Assignment 1

CSCE 4323: Formal Languages and Computability
Fall 2018

Exercises from the book

The following exercises can be found in Chapter 1 of the Sipser book, 2nd edition. Solutions should be provided as code for each in a text document following the format for a DFA on the web site `http://web.cs.ucdavis.edu/~doty/automata/`. A template file "CSCE4323-F18-HW-template.txt" can be found on the course site on Blackboard.

1.4 Each of the following languages is the intersection of two simpler languages. In each part, construct DFAs for the simpler languages, then combine them using the construction discussed in footnote 3 (page 46) to give the definition of a DFA for the language given. In all parts $\Sigma = \{a, b\}$.

a. $\{w | w$ has at least three a's and at least two b's $\}$

c. $\{w | w$ has an even number of a's and one or two two b's $\}$

f. $\{w | w$ has an odd number of a's and ends with a $b\}$

1.5 Each of the following is the complement of a simpler language. In each part, construct a DFA for the simpler language, then use it to give the definition of a DNA for the language given. In all parts $\Sigma = \{a, b\}$.

d. $\{w | w$ is any string not in $a^*b^*\}$

f. $\{w | w$ is any string not in $a^* \cup b^*\}$

g. $\{w | w$ is any string that doesn't contain exactly two a's $\}$

1.6 Give definitions of DFAs recognizing the following languages. In all parts, the alphabet is $\{0, 1\}$.

f. $\{w | w$ doesn't contain the substring 110$\}$

i. $\{w |$ every odd position of w is a 1$\}$

j. $\{w | w$ contains at least two 0s and at most one 1$\}$

m. The empty set