

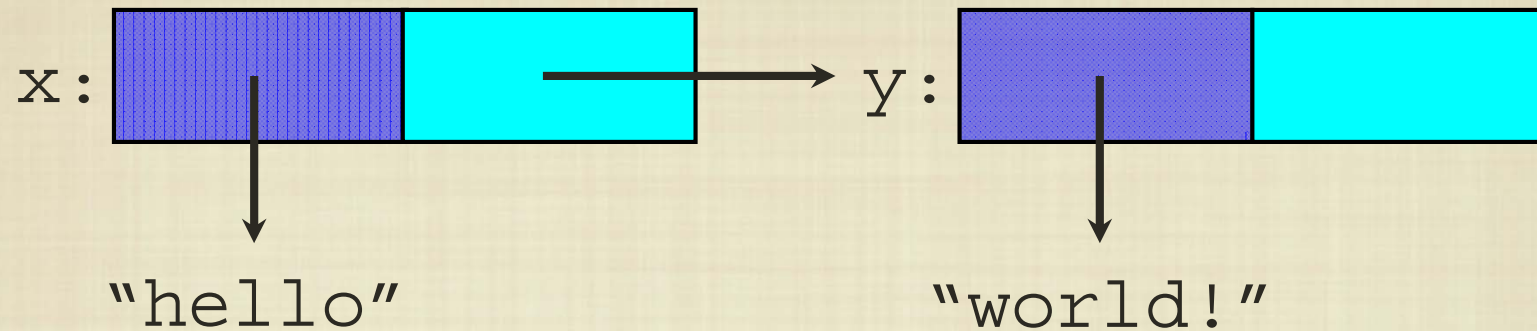
# Linked Structures

## Songs, Games, Movies

II

Fall 2013  
Carola Wenk

# Linked Lists



The simplest dynamic structure is a linear ordering of data, called a "linked list".

We saw that it was easy to modify a linked structure without "touching" all of the data.

How do we implement additions and deletions?

Is finding an item efficient?

# Adding Items

Actually, what does it mean to add to a linked list?

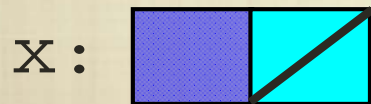
How do we add to the beginning of the list?



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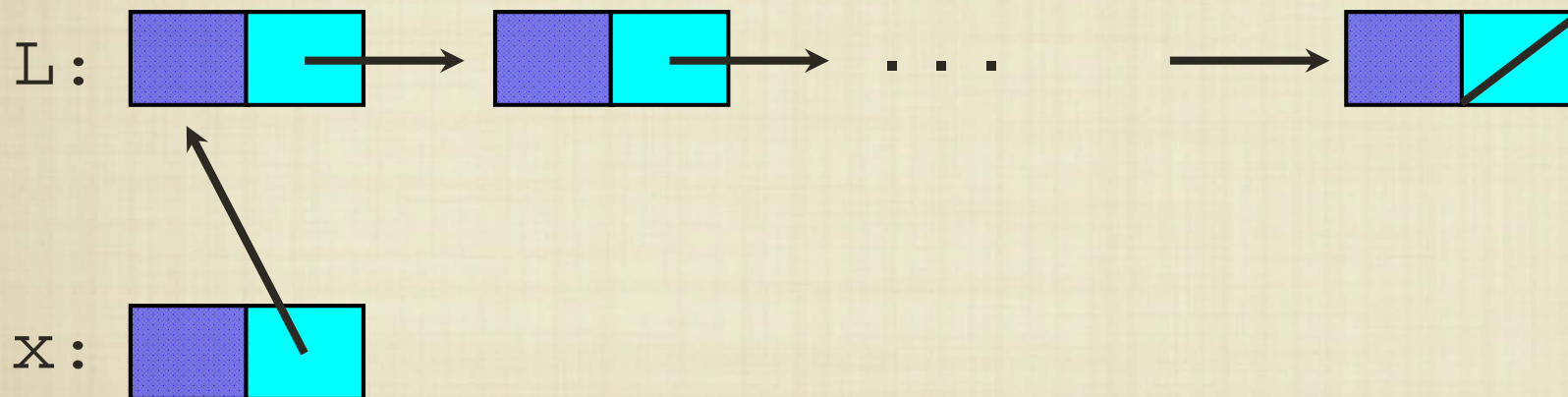
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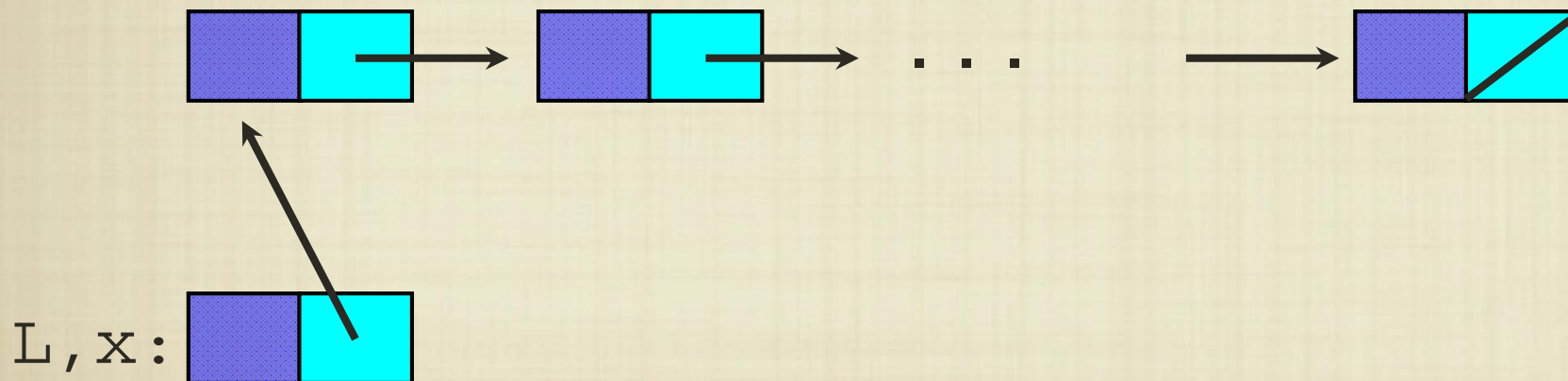
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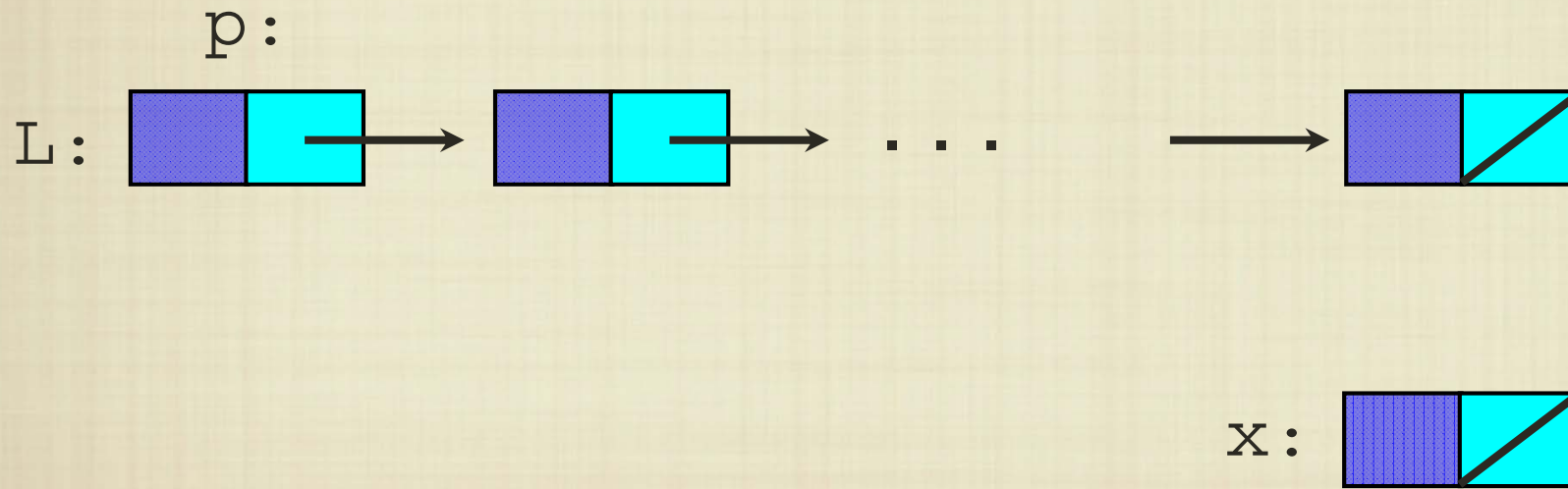


Adding to the front of a list is easy and requires constant work.

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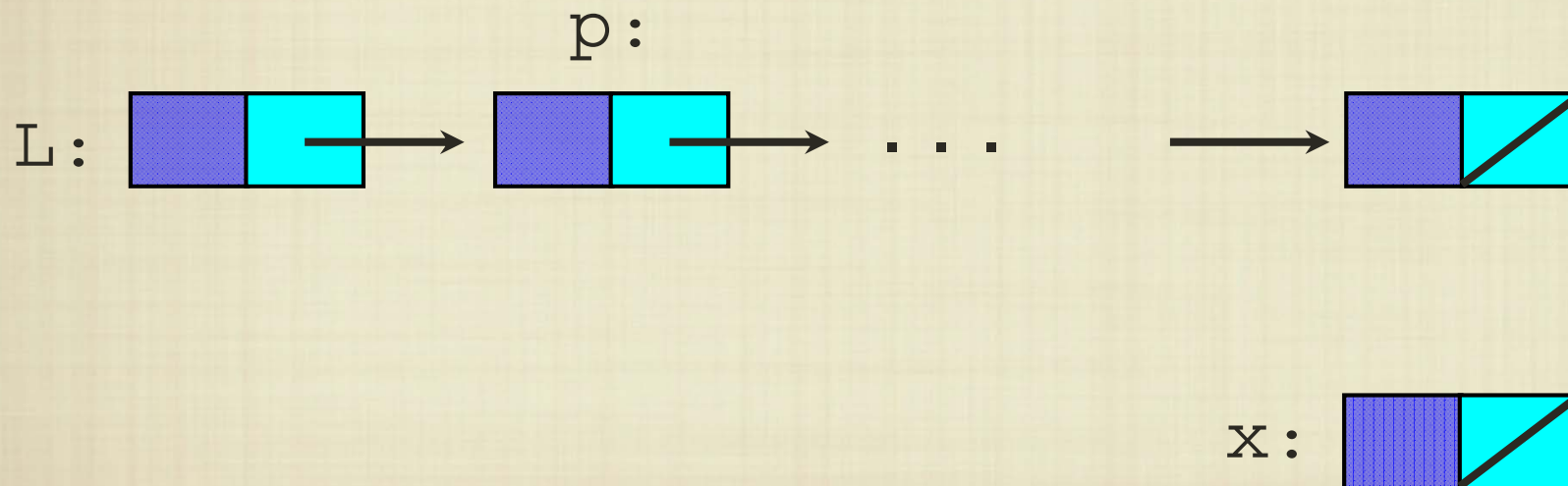
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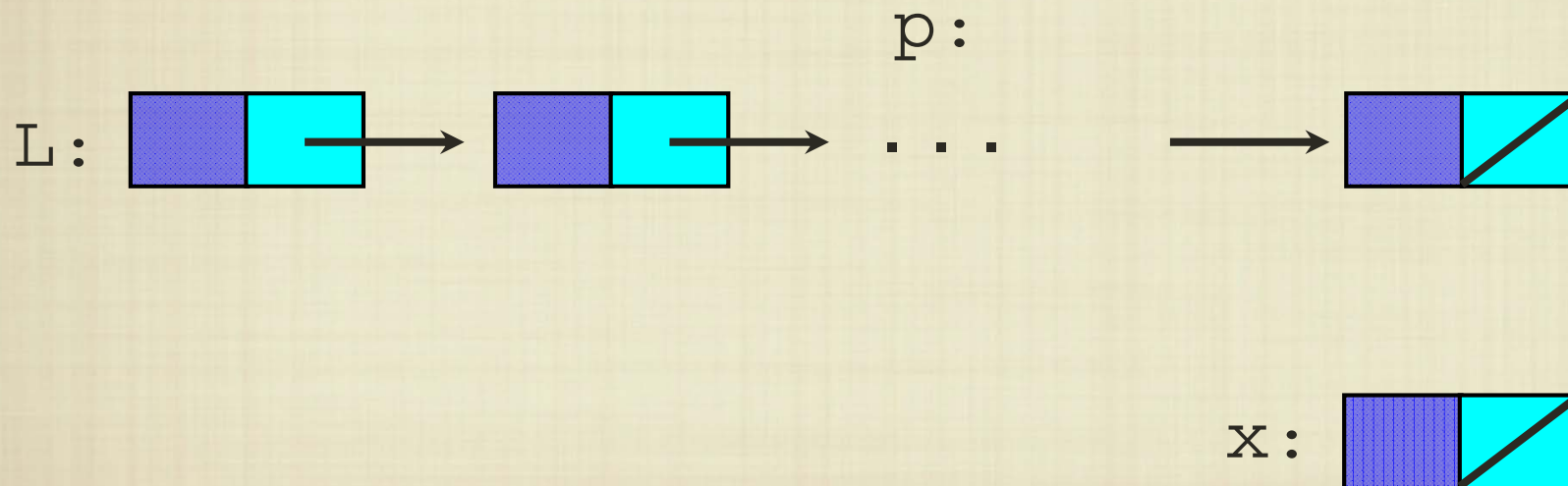




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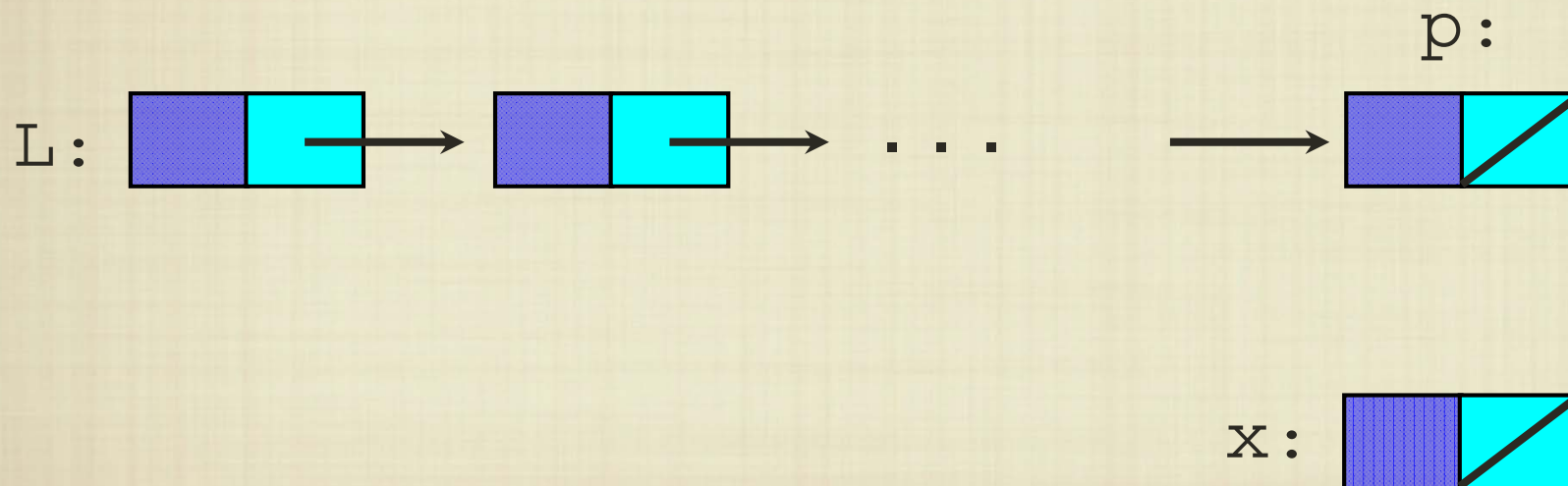
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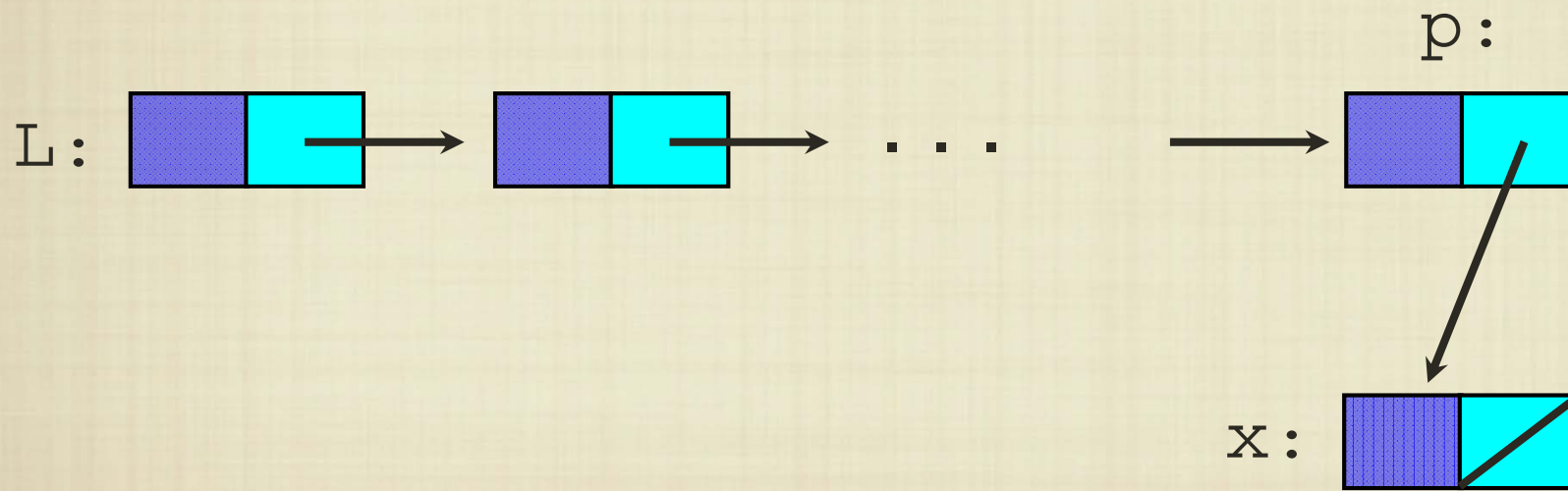
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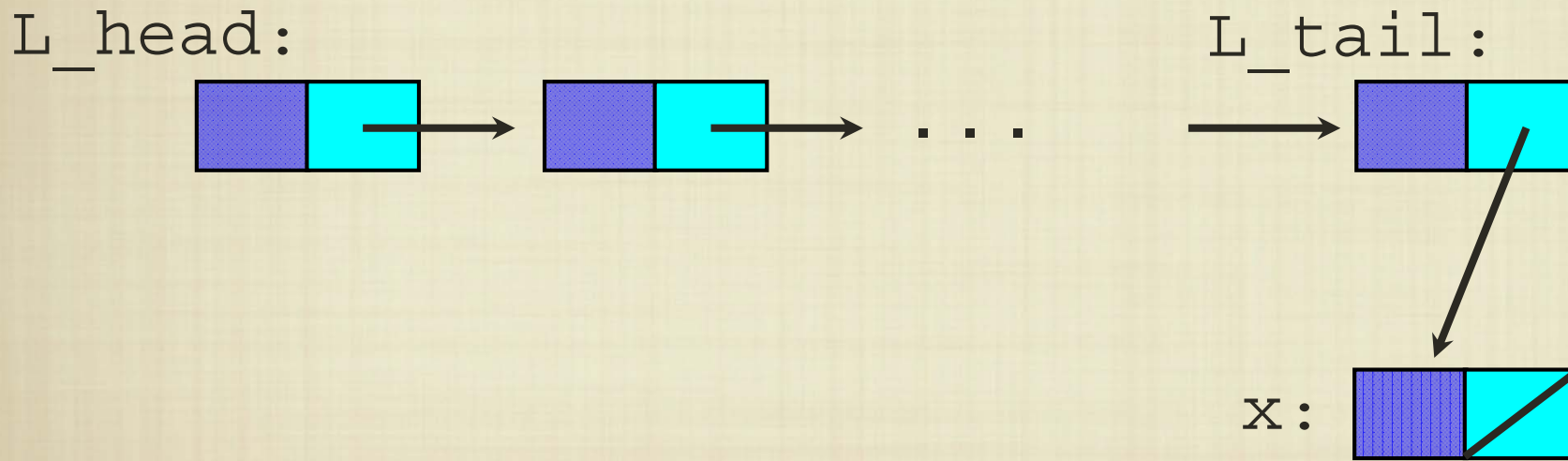


Sadly, we must traverse the entire structure just to add to the end!

# Adding Items

- Actually, what does it mean to add to a linked list?

How do we add to the end of the list?



If we kept track of the end of the list, then we could add an item with just a few operations.



# Finding Items

- To find anything in a linked list, we again need to (potentially) traverse the entire structure.

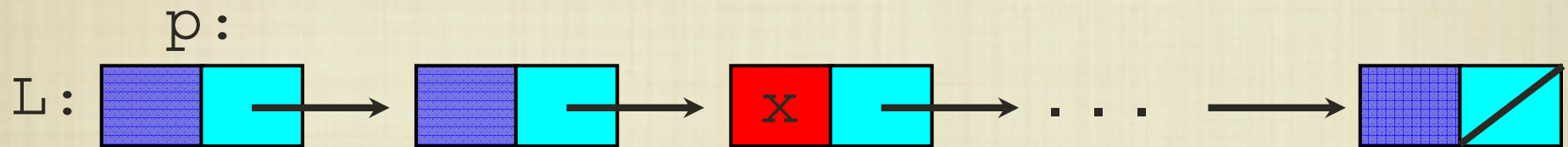
The implementation is easy, but in the worst case it is no better than a linear search, regardless of whether the linked list is ordered or not!



Finding an element is no better than in an array; it takes time that is linear in the size of the list.

# Removing Items

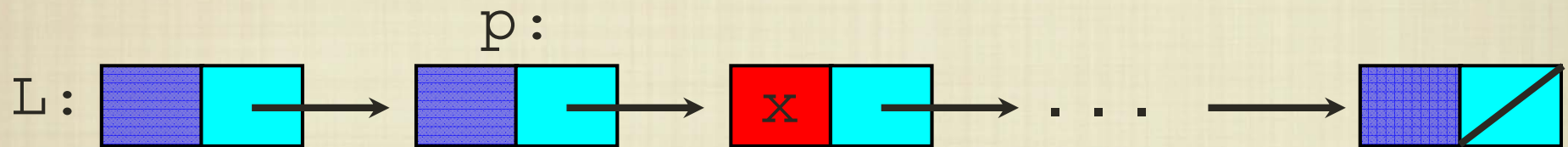
- We must also keep track of the preceding element, so that we can reassign its neighbor.



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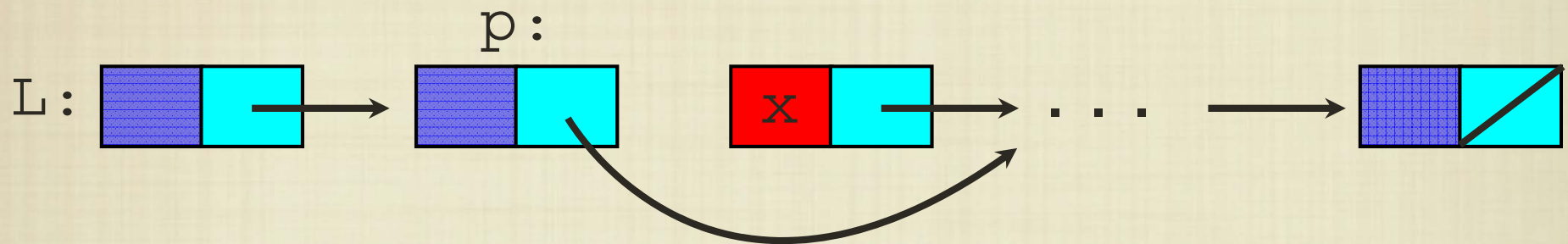


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