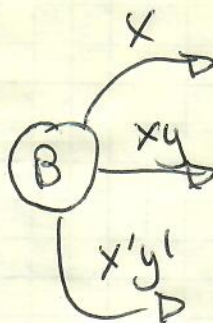
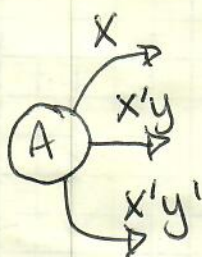


All the states & transitions in a State Diagrams must be :

Complete = Logic OR of the conditions on all the outgoing arcs = 1 (true)

Unequivocal = Logic AND of the conditions on any pair of outgoing arcs = 0 (false)



$$\text{Complete} \begin{cases} x + x'y + x'y' = \\ x + x'(y + y') = \\ x + x' = \\ 1 \end{cases}$$

$$(x)(x'y) = 0$$

$$x + xy + x'y' =$$

$$x(1+y) + x'y' =$$

$$x + x'y' =$$

$$x + y' \neq 1$$

$$(x)(xy) = xy \neq 0$$

Today we'll construct the FSM for a vending machine

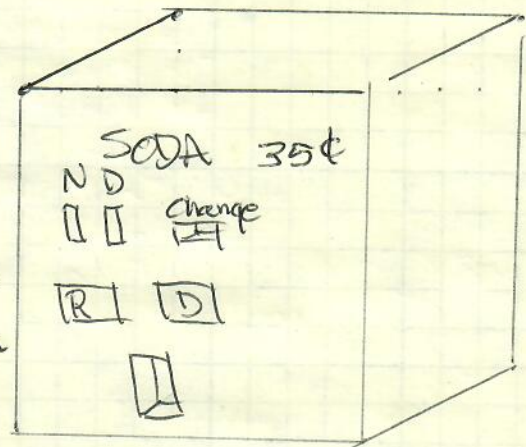
Soda costs 35¢

Input: Nickel 1 insert  
0 no

Dime

Regular Button 1 push  
0 no push

Diet Button



Output: Change

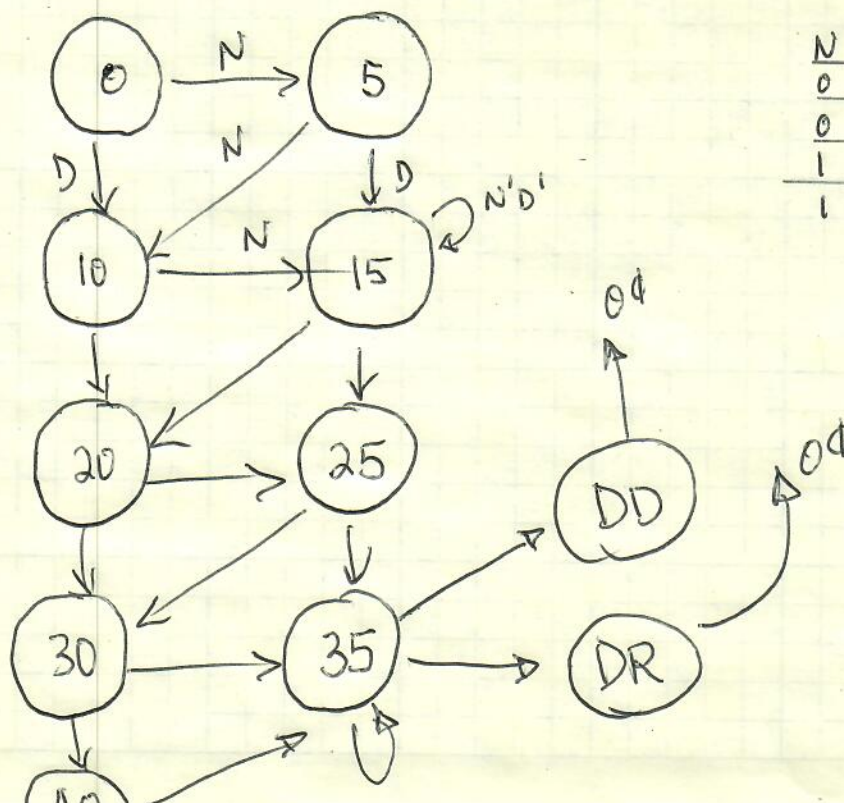
Regular Soda (Dispense)

Diet Soda (Dispense)

State: What do we want to remember?

• #Nickels #Dimes

• Total deposited so far



N	D	Next
0	0	Same
0	1	+10
1	0	+5
1	1	don't care

RS	DS	Next
0	0	35
0	1	DD
1	0	DR
1	1	X



MIED<sub>0</sub>D<sub>5</sub>D<sub>10</sub>D<sub>15</sub>D<sub>35</sub>D<sub>40</sub>D<sub>DD</sub>D<sub>RR</sub>

Control Word

	change	DRS	DDS
Q <sub>0</sub>			
Q <sub>5</sub>			
Q <sub>10</sub>			
⋮			
Q <sub>35</sub>			
Q <sub>40</sub>	1		
Q <sub>DD</sub>			1
Q <sub>DR</sub>		1	

$$Z_{\text{change}} = Q_{40}$$

$$Z_{\text{DRS}} = Q_{\text{DR}}$$

$$Z_{\text{DDS}} = Q_{\text{DD}}$$