

COMS W4115

Programming Languages and Translators

Lecture 14: Midterm Review

March 11, 2013

1. What you should know for the midterm

1. The different kinds of programming languages
 - Lecture 1
 - The fundamental elements of programming languages
 - Lecture 2, ALSU Ch.1
 - Language processing tools
 - Lecture 2, ALSU Ch. 1
 - The structure of a compiler
 - Lecture 3, ALSU Chs. 1 and 2
 - Regular languages, regular expressions, finite automata
 - Lectures 4 and 5, ALSU Ch. 3 except for Sect. 3.9
 - Lexical analysis
 - Lectures 4 and 5, ALSU Chs. 2 and 3 except for Sect. 3.9
 - Context-free languages and grammars
 - Lectures 6 and 7, ALSU Ch. 4 except for Sect. 4.7
 - Top-down parsing
 - Lecture 9, ALSU Chs. 2 and 4 except for Sect. 4.7
 - Bottom-up parsing
 - Lectures 10 and 11, ALSU Ch. 4 except for Sect. 4.7
 - Syntax-directed translation
 - Lectures 12 and 13, ALSU Chs. 2 and Ch. 5 except for Sect. 5.5

2. Automata and Language Theory Review

- Regular languages
 - Finite automata
 - Regular expressions
 - Closure properties of regular languages
 - Decision properties of regular languages
 - Pumping lemma for regular languages and its uses
- Context-free languages
 - Context-free grammars
 - Parse trees, derivations, and ambiguity
 - Pushdown automata and deterministic pushdown automata
 - Closure properties of CFLs
 - Decision properties of CFLs
 - Pumping lemma for CFLs and its uses
- Syntax-directed translation
 - Syntax-directed definitions and translation schemes
 - Attribute grammars, inherited and synthesized attributes
 - S-attributed and L-attributed SDDs

3. Not all LL(1) grammars are SLR(1) and vice versa

- An LL(1) grammar that is not SLR(1)

$S \rightarrow A^+ \mid A^+A^+B \mid B^+B^+A$

$A \rightarrow A^+ \mid \epsilon$

$B \rightarrow A^+ \mid \epsilon$

- An SLR(1) grammar that is not LL(1)

$S \rightarrow A^+ \mid SA \mid A$

