

# CS 311O

## Memoization

Nate Foster  
Spring 2019

Today's music: *Fugue in G Minor, BWV 578* by JS Bach

# Review

**Currently in 3110:** Advanced data structures

- Streams
- Balanced trees
- Mutability
- Promises
- Monads

**Today:**

- Memoization

# ARRAYS AND HASHTABLES

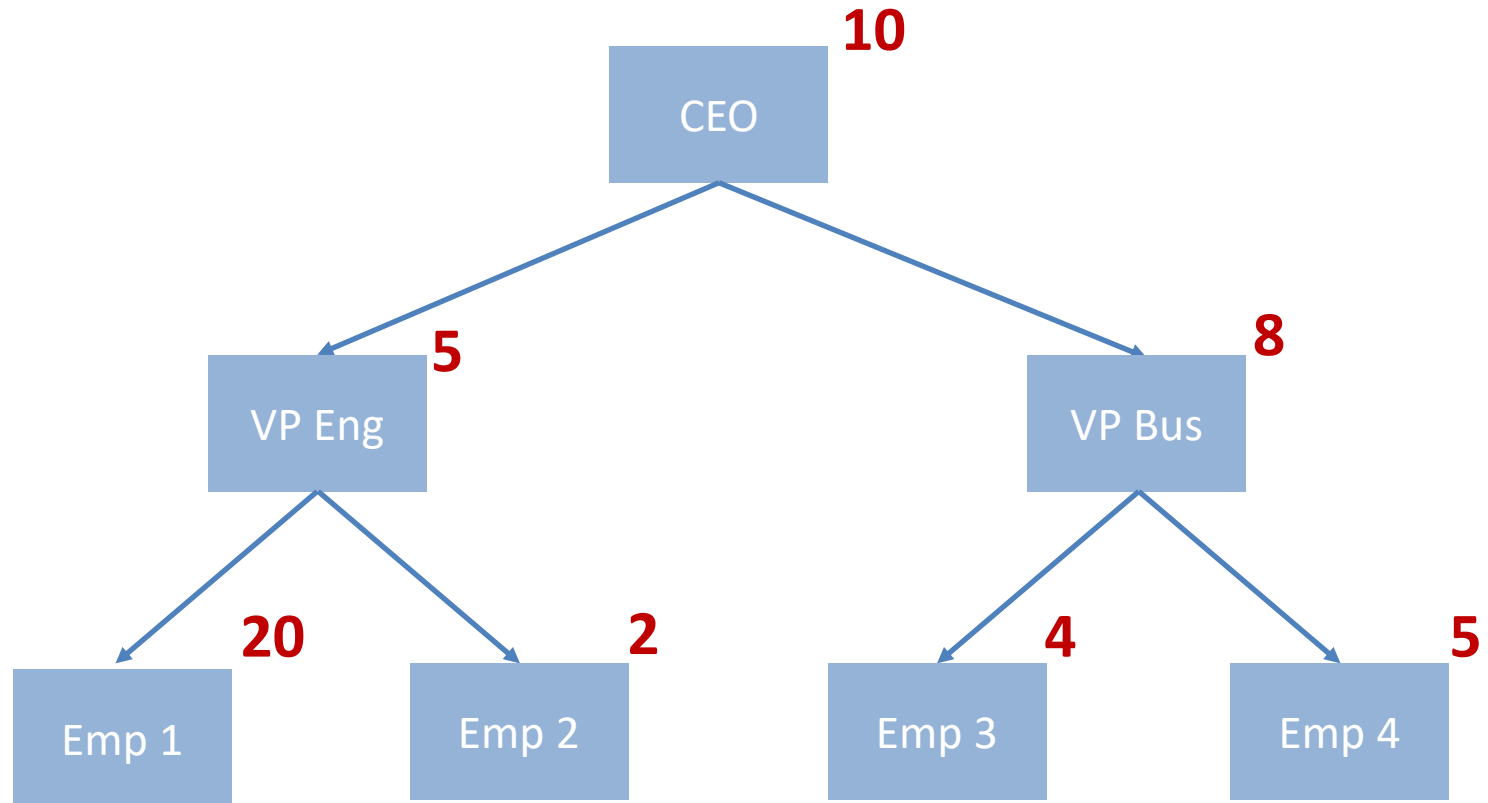
# MEMOIZED FIBONACCI

# Stepping back...

- We took a function,
- We added (mutable) storage,
- We wrapped the function so it either:
  - Returns a previously computed result or
  - Computes the result and stores it

**OPTIMIZING FUN**

# Party Planning



Want to maximize “fun” but can’t invite a person and their boss.

This is also known as the *maximum wet independent set*.

# **PARTY PLANNING**

# **MEMOIZED PARTY PLANNING**

**LINE BREAKING**

# Breaking Text

## Given:

- “This may be a difficult example”
- Margin = 13

## Greedy

This may be a  
difficult  
example

## Optimal

This may be  
a difficult  
example

# LINE BREAKING

# MEMOIZED LINE BREAKING

# **AUTOMATIC MEMOIZATION**

# Stepping back...

- We took a function,
- We added (mutable) storage,
- We wrapped the function so it either:
  - Returns a previously computed result or
  - Computes the result and stores it
- Note that all mutable state is purely internal to the function!

# Upcoming events

- [Friday] A5 due

*This is memorable.*

**THIS IS 3110**