

CS 310, Assignment 3

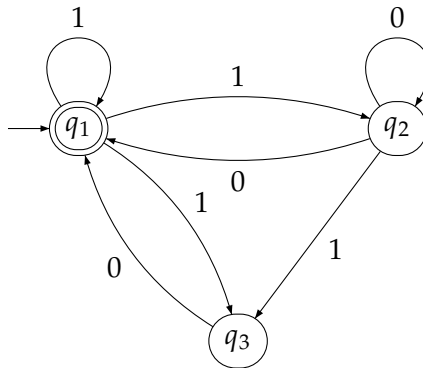
Due on 21 February in class

1. Using one of the methods described in class and/or textbook (Section 9.1) convert the following regular expression into a state transition diagram:

$$(0^*1 + 1^*0)^*(1 + 0)^*$$

Indicate in your answer how you arrived at the result as follows: Write down all the state transition diagrams that you constructed for all the subexpressions and clearly indicate which diagram corresponds to which expression. Do *not* simplify any state transition diagram.

2. Consider the following state transition diagram over $\Sigma = \{0, 1\}$:



Using the method described in class and in the textbook (Section 9.2) convert the diagram into an equivalent regular expression. Include all the intermediate steps in your answer.

3. Are the languages L_1 and L_2 below over the alphabet $\Sigma = \{a, b, c\}$ regular or non-regular? Justify your answer carefully.

(a) $L_2 = \{a^{2^i}b^j c^i : i \geq 0, j > 2\}$

(b) $L_1 = \{a^i b^{2j+1} : i, j \geq 0\} \cap \{a^{2k+1} b^{2n} c^{2p} : k, n, p \geq 0\}$

Make sure you review the submission guidelines posted on the course's Web site before handing in your answers.