

Meeting 09 - Static Scoping

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What questions does your neighbor have?

Announcements

- Lab 2 due this Friday (or Monday?) 6pm

Today

- Preview Lab 2
- [Static Scoping](#)
- Triage Your Questions
 - Using VSCode or the terminal to test your code (on coding.csel.io)?
 - Auto-testing with GitHub Actions?
 - HW2?

Questions?

- Review:
 - How does a *recursive-descent parser* work, roughly?

Questions?

Review: Variable Binding and Scope

What's variable binding?

What's variable scope?

Variable Binding

How do you bind a variable in Scala?

In JavaScript?

JavaScripty

Let's extend our abstract syntax type `Expr`.

```
defined trait Expr
```

Free Variables

Let's define a function to compute the free variables of a JavaScripty expression:

```
defined function freeVars
e_n: N = N(n = 2.0)
e_plusnn: Plus = Plus(e1 = N(n = 2.0), e2 = N(n = 2.0))
e_var: Var = Var(x = "four")
e_plusvarvar: Plus = Plus(e1 = Var(x = "four"), e2 = Var(x = "four"))
e_constdecl: ConstDecl = ConstDecl(
  x = "four",
  e1 = Plus(e1 = N(n = 2.0), e2 = N(n = 2.0)),
  e2 = Plus(e1 = Var(x = "four"), e2 = Var(x = "four"))
)
```

Value Environments

What is the meaning of an expression with free variables?

```
:
```

Compilation Failed

Renaming Bound Variables

```
1 const four = (2 + 2); (four + four)
```

```
1 const x = (2 + 2); (x + x)
```

```
1 const fuzz = (2 + 2); (fuzz + fuzz)
```

Let's implement `rename` that renames all variables into `"x0"`, `"x1"`, etc.

```
defined function rename
```