Final Exam Topics

CS 536, Fall 2004

Basic ideas of scanning and parsing

- including, e.g., writing a CFG for a language, but not including LL(1) parsing

Symbol-Table Management

- static scoping
  - scoping rules for Java vs for C--
  - identifying multiply declared names
  - matching uses to corresponding declarations
  - implementation: list of hashtables and hashtable of lists
    how the two approaches work, trade-offs in efficiency, extending the approaches to handle new language constructs
- dynamic scoping
  - matching uses to corresponding declaration

Type Checking

- type checking the constructs of the language used for the project
- extensions to handle new constructs

Runtime Storage Management

- general storage layout (stack, heap, static data area)
- activation records
  manipulation of activation records on:
  - method call
  - method entry
  - method return
- access to non-local variables
  - for parameters, locals, globals
  - access links and displays for languages with nested subprograms

Parameter-Passing Modes

- call-by-value
- call-by-reference
- call-by-value-result
- call-by-name

both from a language-design point of view and a compiler-writer's point of view

Code Generation

- generating code for the constructs of the language used for the project
- extensions to handle new constructs
- numeric and control-flow approaches to generating code for boolean expressions

Optimization

- goals (safety and profitability)
- peephole optimizations
- copy propagation
- loop optimizations
    - moving loop-invariant computations out of the loop
    - strength reduction in for loops