**COMP 301**
**Assignment 4**
**Due 10:30, Thursday, November 7, 2002**
All problems are of equal value.

## Reading

Sipser, Chapter 3.

## Practice

Sipser, 3.1-5, 3.7, 3.8(a), 3.8(c), 3.10-13, 3.15-18.

## To Be Handed In

1. Sipser, 3.6.
2. (a) Sipser 3.8 (b).
   (b) Give an implementation-level description of a Turing machine that computes the function which on input $a^n$ outputs $a^k$, where $k = \lceil \log n \rceil$ (base 2 logarithm).
3. Sipser, 3.9.
4. Sipser, 3.14.
5. Sipser, 3.19.

## Bonus

A *read-only* TM is a TM that never changes any of the symbols on its tape, i.e., it always rewrites the same symbol as it was reading before moving its head. Prove that $L$ is accepted by a read-only TM if and only if $L$ is a regular language.