Section 4 - Finite State Machines

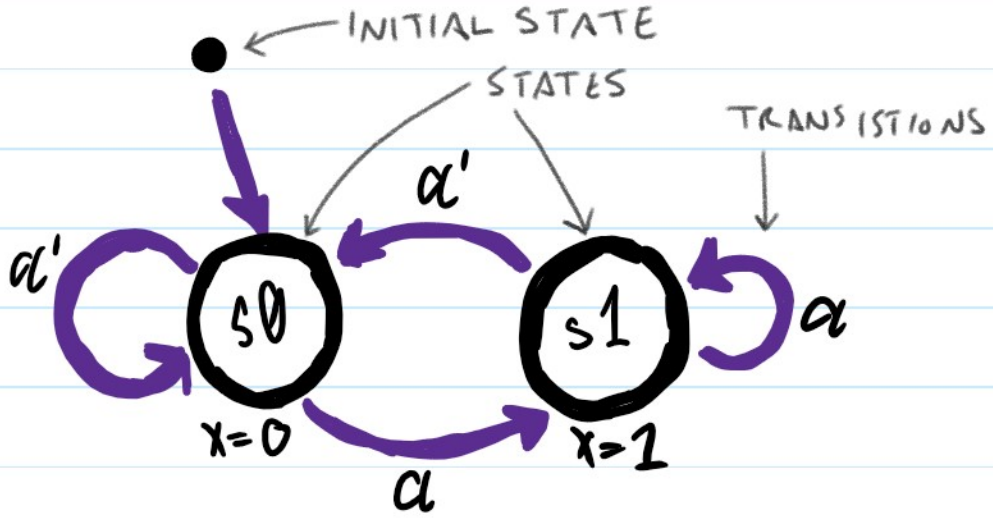
Wednesday, June 19, 2019 12:28 PM

•SECTION 4•

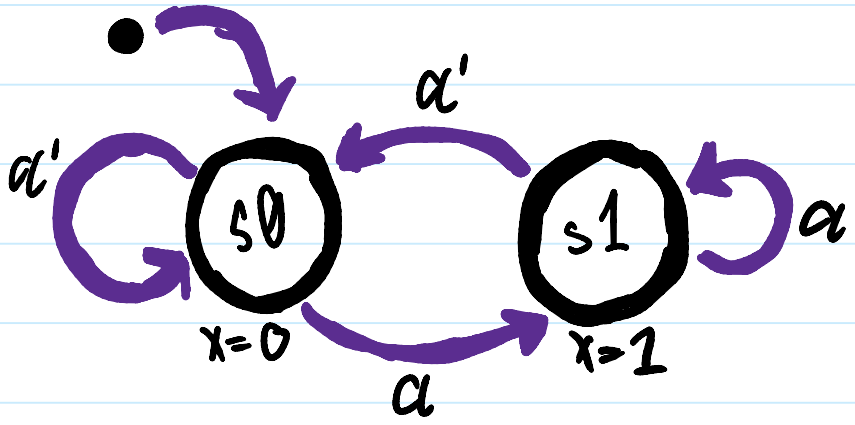
FINITE STATE MACHINES

- In a combinational circuit, equations are used to describe the behavior

- In a sequential circuit, A **FINITE STATE MACHINE (FSM)** IS USED



INPUTS : a
OUTPUTS : x



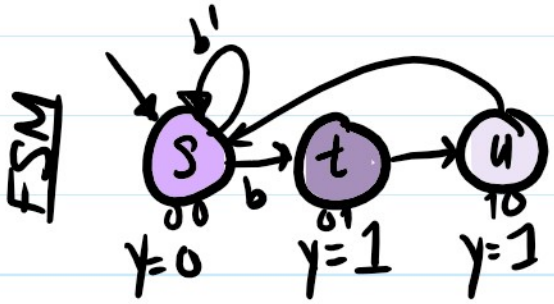
WHAT DOES THIS SAY?
x starts at 0
When a is 1 x becomes 1
When a is 0 x becomes 0

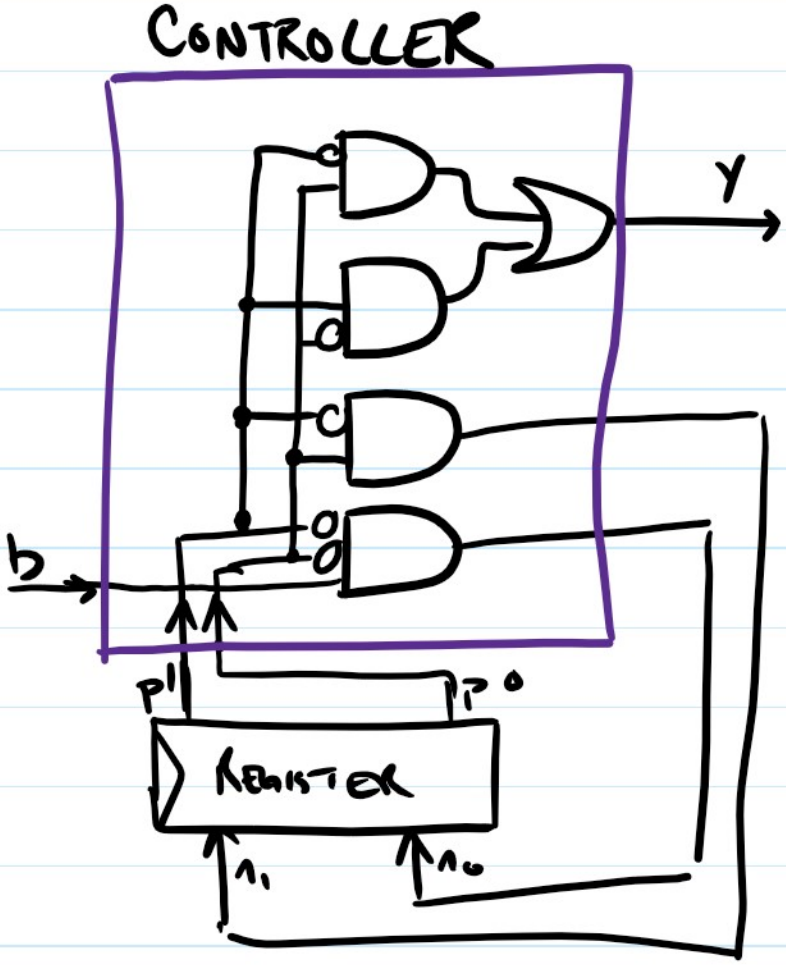
WHENEVER THE CLOCK (CLK) HAS A RISING 1, THE STATE MACHINE WILL ADVANCE

- DESCRIBING A SYSTEMS BEHAVIOR IS KNOWN AS CAPTURING BEHAVIOR WITH A FSM

FSMs To Circuits

- An equation can be converted to a combinational circuit
- An FSM can be converted to a sequential circuit called a **controller**
- A controller consists of a register and a logic block
- The register stores the state
  - ↳ this makes it a **state register**
- The logic computes
  - ↳ Output based on present state
  - ↳ Next state based on inputs and present state





	p1	p0	b	n1	n0	y
s	0	0	0	0	0	0
	0	0	1	0	1	0
t	0	1	0	1	0	1
	0	1	1	1	0	1
u	1	0	0	0	0	1
	1	0	1	0	0	1
unused	1	1	0	0	0	0
	1	1	1	0	0	0

PRESENT STATE | INPUT | NEXT STATE | OUTPUT

- THE CONTROLLER'S HIGH LEVEL VIEW IS CALLED THE **ARCHITECTURE**

- EACH STATE IS GIVEN A BIT ENCODING TO BE USED