Languages and Automata (Gyula Katona) November 3., 2016, 18:15-19:15

Neptun code: **Name:**

Midterm 1

1. Construct a context free grammar for the following language:

$$L = \{ca^i b^j c \mid i, j \geq 0; i \neq j\}.$$

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2. (a) Is the class of context-free languages closed under the intersection operation? Prove your claim. (We have proved this in class.)

   (b) Is the class of context-free languages closed under the union operation? Prove your claim. (We have proved this in class.)

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3. Prove that the langauge $L = \{a^i b^{i^2} c^i \mid i \geq 1\}$ is not context-free.

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4. Construct a Turing machine that recognizes the following language:

$$L = \{a^i b^{i^2} \mid i \geq 1\}$$

You don't have to draw a diagram, or give the δ function, just give a clear description how the machine works.