CISC 672: ADVANCED COMPILER CONSTRUCTION
Spring 2005
Midterm Exam Study Guide
Midterm Time and Date: classtime on Thursday, April 7, 2005

1 References

- Lectures notes and slides from start of course through April 5, 2005.
- Readings listed on schedule through April 5, 2005.
- Assignments PA1, PA2 and PA3.
- Handouts from class
- Parsing homework

2 Topic Coverage

- overall compiler and compiler-related tool constructions.
- lexical specification: regular expressions.
- implementation of a lexical analyzer: manually and using flex.
- dfa and nfa construction from regular expressions.
- error detection and recovery in lexical analysis.
- syntax specification: context free grammars.
- problems with grammars: ambiguity.
- grammar rewriting.
- top-down parsing: getting the grammar in the right form, recursive-descent parsing, FIRST and FOLLOW computation, LL(1) parsing method and and parse table construction, deciding whether a grammar is LL(1).
- bottom-up parsing: issues in parsing, shift-reduce parsing method, use of bison, LR(0), SLR(1), LR(1), LALR(1) DFA and parse table construction, deciding whether a grammar is one of these classes. - symbol tables and their design, construction and use
- static semantic checking
- inheritance graphs

3 Format of Exam

The exam is closed book, closed neighbor and you will have the full class period to work. In general, the exam will be a combination of testing your basic knowledge and understanding of the concepts covered in class and application of the concepts. The questions will most likely be of the form:
- Short answer.
- Writing regular expressions.
- Drawing DFA's.
- Understanding of a flex-like specification.
- Writing context-free grammars.
- Rewriting context-free grammars.
- Identifying problems in context-free grammars.
- Deriving strings and building parse trees.
- Top-down parsing methods (recursive-descent, LL(1)):
(writing part of a recursive-descent parser, constructing FIRST and FOLLOW sets, constructing an LL(1) parse table from given FIRST and FOLLOW sets, determining whether a grammar is LL(1).
- Bottom-up parsing: constructing DFA's for LR(0) and LR(1), constructing parse tables from DFA's, issues in the shift-reduce parsing methods.
- symbol tables: organizing, implementing operations, tradeoffs

The questions are NOT multiple choice. Instead, partial credit will be given when possible on any question in the exam.

4 How to Study

Review your lecture notes, handouts, labs, and textbook chapters, parsing homework.