CSC238S **Problem Set 4** **Due: April 8/96**

1. Let $L = \{w \mid \text{each 0 in } w \text{ is immediately preceded and followed by a } 11\} \subseteq \{0,1\}^*$.
   (a) Write a regular expression which represents L.
   (b) Construct a deterministic FSA which accepts L.
2. a) Give a nondeterministic FSA M which accepts the regular language $(01^*)^*(\, 0 \mid 1\,)$.
   b) Convert the automata M in part a) to a deterministic FSA.
3. Problem 6 of the 1994 December examination.
4. Let $w \in \Sigma^*$ and let w^R denote the reverse of w; i.e. if $w = a_1 a_2 \ldots a_r$ then $w^R = a_r a_{r-1} \ldots a_1$. Let L be a language and define $L^R = \{w^R \mid w \in L\}$.

   Prove: If L is regular then L^R is regular.

   Hint: Let $L = L(M)$ for some FSA M. Construct a nondeterministic automata that "runs M in reverse".