IT 179
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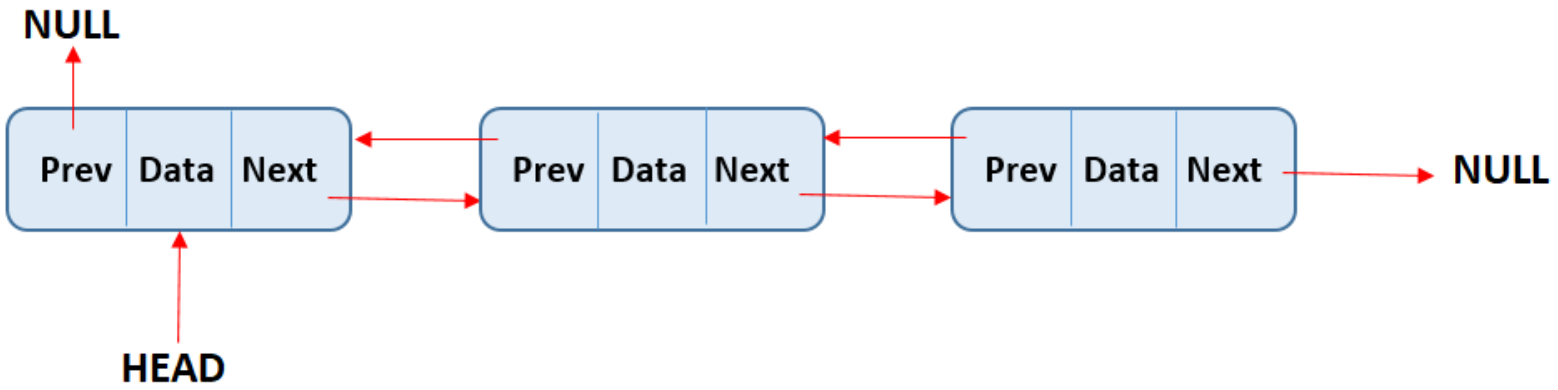
Double-Linked Lists

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***

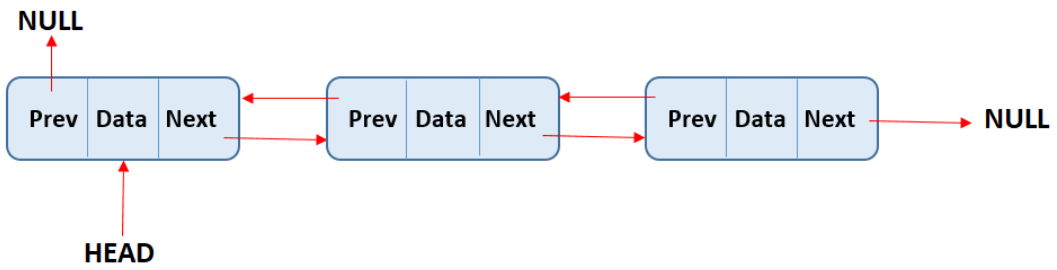
Double-Linked Lists



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*)