Automata Theory: Assignment 5

Due date: October 21 (Thursday)

Problem 1 (4 points)
Demonstrate that, if L_1 is a regular language on the alphabet $\Sigma = \{a, b\}$, then the following subset of L_1 is also a regular language:

$$L_2 = \{w : \ w \in L_1 \text{ and the length of } w \text{ is even}\}.$$

Problem 2 (3 points)
Describe a method for determining whether $L_1 \subseteq L_2$, for given regular languages L_1 and L_2.

Problem 3 (3 points)
Argue that the language $\{a^n b^{2n} : \ n \geq 0\}$ is not regular.