Building Linked Lists with Recursive Algorithms

Announcements

Quiz 04 on Wednesday!

- Come to Tutoring to work through the practice quiz with TAs today (5-7pm in SN011)!
- Review Session today from 6:15-7:15pm in Fred Brooks (FB) 009
- If you have a UAA and want to reschedule your quiz to another date, please let me know!

Assignments:

- *Optional* EX (Linked List Utility Functions) released today, due Monday, April 21

`recursive_range` Algorithm

Create a recursive function called **`recursive_range`** that will create a linked list of Nodes with values that increment from a start value up to an end value (exclusive). E.g.,

`recursive_range(start=2, end=8)` would return:

2 -> 3 -> 4 -> 5 -> 6 -> 7 -> None

Conceptually, what will our **base case** be?

What will our **recursive case** be?

What is an **edge case** for this function?
How could we account for it?

Visualizing recursive calls to `recursive_range`

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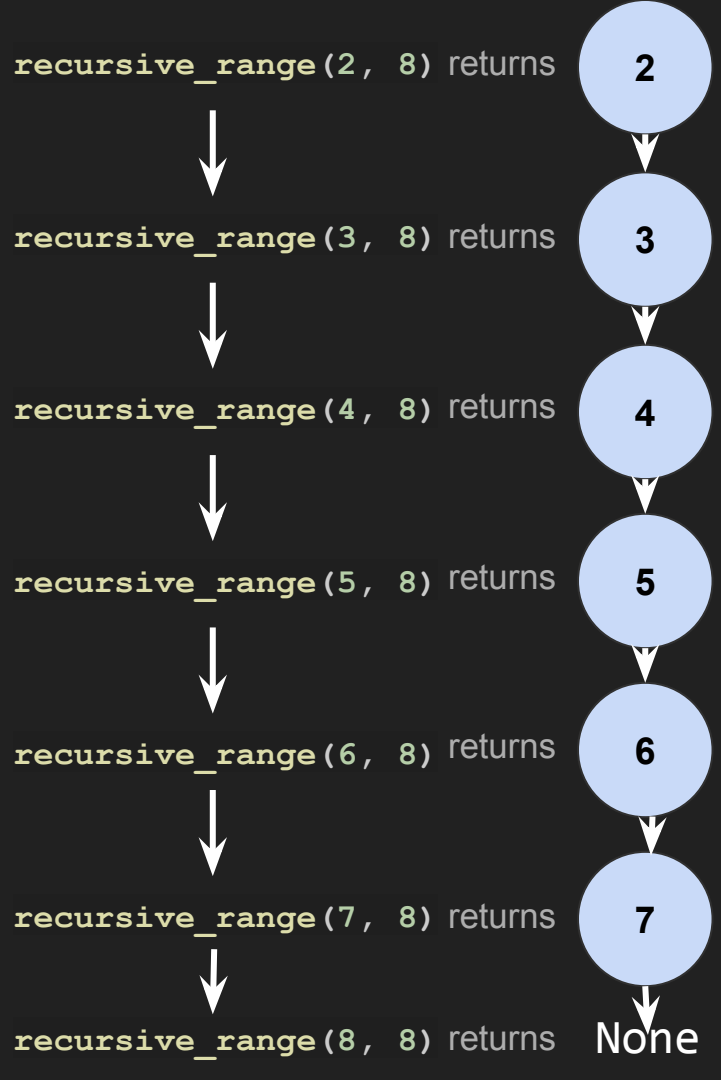


When "building" a new linked list in a recursive function:

Base case:

- ❏ Does the function have a clear base case?
  - ❏ Ensure the base case returns a result directly (without calling the function again).
- ❏ Will the base case *always* be reached?

Recursive case:

- ❏ Determine what the ***first*** value of the new list will be
- ❏ Then "build" the ***rest*** of the list by recursively calling the building function
- ❏ Finally, return a new ***Node(first, rest)***, representing the a new list

Let’s write the `recursive_range` function in VS Code!

More practice!

`insert_after` Algorithm Demo

1. When you are asked,
   "Can you add a Node with a value of 211 after the Node with value 210?"

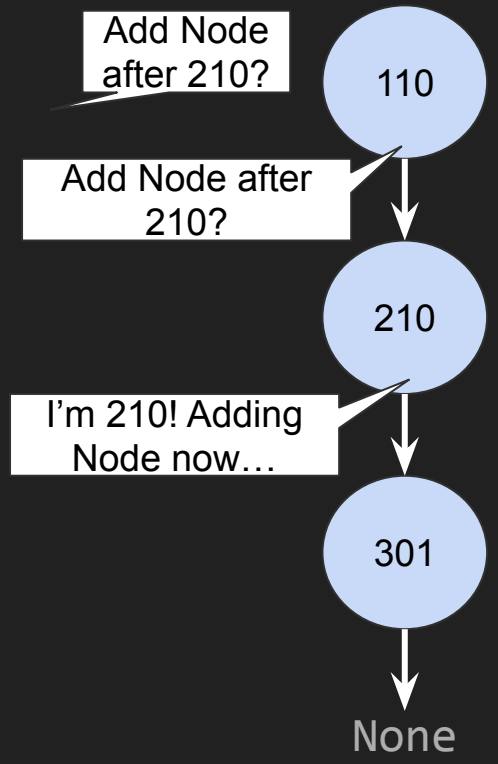
If your value ***is not 210***:

2. Ask the ***next*** Node,
   "Can you add a Node with a value of 211 after the Node with value 210?"
   Wait patiently for an answer!

3. Once the answer is returned back to you, turn to the person who asked you and give them this answer.

If your value **is 210**:

2. Invite a new friend to the list! You will now point to them, and they will point to the person you were previously pointing to. New Node, you'll say "I was added!!"



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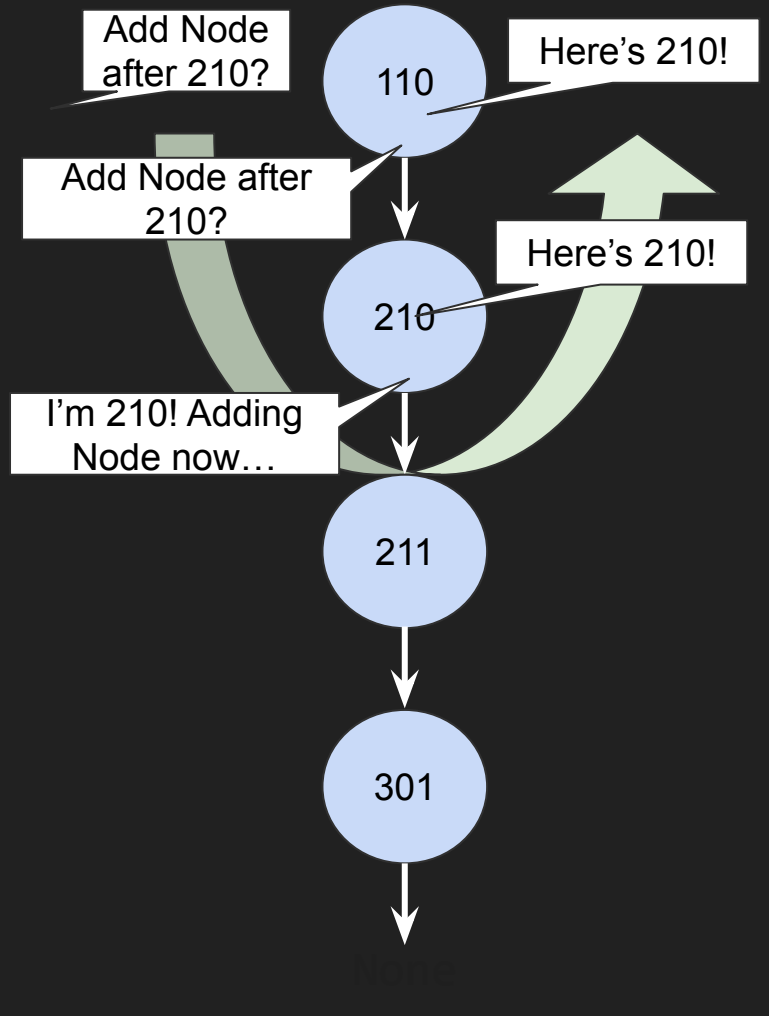

Let’s write pseudocode for the `insert_after` function

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