

My Project

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Chapter 1

Class Index

1.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

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File Index

2.1 File List

Here is a list of all documented files with brief descriptions:

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Chapter 3

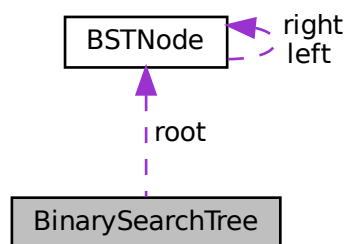
Class Documentation

3.1 BinarySearchTree Class Reference

[BinarySearchTree](#) class. Available member functions include default constructor, insert, traverse and height.

```
#include <DSA.h>
```

Collaboration diagram for BinarySearchTree:



Public Types

- enum [order](#) { **PRE**, **IN**, **POST** }
types of traversals

Public Member Functions

- [BinarySearchTree](#) ()
Construct a new Binary Search Tree object.
- void [insert](#) (ll val)
Insert an element into the tree.
- void [traverse](#) (BSTNode *T, [order](#) tt)
Traverse the tree.
- ll [height](#) (BSTNode *T)
Calculate height of the tree.

Public Attributes

- [BSTNode](#) * [root](#)
pointer to the root

3.1.1 Detailed Description

[BinarySearchTree](#) class. Available member functions include default constructor, insert, traverse and height.

3.1.2 Member Function Documentation

3.1.2.1 height()

```
11 BinarySearchTree::height (
    BSTNode * T )
```

Calculate height of the tree.

Parameters

in	<i>T</i>	tree root pointer
----	----------	-------------------

Returns

||

3.1.2.2 insert()

```
void BinarySearchTree::insert (
    11 val )
```

Insert an element into the tree.

Parameters

in	<i>val</i>	value to be inserted
----	------------	----------------------

3.1.2.3 traverse()

```
void BinarySearchTree::traverse (
```

```
BSTNode * T,  
order tt )
```

Traverse the tree.

Parameters

in	T	tree root pointer
	tt	type of traversal

The documentation for this class was generated from the following files:

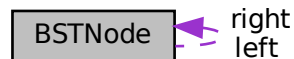
- [DSA.h](#)
- DSA.cpp

3.2 BSTNode Class Reference

BST Node class. Available member functions include initialising constructor.

```
#include <DSA.h>
```

Collaboration diagram for BSTNode:



Public Member Functions

- [BSTNode](#) (ll val)
Construct a new [BSTNode](#) object.

Public Attributes

- [ll info](#)
info stored in the node
- [ll level](#)
level of the node
- [BSTNode * left](#)
pointer to the left child
- [BSTNode * right](#)
pointer to the right child

3.2.1 Detailed Description

BST Node class. Available member functions include initialising constructor.

3.2.2 Constructor & Destructor Documentation

3.2.2.1 BSTNode()

```
BSTNode::BSTNode (
    11 val )
```

Construct a new [BSTNode](#) object.

Parameters

in	val	input value of the node
----	-----	-------------------------

The documentation for this class was generated from the following files:

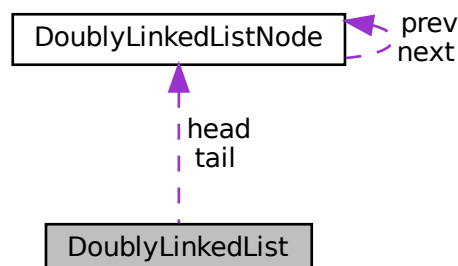
- [DSA.h](#)
- [DSA.cpp](#)

3.3 DoublyLinkedList Class Reference

Doubly Linked List class. Available member functions include default constructor, insert, printer and reverse.

```
#include <DSA.h>
```

Collaboration diagram for DoublyLinkedList:



Public Member Functions

- [DoublyLinkedList](#) ()
Construct a new Doubly Linked List object.
- void [insert](#) (ll data)
Insert an element into the list.
- void [printer](#) (string sep)
Print the list.
- void [reverse](#) ()
Reverse the list.

Public Attributes

- [DoublyLinkedListNode](#) * [head](#)
pointer to the head
- [DoublyLinkedListNode](#) * [tail](#)
pointer to the tail

3.3.1 Detailed Description

Doubly Linked List class. Available member functions include default constructor, insert, printer and reverse.

3.3.2 Member Function Documentation

3.3.2.1 insert()

```
void DoublyLinkedList::insert (  
    ll data )
```

Insert an element into the list.

Parameters

in	data	value to be inserted
----	------	----------------------

3.3.2.2 printer()

```
void DoublyLinkedList::printer (  
    string sep = ", " )
```

Print the list.

Parameters

<code>in</code>	<code>sep</code>	separator string
-----------------	------------------	------------------

The documentation for this class was generated from the following files:

- [DSA.h](#)
- [DSA.cpp](#)

3.4 DoublyLinkedListNode Class Reference

Doubly Linked List Node class. Available member functions include default constructor and initialising constructor.

```
#include <DSA.h>
```

Collaboration diagram for DoublyLinkedListNode:



Public Member Functions

- [DoublyLinkedListNode](#) ()
Construct a new Doubly Linked List Node object.
- [DoublyLinkedListNode](#) (ll val)
Construct a new Doubly Linked List Node object.

Public Attributes

- [ll data](#)
data stored in the node
- [DoublyLinkedListNode](#) * [next](#)
pointer to the next node
- [DoublyLinkedListNode](#) * [prev](#)
pointer to the previous node

3.4.1 Detailed Description

Doubly Linked List Node class. Available member functions include default constructor and initialising constructor.

3.4.2 Constructor & Destructor Documentation

3.4.2.1 DoublyLinkedListNode()

```
DoublyLinkedListNode::DoublyLinkedListNode (
    11 val )
```

Construct a new Doubly Linked List Node object.

Parameters

in	val	input value for the node
----	-----	--------------------------

The documentation for this class was generated from the following files:

- [DSA.h](#)
- DSA.cpp

3.5 Heap Class Reference

Public Member Functions

- [Heap](#) (int capacity)
Construct a new [Heap](#) object.
- int [parent](#) (int i)
Parent function.
- int [left](#) (int i)
Left child function.
- int [right](#) (int i)
Right child function.
- void [insert](#) (int e)
Insert function.
- int [min](#) ()
Minimum of heap.
- void [Heapify](#) (int root)
Heapify function.
- void [deleteMin](#) ()
Delete minimum.

3.5.1 Constructor & Destructor Documentation

3.5.1.1 Heap()

```
Heap::Heap (
    int capacity )
```

Construct a new [Heap](#) object.

Parameters

in	<i>capacity</i>	max capacity of heap
----	-----------------	----------------------

3.5.2 Member Function Documentation

3.5.2.1 Heapify()

```
void Heap::Heapify (
    int root )
```

Heapify function.

Parameters

in	<i>root</i>	root node
----	-------------	-----------

3.5.2.2 insert()

```
void Heap::insert (
    int e )
```

Insert function.

Parameters

in	<i>e</i>	value to insert
----	----------	-----------------

3.5.2.3 left()

```
int Heap::left (
    int i )
```

Left child function.

Parameters

in	<i>i</i>	index of node
----	----------	---------------

Returns

int

3.5.2.4 min()

```
int Heap::min ( )
```

Minimum of heap.

Returns

int

3.5.2.5 parent()

```
int Heap::parent (
    int i )
```

Parent function.

Parameters

in	<i>i</i>	index of node
----	----------	---------------

Returns

int

3.5.2.6 right()

```
int Heap::right (
    int i )
```

Right child function.

Parameters

in	<i>i</i>	index of node
----	----------	---------------

Returns

int

The documentation for this class was generated from the following files:

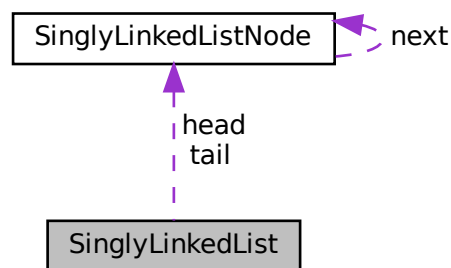
- [DSA.h](#)
- [DSA.cpp](#)

3.6 SinglyLinkedList Class Reference

Singly Linked List class. Available member functions include default constructor, insert, find, deleteVal, printer and reverse.

```
#include <DSA.h>
```

Collaboration diagram for SinglyLinkedList:



Public Member Functions

- [SinglyLinkedList \(\)](#)
Construct a new Singly Linked List object.
- void [insert](#) (ll data)
Insert an element into the list.
- [SinglyLinkedListNode *](#) [find](#) (ll data)
Find an element in the list.
- bool [deleteVal](#) (ll data)
Delete an element from list.
- void [printer](#) (string sep)
Print the list.
- void [reverse](#) ()
Reverse the list.

Public Attributes

- [SinglyLinkedListNode](#) * `head`
pointer to the head
- [SinglyLinkedListNode](#) * `tail`
pointer to the tail

3.6.1 Detailed Description

Singly Linked List class. Available member functions include default constructor, insert, find, deleteVal, printer and reverse.

3.6.2 Member Function Documentation

3.6.2.1 deleteVal()

```
bool SinglyLinkedList::deleteVal (
    ll data )
```

Delete an element from list.

Parameters

in	<i>data</i>	value to be deleted
----	-------------	---------------------

Returns

true/false

3.6.2.2 find()

```
SinglyLinkedListNode * SinglyLinkedList::find (
    ll data )
```

Find an element in the list.

Parameters

in	<i>data</i>	value to be found
----	-------------	-------------------

Returns

SinglyLinkedListNode*

3.6.2.3 insert()

```
void SinglyLinkedList::insert (
    ll data )
```

Insert an element into the list.

Parameters

in	<i>data</i>	value to be inserted
----	-------------	----------------------

3.6.2.4 printer()

```
void SinglyLinkedList::printer (
    string sep = ", " )
```

Print the list.

Parameters

in	<i>sep</i>	separator string
----	------------	------------------

The documentation for this class was generated from the following files:

- [DSA.h](#)
- DSA.cpp

3.7 SinglyLinkedListNode Class Reference

Singly Linked List Node class. Available member functions include default constructor and initialising constructor.

```
#include <DSA.h>
```

Collaboration diagram for SinglyLinkedListNode:



Public Member Functions

- [SinglyLinkedListNode](#) ()
Construct a new Singly Linked List Node object.
- [SinglyLinkedListNode](#) (ll val)
Construct a new Singly Linked List Node object.

Public Attributes

- [ll data](#)
data stored in the node
- [SinglyLinkedListNode](#) * [next](#)
pointer to the next node

3.7.1 Detailed Description

Singly Linked List Node class. Available member functions include default constructor and initialising constructor.

3.7.2 Constructor & Destructor Documentation

3.7.2.1 SinglyLinkedListNode()

```
SinglyLinkedListNode::SinglyLinkedListNode (
    ll val )
```

Construct a new Singly Linked List Node object.

Parameters

in	val	input value for the node
----	-----	--------------------------

The documentation for this class was generated from the following files:

- [DSA.h](#)
- [DSA.cpp](#)

3.8 Trie Class Reference

[Trie](#) class. Available member functions include default constructor, find, insert, checkPrefix and countPrefix.

```
#include <DSA.h>
```

Public Member Functions

- [Trie](#) ()
Construct a new [Trie](#) object.
- bool [find](#) ([Trie](#) *T, char c)
Find a char in a trie.
- void [insert](#) (string s)
Insert string into a trie.
- bool [checkPrefix](#) (string s)
Check if a string is a prefix.
- **ll** [countPrefix](#) (string s)
Count how many strings have the given prefix.

Public Attributes

- **ll** [count](#)
count of the string from root to leaf
- map< char, [Trie](#) * > [nodes](#)
map/dictionary of nodes

3.8.1 Detailed Description

[Trie](#) class. Available member functions include default constructor, find, insert, checkPrefix and countPrefix.

3.8.2 Member Function Documentation

3.8.2.1 [checkPrefix\(\)](#)

```
bool Trie::checkPrefix (  
    string s )
```

Check if a string is a prefix.

Parameters

in	s	string to check
----	---	-----------------

Returns

true/false

3.8.2.2 countPrefix()

```
11 Trie::countPrefix (
    string s )
```

Count how many strings have the given prefix.

Parameters

in	s	prefix to check
----	---	-----------------

Returns

||

3.8.2.3 find()

```
bool Trie::find (
    Trie * T,
    char c )
```

Find a char in a trie.

Parameters

in	T	trie root pointer
in	c	char to find

Returns

true/false

3.8.2.4 insert()

```
void Trie::insert (
    string s )
```

Insert string into a trie.

Parameters

in	s	string to insert
----	---	------------------

The documentation for this class was generated from the following files:

- [DSA.h](#)
- DSA.cpp

Chapter 4

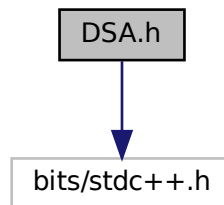
File Documentation

4.1 DSA.h File Reference

C++ declarations of data structures and their utility functions.

```
#include <bits/stdc++.h>
```

Include dependency graph for DSA.h:



Classes

- class [SinglyLinkedListNode](#)
Singly Linked List Node class. Available member functions include default constructor and initialising constructor.
- class [SinglyLinkedList](#)
Singly Linked List class. Available member functions include default constructor, insert, find, deleteVal, printer and reverse.
- class [DoublyLinkedListNode](#)
Doubly Linked List Node class. Available member functions include default constructor and initialising constructor.
- class [DoublyLinkedList](#)
Doubly Linked List class. Available member functions include default constructor, insert, printer and reverse.
- class [BSTNode](#)
BST Node class. Available member functions include initialising constructor.
- class [BinarySearchTree](#)
BinarySearchTree class. Available member functions include default constructor, insert, traverse and height.
- class [Trie](#)
Trie class. Available member functions include default constructor, find, insert, checkPrefix and countPrefix.
- class [Heap](#)

Macros

- `#define ll long long int`
long long int macro
- `#define vi vector<int>`
int vector macro
- `#define vll vector<ll>`
long long vector macro

Functions

- `ostream & operator<< (ostream &out, const SinglyLinkedListNode &node)`
Function to print a Singly Linked List Node.
- `SinglyLinkedList merge (SinglyLinkedList list1, SinglyLinkedList list2)`
Merge two sorted linked lists.
- `ostream & operator<< (ostream &out, const DoublyLinkedListNode &node)`
Function to print a Doubly Linked List Node.
- `ostream & operator<< (ostream &out, const BSTNode &node)`
Function to print a BST Node.
- `void swap (int &x, int &y)`
Swap function.

4.1.1 Detailed Description

C++ declarations of data structures and their utility functions.

Author

Sarthak Mittal (200050129@iitb.ac.in)

Version

1

Date

2022-09-17

4.1.2 Function Documentation

4.1.2.1 merge()

```
SinglyLinkedList merge (
    SinglyLinkedList list1,
    SinglyLinkedList list2 )
```

Merge two sorted linked lists.

Parameters

in	<i>list1</i>	first list
in	<i>list2</i>	second list

Returns

[SinglyLinkedList](#)

4.1.2.2 operator<<() [1/3]

```
ostream& operator<< (
    ostream & out,
    const BSTNode & node )
```

Function to print a BST Node.

Parameters

in	<i>out</i>	standard output stream
in	<i>node</i>	the node to be printed

Returns

ostream&

4.1.2.3 operator<<() [2/3]

```
ostream& operator<< (
    ostream & out,
    const DoublyLinkedListNode & node )
```

Function to print a Doubly Linked List Node.

Parameters

in	<i>out</i>	standard output stream
in	<i>node</i>	the node to be printed

Returns

ostream&

4.1.2.4 operator<<() [3/3]

```
ostream& operator<< (
    ostream & out,
    const SinglyLinkedListNode & node )
```

Function to print a Singly Linked List Node.

Parameters

in	<i>out</i>	standard output stream
in	<i>node</i>	the node to be printed

Returns

ostream&

4.1.2.5 swap()

```
void swap (
    int & x,
    int & y )
```

Swap function.

Parameters

in	<i>x</i>	first value
in	<i>y</i>	second value

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