

# COM S 331

## Homework 3

Christian Shinkle

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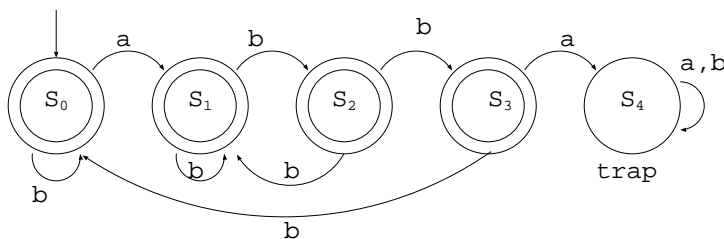
1. Proof: First, we show that any finite language can be represented by a regular expression. We build the regular expression by taking the union of all possible words that can be generated by the language.

$$n \in \mathbb{N}, L(\Sigma) = \{a_0, a_1, \dots, a_n\} : R = a_0 + a_1 + \dots + a_n.$$

Because  $\Sigma$  is finite, every possible word made by  $\Sigma$  is represented in the regular expression  $R$ . By definition of Regular Languages (from section 2.7),  $L$  must be regular.

Now that  $L$  is proven to be regular, using the theorem from section 2.7,  $L$  must also be accepted by a finite automaton.

2. .



3. .

