COMP 301
Assignment 2
Due 10:30, Tuesday, October 1, 2002
All problems are of equal value.

Reading

Sipser, sections 1.3 and 1.4.

Practice

Sipser, 1.13, 1.15, 1.18, 1.23, 1.28, 1.36, 1.37, 1.41, 1.42, 1.43, 1.44.

To Be Handed In

1. Sipser, 1.14.

2. Sipser, 1.16.

3. Sipser, 1.17.

4. Sipser, 1.38.

5. For each of the following pairs of languages, one is regular and the other is not. Which is which? Give proofs.

   (a) $L_1 = \{w \in \{0,1\}^* | w$ is 2^n in binary notation, for some $n \geq 0\}$,
   $L_2 = \{w \in \{1\}^* | w$ is 2^n in unary notation, for some $n \geq 0\}$.

   (b) $L_1 = \{w \in \{0,1\}^* |$ for some x and y, $w = xy$, such that the number of 0's in $x = $ the number of 1's in $y\}$,
   $L_2 = \{w \in \{0,1,a\}^* |$ for some x and y, $w = xay$, such that the number of 0's in $x = $ number of the 1's in $y\}$.

Bonus

Sipser, 1.40.