Find Missing Number in given Array. (Apply Math)

Element would be in 1 to n in random order !!!

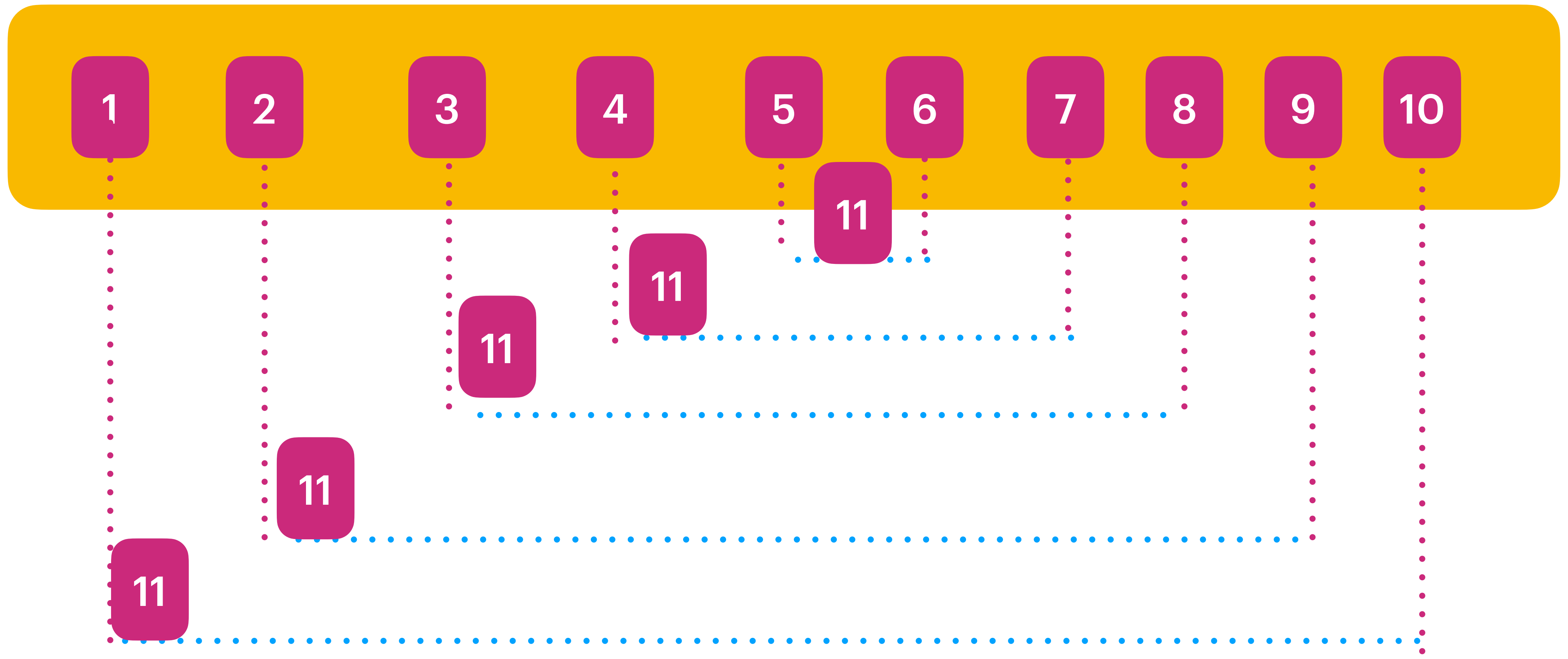
int[] arr = {1,3,4,5}, n=5

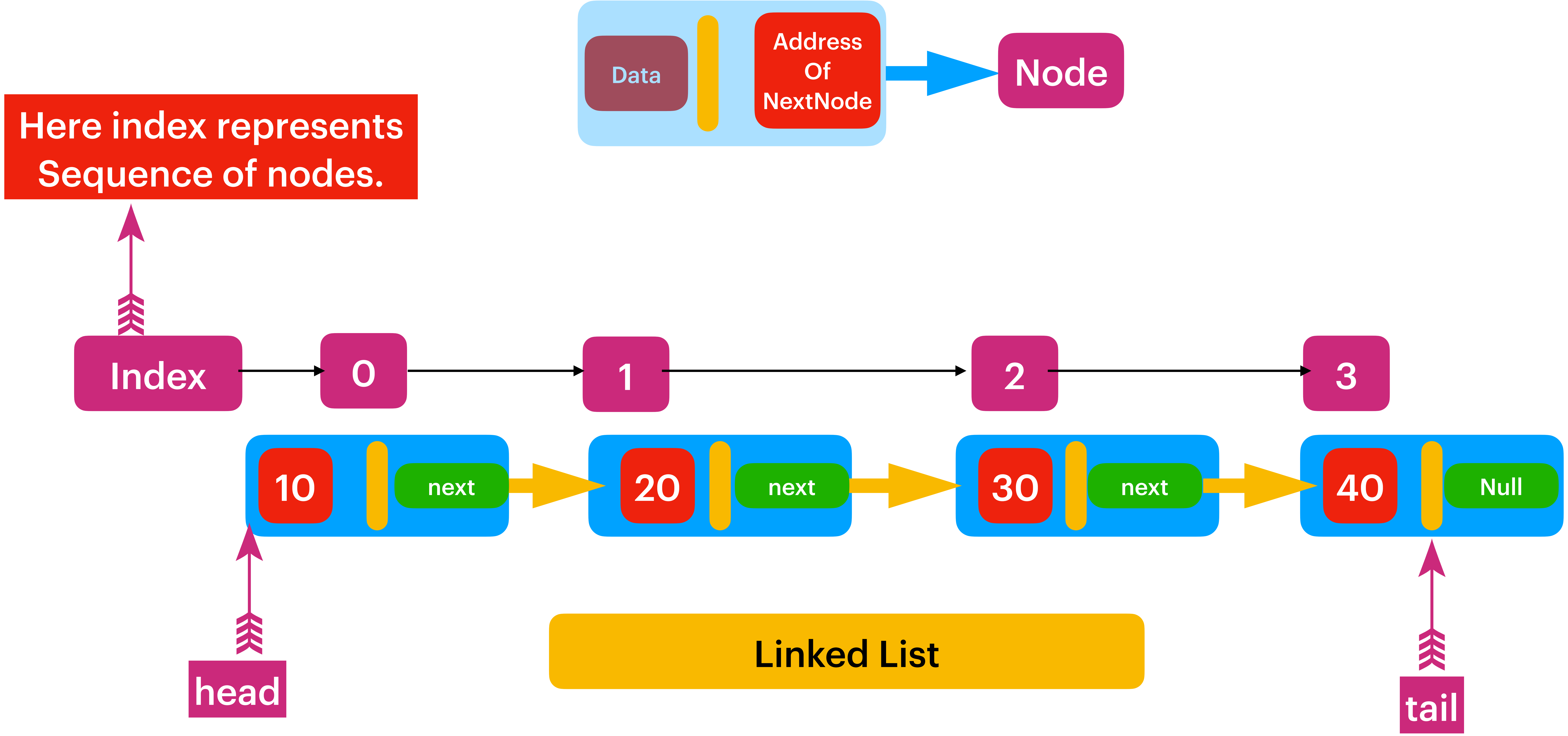
Missing element : 2

int[] arr = {1,2,4} , n=4

Missing element : 3

Lets understand the pattern of natural numbers





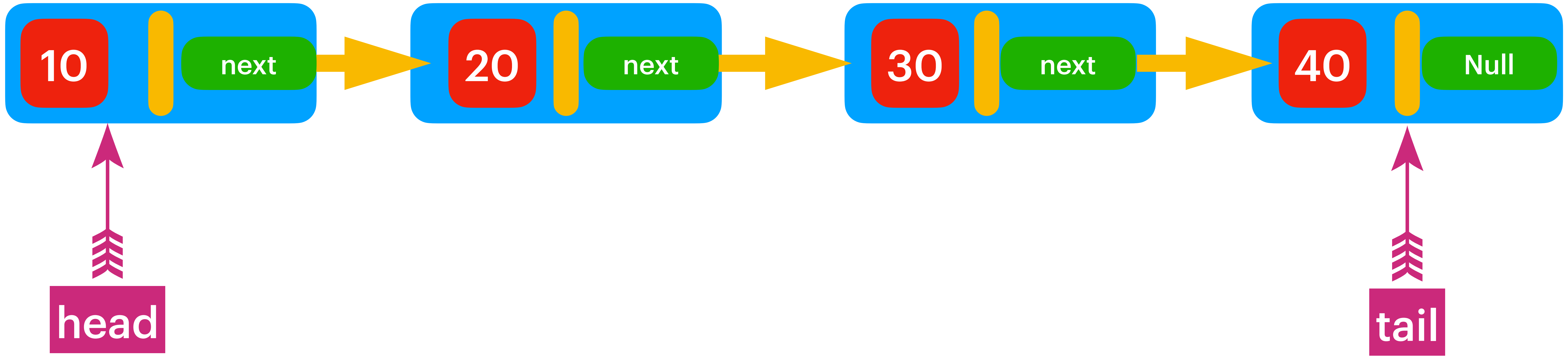
Here index represents Sequence of nodes.

Linked List

In LinkedList we make address as dynamic so that Data Deletion can be done with constant switch operations.

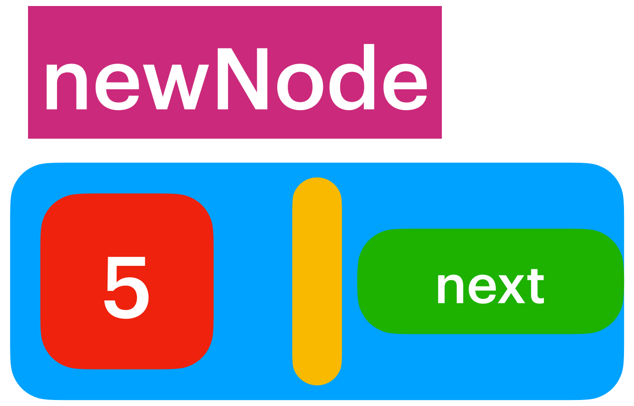
For each data we can create a separate Node object just to make Address Dynamic. And then link to Previous Node

Add to Head

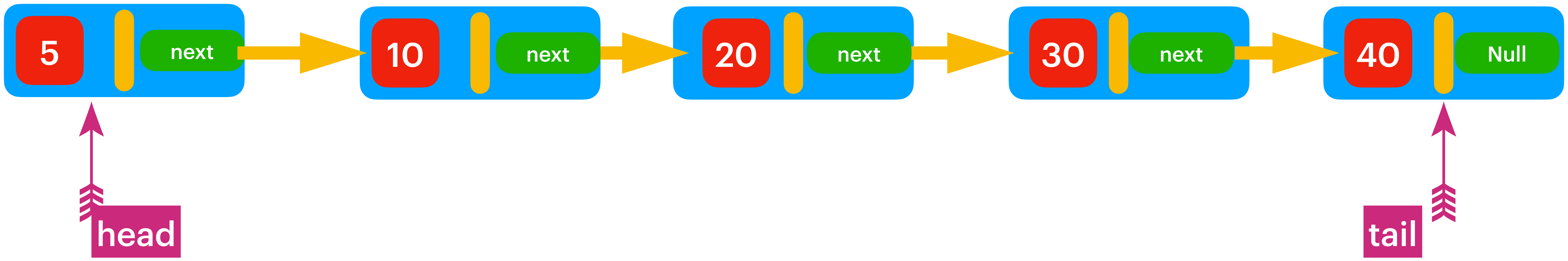


```
class  Node {
int data,
Node next;
}
```

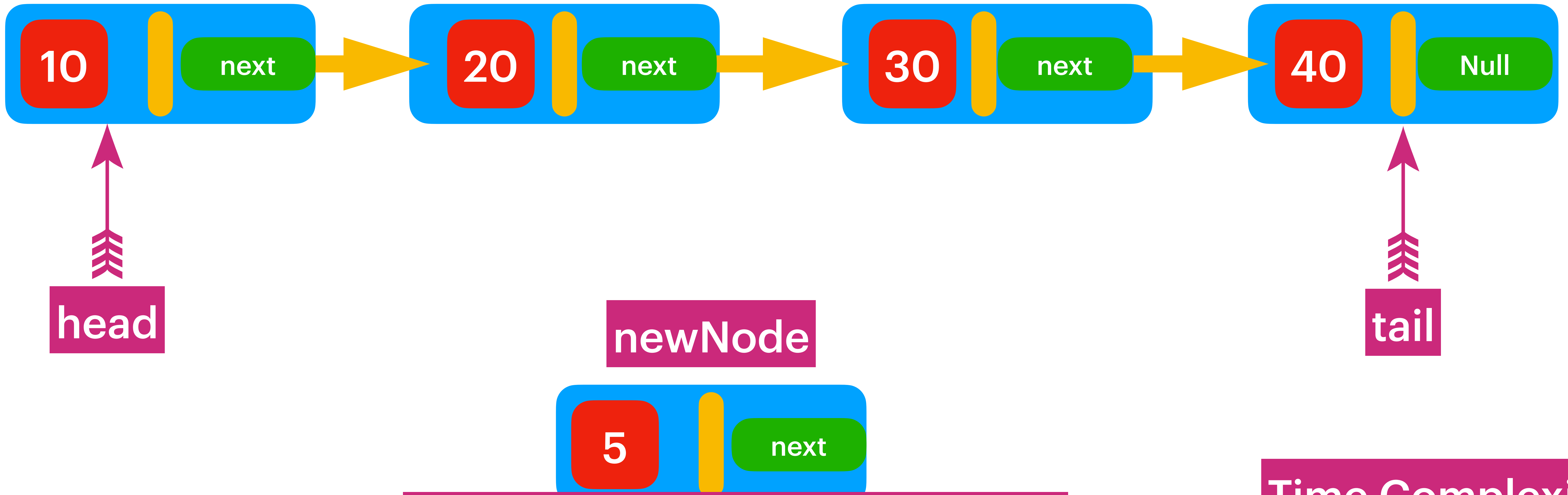
Time Complexity = O(1)



Link newNode next to head .
Make newNode as head.

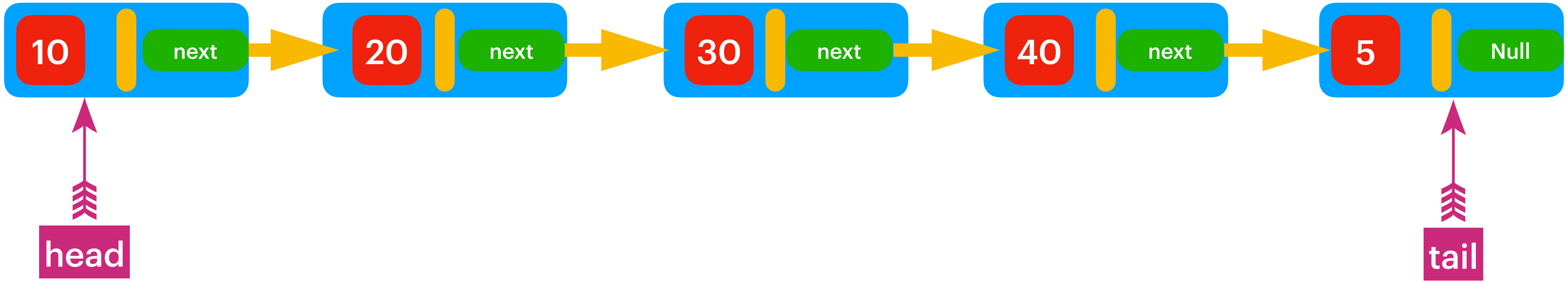


Add Last

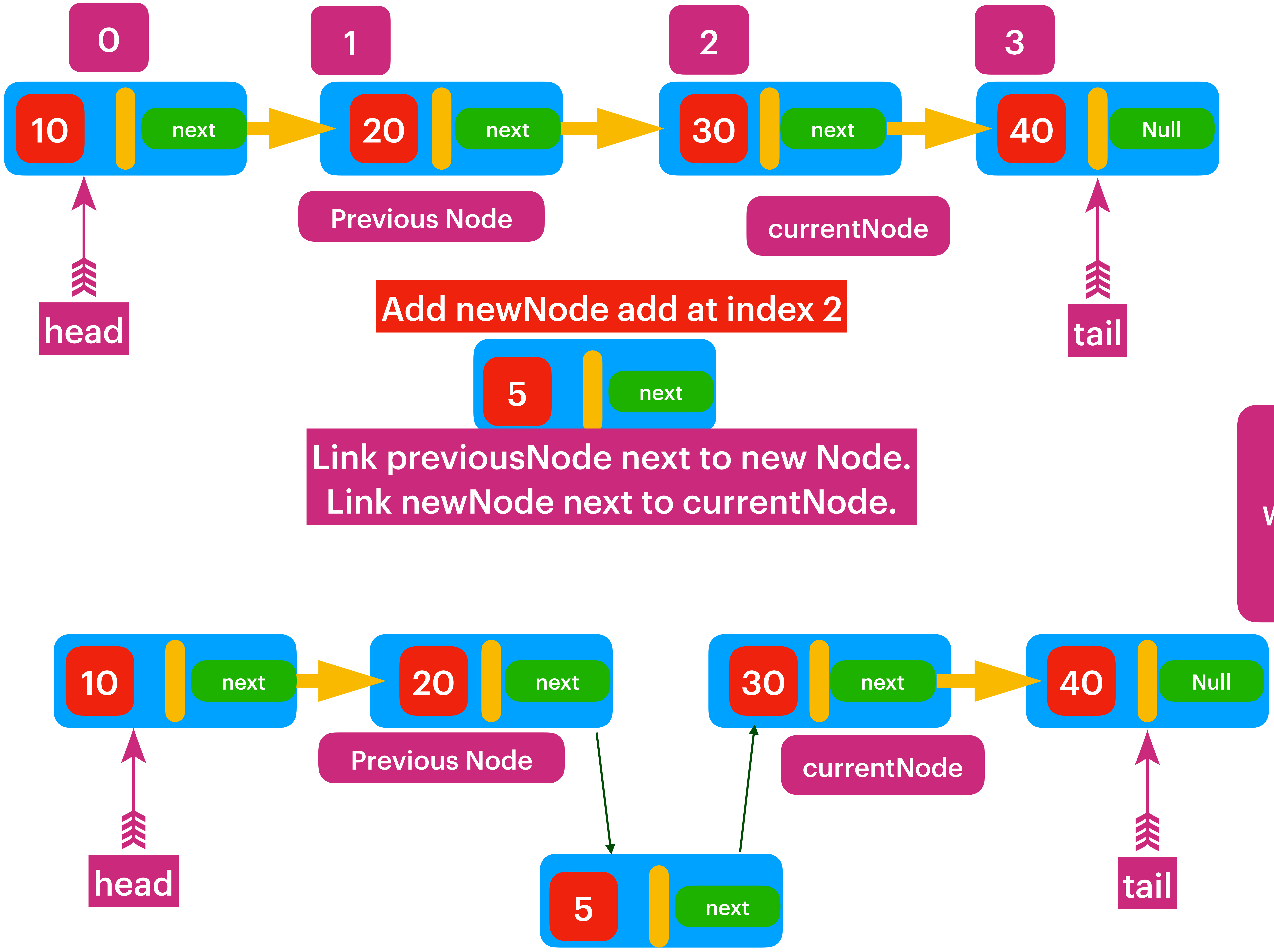


Link tailNode next to newNode .
Make newNode as tail.

Time Complexity = O(1)



Add in the Middle



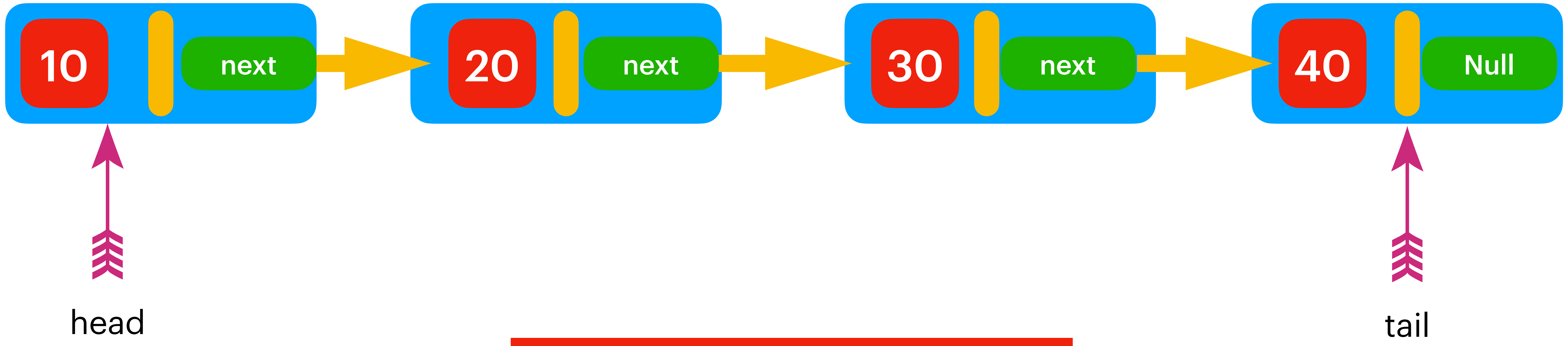
Add newNode add at index 2

Link previousNode next to new Node.
Link newNode next to currentNode.

Time Complexity : O(n)

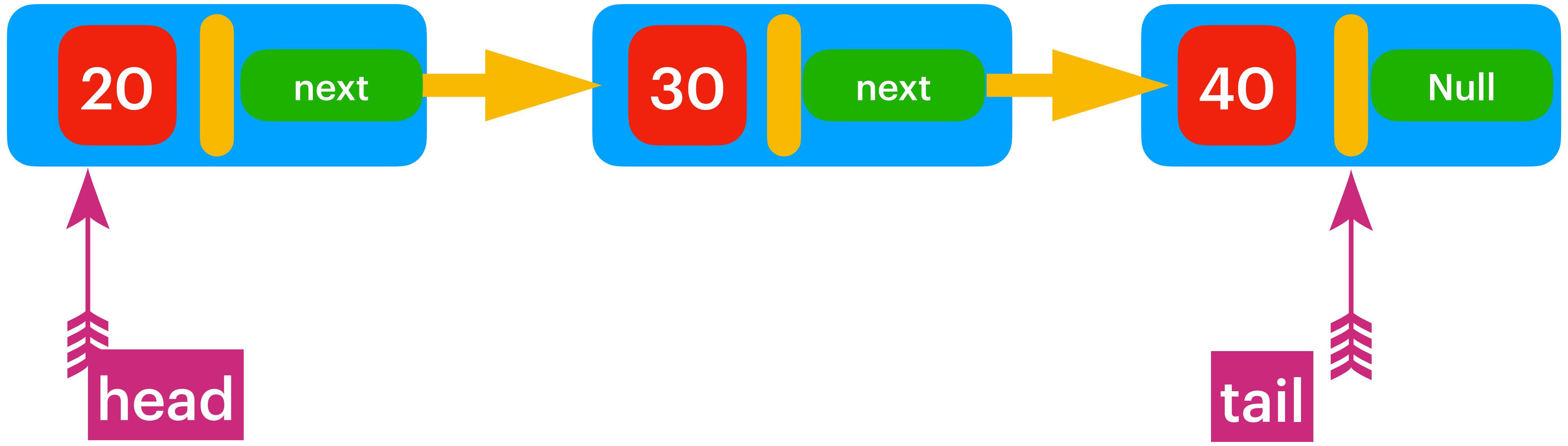
With respect to Shifting of element : O(1)

Delete Head

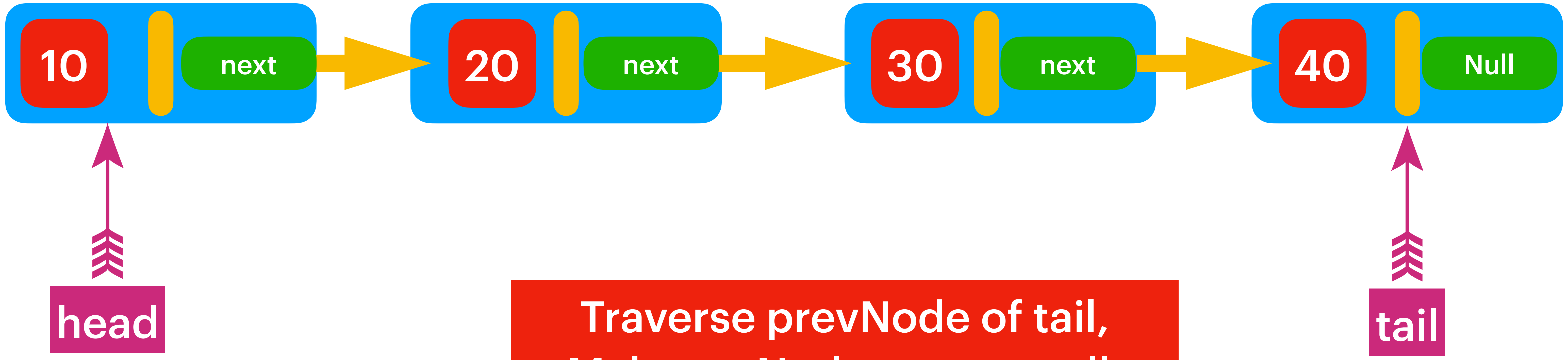


Link head.next to head

Time Complexity : O(1)

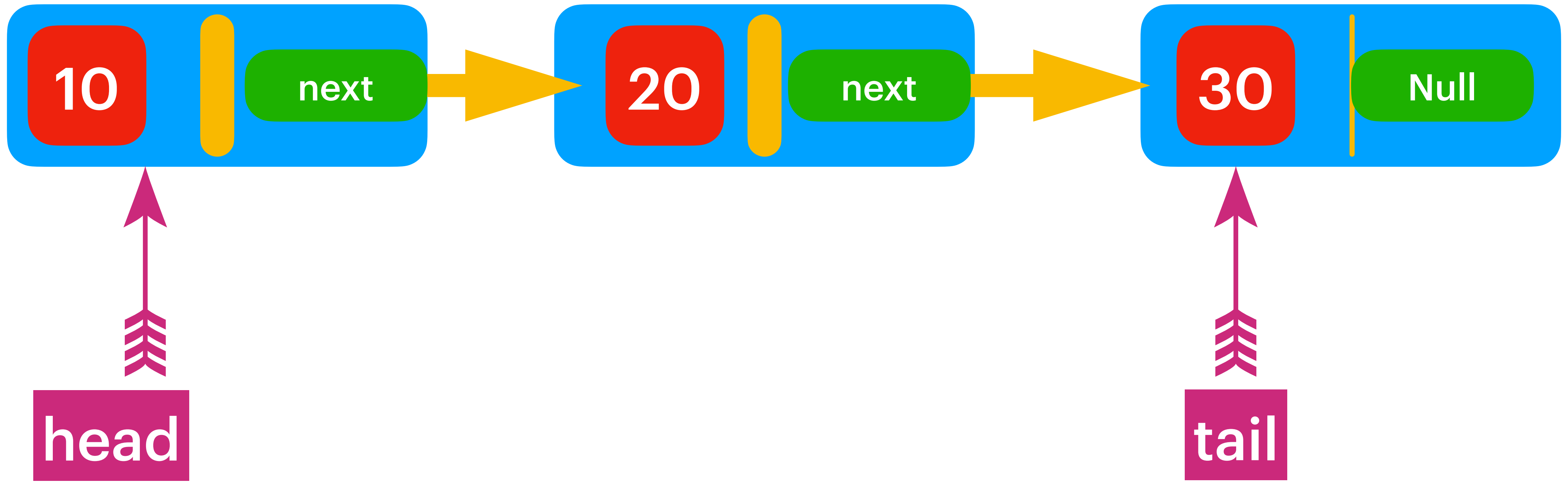


Delete Tail



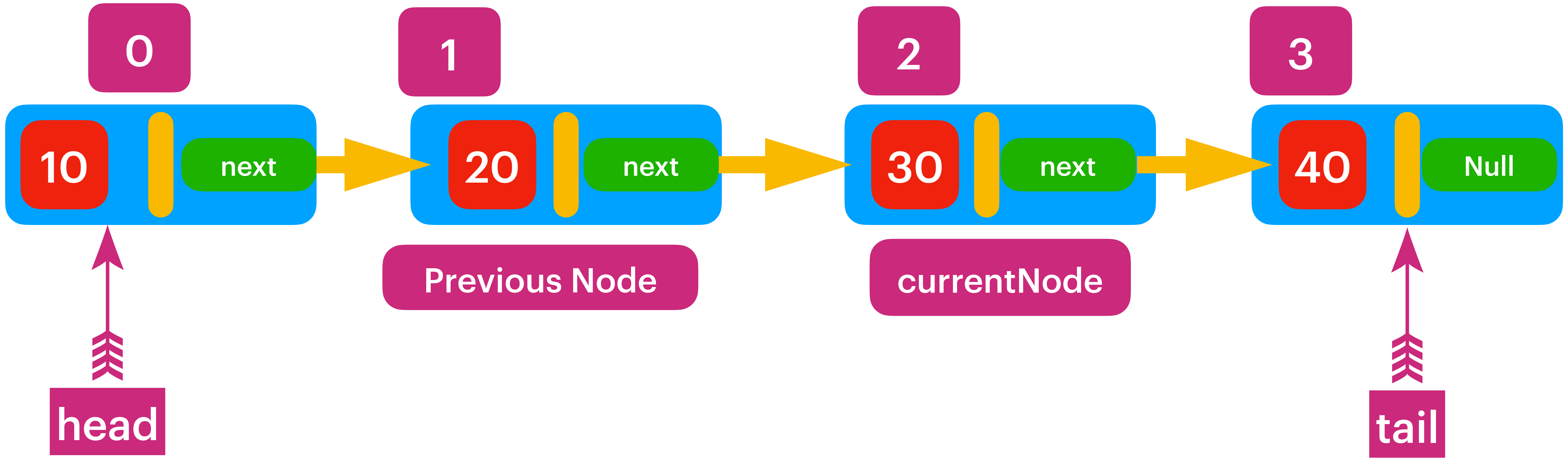
Traverse prevNode of tail,
Make preNode next as null,
Mark prevNode as tail.

Time Complexity : O(n)

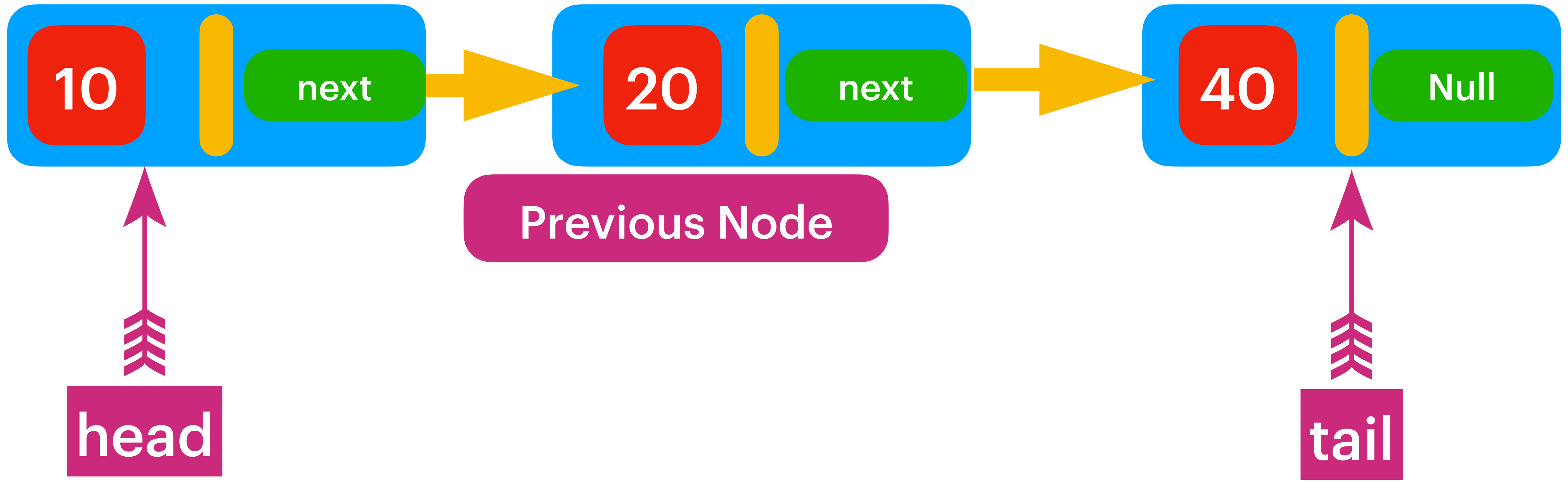


Delete Middle

Delete Node at index 2



Link PreviousNode next to currentNode next.
Mark currentNode next as null. So that current Node would be garbage collected.



Time Complexity : O(n)

With respect to Shifting of element : O(1)