COMP 110

More Practice with Recursive Structures & Processes

`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:

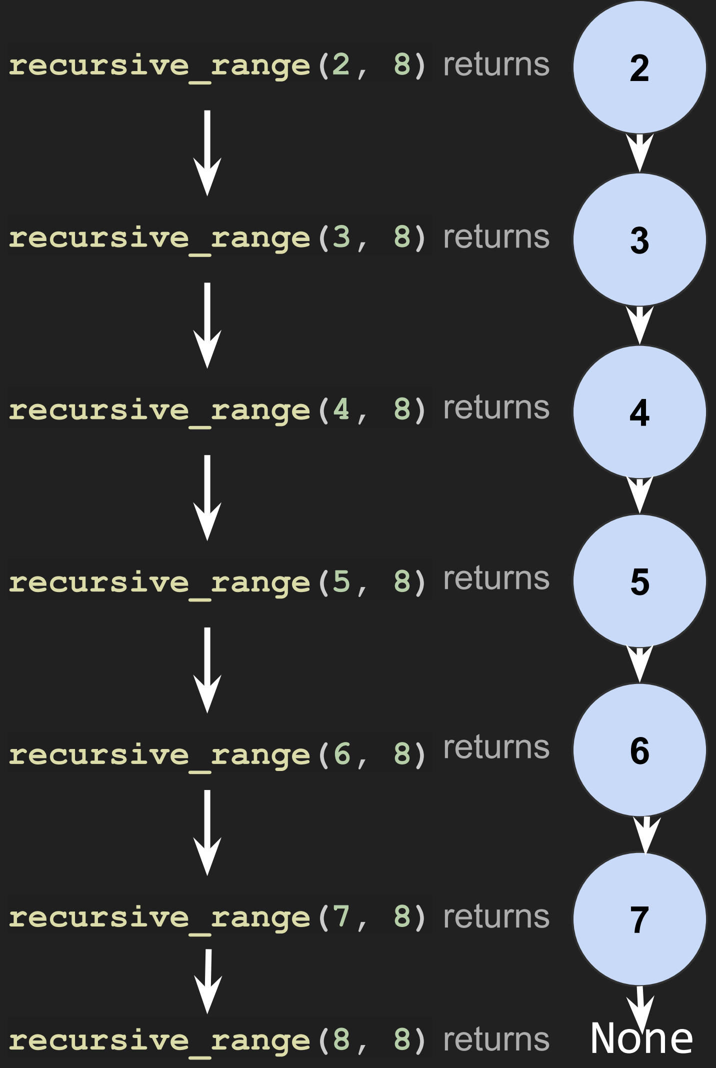
2 -> 3 -> 4 -> 5 -> 6 -> 7 -> None

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?



`recursive_range(2, 8)` returns 2

`recursive_range(3, 8)` returns 3

`recursive_range(4, 8)` returns 4

`recursive_range(5, 8)` returns 5

`recursive_range(6, 8)` returns 6

`recursive_range(7, 8)` returns 7

`recursive_range(8, 8)` returns None

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

`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?"

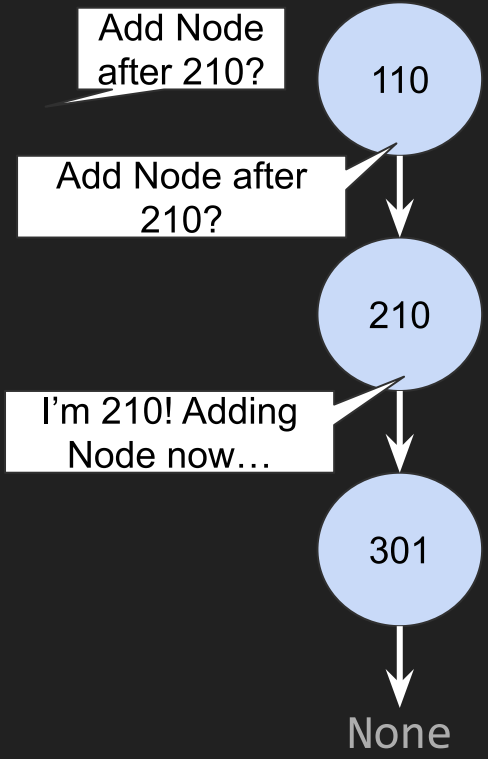
If your value ***is not 210***:

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!!"



`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?"

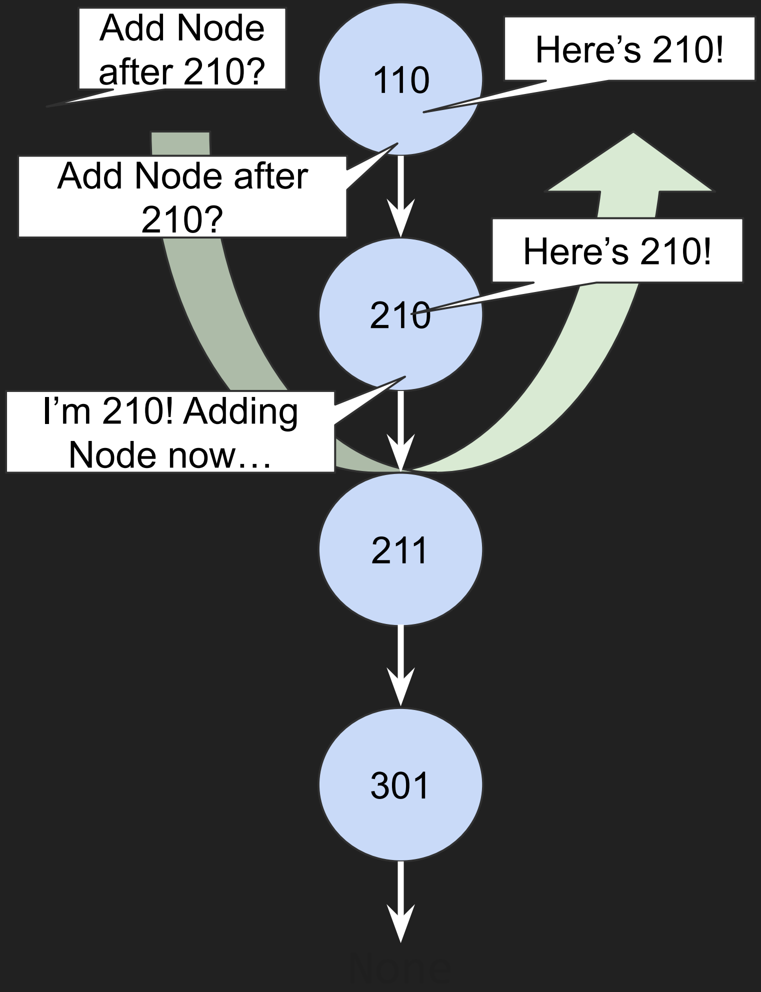
If your value ***is not 210***:

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!!"



Let’s write pseudocode for the **`insert_after`** function

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

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