

Solutions for Assignment #3

Assignment Information

Maximum grade 20

Due date September 8, 2004

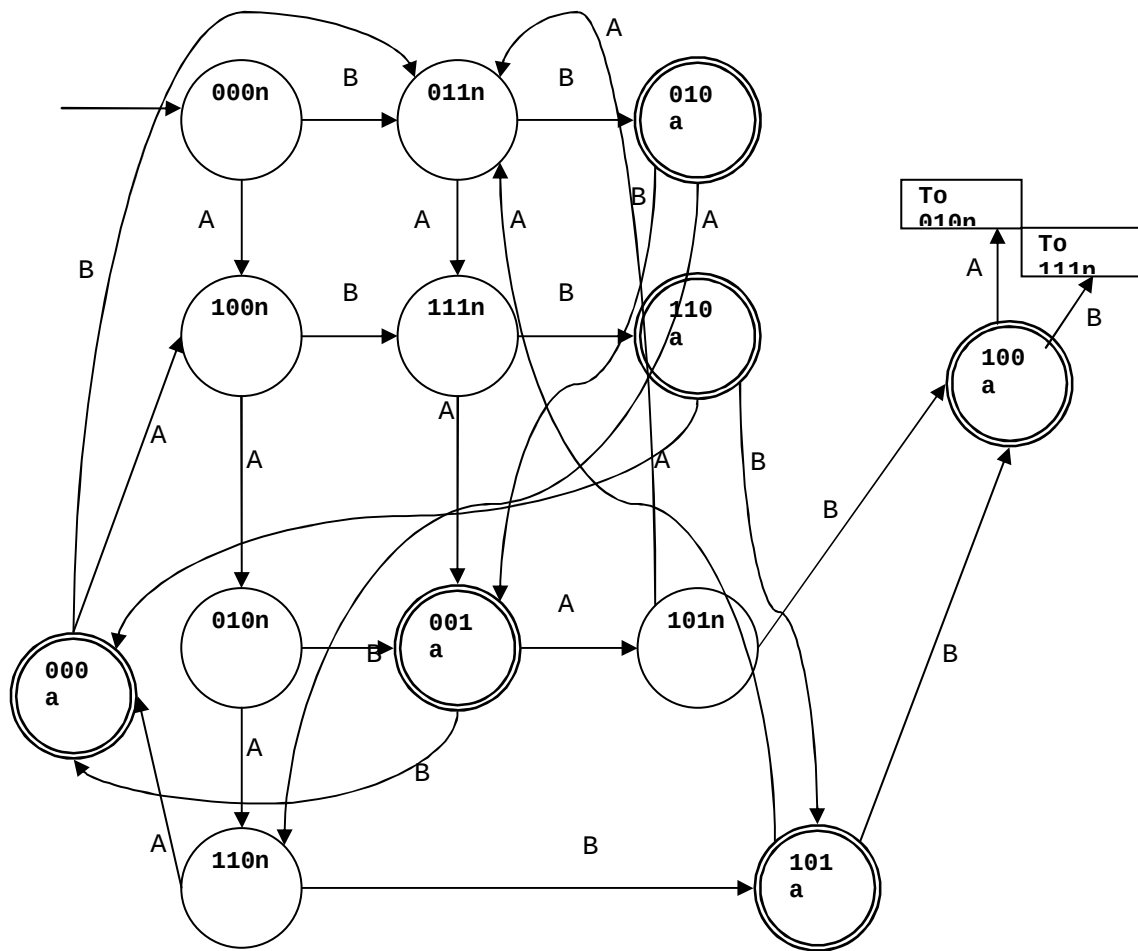
Instructions Textbook, pages 53 and 54
Problems: 2.2.1, 2.2.4 and 2.2.5

2.2.1

a) The initial status of each lever is defined 0, then if the levers change direction they are in state 1. Therefore, initial state is $(X_1X_2X_3)=(000)$ and we have a total of 8 possible states. Also we need to identify the state by appending an “a” for accepted, or “n” for not accepted.

Transition Table

	A	B
→000n	100n	011n
*000a	100n	011n
*001a	101n	000a
010n	110n	001a
*010a	110n	001a
011n	111n	010a
100n	010n	111n
*100a	010n	111n
101n	011n	100a
*101a	011n	100a
110n	000a	101a
*110a	000a	101a
111n	001a	110a

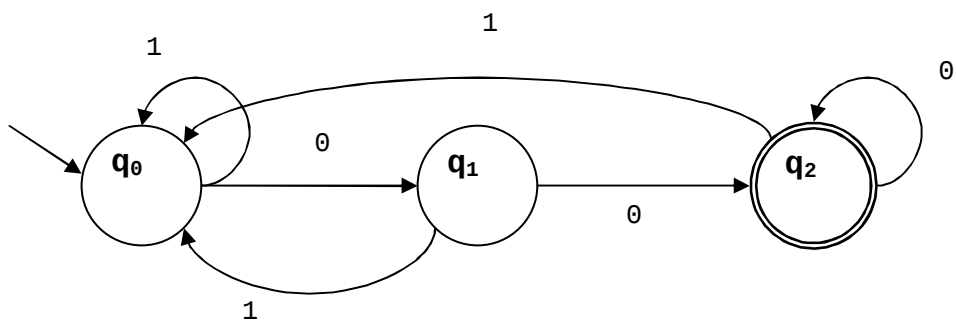


b) Each state in the DFA represents an instance of the state of all the levers, and whether the output is accepted or not. Those inputs represent if the marble is dropped from A or from B.

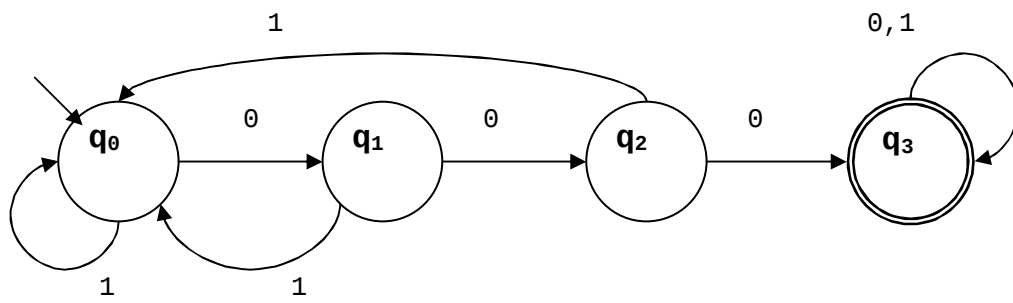
c) Non accepting state ($X_1X_2X_3n$) will be accepting state ($X_1X_2X_3a$). Vice versa. Therefore the language of new automaton will be the complement of the set of strings of old automaton.

2.2.4

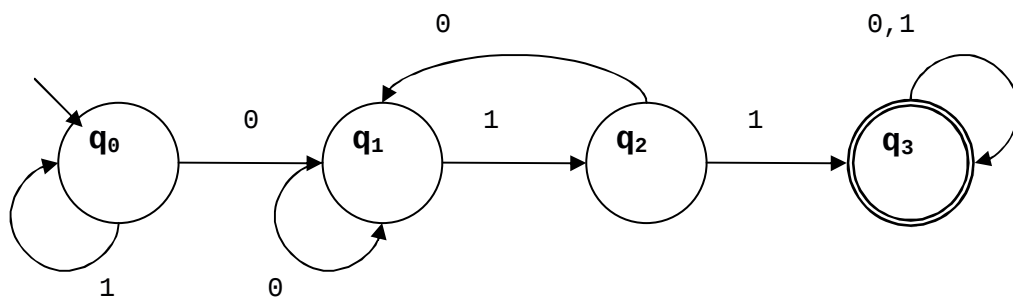
(a)



(b)

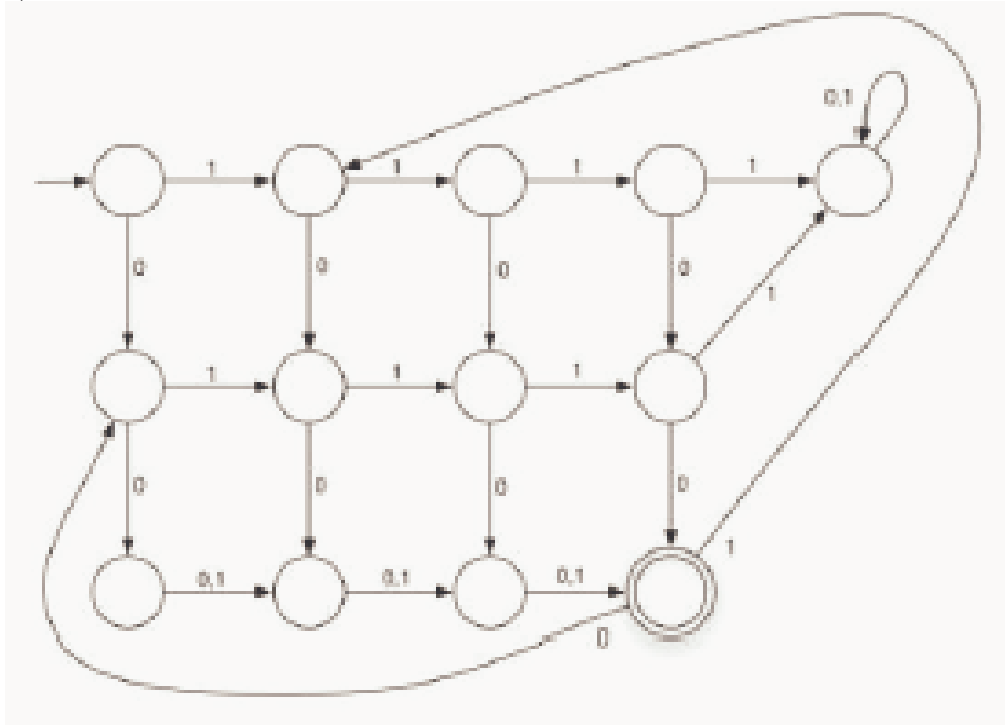


(c)

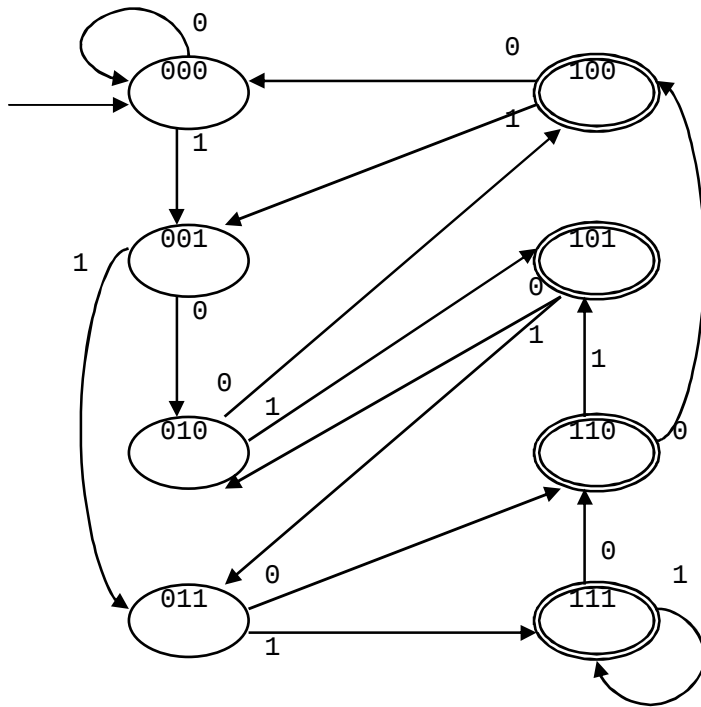


2.2.5

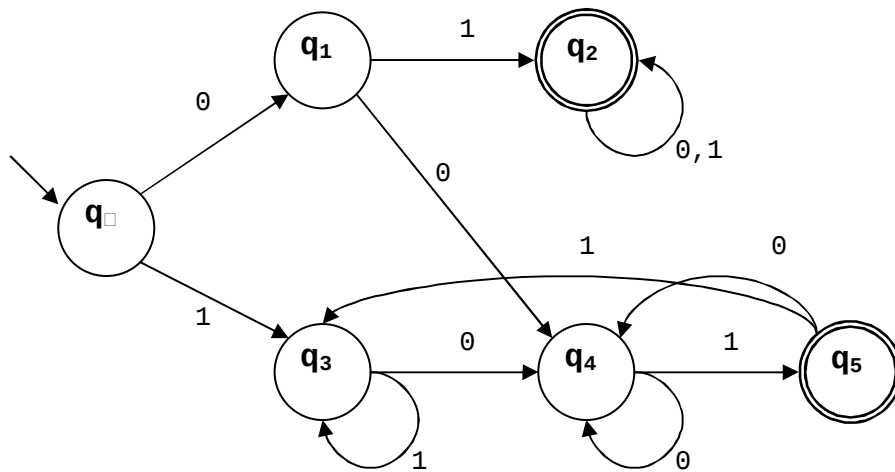
a)



b) The set of all strings whose **third** symbol form the right end is a 1



(c)



(d)

