

**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 A (Graded by Spencer)

PROBLEM 1 (5 points)

Consider the following game with two players:

Repeatedly flip a coin. On heads, player 1 gets a point. On tails, player 2 gets a point. A player wins (and the game ends) as soon as they are ahead by two points. Draw a DFA that recognizes the language of strings (with alphabet $\{H, T\}$) which represent a possible series of flips in which player 1 wins.

PROBLEM 2 (5+5 points)

(A) Draw an NFA that recognizes $\{w \in \Sigma^* : w \text{ contains } aba \text{ or } w \text{ contains } bab\}$

(B) Give the 5-tuple representation for the DFA below, and then describe informally the language it distinguishes.

