Add Two Numbers

Difficulty: Medium

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The Problem

- You are given two non-empty linked lists representing two non-negative integers. The digits are stored in reverse order, and each of their nodes contains a single digit. Add the two numbers and return the sum as a linked list.

- You may assume the two numbers do not contain any leading zero, except the number 0 itself.

Example:

- Input: l1 = [2,4,3], l2 = [5,6,4]

- Output: [7,0,8]

- Explanation: 342 + 465 = 807.
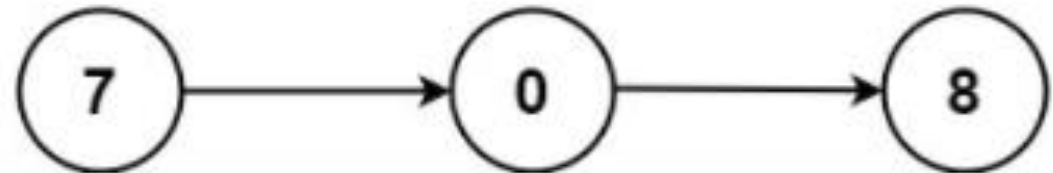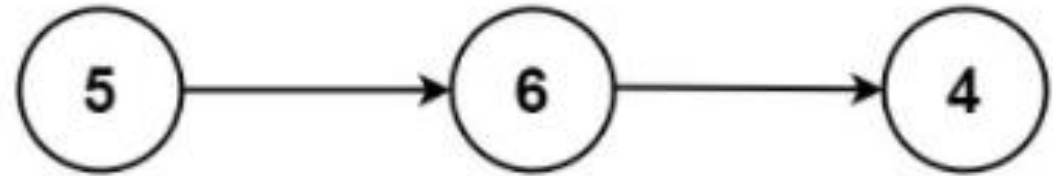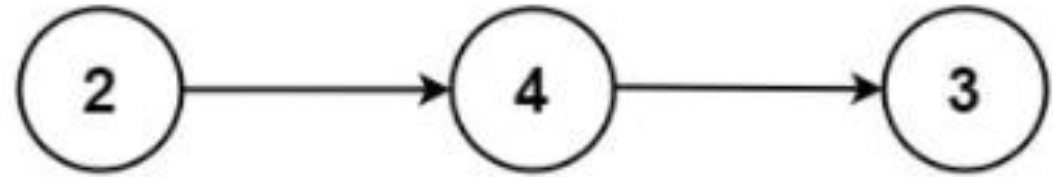
Analyze

- Both list should have at least one digit of value and not be an empty list or without value.

- Non-negative integer allowed.

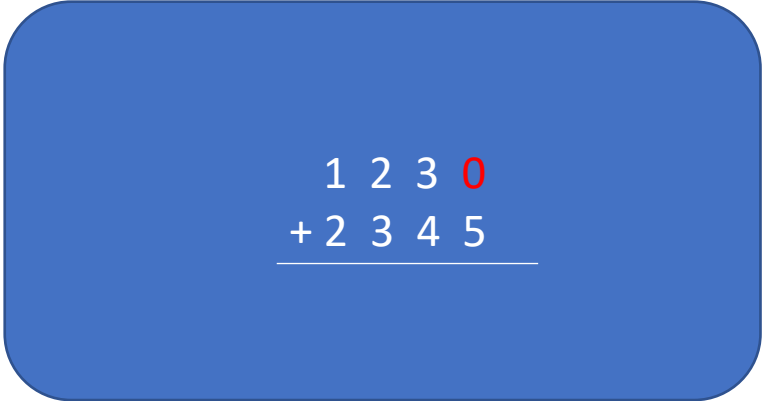- We must reverse each input that is given, add them and store them as a linked list.

- Each digit will be one node.

- You are given two **non-empty** linked lists representing two **non-negative integers**. The digits are stored in **reverse order**, and each of their nodes contains a single digit. Add the two numbers and return the sum as a **linked list**.

- You may assume the two numbers do not contain any leading zero, except the number 0 itself.

- **Example:**

- Input: l1 = [2,4,3], l2 = [5,6,4]

- Output: [7,0,8]

- Explanation: 342 + 465 = 807.

Case 1

• What if there is difference in size of lists?
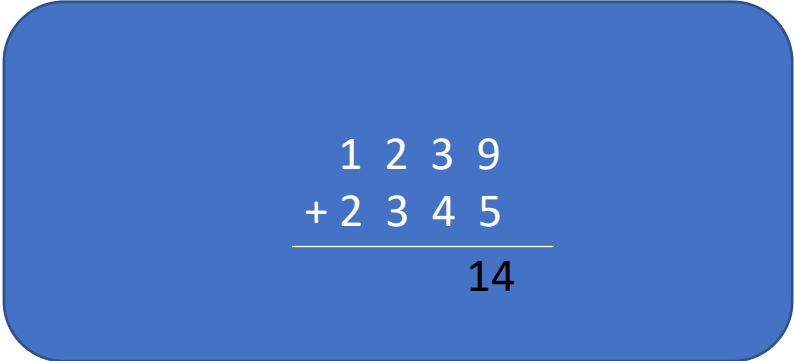
Example:

L1 = [1, 2, 3] + L2 = [2, 3, 4, 5]

1 2 3 0
+ 2 3 4 5

Case 2

- What if the sum of two nodes is bigger then 9?

Example:

8 + 9 = **17**

$$
\begin{array}{r}
1\ 2\ 3\ 9 \\
+\ 2\ 3\ 4\ 5 \\
\hline
14
\end{array}
$$

Code

Case one and two fixes, extracting value

```python
carry = 0
while l1 or l2 or carry:
    v1 = l1.val if l1 else 0
    v2 = l2.val if l2 else 0
```

Calculating new digits + storing

```python
val = v1 + v2 + carry
carry = val // 10
val = val % 10
cur.next = ListNode(val)
```

Storing digits into list

```python
    cur = cur.next
    l1 = l1.next if l1 else None
    l2 = l2.next if l2 else None
return dummy.next
```

```python
class Solution(object):
    def addTwoNumbers(self, l1: ListNode, l2: ListNode):
        dummy = ListNode()
        cur = dummy

        carry = 0
        while l1 or l2 or carry:
            v1 = l1.val if l1 else 0
            v2 = l2.val if l2 else 0

            val = v1 + v2 + carry
            carry = val // 10
            val = val % 10
            cur.next = ListNode(val)

            cur = cur.next
            l1 = l1.next if l1 else None
            l2 = l2.next if l2 else None
        return dummy.next
```

Solutions

Your input	[2,4,3] [5,6,4]		Your input	[2,4,3] [5,6,4,8,4]
Output	[7,0,8]		Output	[7,0,8,8,4]
Expected	[7,0,8]		Expected	[7,0,8,8,4]

Submission

Time Submitted	Status	Runtime	Memory	Language
02/06/2022 11:24	Accepted	142 ms	13.9 MB	python3

Submission Detail

1568 / 1568 test cases passed.

Runtime: **142 ms**
Memory Usage: **13.9 MB**

Status: **Accepted**

Submitted: **1 minute ago**

Reference

- https://leetcode.com/problems/add-two-numbers/submissions/
- https://www.youtube.com/watch?v=wgFPrzTjm7s&ab_channel=NeetCode