

CS 4810 Homework Assignment 4 due Monday in class Sept 24

1. Suppose you already know that $\{0^n 1^n | n \geq 1\}$ is not a regular set. Use this information and closure properties for regular sets to prove that $\{xx | x \in \{a + b\}^*\}$ is not a regular set.
2. Let R be a regular set over the alphabet $\{0, 1\}$. Give a machine construction to prove that the set obtained by deleting one 1 from each even length block of 1's is also regular. Explain in English how your construction works.
3. Let R be a regular set over the alphabet $\{0, 1\}$. Give a proof that the set obtained by deleting one 1 from each even length block of 1's is also regular using closure properties for the class of regular sets. Explain in English the set described by any regular set you use.
4. Let $M_1 = (Q_1, \Sigma, \delta_1, q_{10}, F_1)$ and $M_2 = (Q_2, \Sigma, \delta_2, q_{20}, F_2)$ be finite automata. Construct a finite automaton M_3 that accepts $\text{shuffle}(L(M_1), L(M_2))$.
5. Minimize states in the finite automaton below. The final states are B and C .

	0	1	
start	A	B	A
	B	A	C
	C	D	B
	D	D	A
	E	D	F
	F	G	E
	G	F	G
	H	G	D