5 Homework

Due: Wednesday, October 24, 2007.

Instructions

• Please, review the homework grading policy outlined in the course information page.

• 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:

<table>
<thead>
<tr>
<th>Problem</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit</td>
<td>RC</td>
<td>RC</td>
<td>RC</td>
<td>EC</td>
<td>RC</td>
<td>EC</td>
<td>NA</td>
<td>NA</td>
<td>EC</td>
<td>...</td>
</tr>
</tbody>
</table>

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.

• 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 5 problems

Points: 25 points per problem

1. (Problem 5 from the previous assignment.)

Convert each of the CFGs below to an equivalent PDA, using the procedure given in Theorem 2.20 and the following proofs:

(a) The grammar from the Problem 2.4 (e)
(b) The grammar from the Problem 2.6 (b)
2. Give both an informal description and a state transition diagram for a PDA that recognizes the language:
\[ \{a^i b^j c^k | i, j, k \geq 0 \text{ and } i = j \text{ or } j = k \} \]

3. Give both an informal description and a state transition diagram for a PDA that recognizes the language over the alphabet \{0, 1, \#\} given by
\[ \{x\#y | x, y \in \{0, 1\}^+ \text{ and } |x| \leq |y| \text{ and the } n^{th} \text{ symbol matches the } n^{th} \text{ symbol of } y, \text{ where } n = |x| \} \]

4. Do Problem 2.20

5. Do Problem 2.25