

Computer Organization and Assembly Language

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SEMESTER PROJECT REPORT

**Data Structures Library for X86 Assembly**

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DESCRIPTION:

The project comprises three libraries of Data Structures implemented as a single library of x86 assembly. The libraries are Singly Linked List , Doubly Linked List and Binary Search Tree. The goal of this project was to make possible the use of these libraries in x86 assembly.

The implementation is based on the use of heap and the working is done using the concepts of nodes and pointers.

FUNCTIONS IMPLEMENTED:

Singly Linked List and Doubly Linked List:

* Insert at front / head (inserts a new node at the start of the linked list)
* Insert at last / tail (inserts a new node at the end of the linked list)
* Remove from front / head (deletes a node from the start of the linked list)
* Remove from last / tail (deletes a node from the end of the linked list)
* Insert at position (inserts a new node at the given position of the linked list)
* Remove from position (deletes a node from the given position of the linked list)
* Delete all nodes (deletes all node from the linked list)
* Display all nodes (displays all node from the linked list)

Binary Search Tree:

* Inserting a node (inserts a node in the tree following the order property i-e: if the new node is less than the parent node it is inserted at left , else right)
* Searching a node (searches a given node , and returns yes(exists) or no(doesn’t exist))
* Deleting a node (deletes a given node from the tree)
* node with no child
* node with one child
* node with two children
* Displaying Tree (In order i-e prints the tree in ascending order : left , root/parent , right)

ACHIEVEMENT:

All three of the data structures are implemented in a single code in the form of a library. Users can easily access any of the above mentioned functions by linking our library to their code.