

Drawing Finite State Automata

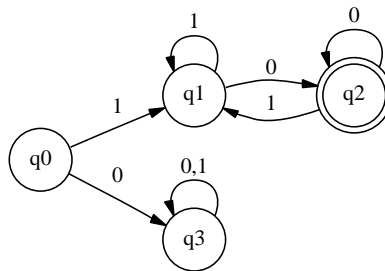
Answers to Exercise 1.4 from Sipser (p84)

Ling 106

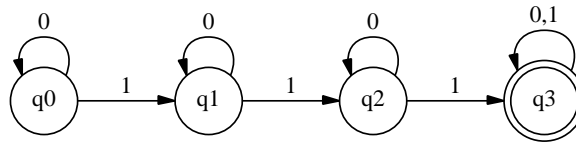
March 18, 2002

Give state diagrams of DFAs recognizing the following languages. In all cases the alphabet is $\{0,1\}$.

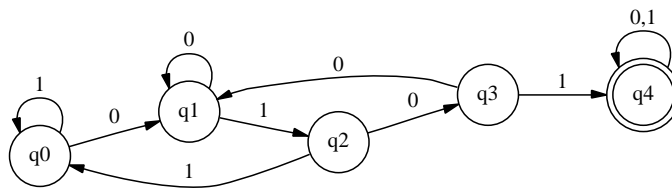
1. $\{w \mid w \text{ begins with a 1 and ends with a 0}\}$.



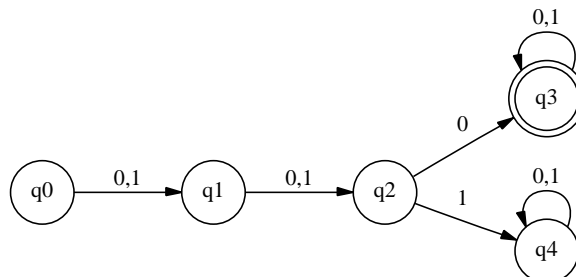
2. $\{w \mid w \text{ contains at least three 1s}\}$.



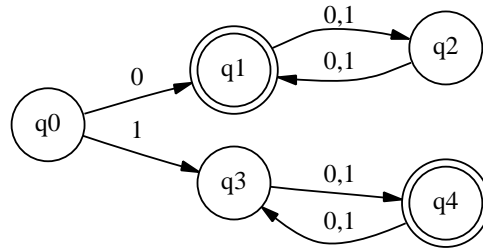
3. $\{w \mid w \text{ contains the substring 0101, i.e., } w = x0101y \text{ for some } x \text{ and } y\}$.



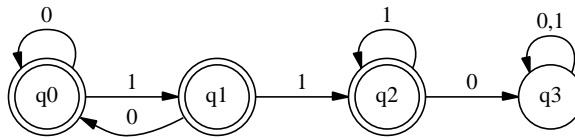
4. $\{w \mid w \text{ has length at least 3 and its third symbol is a 0}\}$.



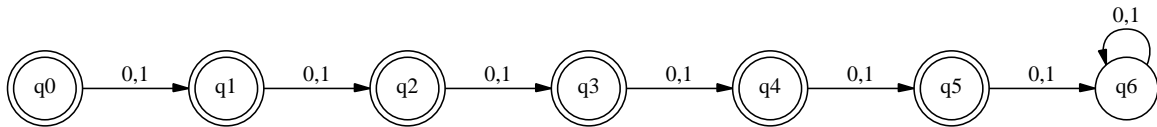
5. $\{w \mid w \text{ starts with 0 and has odd length, or starts with 1 and has even length}\}.$



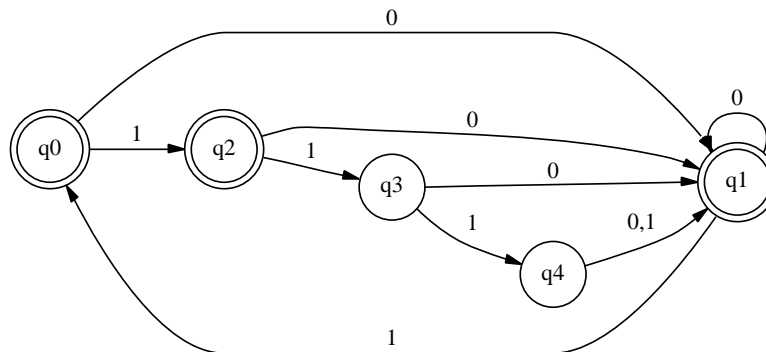
6. $\{w \mid w \text{ doesn't contain the substring 110}\}.$



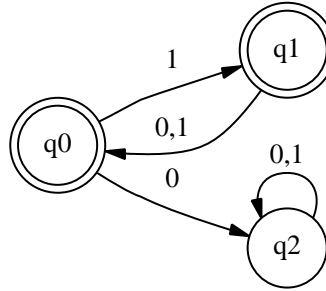
7. $\{w \mid \text{the length of } w \text{ is at most 5}\}.$



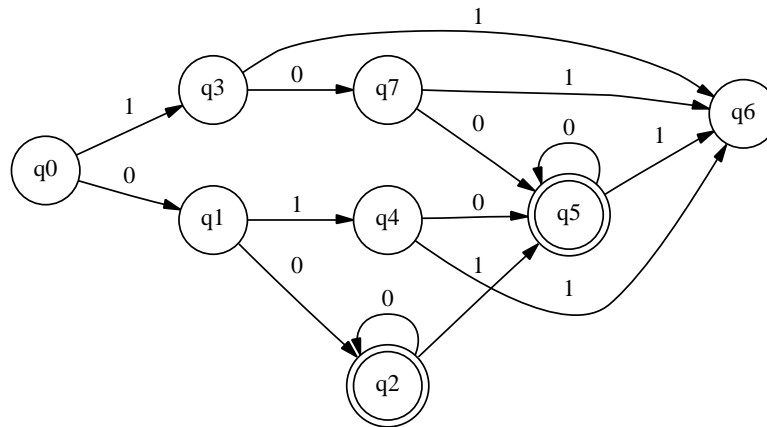
8. $\{w \mid w \text{ is any string except 11 and 111}\}.$



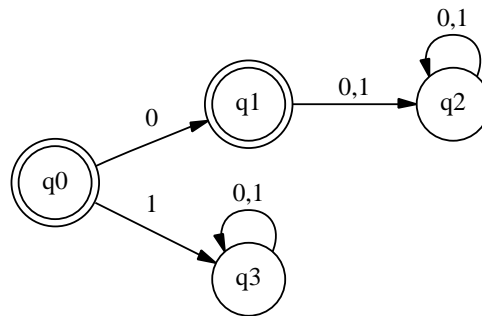
9. $\{w \mid \text{every odd position of } w \text{ is } 1\}$.



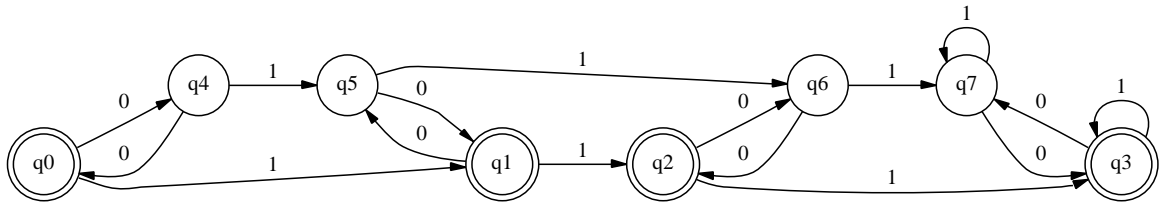
10. $\{w \mid w \text{ contains at least two 0s and at most one 1}\}$.



11. $\{\epsilon, 0\}$.



12. $\{w \mid w \text{ contains an even number of 0s, or exactly two 1s}\}$.



13. The empty set.



14. All strings except the empty string.

