Data Structures

SLL Homework 3

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Teaching, Training and Coaching since more than a decade!

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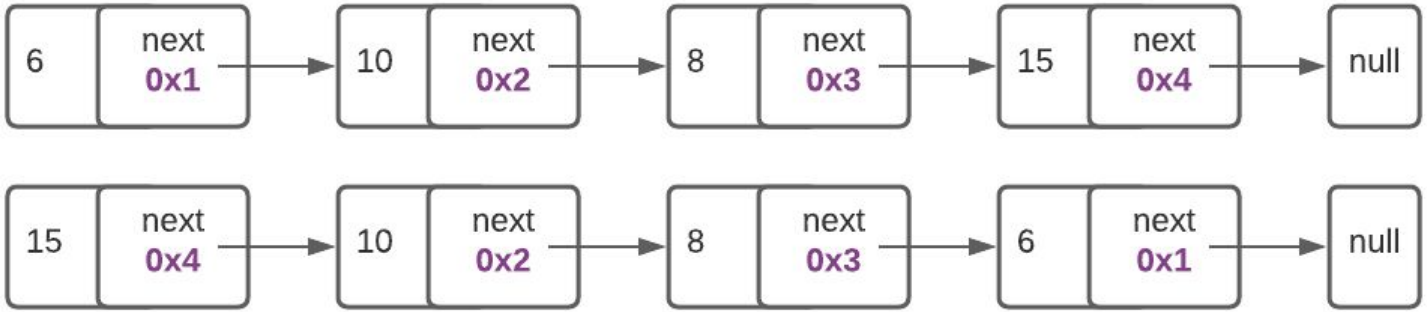
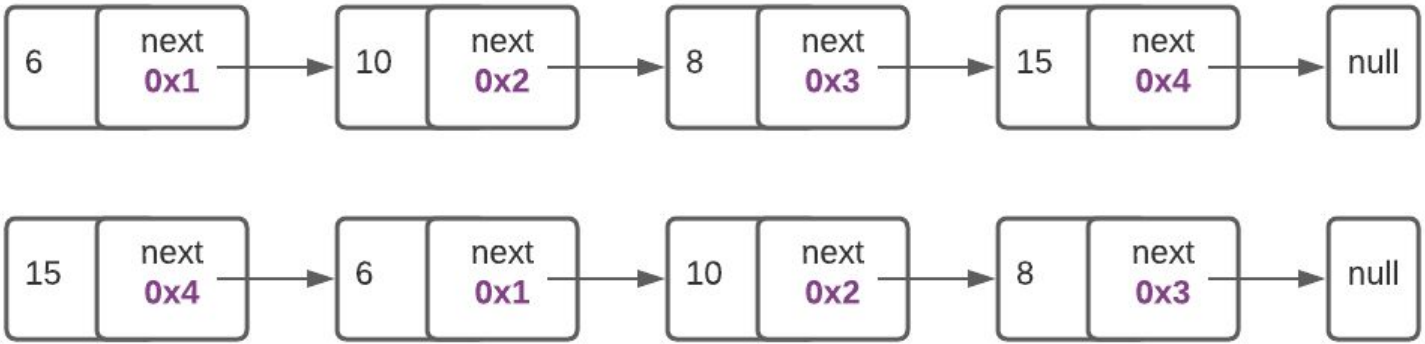
Problem #1: Swap head and tail

- Given a list, we would like swap the head node with the tail now
  - **NODES swap** (addresses) not just values swap
  - See the before and after before. Observe the addresses
- Tip: Draw step by step your procedure. This will save a lot of your time
- Make sure to print after the swap: once the values and also the addreses



Problem #2: Left Rotate

- Given a list, we would like left rotate it k steps (k up to 200000000)
  - Takes the first k elements and shift to back
- void left_rotate(int k): Your code should be O(n) time
- Below list rotated with k = 3 (nodes 6 10 8 shifted back)
  - If k = 1 ⇒ {10, 8, 15, 6}
  - If k = 2 ⇒ {8, 15, 6, 10}



Problem #3: Remove duplicates

- Given list of numbers (not sorted), for any repeated number, remove all except the first
- 1, 2, 1, 3, 2, 4, 3, 5, 2 ⇒ 1, 2, 3, 4, 5
- 1, 2, 3, 4, 5 ⇒ 1, 2, 3, 4, 5
- 1, 1, 1 ⇒ 1

Problem #4: Remove last occurance

- Given list of numbers (not sorted), and a key: remove the last occurrence for this key
- **1**, 2, 3 - key = 1 ⇒ 2, 3
- 1, 2, 3, 4, **1** - key = 1 ⇒ 1, 2, 3, 4
- 1, 2, 3, **1**, 4 - key = 1 ⇒ 1, 2, 3, 4
- 1, 2, 3, 4 - key = 7 ⇒ 1, 2, 3, 4

Problem #5: Move to back!

- Given list of numbers (not sorted), and a key: move all the occurrence for this key to the end of the list
- 1, 2, 3, 2, 4, 1 - key = 1 ⇒ 2 3 2 4 1 1
- 1, 2, 3, 1, 2, 4, 1, 7, 1, 8, 1, 1 - key = 1 ⇒ 2 3 2 4 7 8 1 1 1 1 1 1

Problem #6: Recursive max

- Given a list, we would like to find the max value in it
- Consider the following coding constraints
  - You must use recursion
  - Don’t create more than a function
  - Function name: int max

```
LinkedList list;
list.insert_end(6);
list.insert_end(10);
list.insert_end(8);
list.insert_end(15);
cout<<list.max()<<"\n";      // 15
```

"Acquire knowledge and impart it to the people."

"Seek knowledge from the Cradle to the Grave."