CS381 Homework Assignment number 4
Due Friday, September 23

Please write your name and net id on the upper right corner of each page.

1. (a) Construct all R_{ij}^0, R_{ij}^1, and R_{ij}^2 for the finite automaton defined in the table below. Simplify each R_{ij}^k as you go along. It may help if you draw the state diagram for the automaton and check each R_{ij}^k to make sure that it is correct as you go. Note you are not asked to construct any R_{ij}^3 for this part.

(b) What is the regular expression denoting the set accepted by the finite automaton? Assume that state 1 is the start state and that state 3 is the only final state.

	0	1
$\rightarrow 1$	2	3
2	2	1
3	1	2

2. Let $L_1 = \{0^n 10^{n+1} 1 \mid n \geq 1\}$ and let $L_2 = \{0^n 10^{2n} 1 \mid n \geq 1\}$. Express the set L consisting of strings of the form $0100100001000001\cdots$ where the number of zero's in successive blocks increases as 1,2,4,5,10,11,22,23,…i.e, alternate adding one and multiplying by two. The number of blocks of zeros can be even or odd.

4.2.1

4.2.2 using homomorphisms, inverse homomorphisms and $\cap R$.

4.2.6 by machine construction