Just a Few Days Left!

When: Saturday, April 18th from 10 am - 12 am (MIDNIGHT)

Where: Sitterson and Fred Brooks 1st floor (Floor 0)

- Please confirm your attendance by responding to the official Hack110 email.
- Be on the lookout for an email to join the Hack110 GroupMe
- **Don't want to make a project or stay the full time?** We have plenty of workshops throughout the day to benefit you in multiple ways!
- Still time to sign up. Don't Wait!

Website!

Questions? Email **hack110@office.unc.edu**

Perks

Lunch catered by **Panera**

Dinner catered by **Kolapasi**

Free Hack 110 Shirt

Free Snacks and **Drinks** Throughout

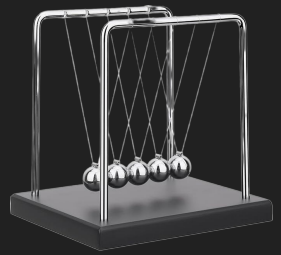
Earn **CLE credit**

Win Vouchers for UNC's best cafe: **Tea Hill**

Compete to **win** many amazing **prizes!**

Select a Prize from the Pool

Laptop Stand

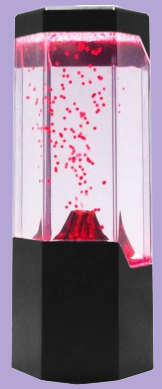


Newton’s Cradle

Portable Fan

Survival Kit

Tile Tracker



Volcano Lamp

Wireless Keyboard

Galaxy Projector

Power Banks

Phone Mount

Building Linked Lists with Recursive Algorithms (Part 2)

Announcements

Re: Assignments:

- **CQ03: Linked List Traversal Questions** due today at 11:59pm
- **EX08: Linked List Utility Functions** due Wed. April 15th

Quiz 03 this Friday! To prep:

- Review your previous quiz
- Practice problems at the end of each slide deck and on the website
- Review session on Wednesday evening (details TBA soon!)

CQ03: With a partner, answer the following questions and submit your answers to Gradescope.

Question 4: Traversing a Linked List Print the output of the function calls below. Write "Error" if code would result in an error.

```
1  from __future__ import annotations
2
3  class Node:
4    value: int
5    next: Node | None
6
7    def __init__(self, value: int, next: Node | None):
8      self.value = value
9      self.next = next
10
11   def __str__(self) -> str:
12     rest: str
13     if self.next is None:
14       rest = "None"
15     else:
16       rest = str(self.next)
17     return f"{self.value} -> {rest}"
18
19 sun: Node = Node(4, None)
20 moon: Node = Node(7, sun)
```

4.1. Print the output.

```
1 print(moon)
```

4.2. Print the output.

```
1 print(sun.value)
```

4.3. Print the output.

```
1 print(moon.next)
```

4.4. Print the output.

```
1 print(moon.next.next)
```

`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.,

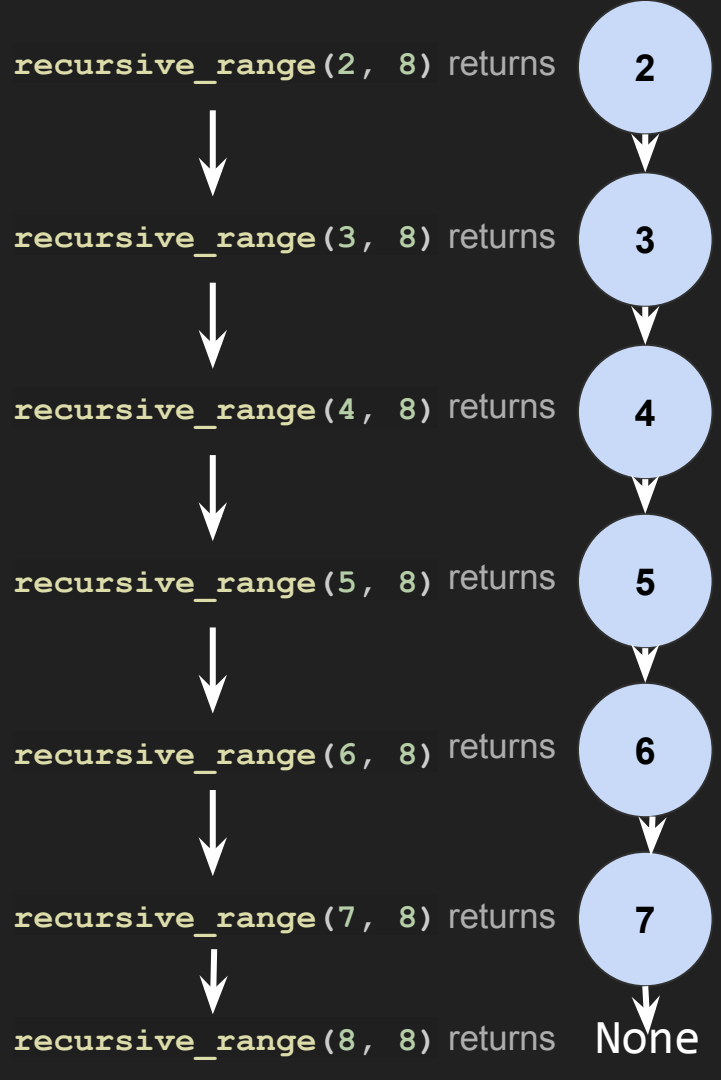
`recursive_range(start=2, end=8)` would return:

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?



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 linked 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 new linked list

Let’s write the `recursive_range` 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?"

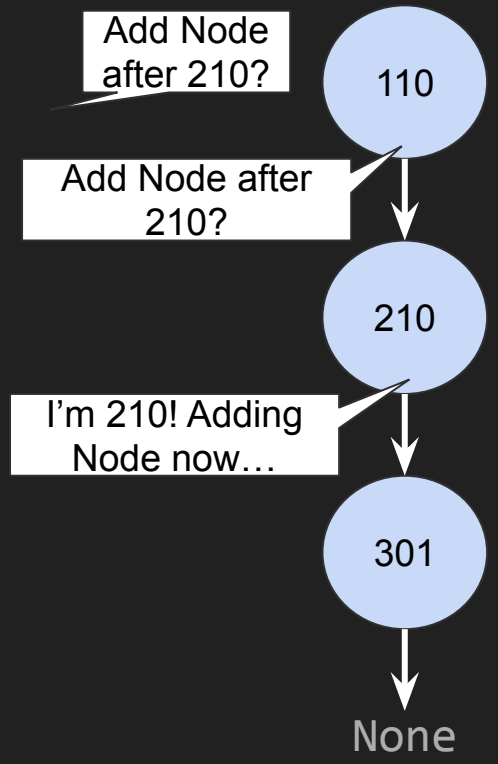
If your value ***is not 210***:

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?"

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   Wait patiently for an answer!

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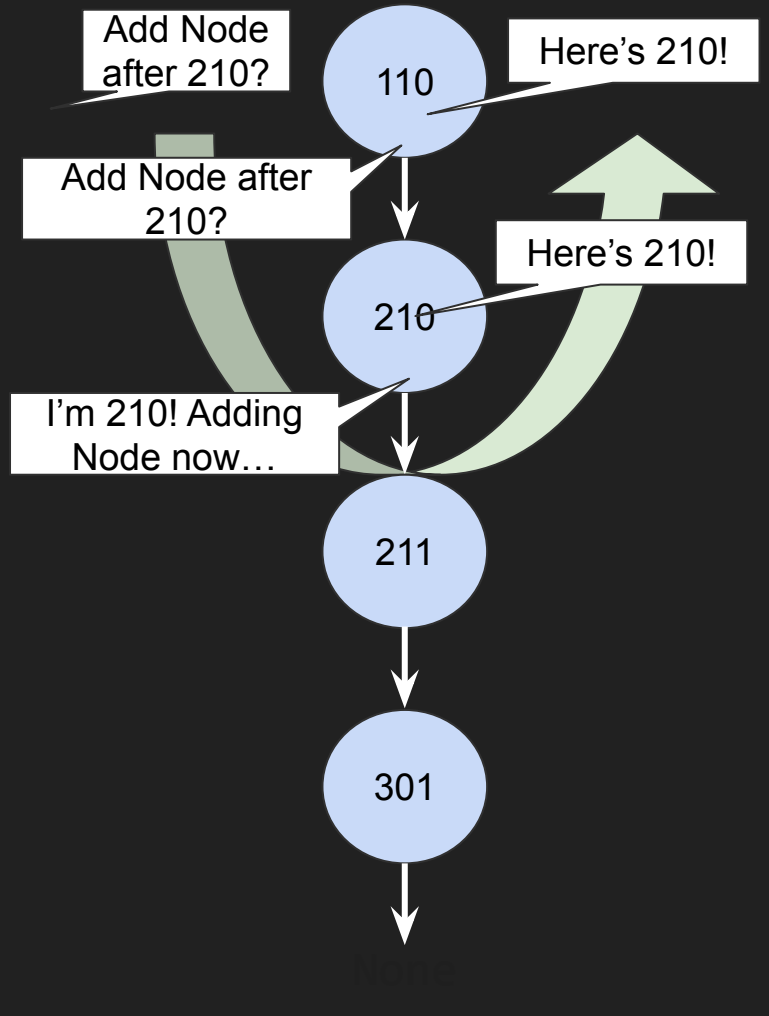
If your value **is 210**:

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!