

## Descriptions of Midterm Problems

The midterm will be on F, May 2nd, during class. The exam is closed book!

The midterm will cover chapters 3 through (and including) 6.2 of our text.

1. Given an English description of a language, produce a regular expression (or an  $FA$ ,  $NFA$ ,  $\Lambda - NFA$ ,  $CFG$ ) for the language.
2. Same as above but the opposite direction.
3. Given an  $FA$  ( $NFA$ ,  $\Lambda - NFA$ ) produce a regular expression for the language accepted by the machine model (or vica versa).
4. Conversion of  $\Lambda - NFA$  to an  $NFA$ .
5. Use subset construction for a converting an  $NFA$  to an  $FA$ .
6. State minimization of  $FA$ 's.
7. Given two  $FA$ 's find an  $FA$  that accepts the intersection (use the cross product construction).
8. Finding (pairwise) distinguishable sets with respect to a language or an  $FA$ .
9. Constructive proofs for closure properties of regular languages.
10. Proving languages non-regular using a version of the Pumping Lemma for regular languages or by giving a set of pairwise distinguishable words of infinite cardinality.
11. Decision problems and decision algorithms regarding regular languages.
12. Closure properties of regular languages.
13. Show that two minimum state  $FA$ 's are isomorphic or not.