Automata Theory - Scrimmage II

L. Kovalchick
LCSEE,
West Virginia University,
Morgantown, WV
{lynn@csee.wvu.edu}

1 Instructions

1. The Scrimmage will not be graded, i.e., there are no points.
2. Attempt as many problems as you can.

2 Problems

1. For $\Sigma = \{a, b\}$, construct a DFA that accepts the set consisting of all strings with no more than 3 a's.
2. For $\Sigma = \{a, b, c\}$, construct an ϵ-NFA that accepts the language $L = \{ab + abc\}^*$.
3. Give a regular expression for the following languages.
   (a) $L = \{a^n b^m | n \geq 4, m \leq 3\}$
   (b) L'
4. Prove that the following language $L = \{a^n b^l a^k | k \geq n + l\}$ is not regular.
5. Find a context-free grammar for the language $L = \{a^n b^m | 2 \cdot n \leq m \leq 3 \cdot n, n \geq 0, m \geq 0\}$.