Advanced Progamming Languages	**Lecture 31**
CS 6110 Spring 2015	**Mon. April 13, 2015**

Lecture 31

Topics

1. Sarah Loos CS colloquium Tuesday 4:15 in Gates Auditorium.
2. Validating Hoare Axioms from Winskel.
3. Hoare logic in asserted programs and Programming Logics. PLCV, Gypsy, and Stanford Pascal Verifier were programming logics of the 1980's.
4. Natural Deduction Logic Rules in Programming Logic (PLCV2). We see logic and computation integrated.

Validating Hoare Axioms – Winskel Chapter 6

First order logic over arithmetic expressions

- **Assn** for Assertions
- Free and bound variables (as in λ-calculus there is a capture issue)
- These integer variables in the logic are distinct from those in the program. The programming logics integrate the two so users can do logic as a special case of programming.

Hoare Axioms p.39, transform to linear style

$\{B[a/X]\}$	We know $B[a/X]$ at this point, say we have evidence of $b(a, X)(s)$ from a proof.
$X := a$	This defines the state so that $s(X) = a$.
$\{B\}$	To know this, we need evidence for exactly $B[a/X]$.

Hoare while rule

Programming Logics based on Hoare-like rules. Asserted Programs are the main characters. There are some in the handouts.

PLVC2 Programming Logic, Lecture Notes in Computer Science v.135, 1982, p.83.