Discussion 01

Welcome to 3110!

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Logistics

- This is Discussion 213, MoWe 10:10AM-11:00AM
- Discussions will generally consist of short review followed by exercise problems
- Attendance will be taken using One-Minute-Memos (OMMs) starting **Wednesday**
- Exercises and slides will be posted on this GitHub Repo: `https://github.com/nwtnni/discussion-sp19`

Kenneth Fang

- Junior in ECE/CS
- Interested in Programming Languages, Computer Architecture, Analog and Digital Integrated Circuit Design
- Ask me about ECE, Theatre Lighting, Frisbee, Video Games

Figure: A Spooky Dude

Newton Ni

Figure: A Physics Dropout

- Senior in CS
- Interested in Programming Languages, Compilers, Systems
- Ask me about Rust, Rocket League, Vim

Introductions

Please tell us your . . .

- Name
- Favorite Household Appliance
- Ex: My name is Kenneth and I like toasters.

Questions about the Course?

Figure: What am I doing here?

Let Expressions

- Let expressions have the following form:
- `let x = e1 in e2`
- Where `x` is an identifier and `e1`, `e2` are expressions

Let Expressions: Dynamic Semantics

- How to **evaluate** expressions
- Here are the dynamic semantics for let expressions:
  1. Evaluate e1 to a value, we'll call it v1
  2. Look for the identifier x and substitute x for v1 everywhere in e2. This gives us a new expression e2'
  3. Evaluate e2' to a value v2. This is the result of evaluating the let expression.

Let Expressions: Dynamic Semantics

- `let z = 0 + 1 in z + 41`
- `let z = 1 in z + 41`
- `1 + 41`
- `42`

Let Expressions: Dynamic Semantics

- `let y = 25 in let z = y * 3 in z - y`
- `let z = y * 3 in z - y`
- `let z = 25 * 3 in z - 25`
- `let z = 75 in z - 25`
- `z - 25`
- `75 - 25`
- `50`

Let Expressions: Static Semantics

- How to **type-check** expressions
- Here are the static semantics for let expressions:
  1. If `e1` has type `t1`
  2. If `e2` has type `t2` given that `x` has type `t1`
  3. Then the let expression has type `t2`

Recitation Exercises