Doubly Linked List

Doubly Linked List Node

```java
class Node{
    E data;
    Node previous;
    Node next;
    Node(E item){
        data = item;
        next = null;
        previous = null;
    }
    Node(){
        data = null;
        next = null;
        previous = null;
    }
}
```

Node n1 = new Node("alice");
Doubly Linked List

```java
Node<String> n1 = new Node("Alice");
Node<String> n2 = new Node("Bob");
Node<String> n3 = new Node("Cathy");
n1.next = n2;
n2.previous = n1;
n2.next = n3;
n3.previous = n2;
```

Insert a Node
Insert a Node

Delete a Node
Delete a node

1. n1.next = n2.next

2. n3.prev = n2.prev

3. n2 is garbage now

Double Linked List Class

```java
public class DoublyLinkedList<E> implements Iterable<E>{
    private int N; // number of nodes
    private Node head; // sentinel before the first node
    private Node tail; // sentinel after the last node;
    DoublyLinkedList(){
        head = new Node();
        tail = new Node();
        head.next = tail;
        tail.previous = head;
    }
```
public void insert(E item) {
    Node last = tail.previous;
    Node t = new Node(item);
    t.next = tail;
    t.previous = last;
    tail.previous = t;
    last.next = t;
    N++;
}