3007 Final Exam Review

William Findlay

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Contents

1 Definitions

1.1 Imperative vs Declarative

1.1.1 Imperative

- Series of instructions
- Iterative functions
- Command driven, statement oriented
- Procedural
  - C
  - Pascal
  - Assembly
- Object oriented
  - C++
  - Java

1.1.2 Declarative

- No side effects
- Focus on relations
- "What to get" instead of "How to get"
- Order of statements *shouldn't* matter
- Examples:
  - SQL
  - Prolog
  - Regex

1.2 Scope vs Visibility

1.2.1 Scope

- The set of expressions for which the variable *exists*
- In lexical scoping
  - variables in the scope we were *defined* in
  - and local variables
  - who uses this?
    - C-family languages
    - Scheme
    - Algol
- In dynamic scoping
  - variables in the scope we were *called* in
  - and local variables
  - who uses this?
    - early LISP
    - APL
    - BASH

1.2.2 Visibility

- The set of expressions for which the variable *can be reached*

- If we **declare a local variable** with the *same name* as a variable in enclosing scope
  - that enclosing scope variable is now hidden
  - all references to *name* are to our locally scoped variable instead

1.3 Applicative Order Evaluation vs Normal Order Evaluation

1.3.1 Applicative Order Evaluation

- **Strict evaluation**
- Evaluate an expression *before* it is passed in as an argument
  - go as deep as you can until you hit primitives, then evaluate and go back
  - as deep into the nest as possible and work backwards

1.3.2 Normal Order Evaluation

- **Lazy evaluation**
- Evaluate an expression *only* when its value is needed
  - first **expand**, then **reduce**