In [5]:
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### CSCI-3080 Discrete Structure
### OLA 6: Chapter 9 -- Finite-Sate Machine & Turing Machines
###        NP & P Problems, Encoding Scheme
### Name:
### Student ID:
### Date:
```

1. Please draw the state graph for the following finate state machine, and compute the output sequence for the given input sequence.

(For the output, please ignore the first bit.)

(a)
Input:0011

0011

Present state	Next state		Output
	Present input		
	0	1	
s_0	s_2	s_3	0
s_1	s_0	s_1	1
s_2	s_1	s_3	0
s_3	s_1	s_2	1

In [ ]:

(b)
Input:acbbca

acbbca

Present state	Next state			Output
	Present input			
	a	***b***	***c***	
s_0	s_1	s_1	s_1	0
s_1	s_2	s_2	s_1	0
s_2	s_0	s_2	s_1	1

2.

(a) Please construct a finite-state machine that will compute the bitwise OR of two binary input string.

In [ ]:

(b) Write the output for the input sequence consisting of the strings 11011 and 10010 (read left to right)

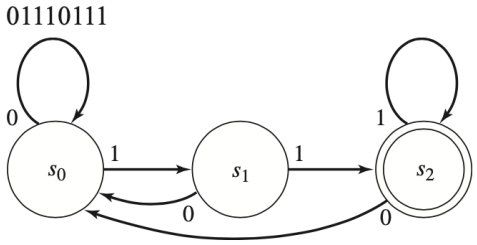
(For the output, please ignore the first bit.)

In [ ]:

3. Determine whether the given machine recognizes the given input string.

(a)

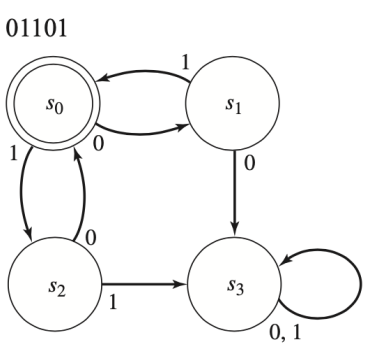
Input:01110111



In [ ]:

(b)

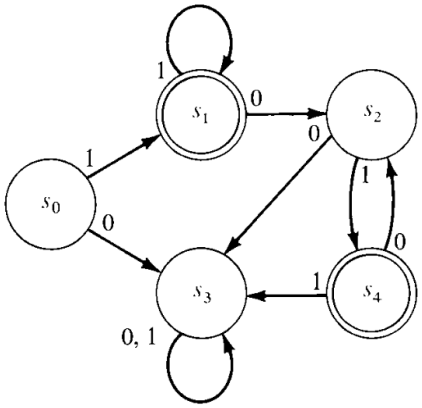
Input:01101



In [ ]:

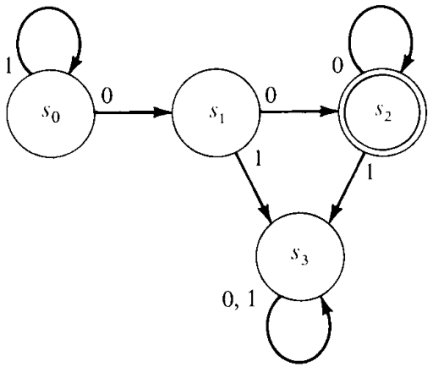
4. Please give a regular expression for the set recognized by the following finite-state machine.

(a)



In [ ]:

(b)



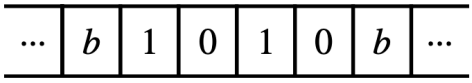
In [ ]:

5. Consider the Turing Machine

(0, 1, 1, 0, R)
(0, 0, 0, 1, R)
(1, 1, 1, 1, R)
(1, b, 1, 2, L)
(2, 1, 1, 2, L)

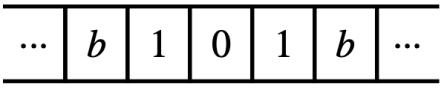
(2, 0, 0, 2, L)

(a). What is its behavior when started on the tape



In [ ]:

(b). What is its behavior when started on the tape



6. Please draw the relationship diagram for P, NP, NP-Complete and NP-Hard problems.

In [ ]:

7. The following hamming code word was received. Use it to answer questions (1) - (5).

0000110

(1) What position number is generated to determine if an error has ocurred in transmission?

In [ ]:

(2)Did an error occur?

In [ ]:

(3) What was the transmitted code word?

In [ ]:

(4) What was the transmitted message?

In [ ]:

(5) If the message was binary, what was the decimal value of the message?

In [ ]: