

Homework #5

Due date: January 23, 2007

Notes:

1. Please write your name on the homework you are going to hand in.
2. Homeworks are to be solved and written individually. Any form of copying or plagiarism is prohibited.
3. This homework is to be handed in the latest by 15:15 on January 23rd. Late homework will not be accepted.
4. In case you have any questions send email to the class mailing list:
em201-list@tem.uoc.gr

Problem 1 [20 points] Construct a deterministic finite state machine that recognizes the following language:

$$L = \{w \mid w \in \{0, 1\}^* \text{ and } w \text{ is of even length}\}.$$

Problem 2 [20 points] Construct a deterministic finite state machine that recognizes the following language:

$$L = \{w \mid w \in \{0, 1\}^* \text{ and every odd position of } w \text{ is an } 1\}.$$

For example $10, 11, 111 \in L$, but $00, 01, 011 \notin L$.

Then construct a non-deterministic finite state machine that recognizes L and has fewer states than the deterministic finite state machine that you constructed previously.

Problem 3 [20 points] Construct a deterministic finite state machine with at most 5 states that recognizes the following language:

$$L = \{w \mid w \in \{0, 1\}^* \text{ and } w \text{ is any string except } 11 \text{ and } 111\}.$$

Problem 4 [20 points] Construct a deterministic finite state machine that recognizes the following language

$$L = \{w \mid w \in \{0, 1\}^* \text{ and } w \text{ ends at } 0101\}.$$

Problem 5 [20 points] Construct deterministic finite state machines that recognize the following languages:

$$L_1 = \{w \mid w \in \{a, b\}^* \text{ and } |w| \leq 5\},$$

$$L_2 = \{w \mid w \in \{a, b, c\}^* \text{ and } |w| \leq 5\},$$

where $|w|$ is the length (number of letters) of the word w .

Total points: 100