

# Hack 110!

- Comp 110 Hackathon!
- 7:00 PM on Dec 1 to 12:00 PM on Dec 2 in Sitterson Lobby
- Two tracks: **web development** and **game development**
- Plenty of workshops + fun!
- Free food + swag!
- ***Great for beginners!***
- <http://tinyurl.com/app23f>
- Apply by Nov 21!
- Questions: Email Kaleb (kalebw02@ad.unc.edu)

COMP  
110

CL13 - Recursion

# Recursion

- When a process or structure is defined in terms of itself
- Examples:
  - File System
  - Onions/Ogres
  - Tree Branches

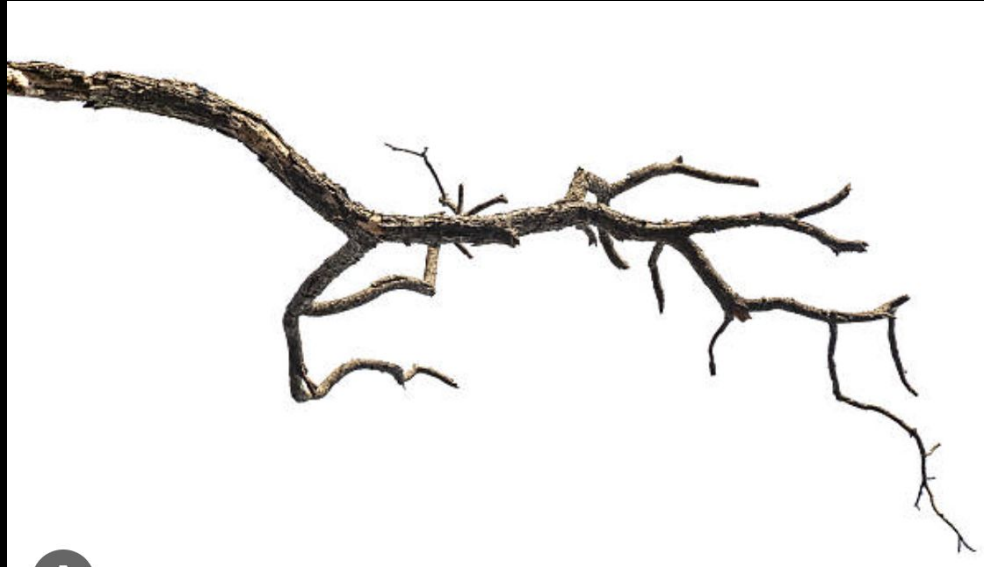


# Recursion

function   data type

- When a **process** or **structure** is defined in terms of itself
- Examples:
  - File System
  - Onions/Ogres
  - Tree Branches

**NOTE:**  
Like loops, recursion  
needs to terminate!



# Structures

Recursive Data Type:

- Contains itself as an attribute/part of an attribute

```
class Node:  
    data: int  
    next: Node
```

# In Memory

```
class Node:  
    data: int  
    next: Node
```

VS Example...

# Ending Recursion

- Terminates on a **base case**
- Recursive attribute replaced with **None** type





# In Memory

```
6  ✓ class Node:
7      |     """My Node class for linked lists."""
8      |
9      |     data: int
10     |     next: Node | None
11     |
12  ✓ def __init__(self, data: int, next: Node | None):
13     |     """Construct Node."""
14     |     self.data = data
15     |     self.next = next
```

```
1  node_c = Node(2, None)
2  node_b = Node(1, node_c)
3  node_a = Node(0, node_b) #head of list
```

