Homework 07

Due: Friday, November 17, 2006

Instructions

1. Please review the homework grading policy outlined in the course information page.
2. On the *first page* of your solution write-up, you *must* make explicit which problems are to be graded for regular credit, which problems are to be graded for extra credit, and which problems you did not attempt. Use a table that looks like this:

Problem	1	2	3	4	5	6	7	8	9	...
Credit	RC	RC	RC	EC	RC	EC	NA	NA	EC	...

   where "RC" denotes "regular credit", "EC" denotes "extra credit", and "NA" denotes "not attempted". Failure to include such a table will result in an arbitrary set of problems being graded for regular credit, no problems being graded for extra credit, and a 5% penalty assessment.
3. You must also write down with whom you worked on the assignment. If this varies from problem to problem, write down this information separately with each problem.

Problems

Required: 4 of the following 6 problems
Points: 25 points per problem

1. - Do Exercise 4.2.
   - Do Problem 4.12.
2. Do Exercise 4.3.
3. Do Exercise 4.4.
4. Do Problem 4.19. *Hint:* Consider how closure of the class of regular languages under string reversal is proved.
5. Prove that $ONE_{\mathrm{DFA}} = \{\langle D \rangle \mid D \text{ is a DFA and } |L(D)| = 1\}$ is decidable.
6. Prove that $INFINITE_{\mathrm{CFG}} = \{\langle G \rangle \mid G \text{ is a CFG and } L(G) \text{ is infinite}\}$ is decidable. *Hint:* One way to do this is to consider the appropriate Pumping Lemma and the first few steps of its proof. Whatever approach you use, provide a mathematical argument justifying it.