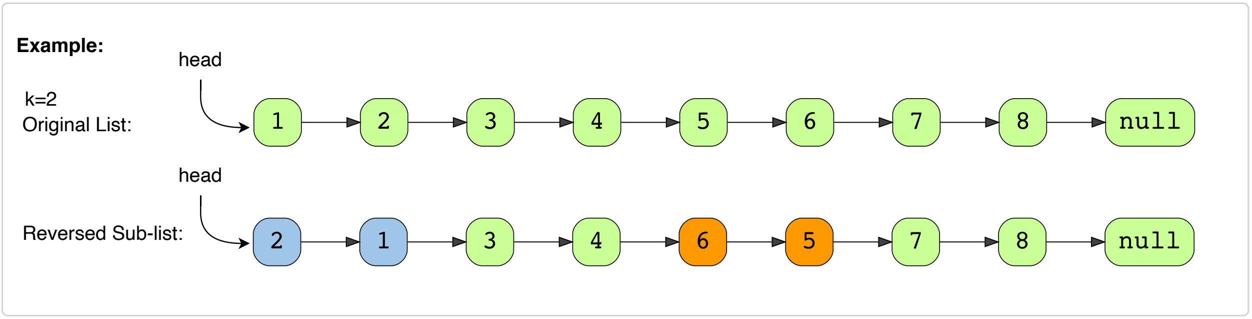
Solution Review: Problem Challenge 1

We'll cover the following

Reverse alternating K-element Sub-list (medium)

Given the head of a LinkedList and a number 'k', **reverse every alternating 'k' sized sub-list** starting from the head.

If, in the end, you are left with a sub-list with less than 'k' elements, reverse it too.



Solution

The problem follows the **In-place Reversal of a LinkedList** pattern and is quite similar to Reverse every K-element Sub-list (https://www.educative.io/collection/page/5668639101419520/5671464854355968/6119318955753472/). The only difference is that we have to skip 'k' alternating elements. We can follow a similar approach, and in each iteration after reversing 'k' elements, we will skip the next 'k' elements.

Code

Most of the code is the same as Reverse every K-element Sub-list (https://www.educative.io/collection/page/5668639101419520/5671464854355968/6119318955753472/); only the highlighted lines have a majority of the changes:

Java | Python3 | C++ | JS

```
from __future__ import print_function


class Node:
```

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

  def print_list(self):
    temp = self
    while temp is not None:
      print(temp.value, end=" ")
      temp = temp.next
    print()


def reverse_alternate_k_elements(head, k):
  if k <= 1 or head is None:
    return head

  current, previous = head, None
  while True:
    last_node_of_previous_part = previous
    # after reversing the LinkedList 'current' will become the last node of the sub-list
    last_node_of_sub_list = current
    next = None  # will be used to temporarily store the next node

    # reverse 'k' nodes
```

Time complexity

The time complexity of our algorithm will be $O(N)$ where 'N' is the total number of nodes in the LinkedList.

Space complexity

We only used constant space, therefore, the space complexity of our algorithm is $O(1)$.

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