C++

LAUNCHPAD

CODING BLOCKS

Lecture-12,13

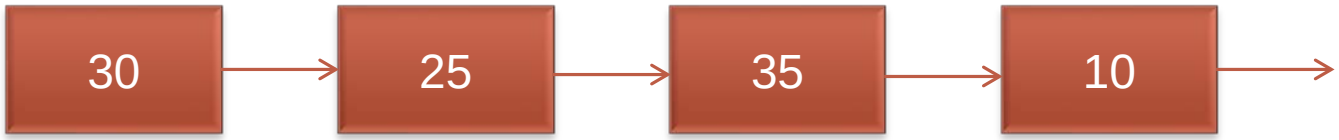
Data Structures

- Linked List- I
- Linked List - II

Prateek Narang

What are Data Structures?

What are Linked Lists?



Lets define our own Linked List

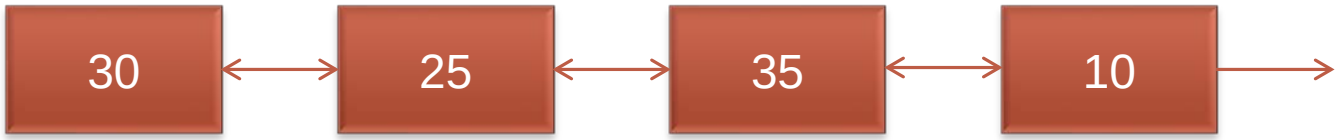
```
class Node {
        int data;
        Node* next;
}
```

Head and Tail nodes

Basic operations over Linked List

1. Taking Linked List as input from user
2. Accessing next element
3. Looping over Linked List
4. Inserting into Linked List
5. Deleting from Linked List

Doubly Linked Lists



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Implementation?

```
class Node {
        int data;
        Node* next;
        Node* prev;
}
```

Doubly LL vs Singly LL

1. Faster to go back in the linked list
2. Uses more memory

Lets try some problems

- Find length of a linked list
- Find an element recursively
- Find mid point of a linked list
- Implement Bubble Sort

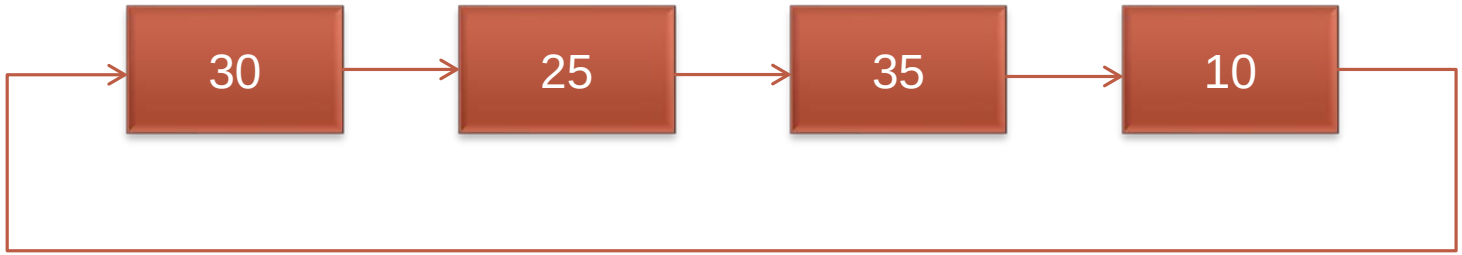
Lets try some problems

- Find 5th element from end without calculating length of Linked List
- Given two sorted linked lists merge them into a sorted linked list
- Implement merge sort
- Reverse a Linked List

More problems

- Cycle Detection
- K- Reverse

Circular Linked Lists



Benefits of Arrays over Linked List

1. Random access to elements
2. Fast iteration through the elements
3. Very compact way to store data

Benefits of Linked List over Array

1. Constant time insertion and deletion of elements
2. Don’t need to know the number of elements
3. Insert elements in the middle of the list

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Thank You!

Prateek Narang