In [1]:
```
### CSCI-3080 Discrete Structure
### OLA 6: Chapter 9 -- Finite-Sate Machine & Turing Machines
### 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.

(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 [ ]:

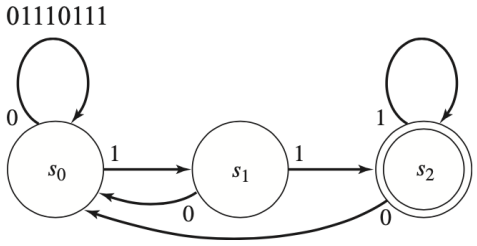
(b) Write the output for the input sequence consisting of the strings 11011 and 10010 (read left to right)

In [ ]:

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

(a)

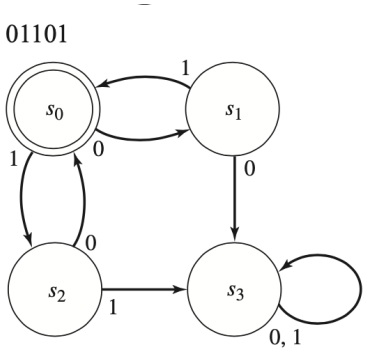
Input:01110111



In [ ]:

(b)

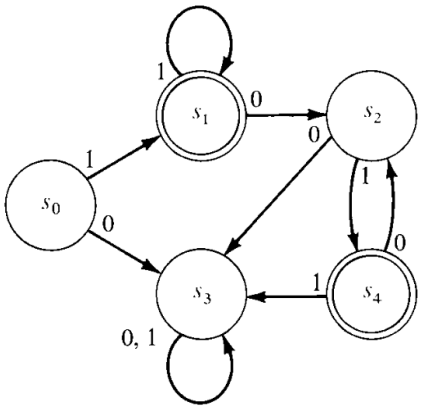
Input:01101



In [ ]:

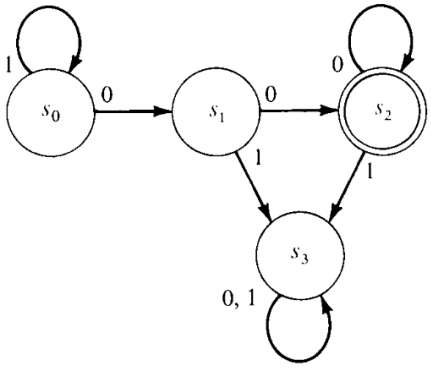
4. Please give a regular expression for the set recognized by the following finite-state machine.

(a)



In [ ]:

(b)



In [ ]:

5. Consider the Turing Machine

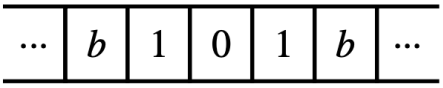
(0, 1, 1, 0, R)
(0, 0, 0, 1, R)
(1, 1, 1, 1, R)
(1, b, 1, 2, L)
(2, 1, 1, 2, L)
(2, 0, 0, 2, L)
(2, b, 1, 0, R)

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

...	b	1	0	1	0	b	...

In [ ]:

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



6. Find a Turing machine that recognizes $\{0^n 1^{3n}, n \geq 0\}$.

Please take the reference from the lecgture we covered during the class:
https://lecture.yangxinmtsu.repl.co/3080/tm2.html
(https://lecture.yangxinmtsu.repl.co/3080/tm2.html)

In [ ]: