Formal Languages and Automata: NFA and Grammar Practice Problems

A. Let $\Sigma = \{a, b, c\}$ and L $= \{w \in \Sigma^* |$ w ends in cab $\}$. Design an NFA for L.

B. Let $\Sigma = \{a, b\}$ and let L $= \{w \in \Sigma^* |$ the third-from-last character of w is a $\}$. Design an NFA for L. Your NFA should use at most four states.

C. Let $\Sigma = \{a, b\}$ and $L = \{baa\}$. Design an NFA and DFA for L.

D. Construct an NFA that recognizes strings over $\Sigma = \{a, b\}$ that have an odd number of a's.

E. Construct an NFA that recognizes strings over the alphabet $\Sigma = \{a, b, c\}$ that start and end with the same symbol.

F. Construct a regular grammar for the language of all strings over $\Sigma = \{a, b\}$ that start with 'a' and end with 'b'

G. Construct a regular grammar for the language of all binary strings over the alphabet $\{0, 1\}$ that have an even number of 1's.

I. Construct a regular grammar for the language of all strings over $\Sigma = \{a, b\}$ that have at most one a.

J. Construct a regular grammar for the language of all strings over $\Sigma = \{a, b\}$ where the substring abb appears.

K. Construct a regular grammar for the language of all strings over $\Sigma = \{a, b\}$ that are palindromes.

L. Construct a regular grammar for the language of all strings over $\Sigma = \{a, b\}$ that do not contain the substring aa.