

HW3

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1. Prove or disprove every finite language is recognized by some FA.

A finite language can be represented by a regular expression because if the alphabet is finite then we can order the strings in some sort of order $s_0, s_1, s_2, \dots, s_n$ where n is equal to the number of strings subtracted by 1 in the finite alphabet. We could simply union every string together $s_0 + s_1 + s_2 + \dots + s_n$ to make a regular expression. We know from 2.7 of the LanguageBook.pdf from the Definition that a language L is regular iff it can be represented by a regular expression so we know a finite language is regular. The theorem states that a language is regular iff it is accepted by a finite automaton so therefore we know that every finite language is recognized by some FA.

2. Define a DFA, simplified to the best of your abilities, that recognizes the language $L = \{ w \in \{ a, b \}^* : w \text{ does not contain the substring } abba \}$