

Exercise set 1

Syntactic Structures Can't Be Just Anything
DGfS-CL Fall School 2019
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Exercise 1

For each sentence s below:

1. Determine whether s is in the language generated by the FSA
2. If s is generated by it, write down the sequence of states that accept it
3. What would you have to change about this grammar for the long-distance dependency between *cowboy* and *himself*, *mechanic* and *him/herself* and *gun* and *itself*?
4. What does that tell you about the adequacy of FSAs to generate human languages?

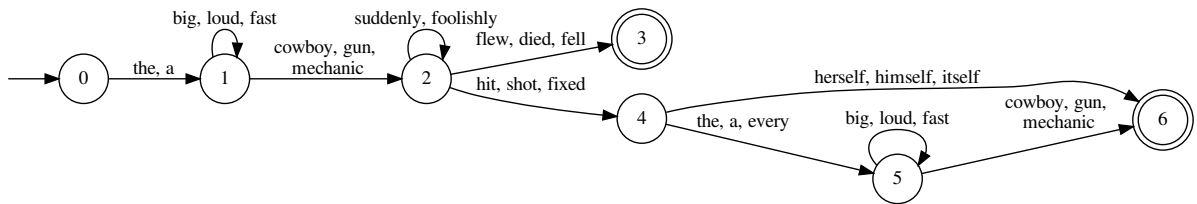


Figure 1: Finite State Automaton

Sentences:

1. The big cowboy shot a mechanic
2. A gun foolishly died
3. Every mechanic suddenly shot a cowboy
4. The cowboy shot herself
5. The loud mechanic fixed a fast big cowboy
6. The captain has a Firefly.

Exercise 2

Pick a language you and your partner both know. Work separately try to draw FSAs for some subset of the language (use different subsets). Now trade papers and try to find sentences your partner's automaton generates that are not in the language. Trade back and try to update them. Cycle through this until you're satisfied or you get bored. You can also try to expand them to include more sentences, or work together to improve the FSAs.

Exercise 3

Optional: pick your favourite programming language and write an FSA. Give it functions to check a sentence for validity (i.e. make an acceptor), and to generate sentences.

You can also extend it to a *probabilistic* FSA by adding probabilities to each transition (and to the option to stop at final states). Make sure that for each state, all outgoing edges, plus stopping, sum to 1.

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