

# CSE 341: Programming Languages

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Spring 2004

Lecture 14— Delayed Evaluation, Memoization, Thunks, Streams

# Today

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- Scheme top-level: forward references and evil mutation
- Delaying evaluation: Function bodies evaluated only at application
- Key idioms of delaying evaluation
  - Thunks
  - Laziness
  - Memoization
  - Streams
- In general, evaluation rules defined by language semantics
  - Some languages have “lazy” function application!

## Top-level definitions

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Scheme top-level allows forward references and mutation of bindings

- What should a name clash do? (In fact, it's mutation.)
- How can you program defensively?
  - General point: Make a local copy!
- How does “primitives are functions” make this harder?
- What do Schemers do in practice?
  - Don't mutate top-level bindings
  - Use a module system for namespace management