Lecture 15:

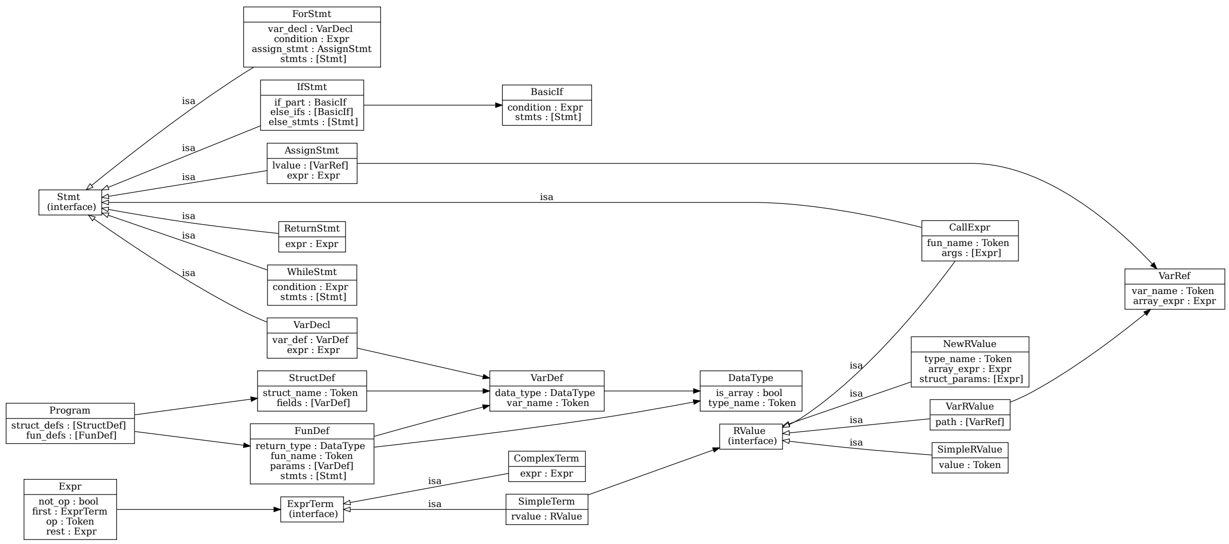
- MyPL AST Overview
- Associativity and Precedence (intro)

Announcements:

- HW-3 out

MyPL AST Classes

See the course website for diagram ...



Trickier parts:

- simple vs complex terms (latter for parenthesized expressions)
- if statements with (reusable) "If Parts"
- lvalues as path (list) of VarRef (var name and optional array expr)
- variable rvalues with similar path of VarRef

More on Context Free Grammars

With recursive descent parsers, it can be hard to ...

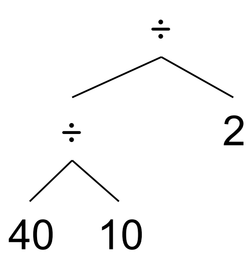
- define grammars with appropriate operator **associativity**
- define grammars with appropriate operator **precedence**
- ... and these are important for semantic analysis (and evaluation)

Operator associativity

- many operators are **left associative** ... e.g., $\times$, $\div$, $+$, $-$
- For example ... $40 \div 10 \div 2 \equiv (40 \div 10) \div 2$
- Can be captured by the grammar rule:

  $e \rightarrow e \div n$ ... n a number

- and the "AST":



- But notice this requires ulineleft recursion! ... so not $LL(k)$