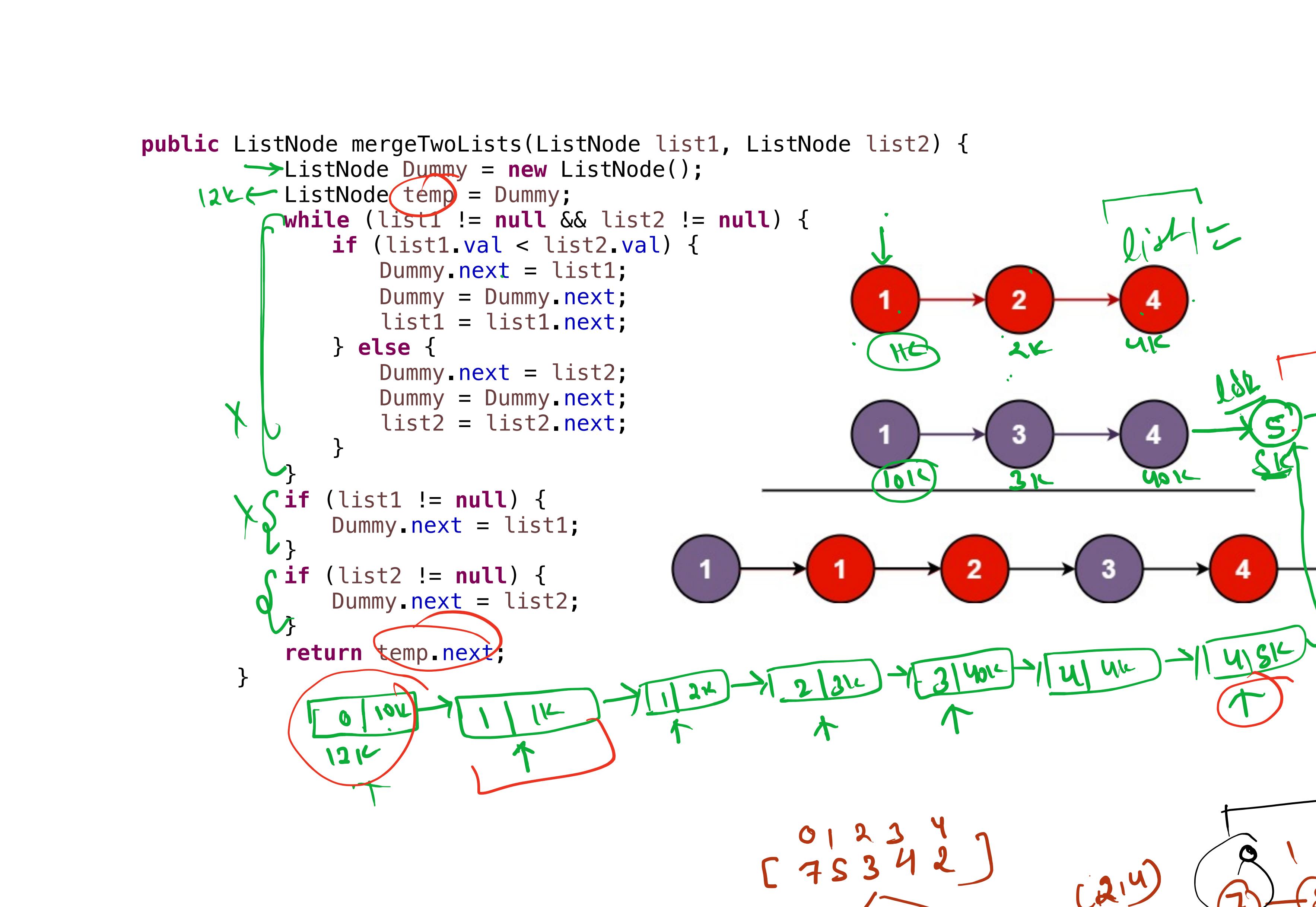
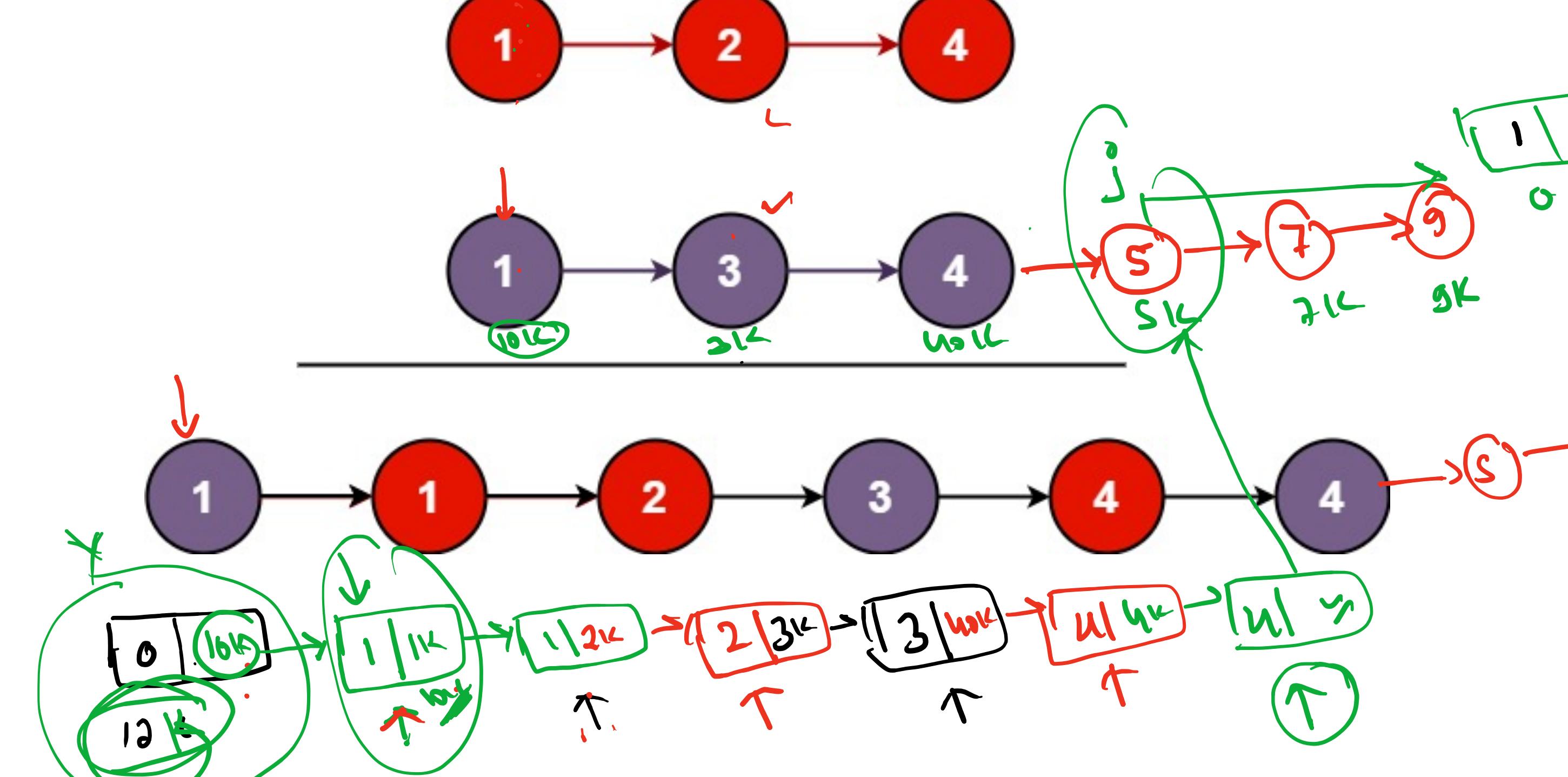
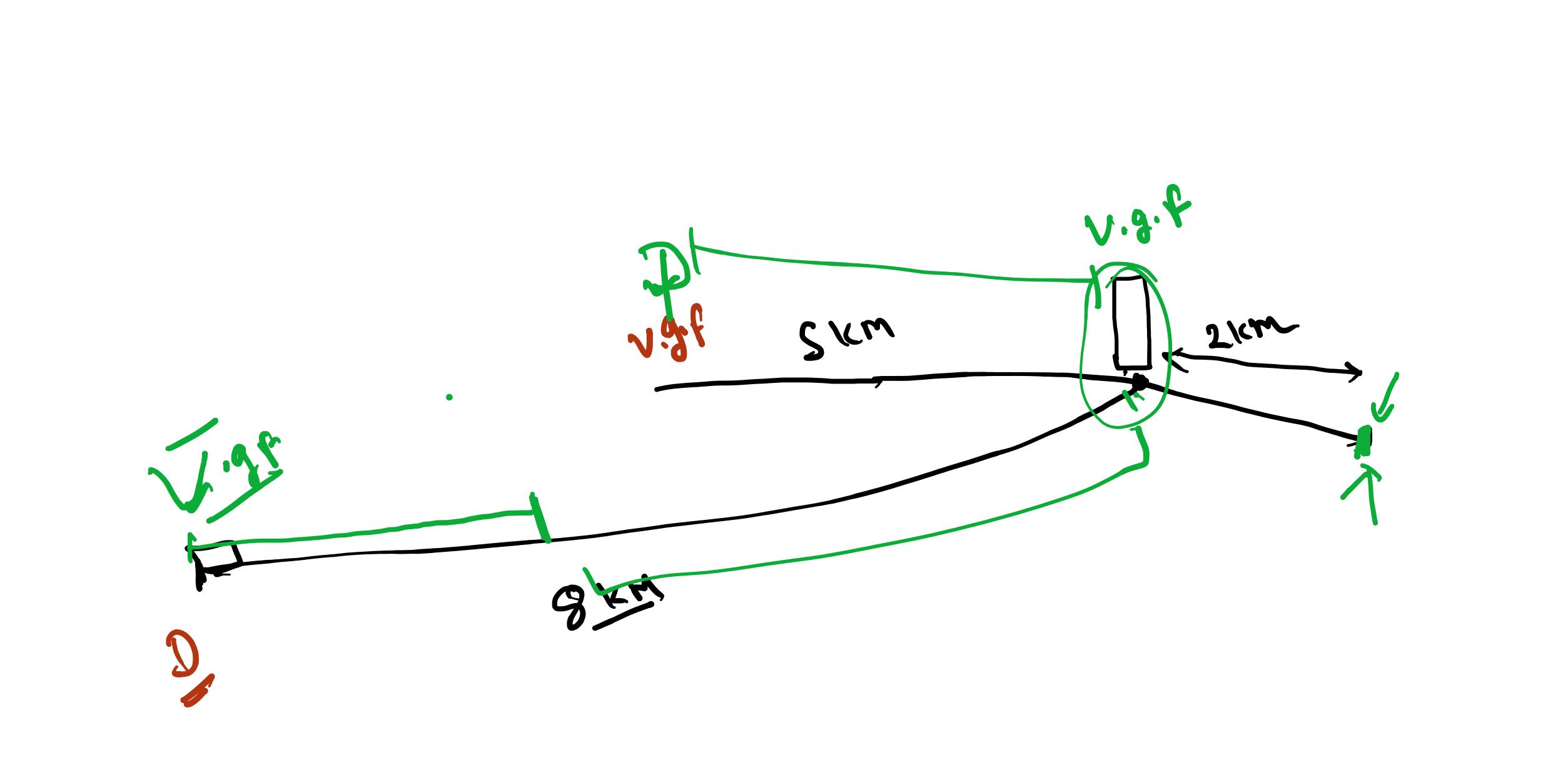
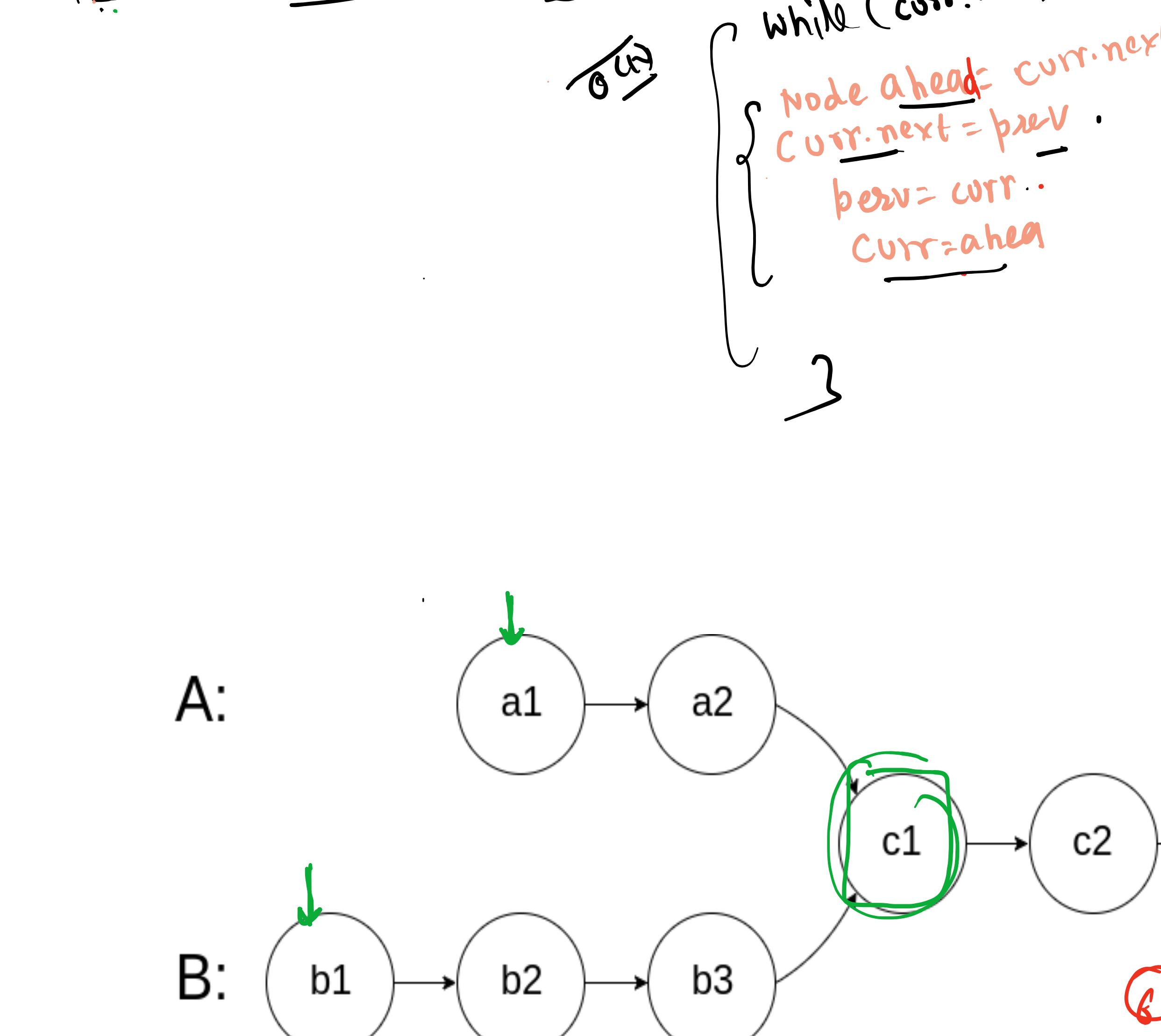
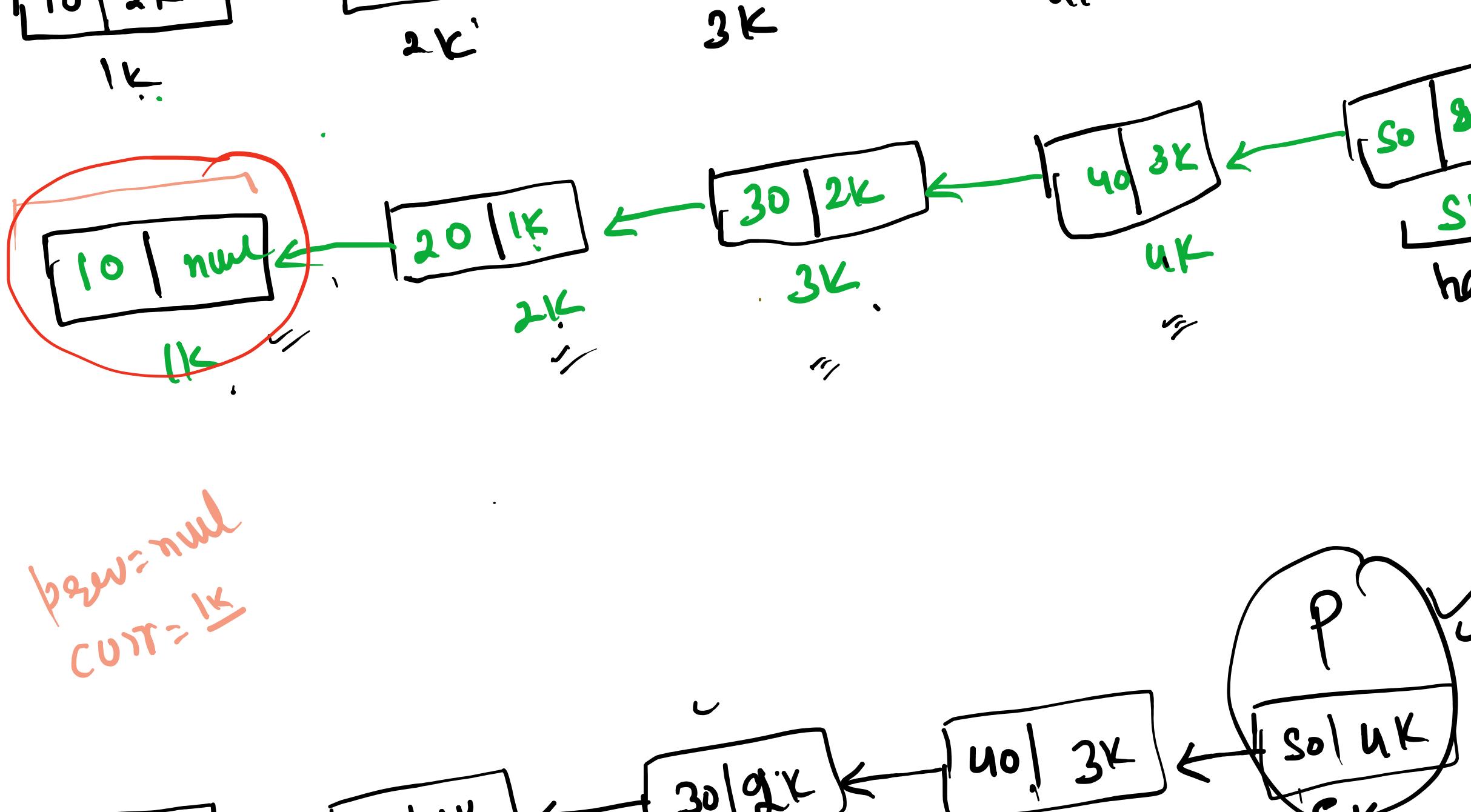


(i) $C \leftarrow \text{head} \rightarrow \text{fixed cycle detection}$



```
public ListNode mergeTwoLists(ListNode list1, ListNode list2) {
```

```
    ListNode Dummy = new ListNode();
```

```
    while (list1 != null && list2 != null) {
```

```
        if (list1.val < list2.val) {
```

```
            Dummy.next = list1;
```

```
            Dummy = Dummy.next;
```

```
            list1 = list1.next;
```

```
        } else {
```

```
            Dummy.next = list2;
```

```
            Dummy = Dummy.next;
```

```
            list2 = list2.next;
```

```
        }
```

```
        if (list1 != null) {
```

```
            Dummy.next = list1;
```

```
        } if (list2 != null) {
```

```
            Dummy.next = list2;
```

```
        }
```

```
        return temp.next;
```

```
    public ListNode middleNode(ListNode head) {
```

```
        ListNode slow = head;
```

```
        ListNode fast = head;
```

```
        while (fast != null && fast.next != null) {
```

```
            slow = slow.next;
```

```
            fast = fast.next.next;
```

```
        }
```

```
        return slow;
```

