

**CSE
31F**

Foundations of Computing I

* All slides are a combined effort between
of the course

Strings over $\{0, 1, 2\}^*$

M_1 : Strings with an even number of 2's

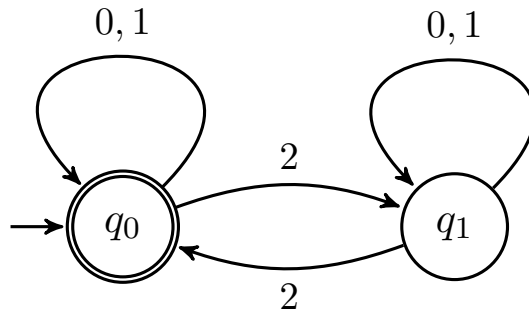
Re-do these
from last
time

M_2 : Strings where the sum of digits mod 3 is 0

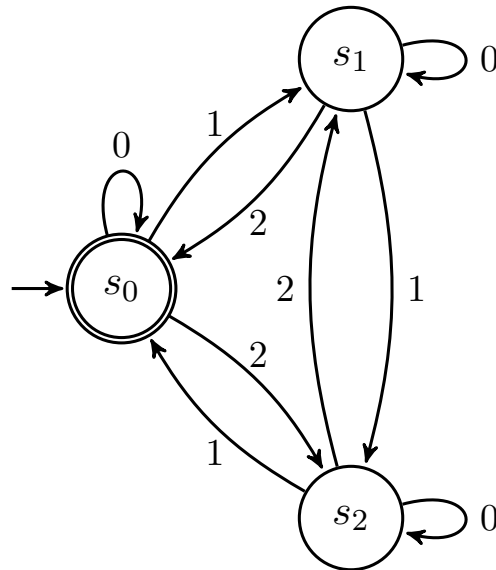
Adam's Monday
Office Hours moved to
CSE 674 for the
quarter.

Strings over $\{0, 1, 2\}^*$

M_1 : Strings with an even number of 2's

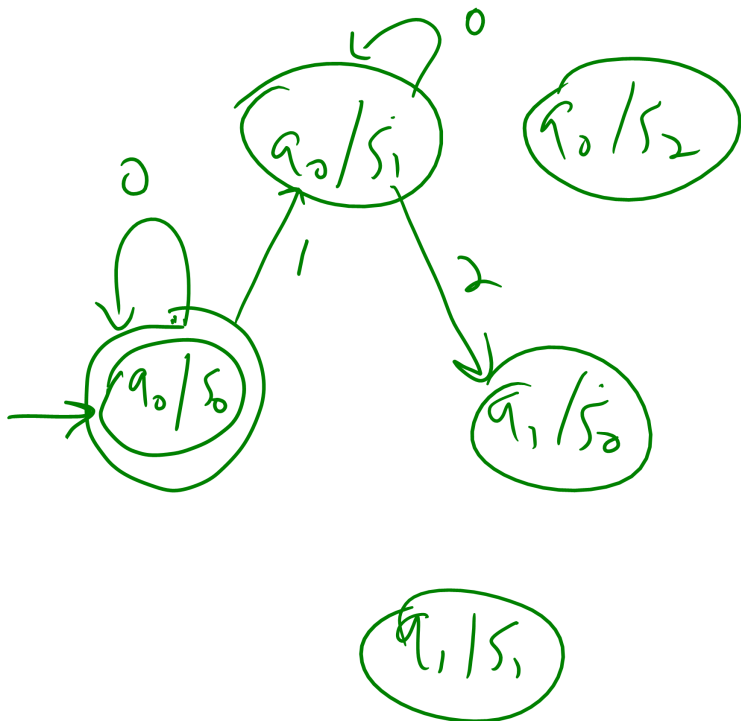
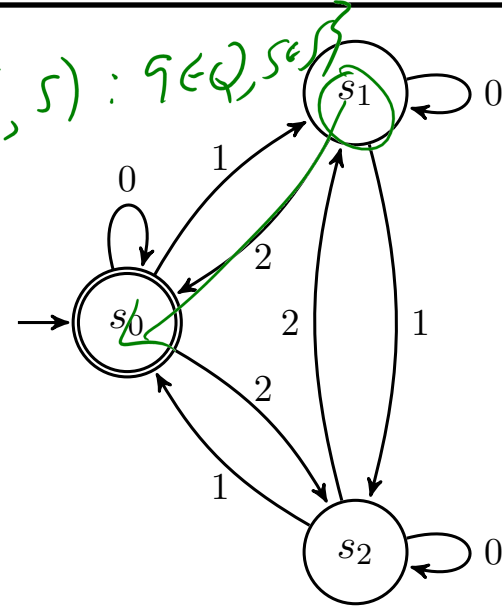
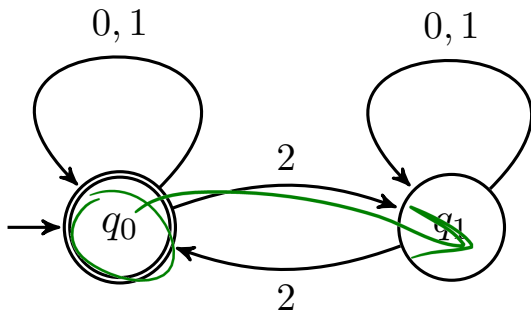


M_2 : Strings where the sum of digits mod 3 is 0



Strings with an even number of 2's AND a mod 3 sum of 0

$$Q \times S = \{(q, s) : q \in Q, s \in S\}$$

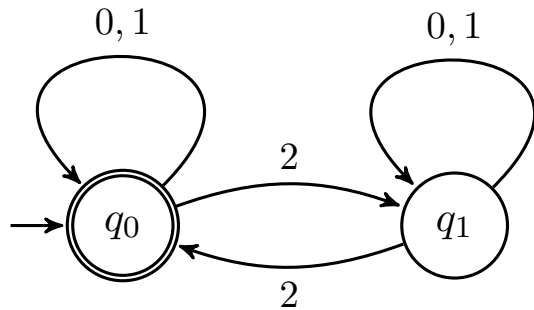


✓✓✓
01012

(q1/s2)

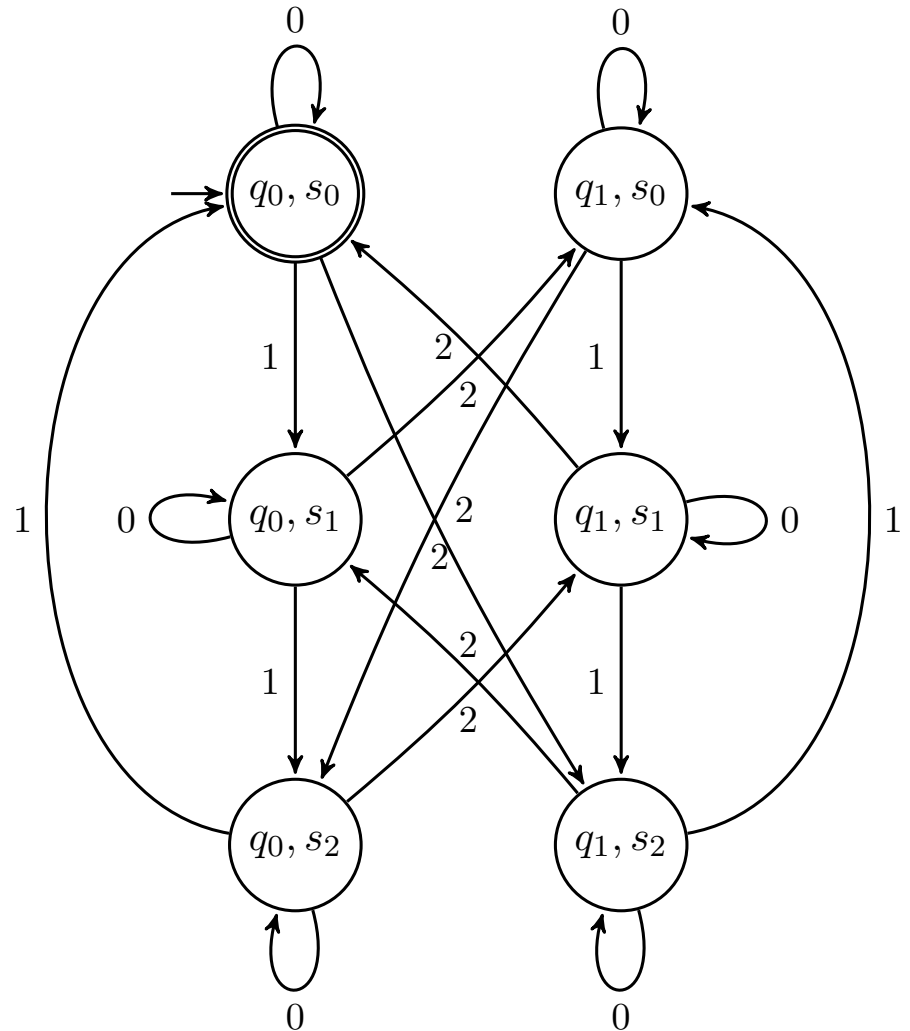
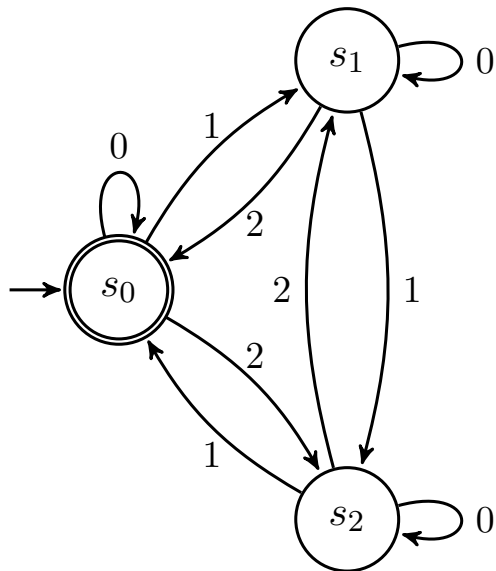
(q1/s1)

Strings with an even number of 2's AND a mod 3 sum of 0

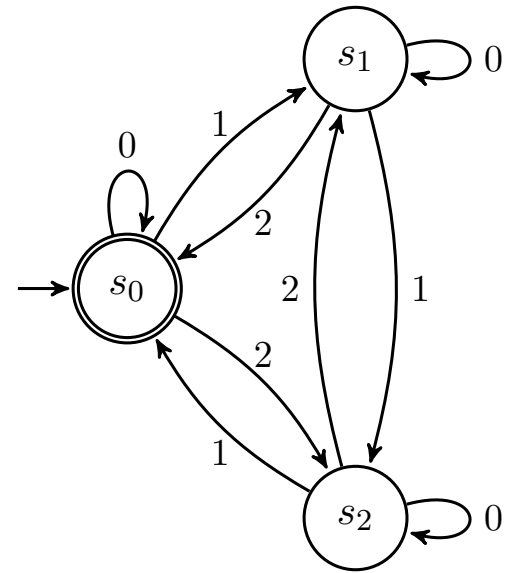
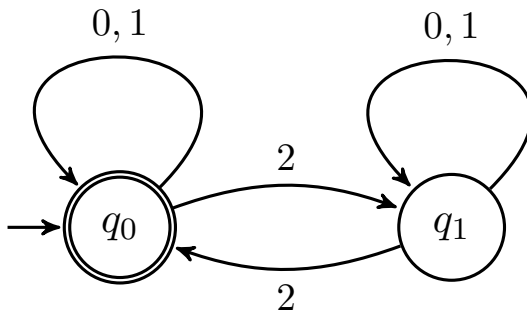


A

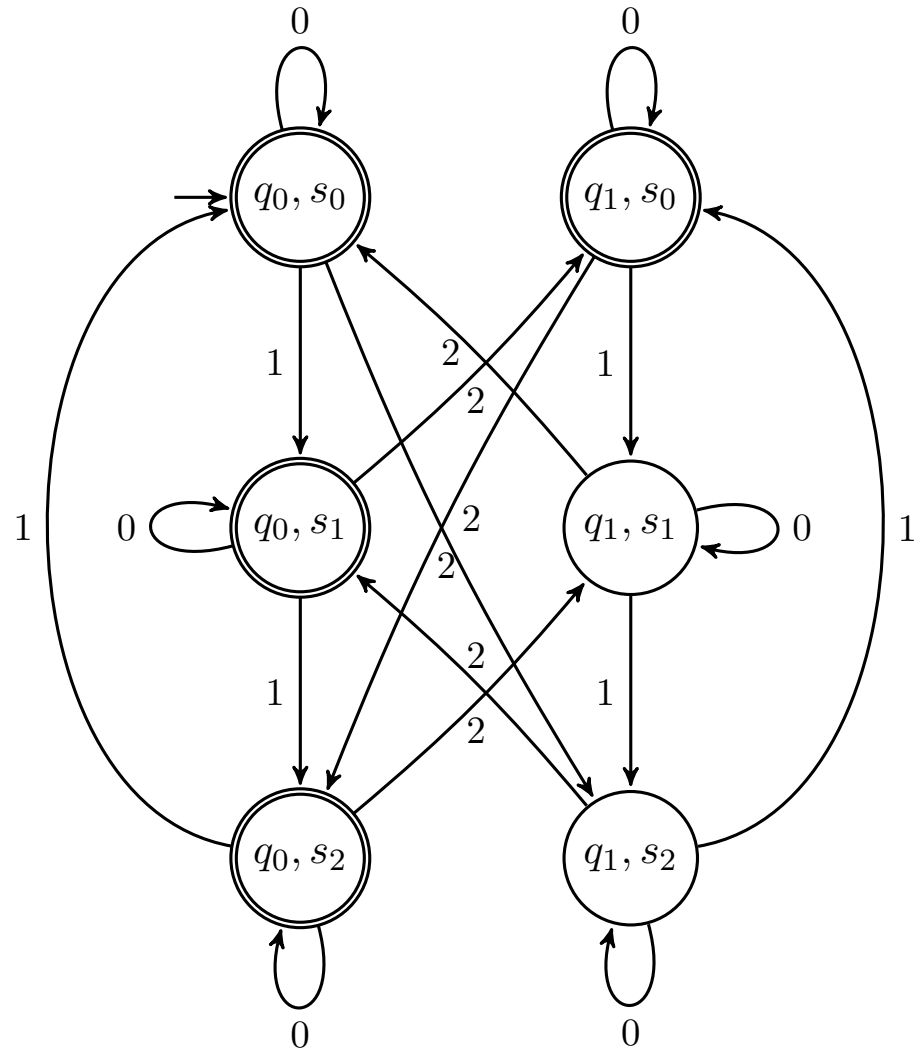
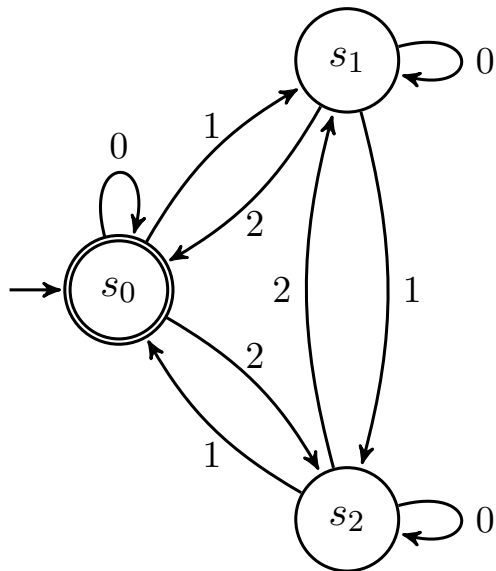
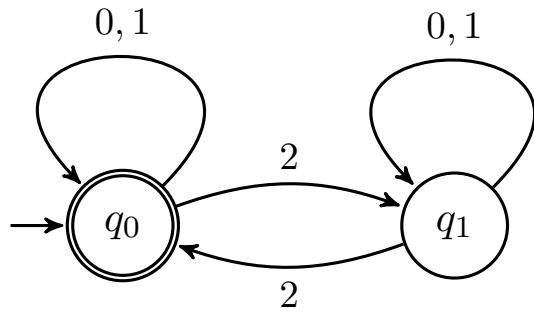
B



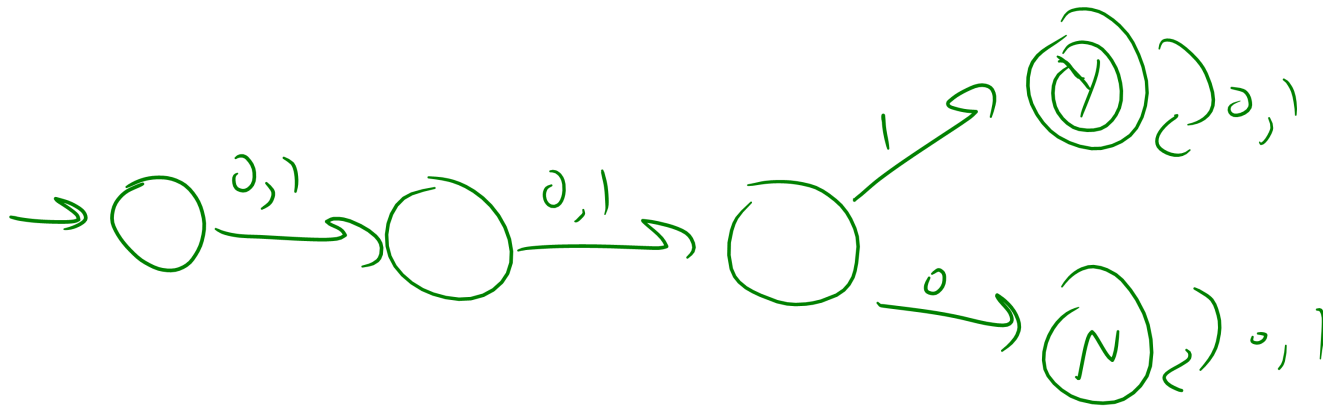
Strings with an even number of 2's OR a mod 3 sum of 0



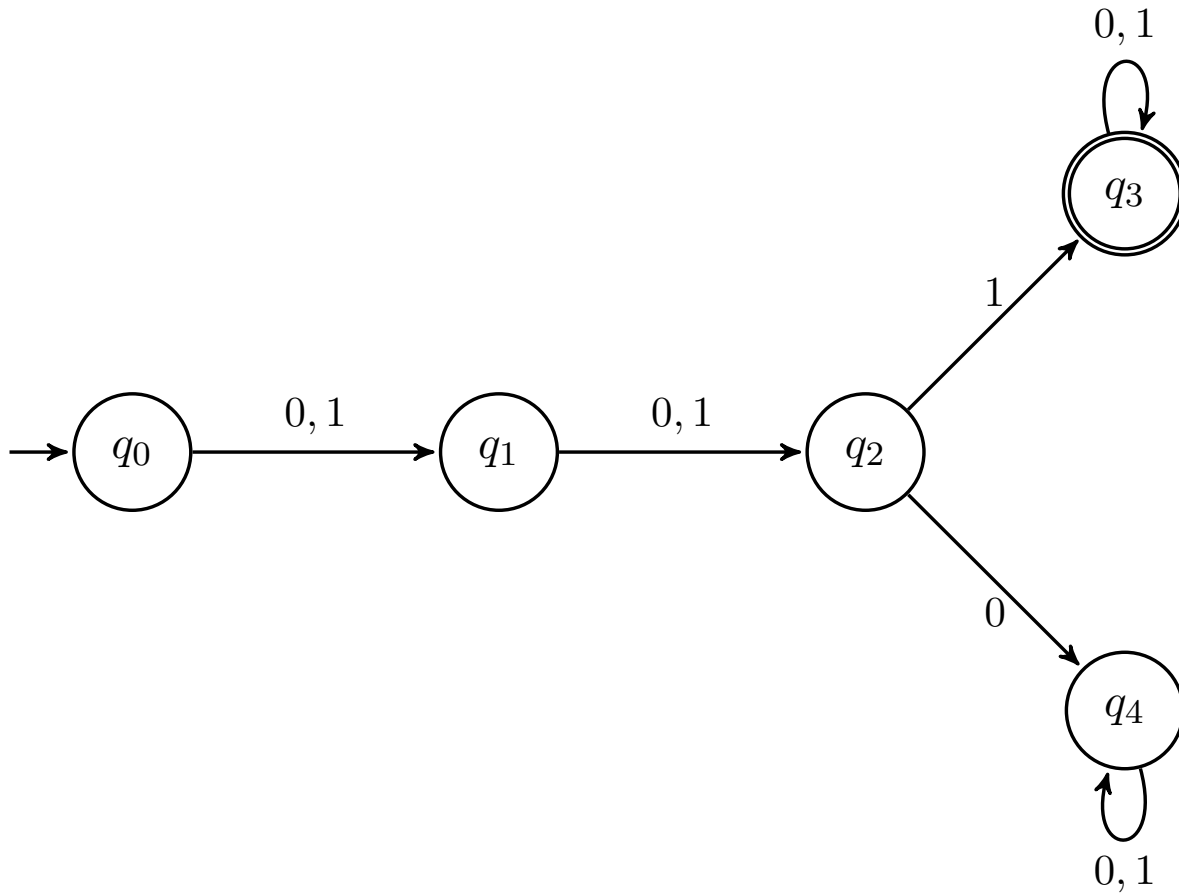
Strings with an even number of 2's OR a mod 3 sum of 0



FSM that accepts binary strings with a 1 three positions from the start

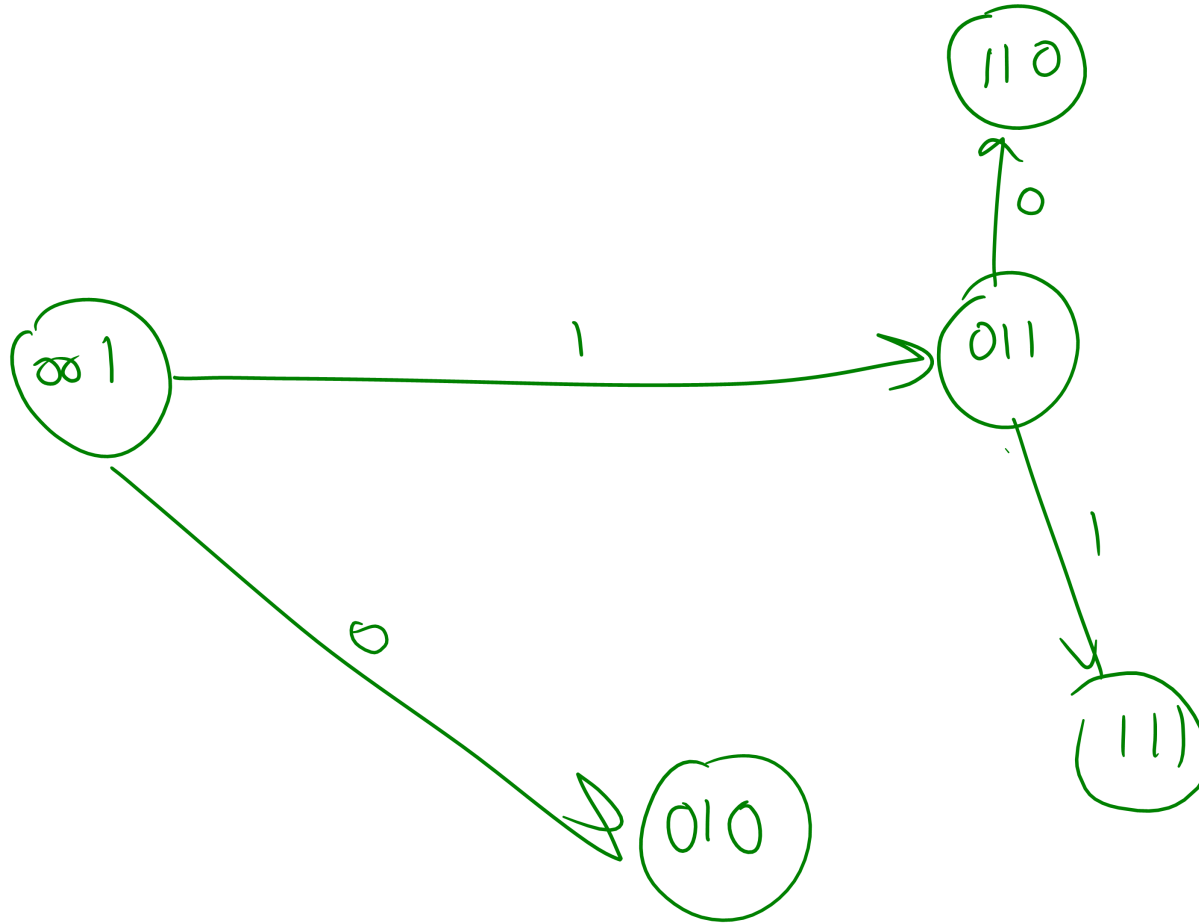


FSM that accepts binary strings with a 1 three positions from the start



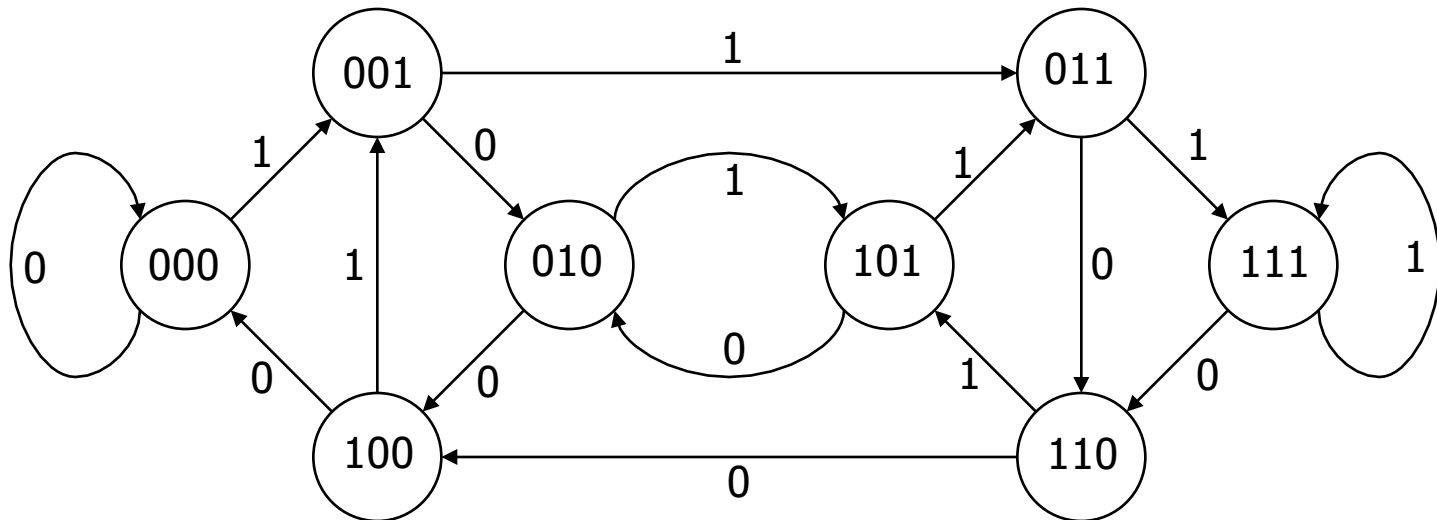
3 bit shift register

“Remember the last three bits”

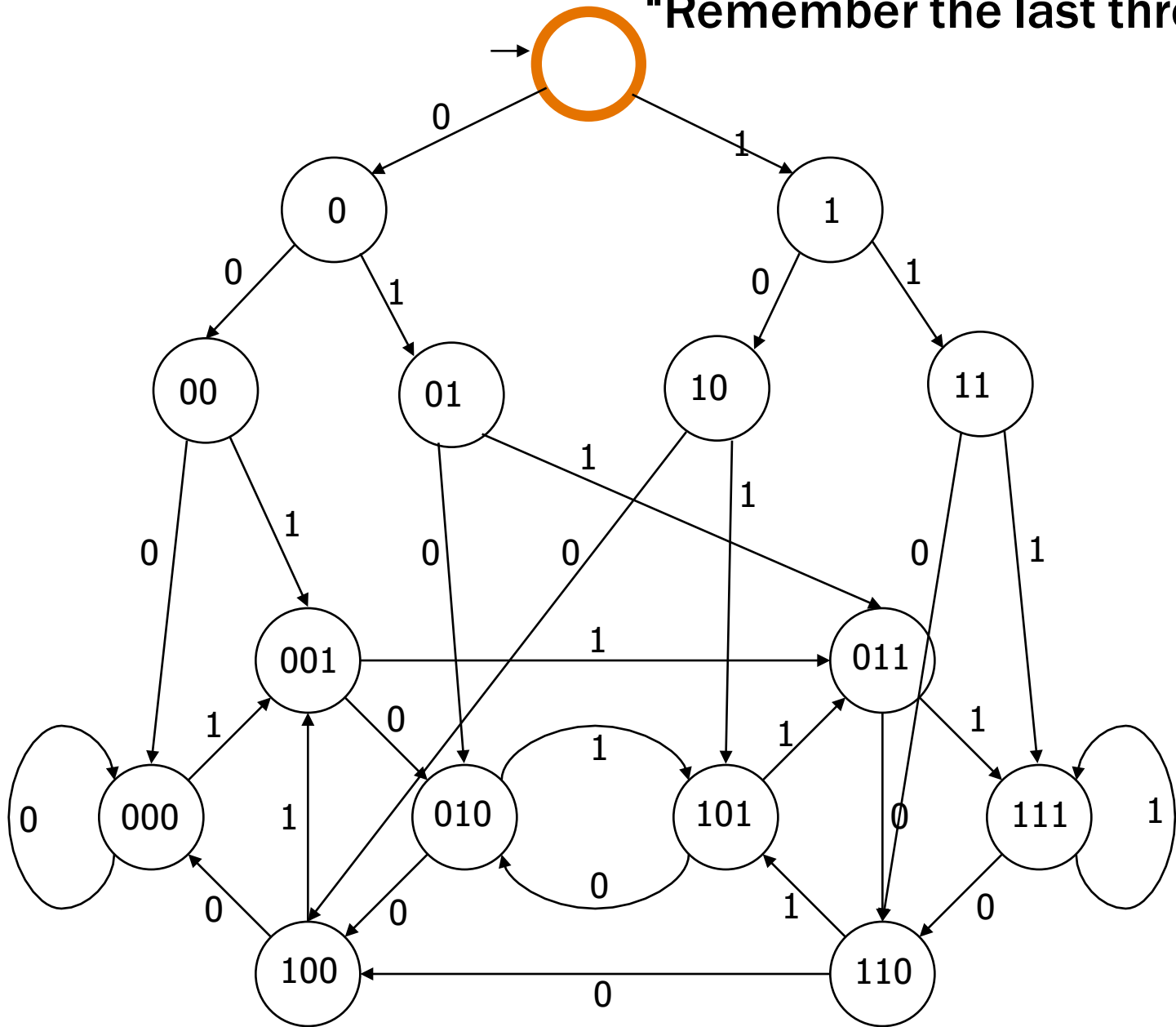


3 bit shift register

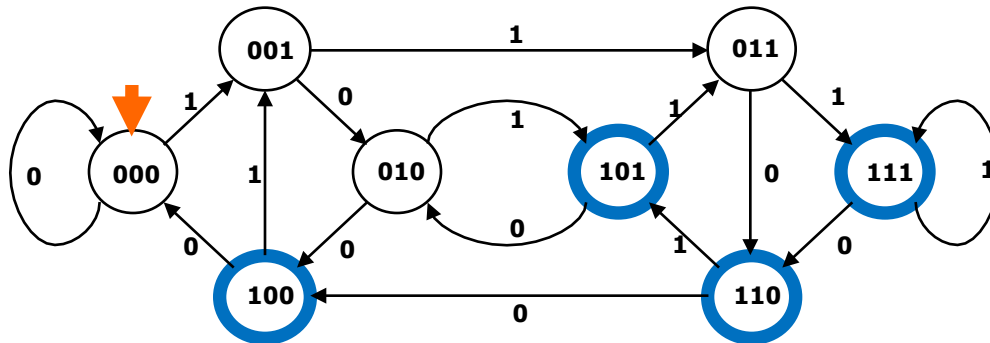
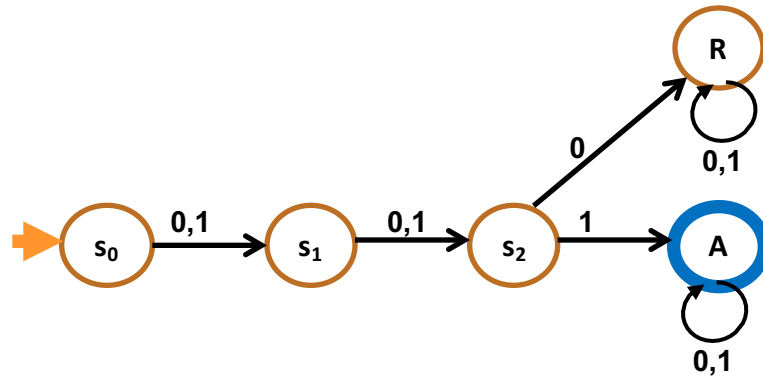
“Remember the last three bits”



“Remember the last three bits”



The beginning versus the end



CSE 311: Foundations of Computing

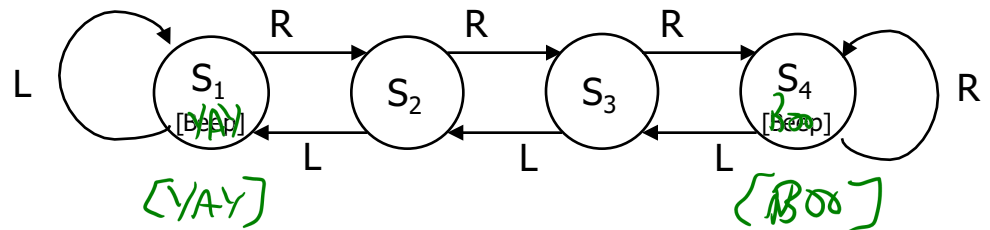
Lecture 22: Finite State Machines with Output



State Machines with Output

State	Input		Output
	L	R	
S ₁	S ₁	S ₂	Beep
S ₂	S ₁	S ₃	
S ₃	S ₂	S ₄	
S ₄	S ₃	S ₄	Beep

“Tug-of-war”





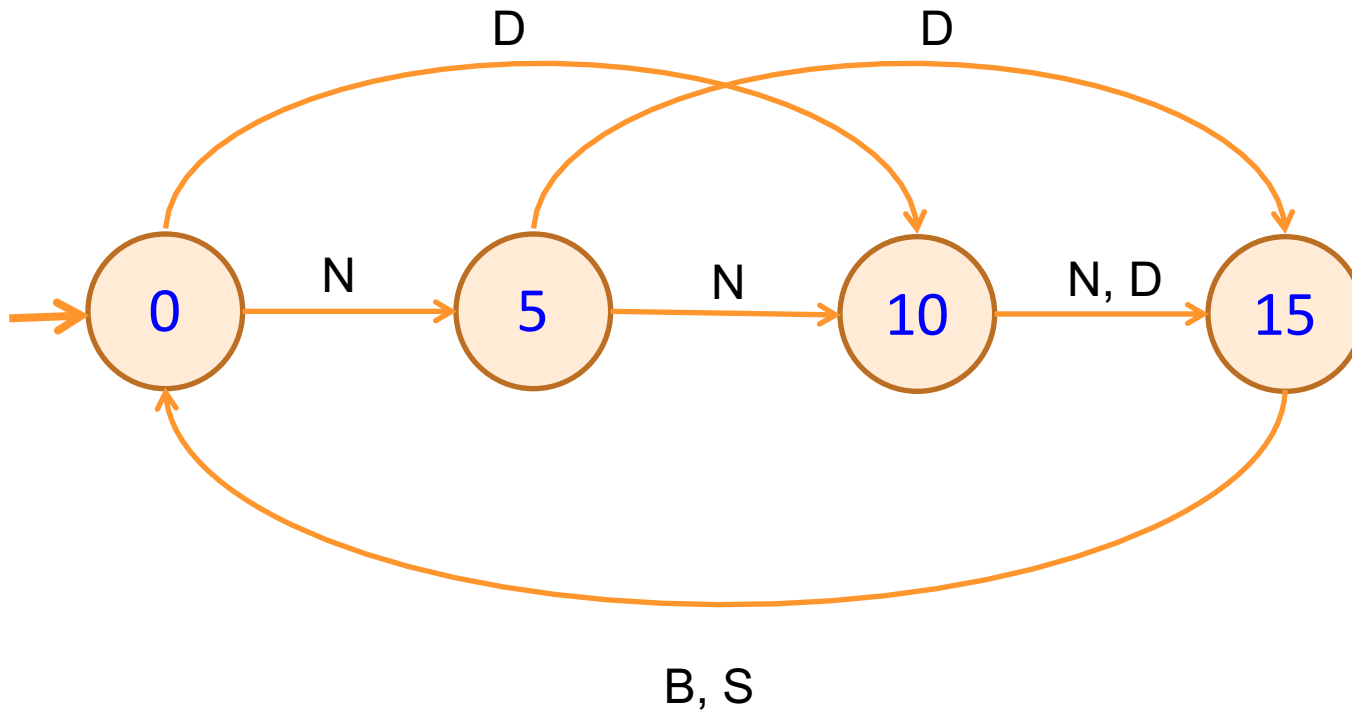
Vending Machine



Enter 15 cents in dimes or nickels
Press S or B for a candy bar

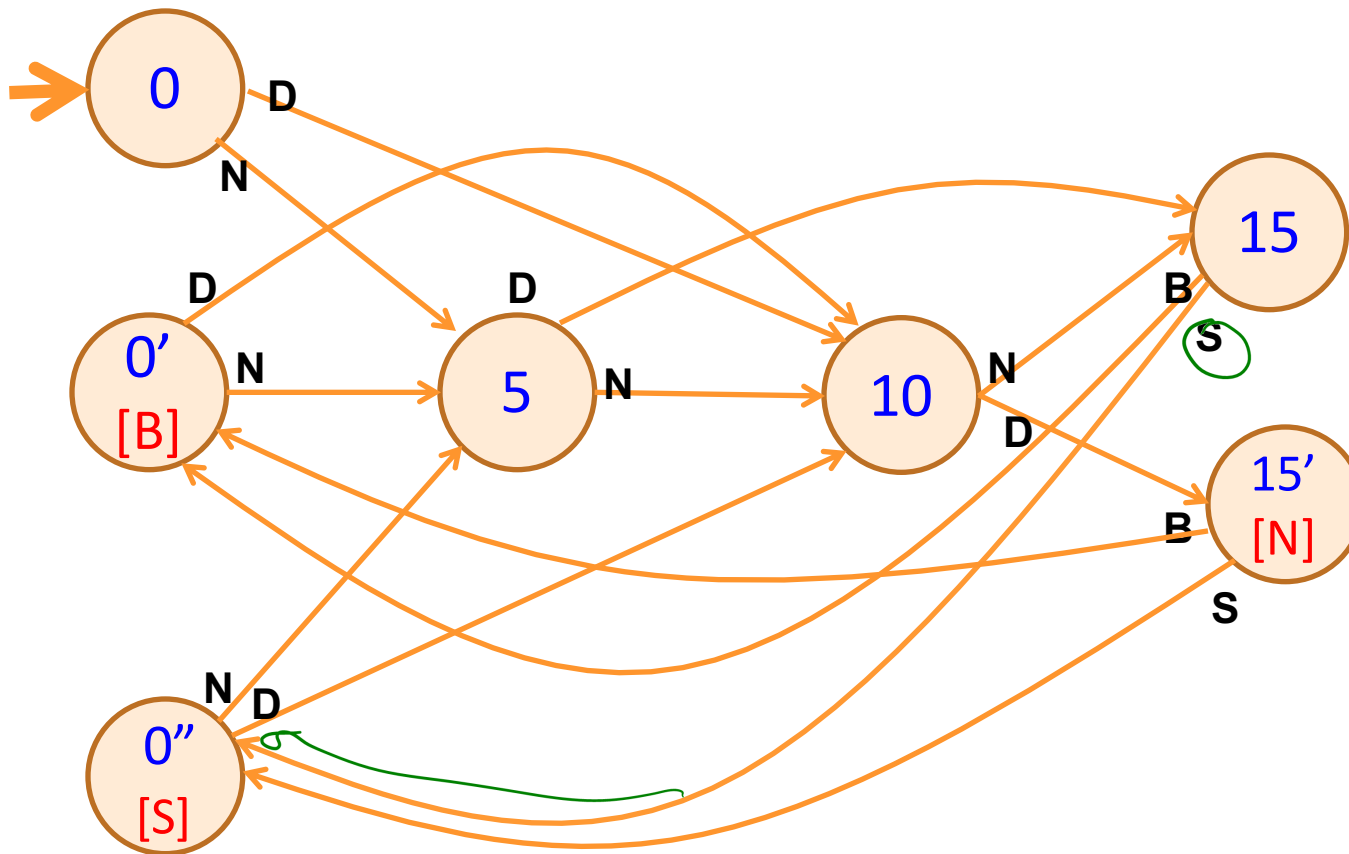


Vending Machine, v0.1



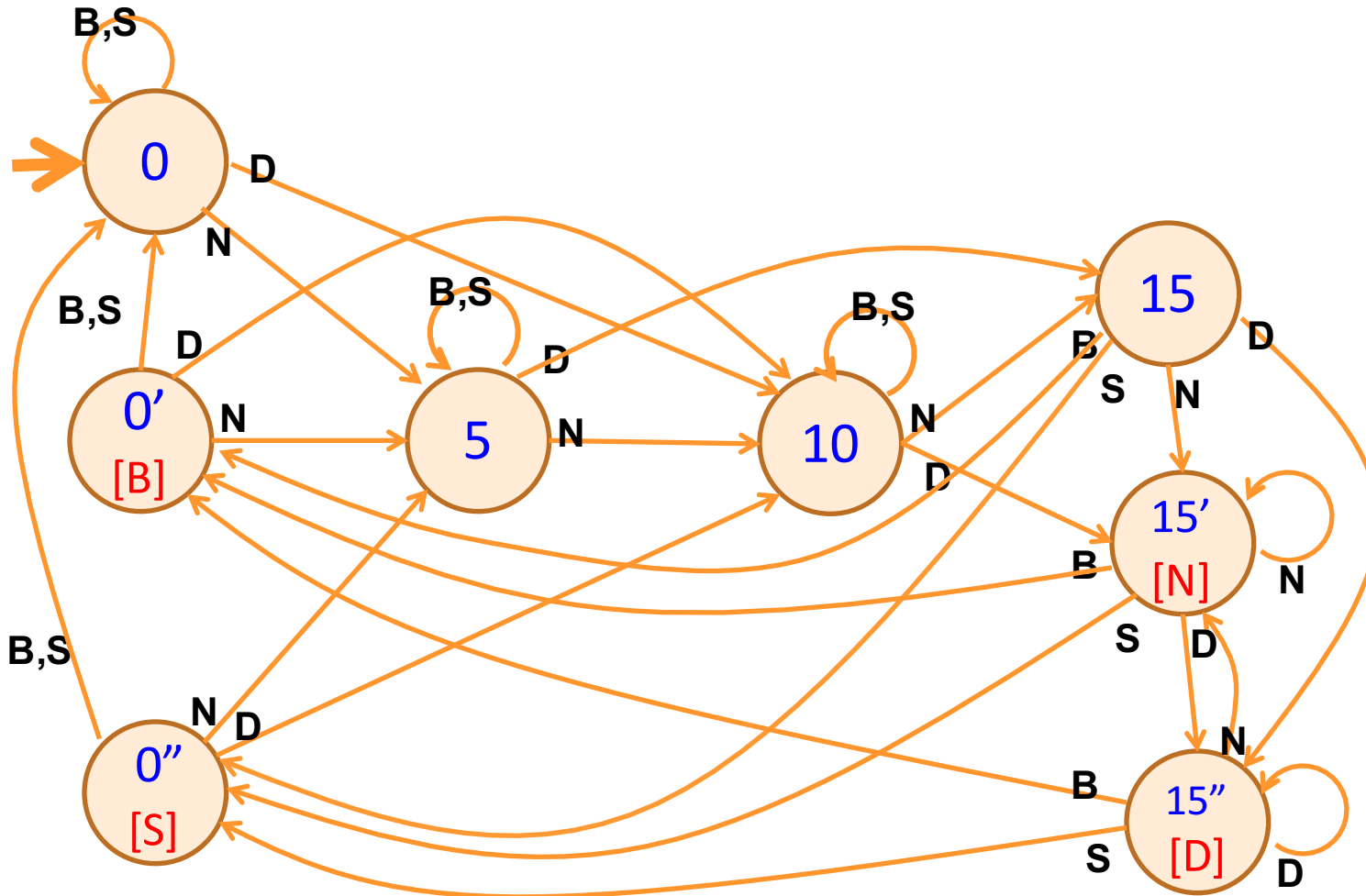
Basic transitions on N (nickel), D (dime), B (butterfinger), S (snickers)

Vending Machine, v0.2



Adding output to states: N – Nickel, S – Snickers, B – Butterfinger

Vending Machine, v1.0



Adding additional “unexpected” transitions