CPSC 351 — Tutorial Exercise #8
Additional Practice Problems

About These Problems

These problems will not be discussed during the tutorial, and solutions for these problems will not be made available. They can be used as "practice" problems that can help you practice skills considered in the lecture presentation for Lecture #8, or in Tutorial Exercise #8.

Practice Problems

1. Let $\Sigma = \{\mathtt{a}\}$. Prove that the language

   $$L = \{a^n \mid n \text{ is a power of two}\}$$

   is not a regular language — where "n is a power of two" means that $n = 2^k$ for some integer k such that $k \geq 0$.

2. Let $\Sigma = \{\mathtt{a}, \mathtt{b}\}$. Prove that the language

   $$L = \{\mathtt{b}\mathtt{a}^n\mathtt{b}\mathtt{a}^{2n}\mathtt{b} \mid n \text{ is an integer such that } n \geq 0\}$$

   is not a regular language.

3. Let $\Sigma = \{\mathtt{a}, \mathtt{b}\}$. Prove that the language

   $$L = \{\mathtt{a}^k\mathtt{b}\mathtt{a}^\ell\mathtt{b}\mathtt{a}^{k+\ell} \mid k \text{ and } \ell \text{ are integers such that } k, \ell \geq 0\}$$

   is not a regular language.