Homework 3

Posted: October 17, 2018
Due: October 31, 2018

1. Let $A = \{a, b\}$ be an alphabet. Compute the minimal dfa capable of recognizing the language A^*abA^+.

2. Consider the dfa $\mathcal{M} = (\{a, b\}, \{q_0, q_1, q_2\}, \delta, q_0, \{q_2\})$, whose transition function is defined by the table

δ	q_0	q_1	q_2
a	q_1	q_1	q_2
b	q_2	q_2	q_2

   Describe the language accepted by $\mathcal{M}$ using languages E_{ij}^k.

3. Prove that the the language $\{a^{n^3} \mid n \in \mathbb{N}\}$ is not regular.

4. Prove that the language $\{a^n b^{n+10} c^{n+20} \mid n \in \mathbb{N}\}$ is not regular.

5. Let K, L be two languages such that $L \cup K$, $L - K$, and $K - L$ are regular languages. Is $L \cap K$ a regular language? Motivate your answer.