Automata

Example exam, to be discussed on 13.1.2015

Task 1 Construct a DFA for the language

$$L_1 = ((00)^*11 \cup 01)^*.$$

Task 2 Consider the language

$$L_2 = \{w(w^i)^R \mid w \in \{0,1\}^*\}$$

where the inverse word w^i of a word w is defined inductively by $\varepsilon^i = \varepsilon$, $(0u)^i = 1u^i$, and $(1u)^i = 0u^i$. Construct a grammar and a PDA for L_2.

Task 3 Construct a PDA for the language

$$L_3 = \{a^n b^m \mid n \le m \le 2n\}$$

. Can you construct a DPDA? Explain your answer.

Task 4 Construct a TM for deciding the language

$$L_4 = \{w * 1^n \mid w \in \{0,1\}^* \text{ and } n = \#_1(w)\}.$$