

# IT 179

## 10

# Double-Linked Lists

# For Next Lecture

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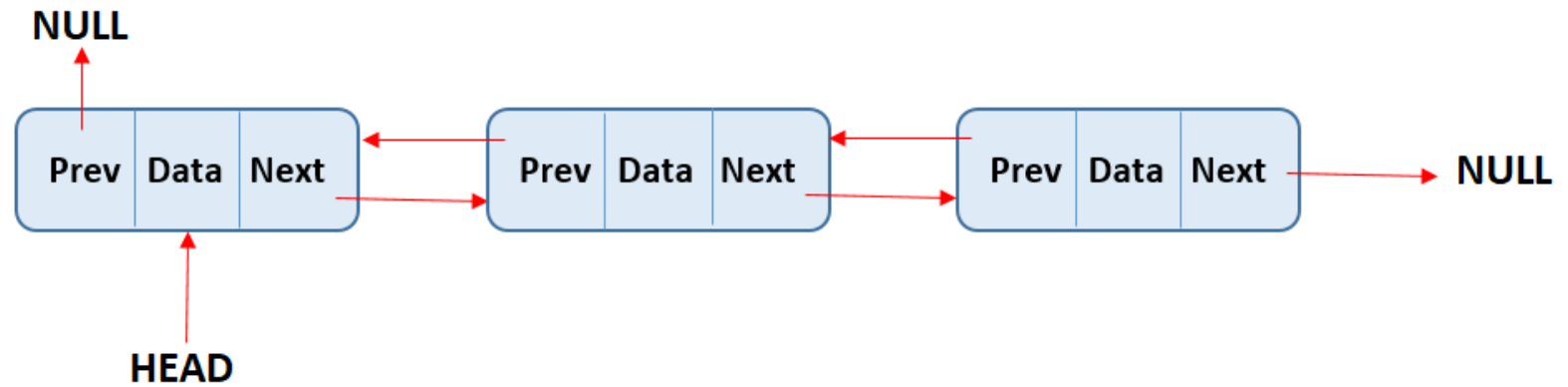
Read Sections 2.7 and 2.8  
**The LinkedList Class**

# Double-Linked Lists

- Limitations of a singly-linked list include:
  - ▣ Insertion at the front is  $O(1)$ ; insertion at other positions is  $O(n)$
  - ▣ Insertion is convenient only after a referenced node
  - ▣ Removing a node requires a reference to **previous** node
  - ▣ We can traverse list only in the **forward direction**
- We can overcome these limitations:
  - ▣ Add a reference in each node to the previous node, creating a **double-linked list**

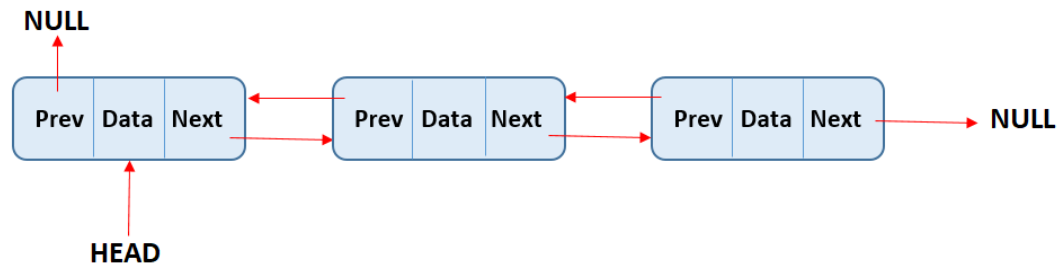
# Double-Linked Lists

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# Node<E> Class

```
private static class Node<E> {  
    private E data;  
    private Node<E> next = null;  
    private Node<E> prev = null;  
  
    private Node(E dataItem) {  
        data = dataItem;  
    }  
}
```



# A Double-Linked Class

- ▣ head (a reference to the first list Node)
  - ▣ tail (a reference to the last list Node)
  - ▣ size
- 
- ▣ Insertion at either end is  $O(1)$ ; insertion elsewhere is still  $O(n)$