Sunday, 01 January 2017

Crux

Lecture -11

Data Structures -1

Linked Lists

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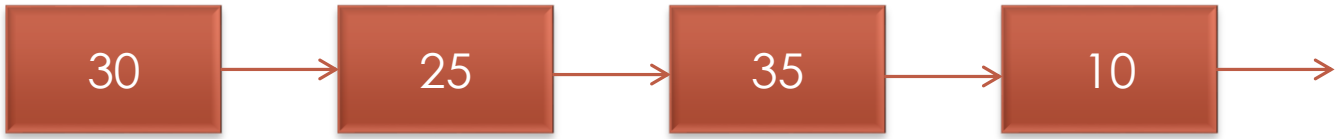
CODING BLOCKS

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;
}
```

CODING BLOCKS

Head and Tail nodes

Lets Try

```
class LinkedList{
    int size();
    boolean isEmpty();
    T getFirst();
    T getLast();
    T getAt(int idx);
    }
```

CODING BLOCKS

Your turn

```
class LinkedList{
    Void addFirst(T data);
    Void addLast(T data);
    Void addAt(T data, int idx);
    T removeFirst();
    T removeLast();
    T removeAt(int idx);
    Void display();
    }
```

CODING BLOCKS

Benefits of Arrays over Linked List

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

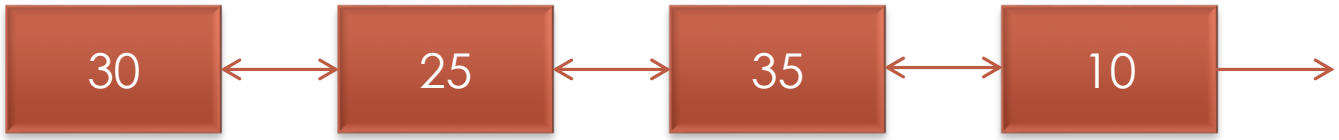
CODING BLOCKS

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

CODING BLOCKS

Doubly Linked Lists



CODING BLOCKS

Implementation?

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

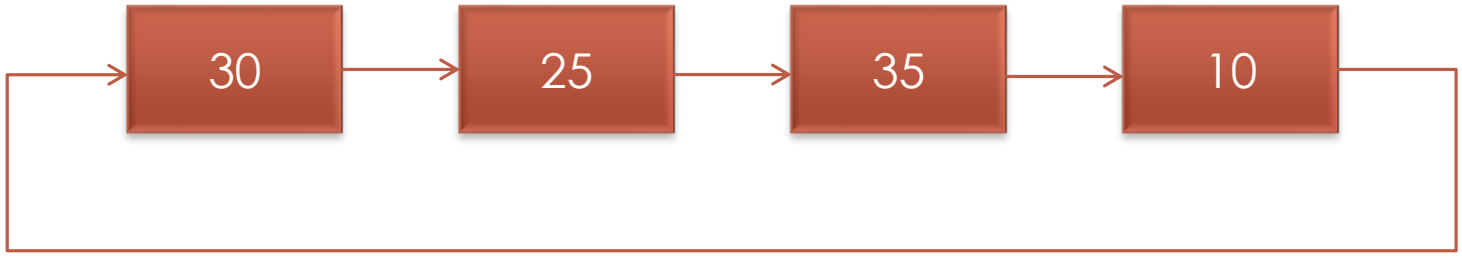
CODING BLOCKS

Doubly LL vs Singly LL

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

CODING BLOCKS

Circular Linked Lists



CODING BLOCKS

Lets try

- Find mid point of a linked list
- Find 5^{th} element from end without calculating length of Linked List

CODING BLOCKS

Lets try

- Find – Iterative, Recursive
- Reverse – Iterative, Recursive
- Reverse – Pointers, data

CODING BLOCKS

Lets Try

- Implement Bubble sort
- Given two sorted linked lists merge them into a sorted linked list
- Implement merge sort

CODING BLOCKS

Thank You !! ☺

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