

Homework Assignment #5
Due: October 16, 2014 at 4:00 p.m.

1. For this question, remember to use the definition of regular expressions given in the course textbook. (Java allows a wider variety of regular expressions and has a slightly different syntax.) For this question, you do not have to prove that your answers are correct.
 - (a) Let L_1 be the set of all binary strings that are legal Leutonian numbers. (See assignment 2 for an explanation of what this means.) Give a regular expression for L_1 .
 - (b) Let $L_2 = \{x \in \{0, 1\}^* : |x| \geq 5 \text{ and the fifth last character of } x \text{ is } 1\}$. Give a regular expression for L_2 .

2. Let $\Sigma = \{(), \{\}$. Let $L_3 \subseteq \Sigma^*$ be the set of strings of correctly balanced parentheses. For example, $((()))()$ is in L_3 and $((()))($ is not in L_3 . Formally, L_3 is defined recursively as follows.
 - $\varepsilon \in L_3$.
 - A string $x \neq \varepsilon$ is in L_3 if and only if x is of the form $(y)z$, where y and z are in L_3 .

Prove that L_3 is not regular.