

Exploring DFAs

CS 311, Fall 2015

Exercise 1 Consider the DFA M_1 where:

$$Q = \{q_0, q_1, q_2, q_3\}$$

$$\Sigma = \{a, b\}$$

$$F = \{q_0, q_1\}$$

The start state is q_0 and the transition function is:

δ	q_0	q_1	q_2	q_3
a	q_1	q_1	q_1	q_3
b	q_3	q_2	q_2	q_3

a) Draw a state diagram for the the DFA M_1 .

b) What is the language recognized by the DFA M_1 , $L(M_1)$?

c) Choose an $s \in L(M_1)$ and write down the path of that string through the machine. Now do the same for a string $s' \notin L(M_1)$.

Exercise 2 Draw a state machine for a DFA that recognizes each of the following languages:

a) $A = \{w \mid w \text{ contain neither the substrings } 01 \text{ nor } 10\}, \Sigma = \{0, 1\}$

b) $B = \{w \mid w = x\mathbf{bab}y, \text{ where } x, y \in \Sigma^*\}, \Sigma = \{a, b\}$

c) $C = \{w \mid \text{every odd position in } w \text{ is a } 2\}, \Sigma = \{0, 1, 2\}$