Practice Problems 7 Solutions

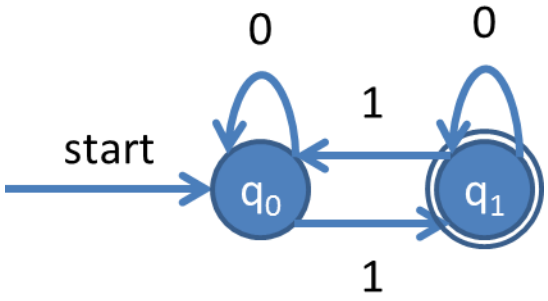
Be sure to provide an answer for each question. You may work with other students, as well as use your notes, the book, and the internet. Do make sure you understand how to solve the problems and answer the questions, as similar ones may appear on the exams.

1. For each of the following languages, graphically depict a FSM that represents that language and describe it using the five components of an FSM. Do not forget to provide either the transition matrix or list of transition functions.

    a. A FSM that accepts all binary strings that have an odd number of 1's.
    Examples: 1, 111, 010, 010010100

    Q: $\{q_0,q_1\}$
    Start state: q_0
    Set of inputs: {0,1}
    Set of accepting states: $\{q_1\}$
    Transition functions:

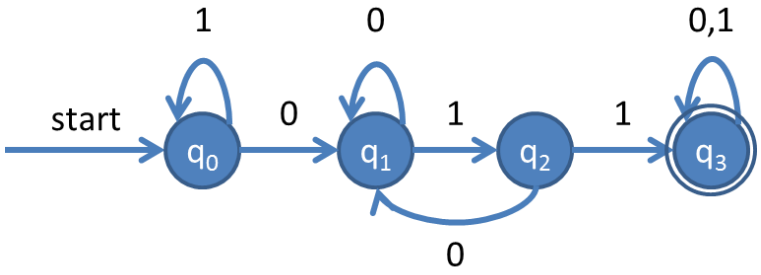
	0	1
q_0	q_0	q_1
q_1	q_1	q_0



b. A FSM that accepts all binary strings that contain the substring 011.
Examples: 011, 0101100, 011001, 011011011

Q: $\{q_0,q_1,q_2,q_3\}$
Start state: q_0
Set of inputs: {0,1}
Set of accepting states: $\{q_3\}$
Transition functions:

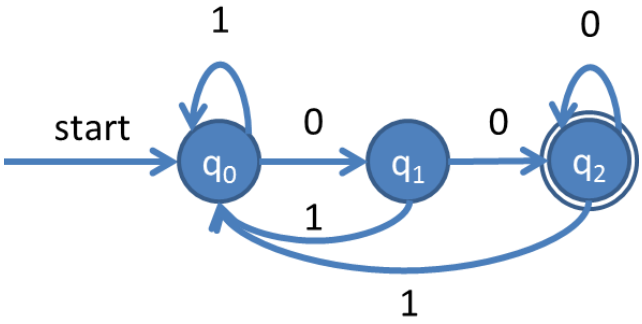
	0	1
q_0	q_1	q_0
q_1	q_1	q_2
q_2	q_1	q_3
q_3	q_3	q_3



c. A FSM that accepts all binary strings that end in 00.
Examples: 00, 1100, 010100, 1111100

Q: $\{q_0,q_1,q_2\}$
Start state: q_0
Set of inputs: {0,1}
Set of accepting states: $\{q_2\}$
Transition functions:

	0	1
q_0	q_1	q_0
q_1	q_2	q_0
q_2	q_2	q_0



d. All binary strings made up of a single byte.
Examples: 00000000, 01010101, 00110011
Q: $\{q_0,q_1,q_2,q_3,q_4,q_5,q_6,q_7,q_8\}$
Start state: q_0
Set of inputs: {0,1}
Set of accepting states: $\{q_8\}$
Transition functions:

	0	1
q_0	q_1	q_1
q_1	q_2	q_2
q_2	q_3	q_3
q_3	q_4	q_4
q_4	q_5	q_5
q_5	q_6	q_6
q_6	q_7	q_7
q_7	q_8	q_8
q_8	ϕ	ϕ