Wednesday, 5
August 15

Crux
Lecture -11

Data Structures -1

Linked Lists

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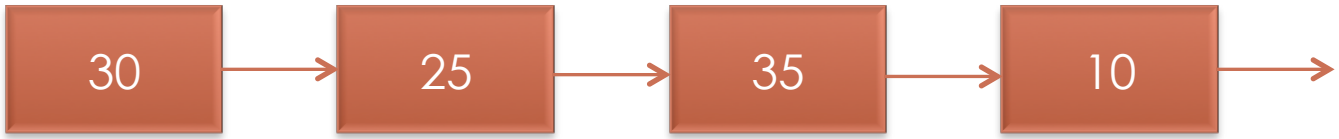
CODING
BLOCKS

What are Data Structures?

What are Linked Lists?



CODING BLOCKS

Lets define our own Linked List

```
public class Node<T> {
        T data;
        Node<T> next;
}
```

Head and Tail nodes

Lets do some problems

1. Taking Linked List as input from user
2. Print a Linked List

Your turn

1. Print ith element of Linked List

Insertion at ith Position

Your turn

1. Find length of Linked List
2. Delete the element at ith Position
3. Implement Insertion/Deletion using Recursion

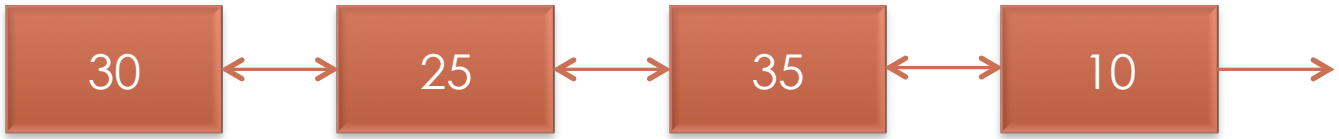
Benefits of Arrays over Linked List

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

Doubly Linked Lists



CODING BLOCKS

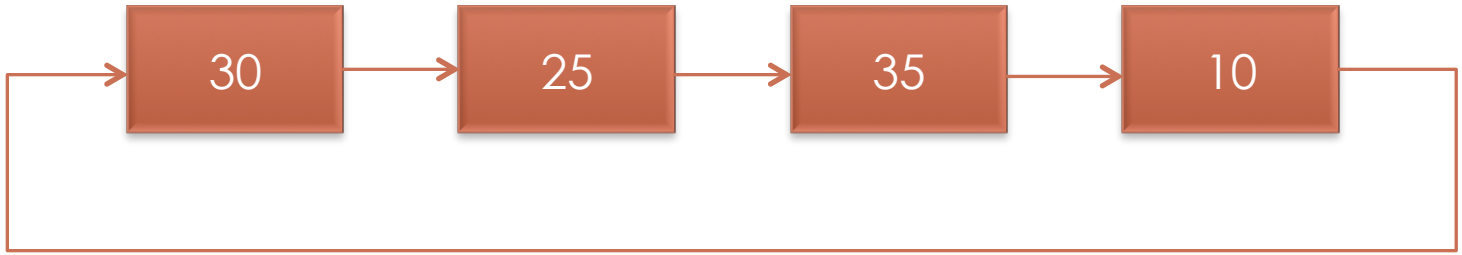
Implementation?

```
public class Node<T> {
        T data;
        Node<T> next;
        Node<T> prev;
}
```

Doubly LL vs Singly LL

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

Circular Linked Lists



CODING BLOCKS

Lets try some problems

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

Your Turn

- 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

Thank You !! ☺

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