CSE-341
The first half of the quarter

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Disclaimer... :-)

This is not necessarily a comprehensive listing of all the topics we have covered thus far. Any material from lecture notes, required readings, section notes, assignments, or the mailing list may appear on the exam.

Major topics

- Languages overview
- Functional programming
  - Scheme (with some imperative features)
  - Haskell (purely functional)
- Logic/Relational programming
  - Prolog

Scheme

- Evaluation rules
- "Inside-out" evaluation
- Suppressing evaluation with quote
- Special forms
- Types of values and dynamic typing
- Anonymous procedures via lambda
- Bindings instead of assignment

More Scheme...

- Recursion, tail-recursion
- Lists, cons cells, car, cdr and friends
- First class procedures
- Higher order functions
  - procedures as arguments to other procedures
  - procedures returned from factory procedures
- Free variables, lexical vs. dynamic scope

Even more Scheme...

- apply procedure, rest arguments
- eq? vs. equal?
- Side-effects
  - assignment
  - list-surgery
  - sequencing
- Garbage collection

Haskell

- Purely functional
- Referential transparency
- Lists, but homogenous and proper
- Two-dimensional layout syntax
- Currying, partial application
- Pattern matching
- List comprehensions

More Haskell...

- Static typing, polymorphic types
- Type inference, type unification
- Lazy evaluation—outside-in

Prolog

- Relations vs. functions
- Specialized language for search
- Facts + rules, and queries
- Variables, variable scope
- Predicate logic
- Eight queens and backtracking
- Multiple solutions, working backwards

More prolog

- Pattern matching and unification
- Arithmetic using "is"
- Constraint Logic Programming (CLP)
- Built-in search algorithm
- Traces, search trees
- Cut
- Difference lists