are stored in AVL Trees along with Line number of Values stored in files against the Keys in AVL trees.
- For Searching Query Program Searches Values stored in File system using the corresponding Line Number stored in AVL Tree.

Classes:

Class Diagram is attached below for Reference. Separate PDF only containing class Diagram is also attached.

- 1) Linked Lists
 - Class SinglyCircularNode
 - Class CircularLinkedList
 - Class DoublyNode
 - Class DoublyLinkedList
- 2) AVL Tree
 - Class AVLNode
 - Class AVLTree
 - Class Data
- 3) Filing
 - Class File

Class Diagram:



