

## Homework 7 (CS/Math 385)

due October 24, 2018

Universal Rule for all homework: Unless otherwise stated, all solutions must include a brief proof that they are correct. For problems that involve following a procedure we have discussed in class, showing the steps you took and giving an indication of what was done at each step (for example writing that “State  $q_3$  was removed to obtain the following equivalent super-NFA.”) suffices to satisfy the rule.

Section 7.1: 4dh, 5, 9 (Draw the actual DFA), 17 (In the notation I used in class,  $N(M)$  consists of all the strings  $w \in \Sigma^*$  such that  $(p, \lambda) \in \delta^*(q_0, w, z)$  for some  $p \in Q$ . Note that  $p$  does not have to be a final state.)

Section 7.2: 3, 5, 14 (You only need to write out enough productions to convince me you know what you are doing.)

For the PDA in problem 14, find a sequence of transitions by which the given PDA accepts the string *abaaba*, and give the corresponding sequence of productions in the grammar.

You may use facts we proved in class without proving them again.