School for Computer Science and Information Technology

Machines and their languages (G51MAL) Spring 2004

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6th Coursework

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Deadline: 12/3/2004 - 15:30 (A39)

Given the following Pushdown Automaton (PDA) P

$$P = (Q = \{q_0, q_1\}, \Sigma = \{\mathtt{0}, \mathtt{1}\}, \Gamma = \{0, 1, \#\}, \delta, q_0, \#, F = \{q_0\})$$

where δ is given by the following equations:

$$\begin{array}{lcll}
\delta(q_0, \mathtt{0}, \#) & = & \{(q_1, 0\#)\} & \\
\delta(q_0, \mathtt{1}, \#) & = & \{(q_1, 1\#)\} & \\
\delta(q_1, \mathtt{0}, 1) & = & \{(q_1, \epsilon)\} & \\
\delta(q_1, \mathtt{0}, 0) & = & \{(q_1, 00)\} & \\
\delta(q_1, \mathtt{1}, 0) & = & \{(q_1, \epsilon)\} & \\
\delta(q_1, \mathtt{1}, 1) & = & \{(q_1, 11)\} & \\
\delta(q_1, \epsilon, \#) & = & \{(q_0, \#)\} & \\
\delta(q, w, z) & = & \{\} & \text{everywhere else}
\end{array}$$

1. Construct sequences of *Instantanous Descriptions* (IDs) for the words

   $$\mathtt{01}, \mathtt{0110}, \mathtt{00}, \epsilon$$

2. We use acceptance by final state. Which of the words from 1. are in $L(P)$ and which ones aren't ?

3. Describe $L(P)$ in one sentence!

4. What does it mean for a PDA to be deterministic? Is P deterministic?