數位邏輯設計作業　CH10

注意事項：請寫出詳細計算與分析過程，不可以只寫答案!

Problems:

10.1 Is the state machine in Figure 10.42 a Moore machine or a Mealy machine? Explain your answer.

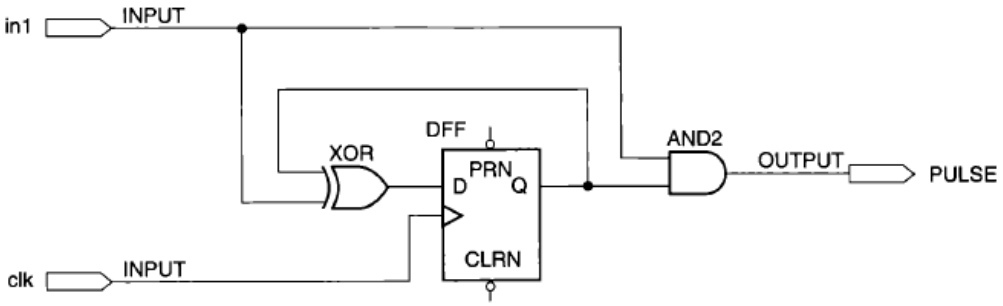

FIGURE 10.42 Problem 10.1: State Machine Circuit

10.3 A 4-bit Gray code sequence is shown in Table 10.7 Use classical design methods to design a counter with this sequence, using D flip-flops. Draw the resulting circuit diagram in a Quartus II Block Diagram File. Create a simulation to verify the circuit operation.

TABLE 10.7 4-Bit Gray Code Sequence

Q_3	Q_2	Q_1	Q_0
0	0	0	0
0	0	0	1
0	0	1	1
0	0	1	0
0	1	1	0
0	1	1	1
0	1	0	1
0	1	0	0
1	1	0	0
1	1	0	1
1	1	1	1
1	1	1	0
1	0	1	0
1	0	1	1
1	0	0	1
1	0	0	0

10.7 Use classical state machine design techniques to find the Boolean next state and output equations for the state machine represented by the state diagram in Figure 10.44. Draw the state machine circuit as a Block Diagram File in Quartus II. Create a simulation file to verify the operation of the circuit. Briefly explain the intended function of the state machine.

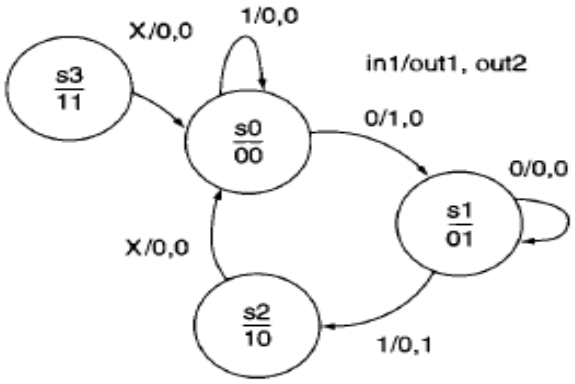

FIGURE 10.44 Problem 10.7: State Diagram

10.18 Refer to the state diagram in Figure 10.46.

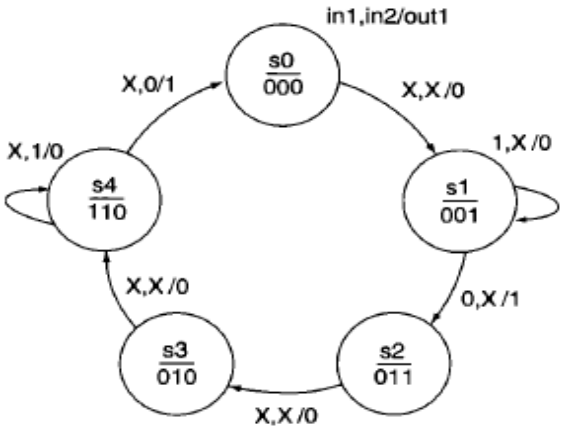

FIGURE 10.46 Problem 10.18: State Diagram

a. How many state variables are required to implement this state machine? Why?

b. How many unused states are there for this state machine? List the unused states.

c. Complete the partial timing diagram shown in Figure 10.47 to illustrate one complete cycle of the state machine represented by the state diagram of Figure 10.46.

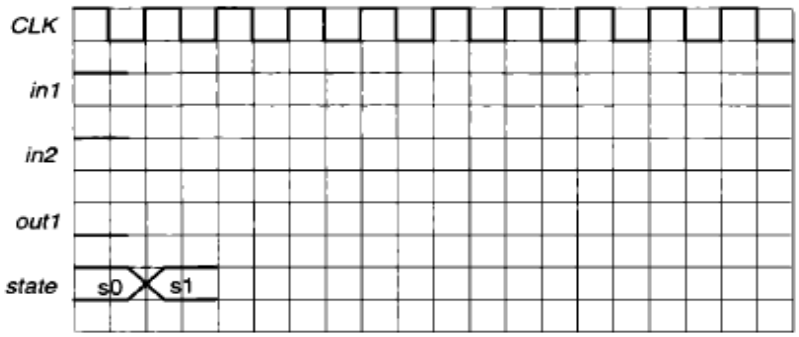

FIGURE 10.47 Problem 10.18: Partial Timing Diagram