CS 448/2405
Automata and Formal Languages
ASSIGNMENT # 1
NEW DUE DATE: Monday, February 6

1. Give deterministic finite automata accepting the following languages over $\{0, 1\}$.

   a. The set of all strings not containing the substring 111.

   b. The set of all strings of length at least four, and such that every block of four consecutive symbols contains at least 2 0's.

   c. The set of all strings with at least three symbols such that the third symbol from the right end is 1.

2. Prove of disprove the following for regular expressions r, s and t.

   a. $(rs + r)^* = r(sr + r)^*$

   b. $s(rs + s)^* = rr^*s(rr^*s)^*$

   c. $(r + s)^* = r^* + s^*$

3. Are the following languages regular? Prove or disprove your answer.

   a. $L = \{w \mid w = w^R\}$

   b. $L = \{0^n \mid n \text{ is prime}\}$

   c. $L = \{0^n \mid n \text{ is even}\}$

   d. $L = \{0^n 1^m 0^n \mid m, n \geq 0\}$

4. Sipser, Problem 1.57