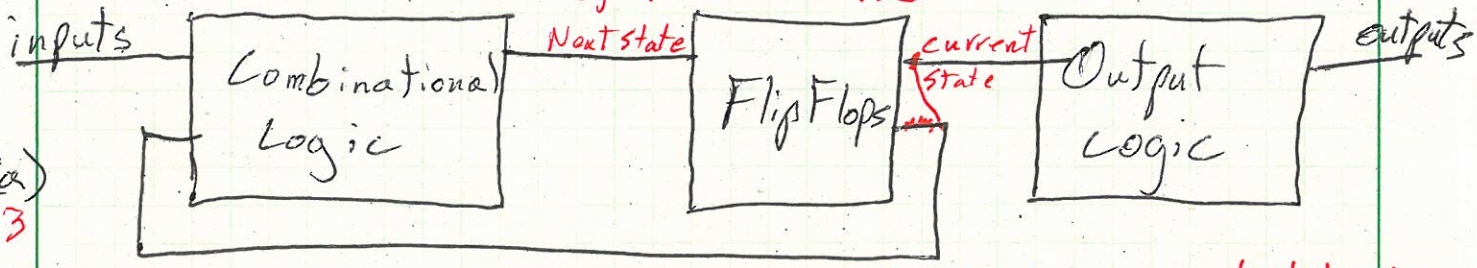
Overview:
- FSMs
  - Design
- HW due LSN 14

FSM - M-inputs, N-Outputs, & K-Bits of state

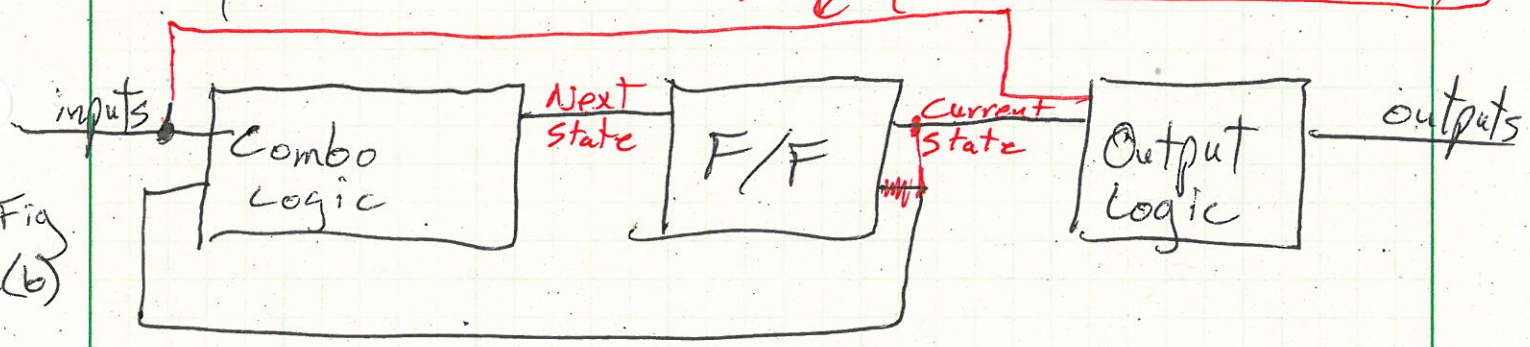
Finite State Machines (FSM): They have K registers can be in one of a finite number (2^K) ~~state~~ unique states

Moore Machine: Outputs - only depends only on the current state of the machine



see Fig 3.22(a) p. 123

Mealy Machine - outputs depend on both the current state & current inputs, only diff btwn Moore & Mealy



see Fig 3.22(b)

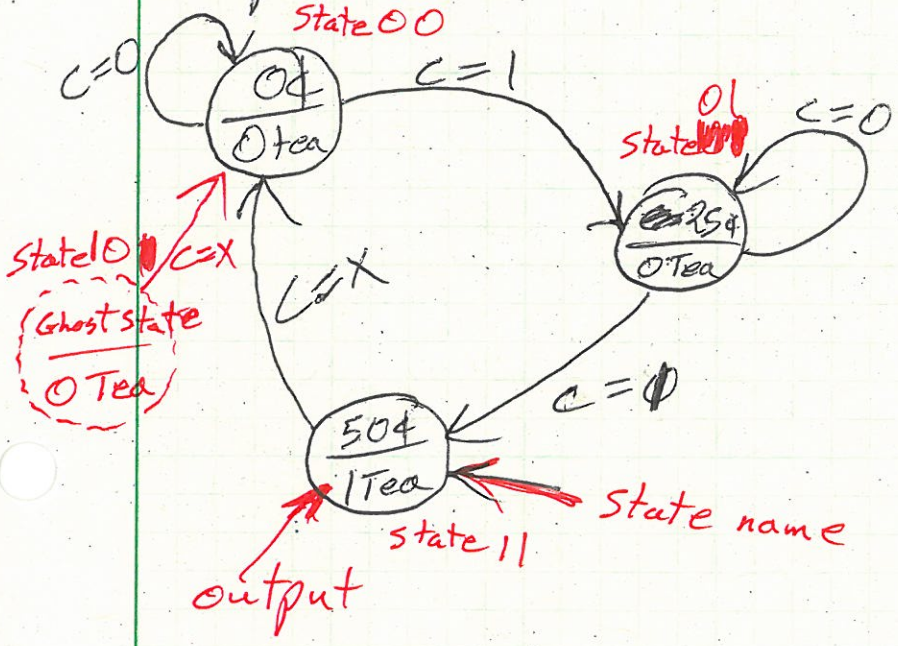
How to design a state machine:

0) Description
1) state transition diagram
2) state transition & output tables
3) next state & output equations
4) schematic

0) Vending machine
- Tea = 50¢
- No change given
- Only accepts 25¢

Inputs: C = coin
also a clock

1) Output: Tea



State Transition Diagram (moore machine)

★ Need to account for all states
- The ghost state could be ~~our exes~~ our reset state
- when we turn on machine we need to account for all possible states

2) State Table:

A	B	C	A*	B*
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	1
1	0	0	0	0
1	0	1	0	0
1	1	0	0	0
1	1	1	0	0

coin? → C; Current State → A B; Next State → A* B*

Output table:

A	B	T
0	0	0
0	1	0
1	0	0
1	1	1

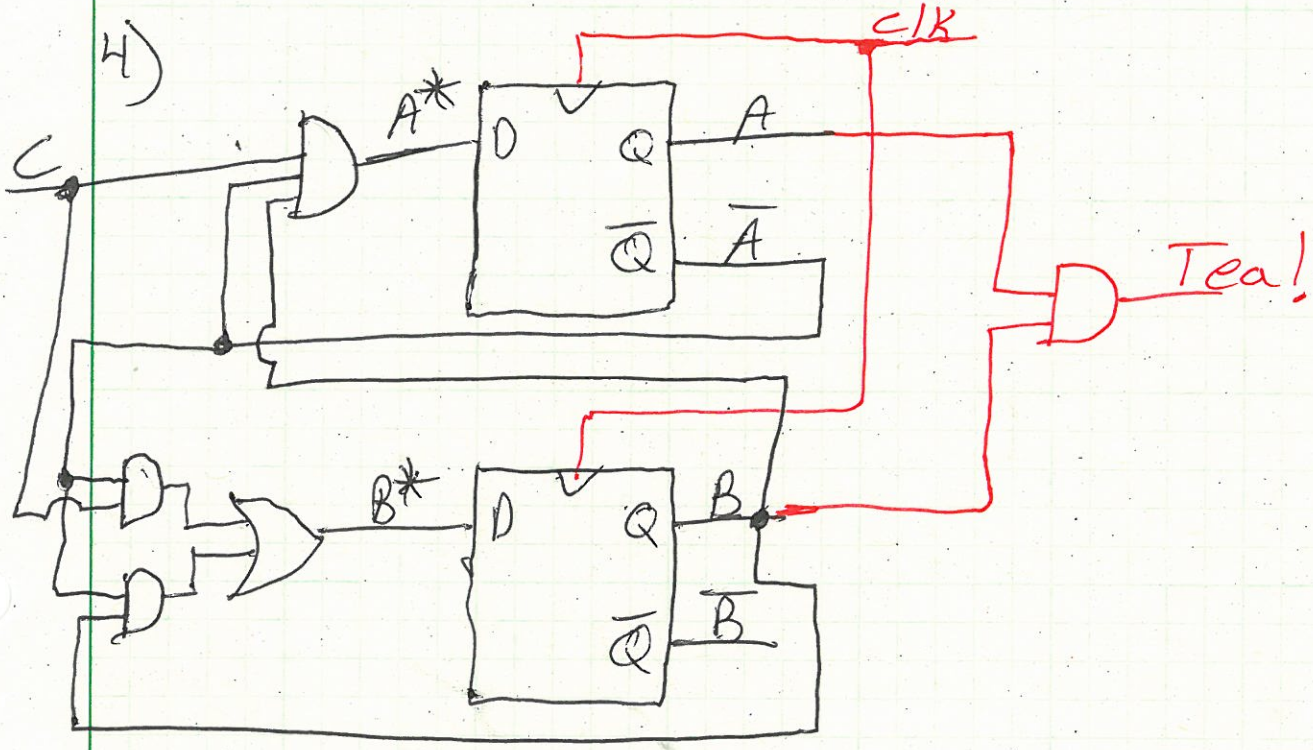
3) Equations

$T = AB$

$A^* = \bar{A}BC$

$B^* = \bar{A}\bar{B}C + \bar{A}B = \bar{A}B + \bar{A}C$

4)

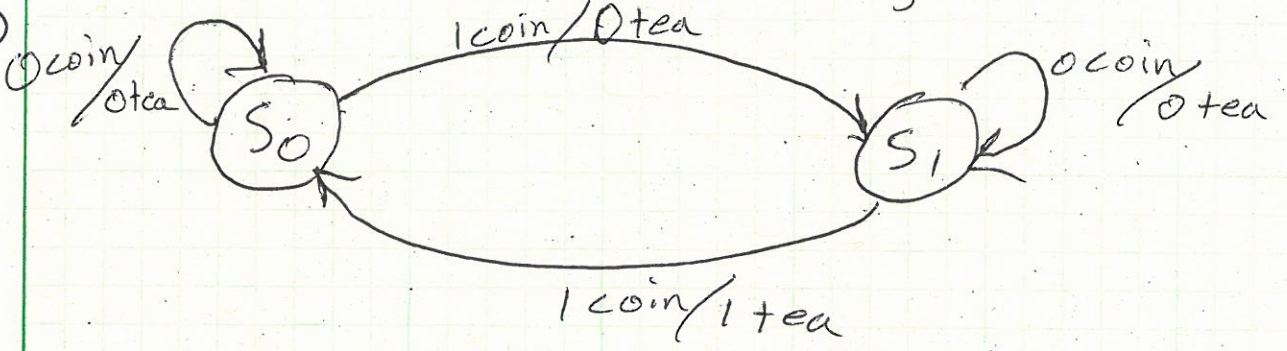


Real Life examples of statemachines:

- Soda machine
- Software Applications
- spell checker - using soundex
- Driving to school/work

Mealy Machine:
- Potential for less states
- More difficult to design

1)



- Outputs tied to arcs

How many F/Fs do we need? 1

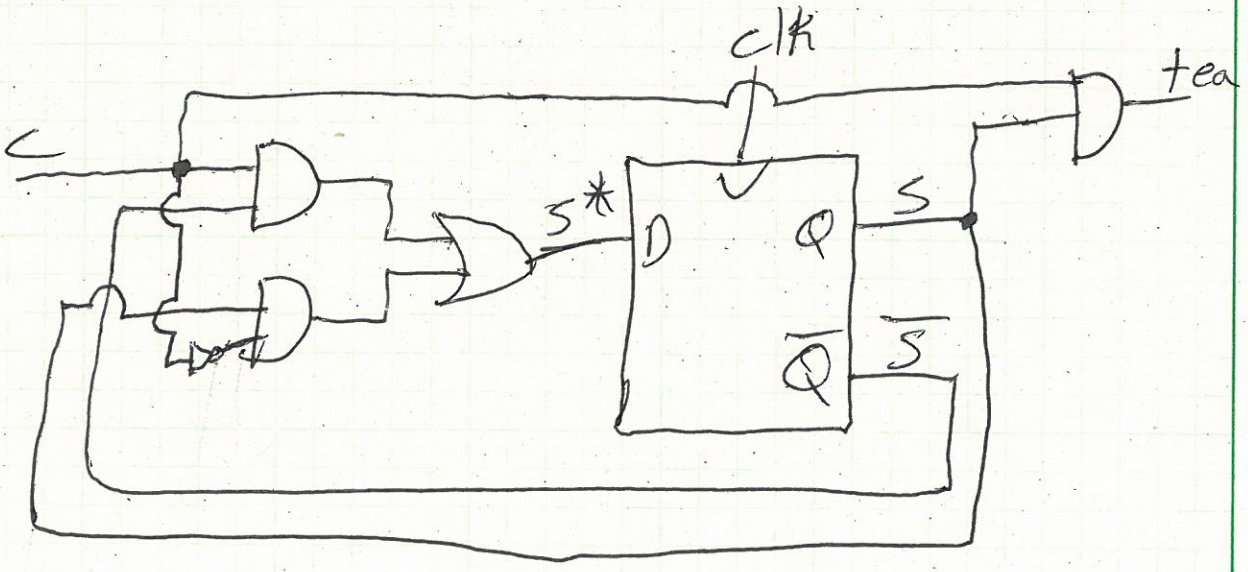
2)

State	C	State*	T
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

3) $T = SC$

$S^* = \bar{S}C + S\bar{C}$

4)



Board Work:

- Draw me a picture of a mealy or moore state ~~machine~~ Transition Diagram that shows
- A snail is crawling across ~~numbers~~ a sequence of Numbers and he smiles if the last 2 #s are ~~"01"~~ book Does "01" Have them use "11" makes him smile
  Example 3.7 on p 132

Sequence