

Harvard University  
Computer Science 121

Problem Set 1

Due Tuesday, September 18, 2012 at 11:59 PM.

Submit your solutions electronically on the course website, located at <http://people.seas.harvard.edu/~salil/cs121/fall12/>. On the site, click the "Problem Set Submission" button and provide your login info. Once logged in, place the solutions to Parts A and B, in separate files named lastname+ps1a.pdf and lastname+ps1b.pdf respectively, in the appropriate dropboxes.

Late problem sets may be turned in until Friday, September 21, 2012 at 11:59 PM with a 20% penalty.

Problem set by \*\*ENTER YOUR NAME HERE\*\*

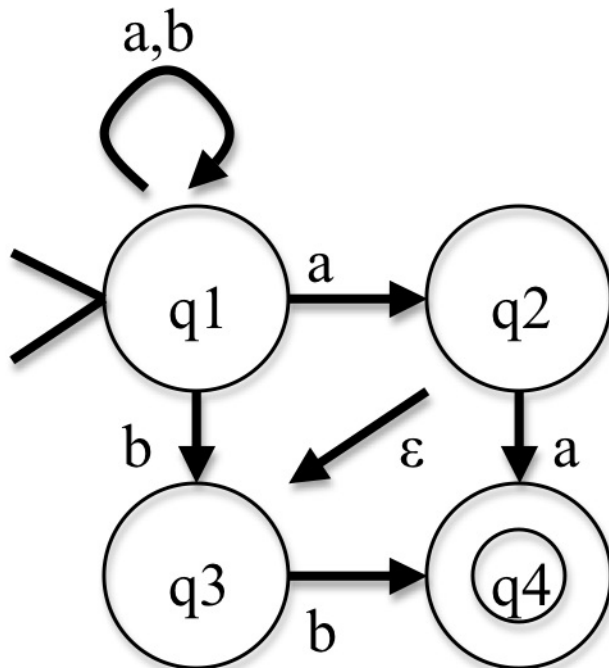
Collaboration Statement: \*\*FILL IN YOUR COLLABORATION STATEMENT HERE  
(See the syllabus for information)\*\*

See syllabus for collaboration policy.

PART B (Graded by Perry)

PROBLEM 1 (5+5 points)

Consider the following NFA.



(A) Give the 5-tuple representation for this NFA, and then describe informally the language it distinguishes.

(B) Convert this NFA to an equivalent DFA. (You may omit states not reachable from the start state.)

## PROBLEM 2 (8 points)

For a language  $L$ , let  $L^R = \{w^R : w \in L\}$  (where  $w^R$  is the reversal of  $w$ ). Prove that if  $L$  is regular, then so is  $L^R$ .