Data Structure
Programming Assignment 1

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What to do?

- **The pop() function of the queue implementation we discuss in class is O(n)**

- **Use double linked list to implement queue, stack**

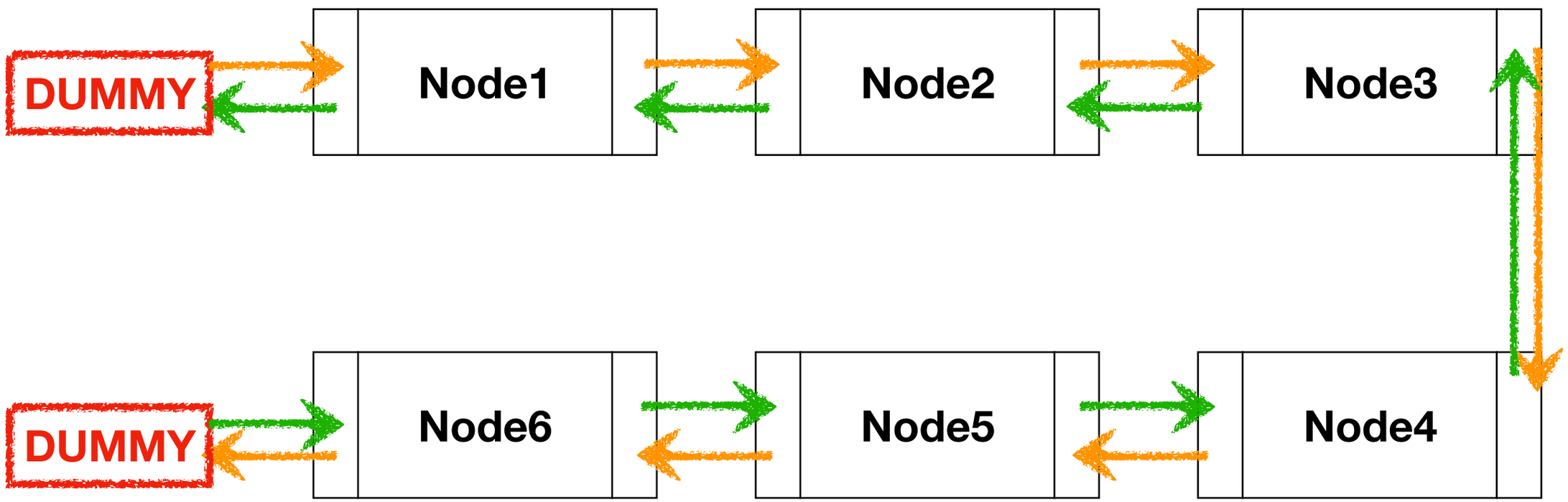
- **Make sure your pop() and push() should be O(1)**

What is double linked list?

- **Each node have two links to access the previous node and the next node**

- **: means the prev node**

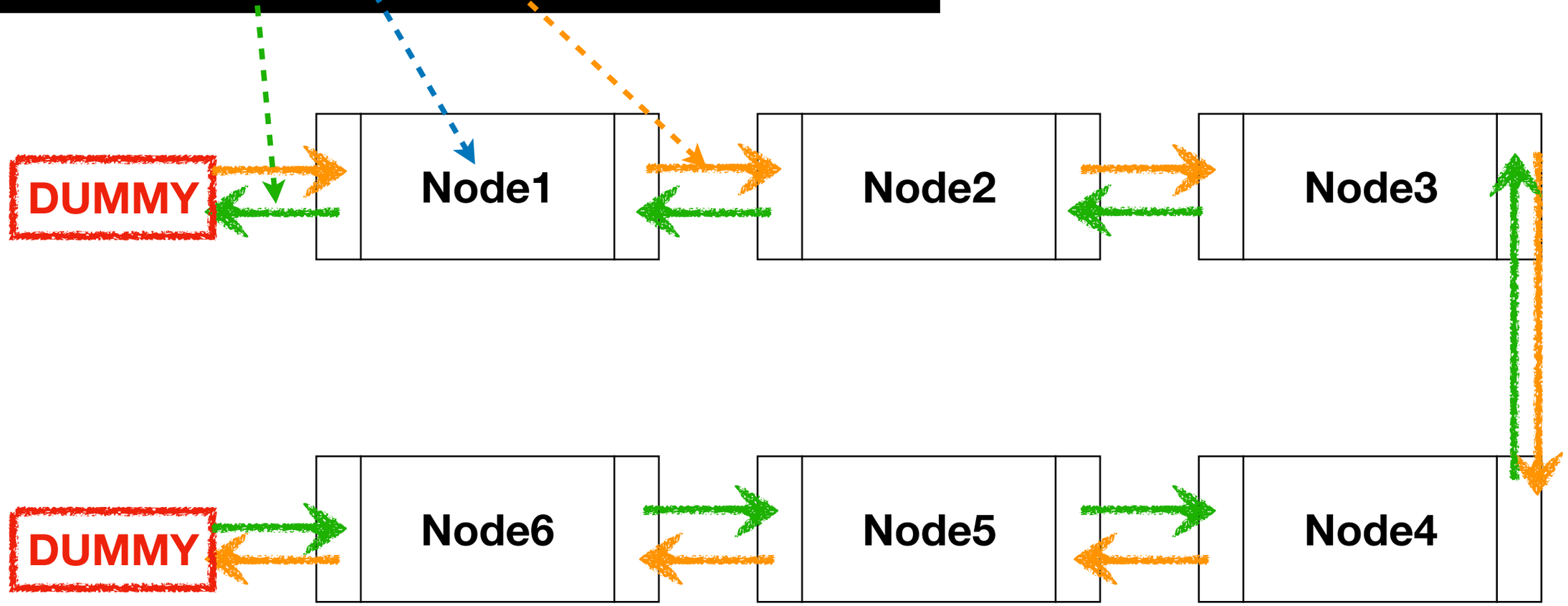
: means the next node



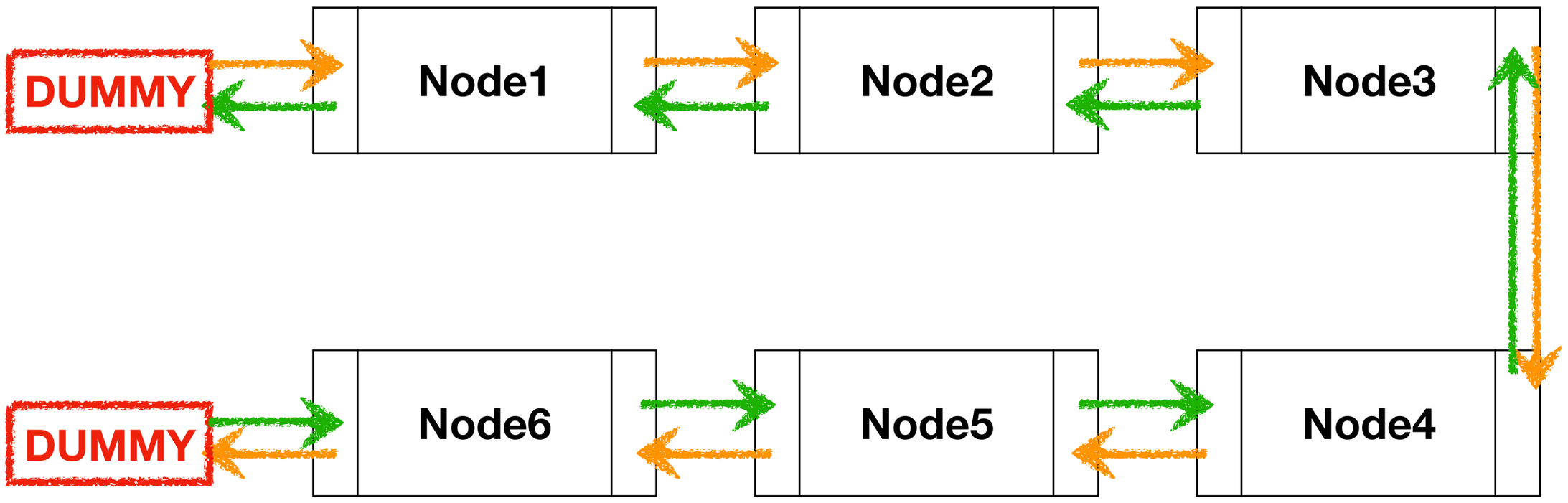
Code Template

```
class node:
    # this class infor testing
    # Do Not Modify
    def __init__(self, value):
        self.value = value
        self.right = self
        self.left = self

    def __repr__(self):
        return 'Node{}'.format(self.value).strip()
```

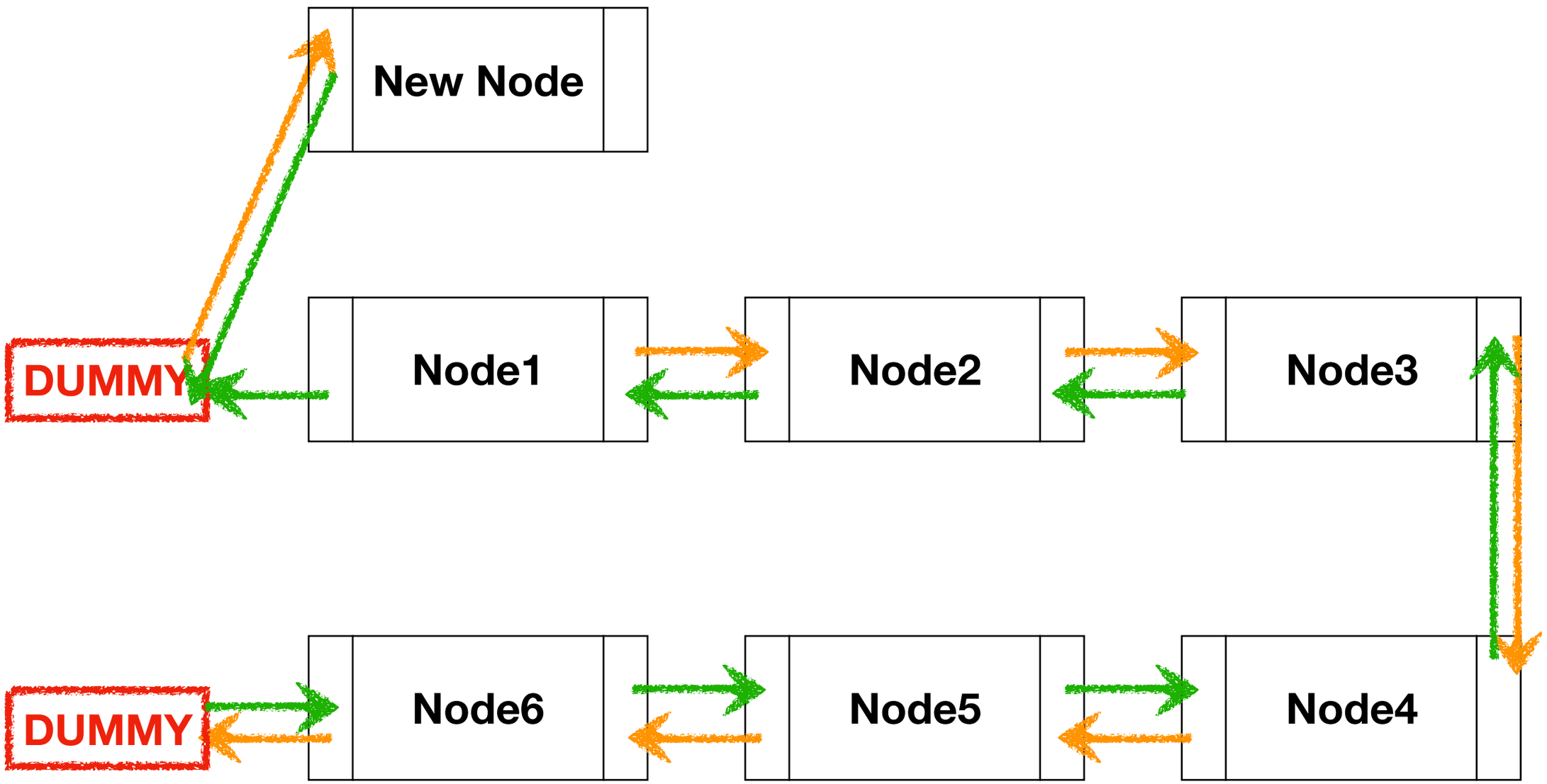


Insert Node



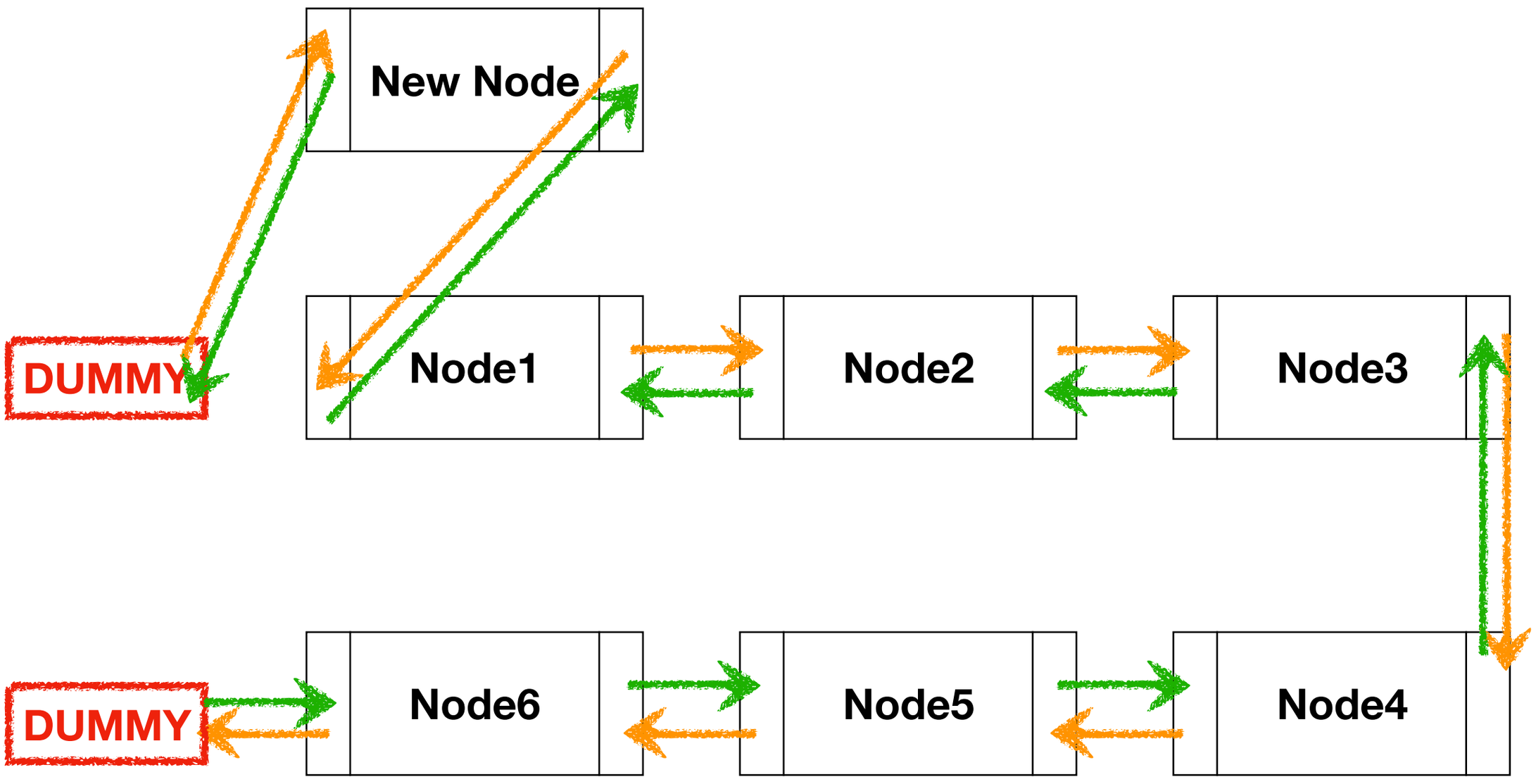
Insert Node (1/2)

Connect new node and previous node

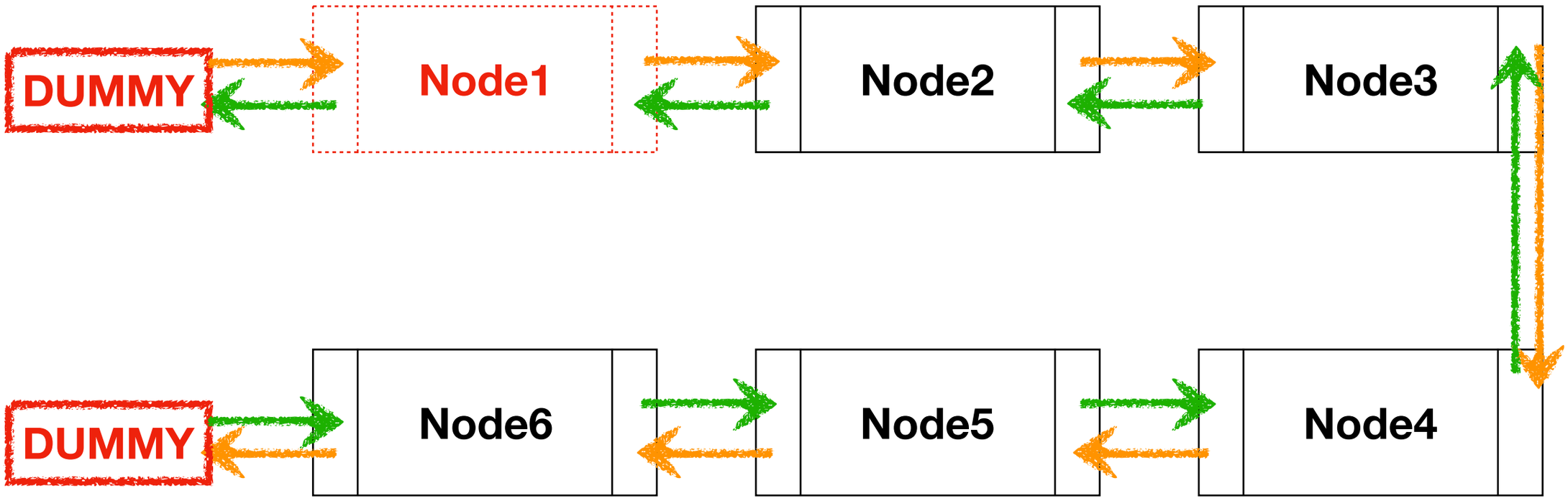


Insert Node (2/2)

Connect new node and next node

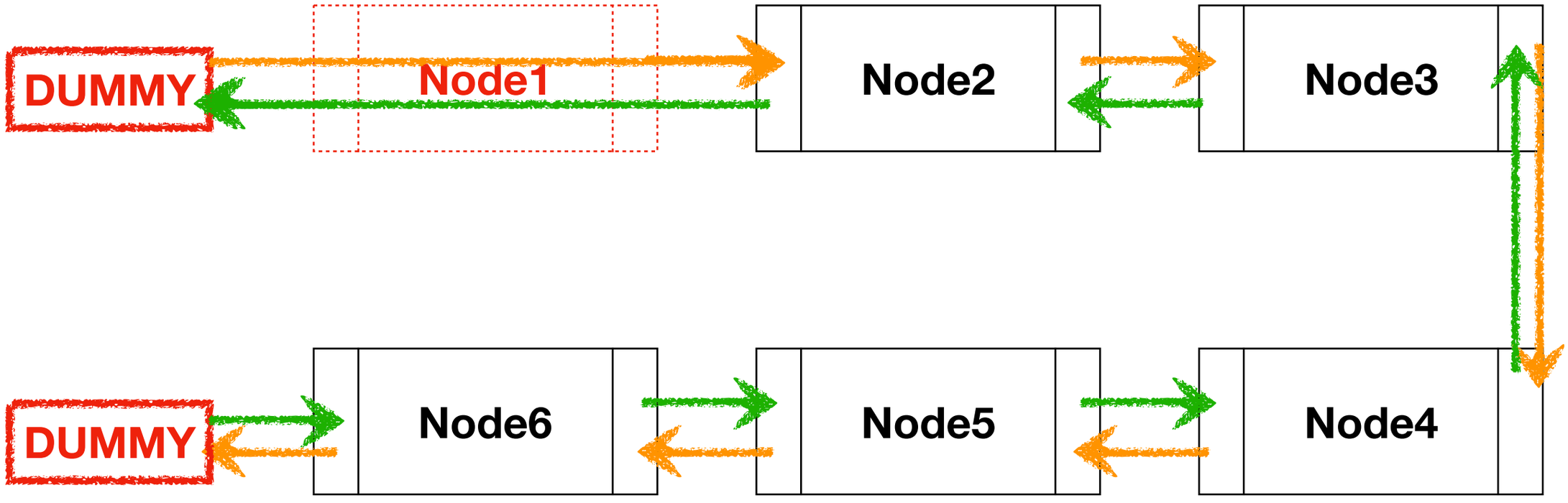


Delete Node



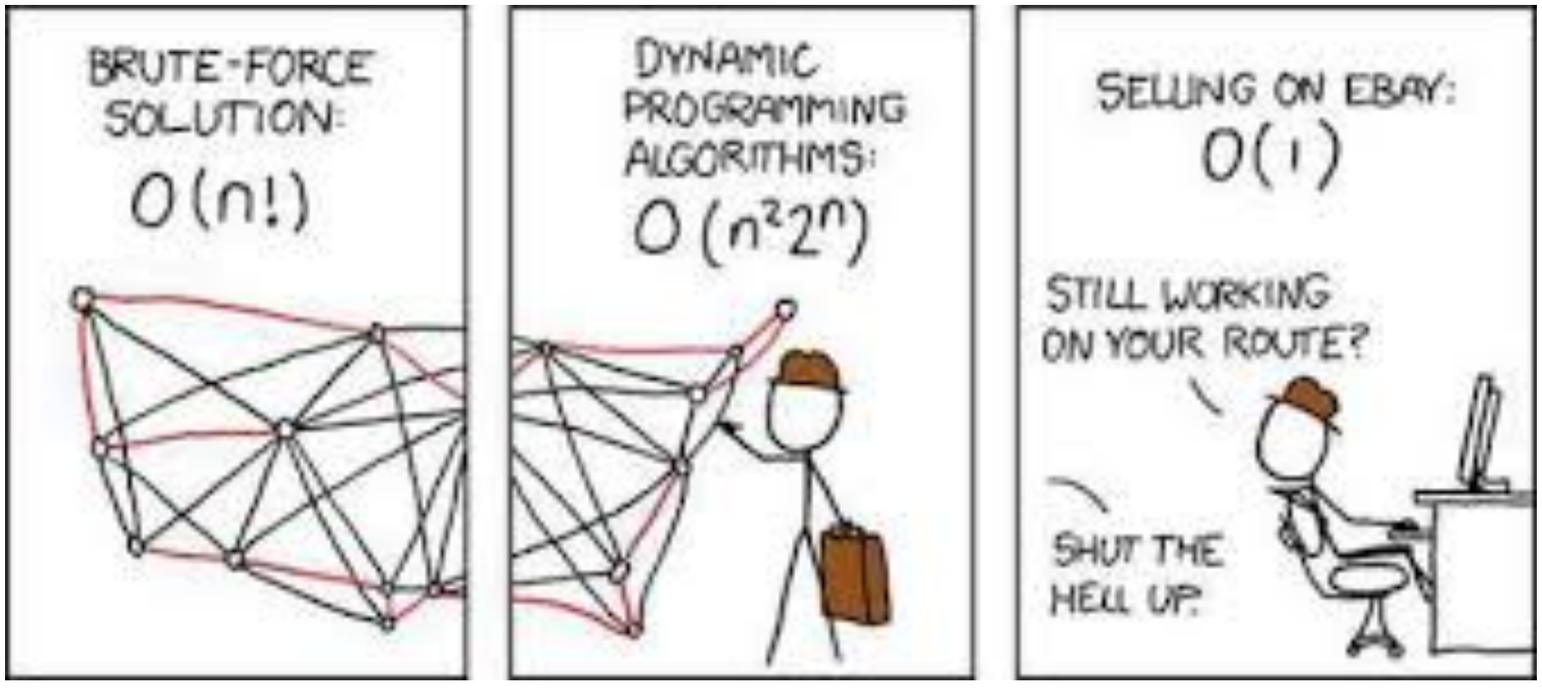
Delete Node

Modify the link between previous node and next node directly (free up memory is optional)



Submission

- **Please follow the rules in the pdf file**
- **Deadline: 2020/04/09 04:00 a.m.**
- **Hope this helps!**



Supplement

- **__init__() is the constructor for the class, which is similar to the usage in c/c++**

- **__repr__() returns a printable representational string, and the print() will call this function in the class**

- **In the homework template you can just `print(stack)` or `print(queue)` without any modification.**