CSE 12 – Basic Data Structures and Object-Oriented Design
Lecture 25

Greg Miranda & Paul Cao, Winter 2021

This lecture is being recorded

Announcements

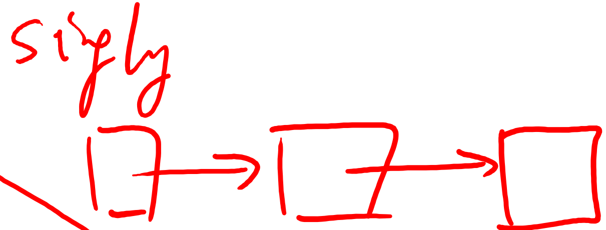
- Quiz 25 due Friday @ 8am
  - Last quiz!!
- Survey 10 due Friday @ 11:59pm
- PA8 due Thursday @ 11:59pm
- No pre-recorded lecture for Friday
  - Final Review
- Final Exam
  - Starts Saturday, March 13th @ 8:00am
  - Ends Monday, March 15th @ 11:59pm
  - 3 hour exam – clock starts when you open exam
    - Must be finished in one sitting

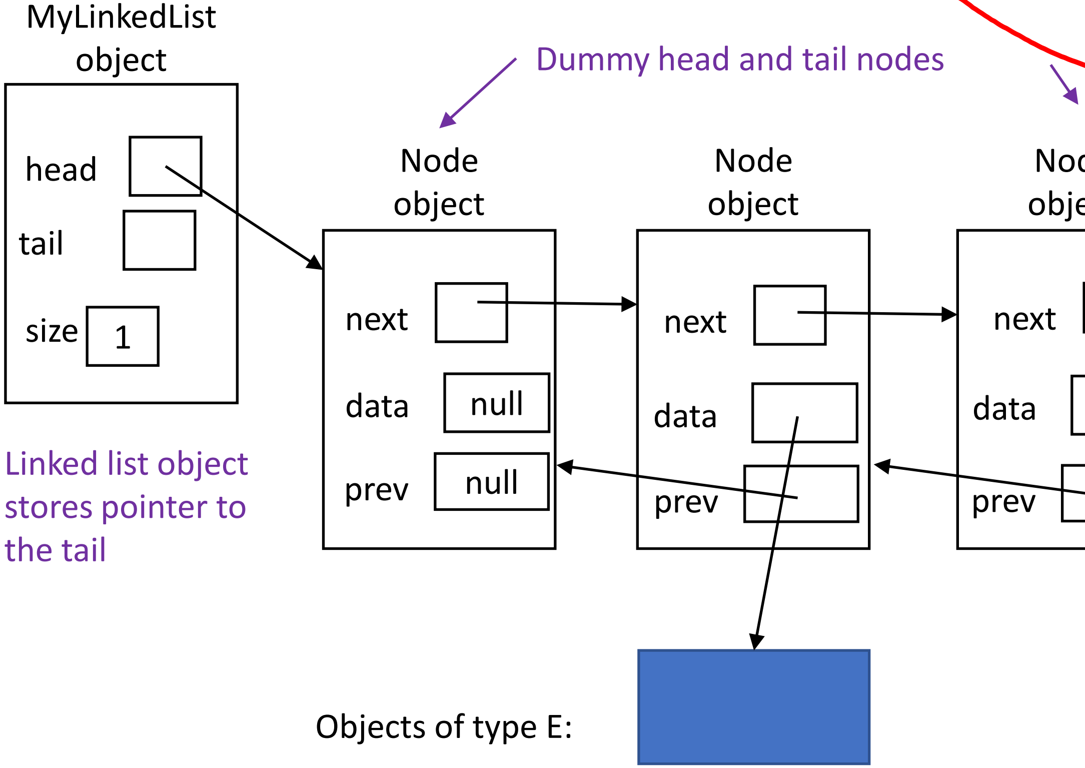
Reminder: Complete CAPE
1 pt challenge

Topics

- Improved Lists
- Questions on Lecture 25?

Doubly linked lists





Linked list object stores pointer to the tail

singly

get { O(N)

delete { O(N)

doubly

insert:

singly { front: O(1)
end O(N)

doubly { front O(1)
end O(1)

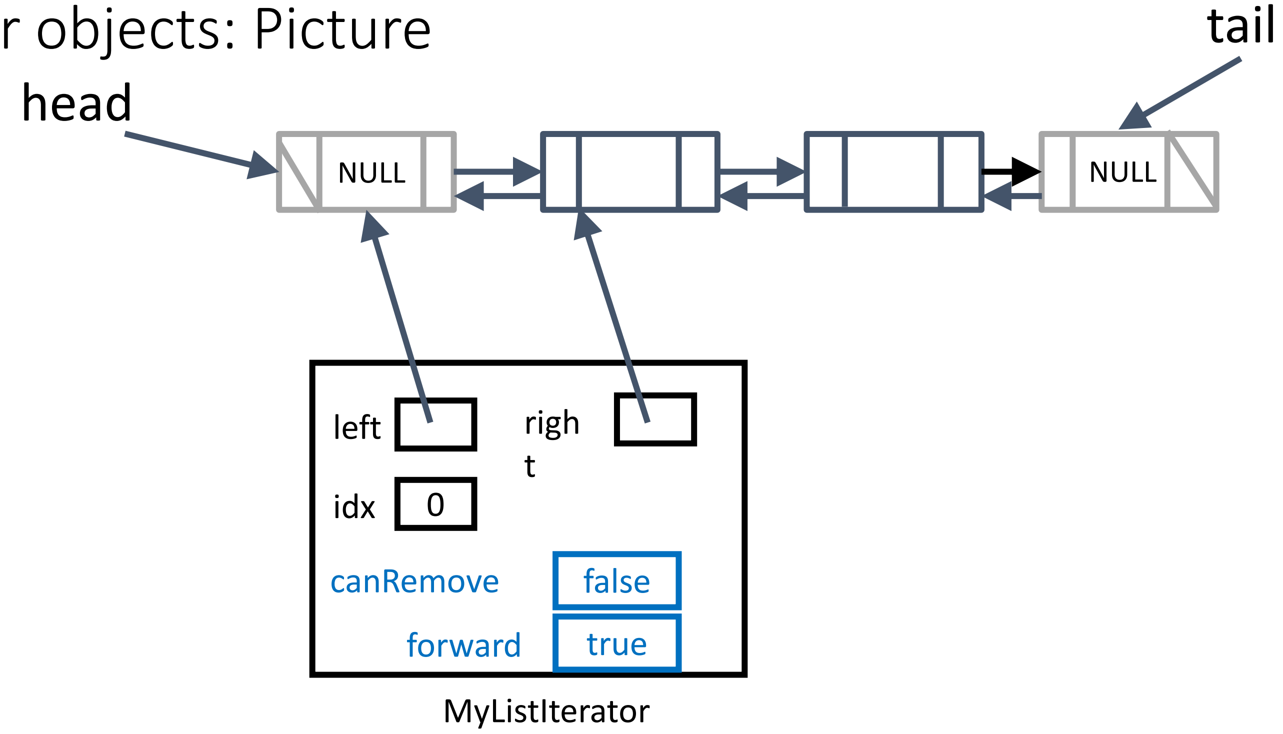
Types of Linked Lists

- Singly linked list
- Doubly linked list

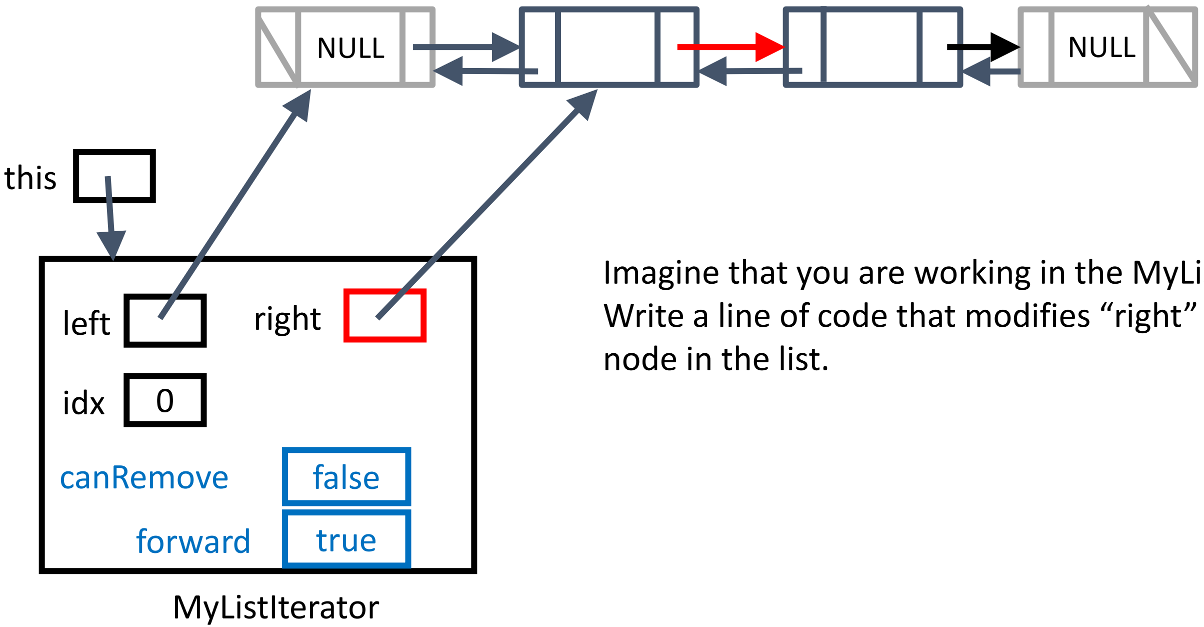
  iterator

- Circular singly linked list
- Circular doubly linked list

Iterator objects: Picture

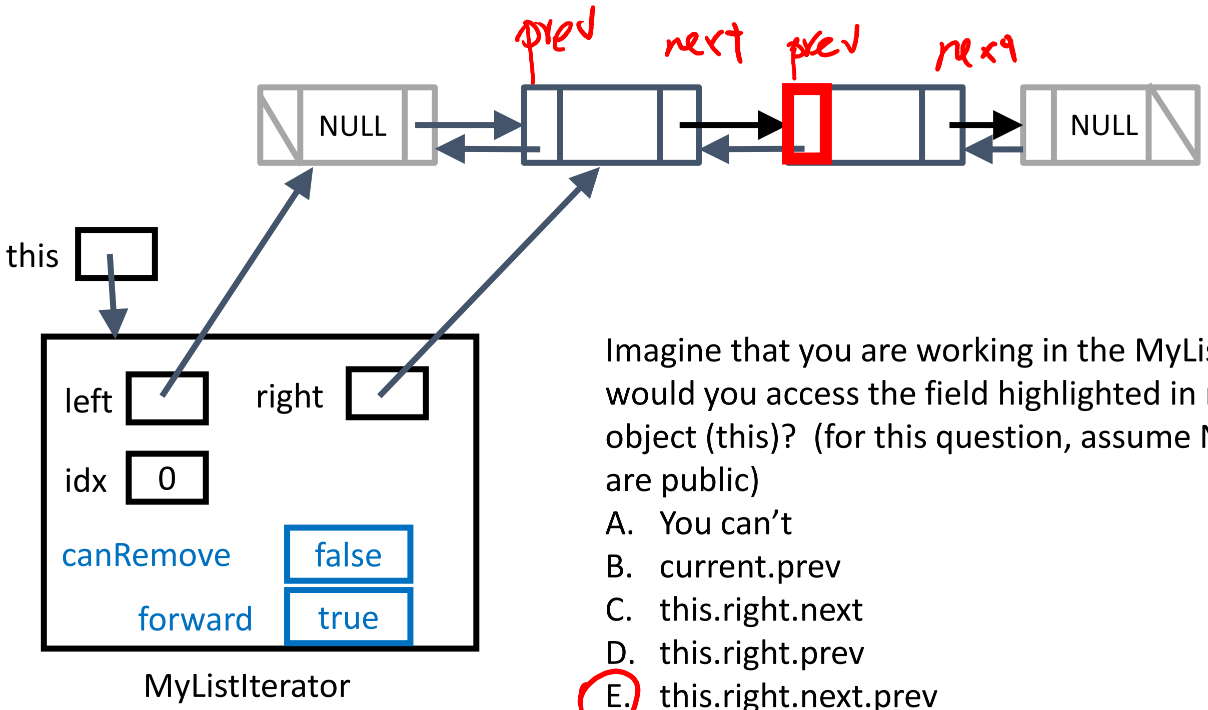


Accessing and setting node fields



Imagine that you are working in the MyListIterator class. Write a line of code that modifies “right” to point to the next node in the list.

Accessing and setting node fields



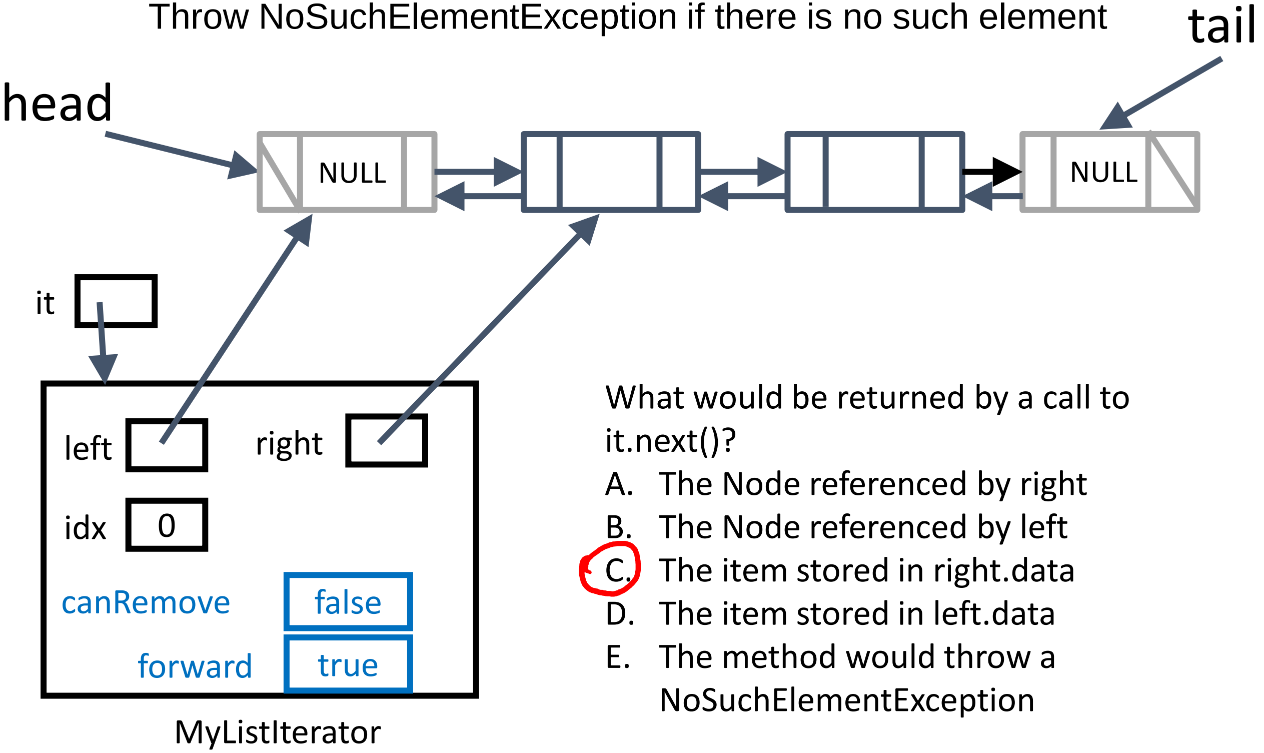
Imagine that you are working in the MyListIterator class. How would you access the field highlighted in red from the iterator object (this)? (for this question, assume Node's next and prev are public)

A. You can't
B. current.prev
C. this.right.next
D. this.right.prev
[✓ E.] this.right.next.prev

T next()

Return the next element in the list when going forward.

Throw NoSuchElementException if there is no such element



What would be returned by a call to it.next()?

A. The Node referenced by right

B. The Node referenced by left

[✓ C.] The item stored in right.data

D. The item stored in left.data

E. The method would throw a NoSuchElementException

T next()

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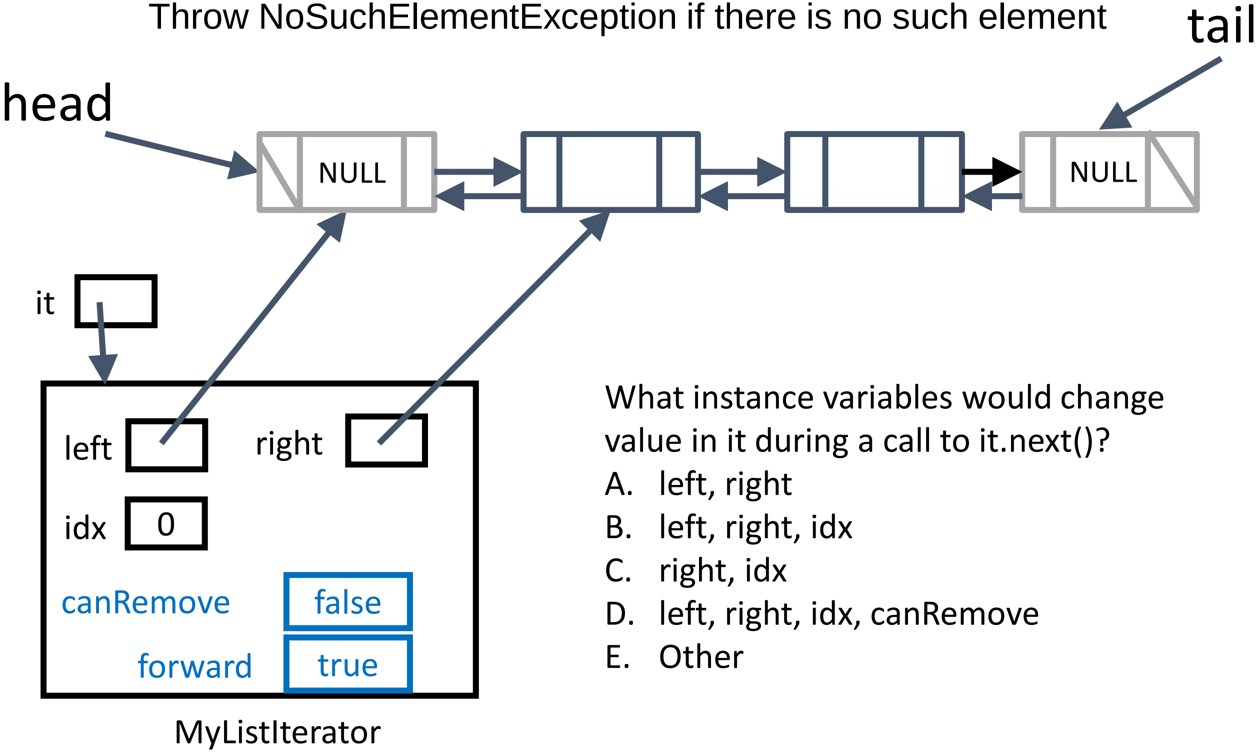

What instance variables would change value in it during a call to it.next()?

A. left, right
B. left, right, idx
C. right, idx
D. left, right, idx, canRemove
E. Other

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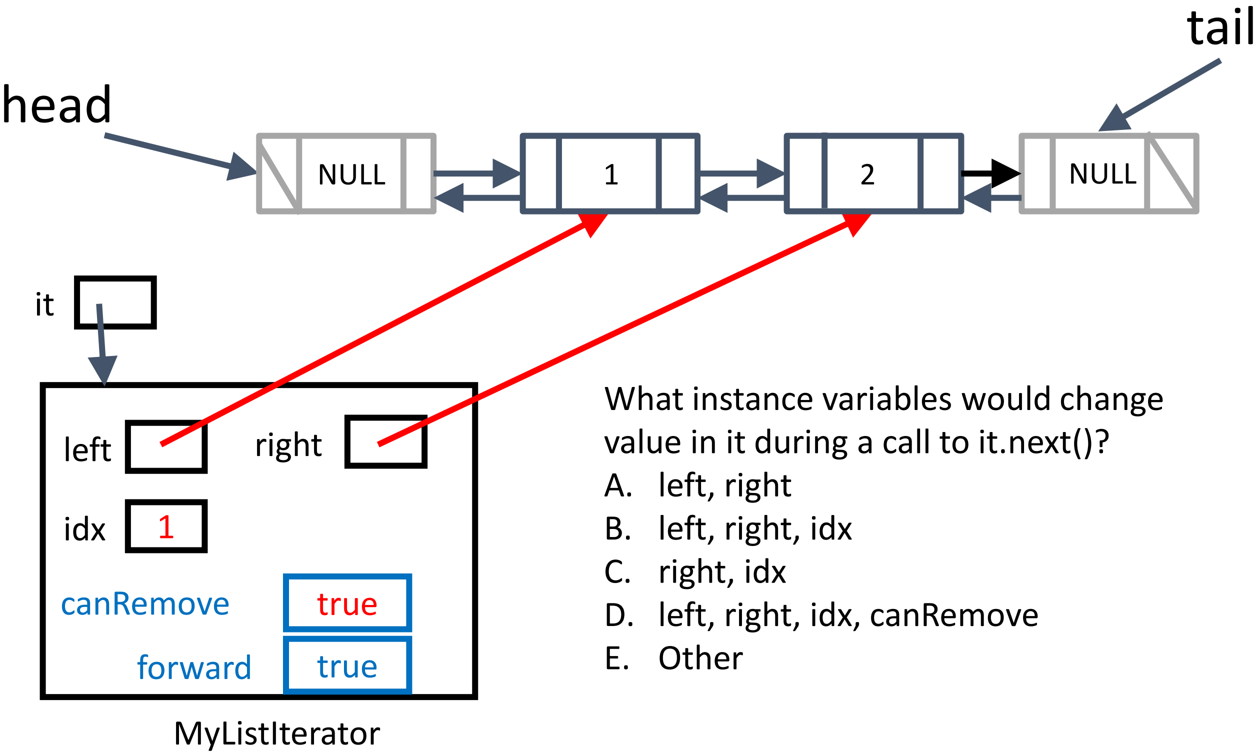

What instance variables would change value in it during a call to it.next()?

A. left, right
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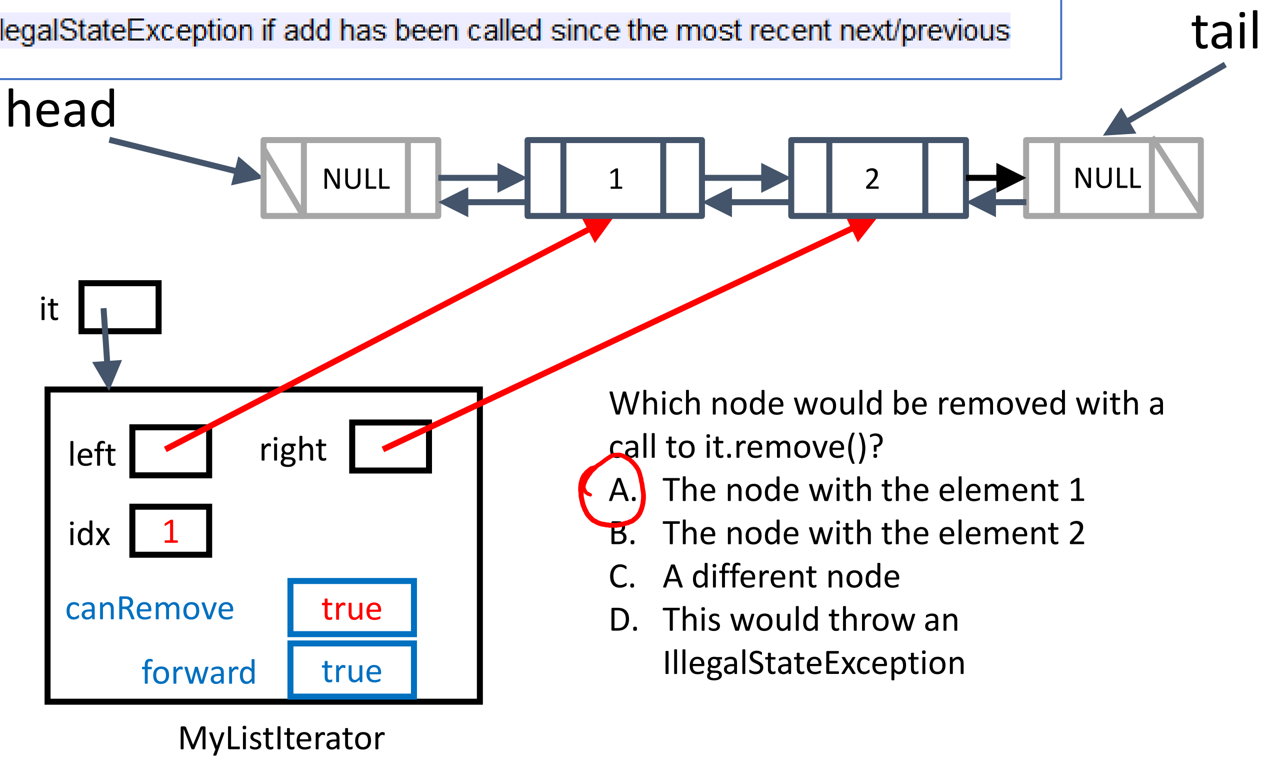
D. left, right, idx, canRemove
E. Other

void remove()

Remove the last element returned by the most recent call to either next/previous

Throw an IllegalStateException if neither next nor previous were called

Throw an IllegalStateException if add has been called since the most recent next/previous



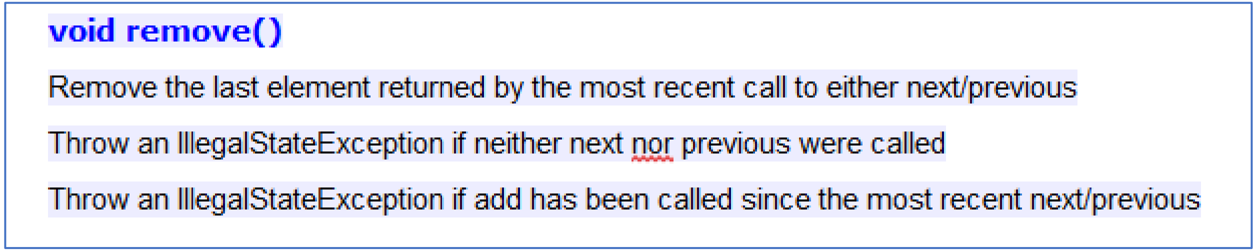
Which node would be removed with a call to it.remove()?

[✓ A.] The node with the element 1

B. The node with the element 2

C. A different node

D. This would throw an IllegalStateException



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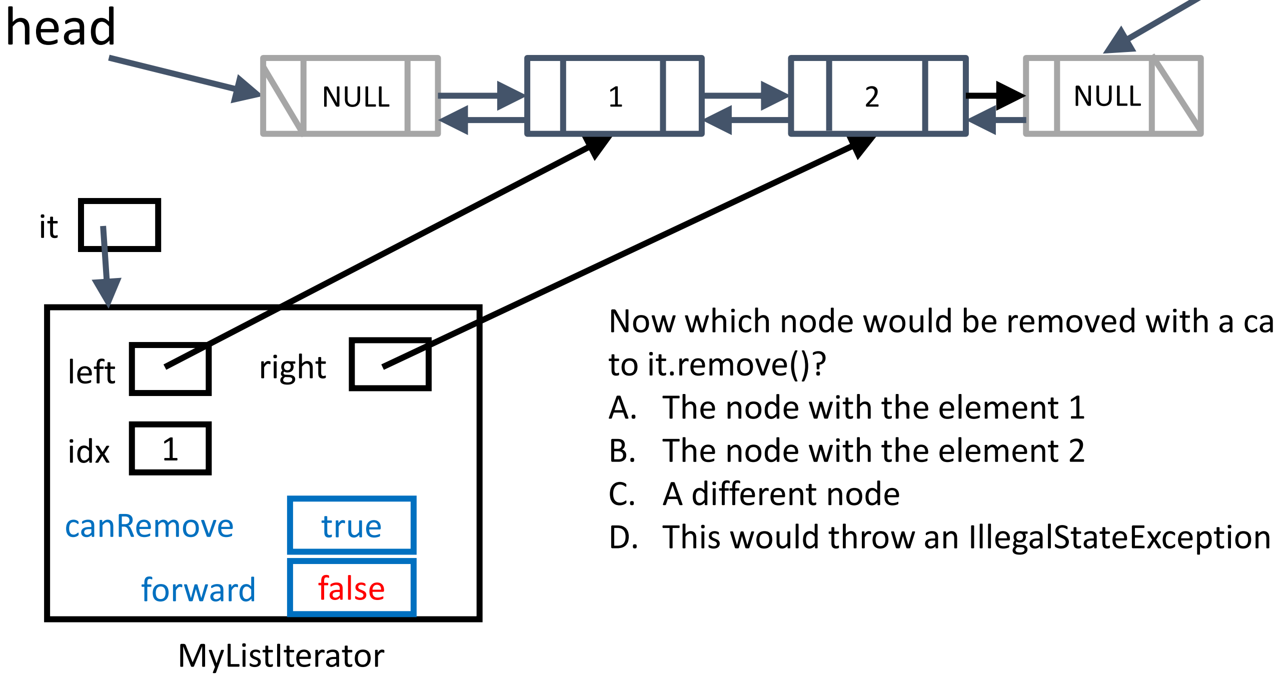

Now which node would be removed with a call to it.remove()?

A. The node with the element 1

B. The node with the element 2

C. A different node

D. This would throw an IllegalStateException