

LEC 09

**CSE 123**

# Recursive Programming

Questions during Class?  
Raise hand or send here

sli.do #cse123



BEFORE WE START

*Talk to your neighbors:*

*Who ya got in the Super Bowl?*

Respond on [sli.do](#)!

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**Instructor:** Brett Wortzman

**TAs:**

Arohan	Jonah	Kavya	Eeshani	Trien
Ashar	Brice	Misha	Aidan	Evan
Sean	Chris	Kieran	Cora	Rena
Chloe	Elden	Sahana	Dixon	Katharine
Jenny	Ishita	Anirudh	Nhan	Anyia
Nate	Kuhu	Crystal		

Now playing: 🎵 [CSE 123 26wi Lecture Tunes](#) 🎵

# Announcements

- Resubmission Period 2 due tonight (2/6) at 11:59pm
  - Last opportunity for C0
- Quiz 1 Tuesday (2/10) in your registered section
- Programming Assignment 1 is due Wednesday (2/11) at 11:59pm

# Recursive Methods [Review]

- 2 components of every recursive method:
- Recursive case
  - Decompose problem into subproblem
  - Make the actual recursive call
  - Combine results meaningfully
- Base case
  - Simplest version of the problem
  - No subproblems to break into
  - Return known answer



*If decomposing moves you closer to the base, no infinite recursion!*

# Why Recursion?

- Generally, anything you can write iteratively you can write recursively
  - So why write anything recursively?

*Recursion is particularly useful when dealing with something that's recursively defined*

- Math examples:
  - Factorial:  $n! = n * (n - 1)!$
  - Exponent:  $x^n = x * x^{n-1}$
  - Fibonacci:  $fib(n) = fib(n - 1) + fib(n - 2)$
- Non-math examples?
  - ListNodes (int data, ListNode next)
  - Other ideas?

# Public / Private Pairs

- Used when we need additional information between recursive calls
- Private helper method hides additional info
  - Clients shouldn't have to worry about it
- All public method does is kick-start the private one
  - What's the correct starting value(s) for additional param(s)?

*Question to ask: "Do I need to keep track of any additional information?"*