CS403: Programming Languages

Notes on Programming Languages

Basic Scheme
- basics
- evaluation of Scheme expressions

Scheme and Functions
- recursive vs. iterative processes
- bindings
- functions
- combining functions

Scheme and Data
- data structures in Scheme
- data abstraction
- simple list manipulations

Abstraction with Data
- conventional interfaces
- data-directed programming using tagged data
- encapsulation

State
- state
- drawbacks to state

User-defined Data Structures with State
- stacks
- queues

Interesting Applications
- discrete-event simulation
- constraint-based programming (optional)
- introduction to streams
- more on streams
- still more on streams

Topics concerning the implementation of a programming language
- overview
- grammars
- fun with grammars
- lexical analysis (scanning)
- recursive descent parsing for language recognition
- parse trees and pretty printing
• implementing environments
• evaluating parse trees
• adding built-in functions
• associativity and precedence
• detecting undefined variables
• static typing versus dynamic typing
• object orientation

Other Programming Language Topics
• invariants
• axiomatic semantics
• more on axiomatic semantics
• still more on axiomatic semantics
• variations on passing arguments