Homework 1 (CS/Math 385) due September 5, 2018

Universal Rule for all homework: Unless otherwise stated, all solutions must include a brief proof that they are correct.

I will explain "brief proof" with an example. We did a detailed proof that the first automaton discussed in class accepted all nonempty alternating strings. Here is a brief version of the proof:

Proof. The automaton rejects all strings starting in state d, since it must stay in state d, which is not a final state. From state b, it accepts strings starting with a 1 that alternate, and from state c, it accepts strings starting with a 0 that alternate, since, on the correct start, it goes to the other state, forcing alternation, and on the wrong start, it goes to state d, resulting in rejection. From state a, it goes to state b or c as needed to force the remaining letters to alternate properly. □

You can think of writing such a proof as a way of making sure you have actually covered all the possible input cases in your thinking.

Do Section 2.1: 2ae, 9bc, 24

For 9c only, do a detailed proof like the long proof done in class last Friday.

Do Section 2.2: 10, 18, 21

Generalize #21 by explaining how to convert an incomplete dfa into a dfa by adding only one state.

Do Section 2.3: 3 (exempt from universal rule), 8.