

Reverse a Linked List

May 12, 2020

1 Reversing a linked list exercise

Given a singly linked list, return another linked list that is the reverse of the first.

In []: *# Helper Code*

```
class Node:
    def __init__(self, value):
        self.value = value
        self.next = None

class LinkedList:
    def __init__(self):
        self.head = None

    def append(self, value):
        if self.head is None:
            self.head = Node(value)
            return

        node = self.head
        while node.next:
            node = node.next

        node.next = Node(value)

    def __iter__(self):
        node = self.head
        while node:
            yield node.value
            node = node.next

    def __repr__(self):
        return str([v for v in self])
```

1.0.1 Write the function definition here

```
In [ ]: def reverse(linked_list):
        """
        Reverse the inputted linked list

        Args:
            linked_list(obj): Linked List to be reversed
        Returns:
            obj: Reversed Linked List
        """

        # TODO: Write your function to reverse linked lists here
        new_list = LinkedList()
        prev_node = None
        for value in linked_list:
            new_node = Node(value)
            new_node.next = prev_node
            prev_node = new_node
        return new_list
        pass
```

1.0.2 Let's test your function

```
In [2]: llist = LinkedList()
        for value in [4,2,5,1,-3,0]:
            llist.append(value)

        flipped = reverse(llist)
        is_correct = list(flipped) == list([0,-3,1,5,2,4]) and list(llist) == list(reverse(flipped))
        print("Pass" if is_correct else "Fail")
```

NameError Traceback (most recent call last)

```
<ipython-input-2-a78ec44b9e18> in <module>()
----> 1 llist = LinkedList()
      2 for value in [4,2,5,1,-3,0]:
      3     llist.append(value)
      4
      5 flipped = reverse(llist)
```

NameError: name 'LinkedList' is not defined

Hide Solution

```
In [ ]: # Solution
```

```
# Time complexity  $O(N)$ 
def reverse(linked_list):
    """
    Reverse the inputted linked list

    Args:
        linked_list(obj): Linked List to be reversed
    Returns:
        obj: Reversed Linked List
    """
    new_list = LinkedList()

    prev_node = None

    """
    A simple idea - Pick a node from the original linked list traversing from the beginning
    prepend it to the new linked list.
    We have to use a loop to iterate over the nodes of original linked list
    """
    # In this "for" loop, the "value" is just a variable whose value will be updated in
    for value in linked_list:
        # create a new node
        new_node = Node(value)

        # Make the new_node.next point to the
        # node created in previous iteration
        new_node.next = prev_node

        # This is the last statement of the loop
        # Mark the current new node as the "prev_node" for next iteration
        prev_node = new_node

    # Update the new_list.head to point to the final node that came out of the loop
    new_list.head = prev_node

    return new_list
```

```
In [ ]:
```