

The third test in this course will take place in class on Wednesday, December 3. It covers Chapter 3, Sections 4 through 7 and Chapter 4, Sections 1 and 3 (except for LL(1) and LR(1) parsing). You will also, of course, need to be familiar with the background material on languages and regular expressions from Sections 3.1 and 3.2. The following list contains some of the terms and concepts that you should be familiar with.

Finite state automaton

Deterministic finite state automaton (DFA)

Definition of a DFA as a 5-tuple $(Q, \Sigma, q_0, \delta, F)$

Definition of a DFA using a transition diagram

Start state

Accepting state (also known as final state)

Transition function $\delta: Q \times \Sigma \rightarrow Q$

How a DFA reads and accepts (or does not accept) a string

Finding machines that accept a given language, and *vice versa*

Nondeterministic finite automaton (NFA)

ϵ -transition

How an NFA reads and accepts (or does not accept) a string

The language $L(M)$ accepted by a DFA or NFA M

Algorithm for constructing a DFA that accepts the same language as a given NFA

Algorithm for constructing an NFA that accepts $L(r)$ for a regular expression r

The fact that the language accepted by an NFA or by a DFA is a regular language

Intersection and complement of regular languages are regular

The fact that there are languages that are not regular

The Pumping Lemma for regular languages

Using the Pumping Lemma to prove that a given language is not regular

Grammars

Rewriting rules and production rules

Context free grammars (CFGs)

Definition of a CFG as a 4-tuple (V, Σ, P, S)

Non-terminal and terminal symbols

Start symbol

The language $L(G)$ generated by a CFG G

The $\Rightarrow$ and $\Rightarrow^*$ notations

Derivation of a string w over a CFG G

Finding a grammar to generate a given language, and *vice versa*

Union, concatenation, Kleene star of context-free languages are context free

Proofs of the preceding statement

Every regular language is context free

Examples of languages that are not context free

Parsing

Parse tree

Ambiguous grammar

Left derivation