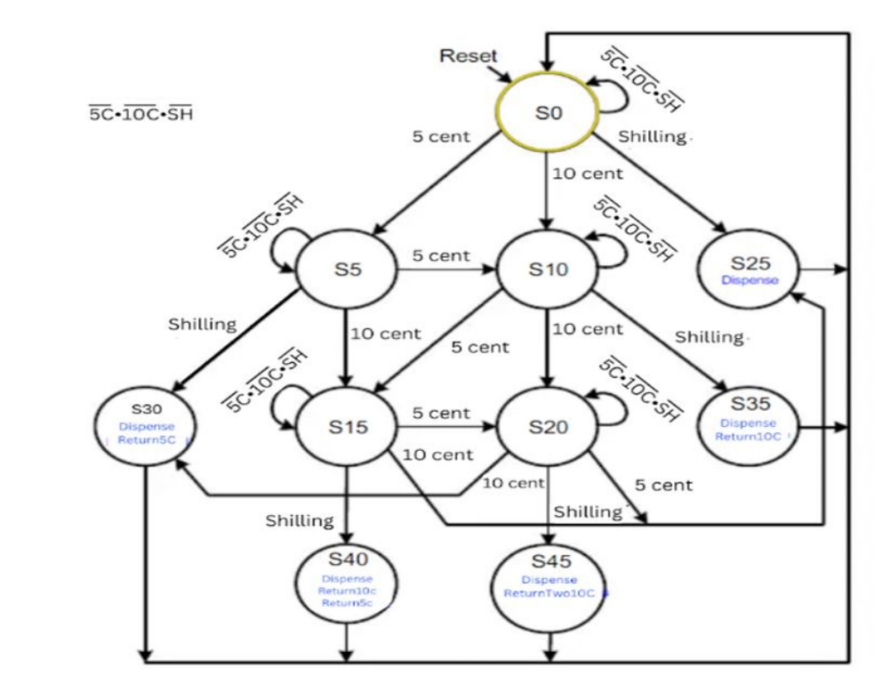
Drive & Desire

encoding table

State	Encoding $^{s}9:0$
S0	0000000001
S5	0000000010
S10	0000000100
S25	0000001000
S30	0000010000
S15	0000100000
S20	0001000000
S35	0010000000
S40	0100000000
S45	1000000000



Current state s	Inputs			next state s
	nickel	dime	quarter	
S0	0	0	0	S0
S0	0	0	1	S25
S0	0	1	0	S10
S0	1	0	0	S5
S5	0	0	0	S5
S5	0	0	1	S30
S5	0	1	0	S15
S5	1	0	0	S10
S10	0	0	0	S10
S10	0	0	1	S35
S10	0	1	0	S20
S10	1	0	0	S15
S25	X	X	X	S0
S30	0	0	0	S0
S15	0	0	0	S15
S15	0	0	1	S40
S15	0	1	0	S25
S15	1	0	0	S20
S20	0	0	0	S20
S20	0	0	1	S45
S20	0	1	0	S30
S20	1	0	0	S25
S30	X	X	X	S0
S40	X	X	X	S0
S45	X	X	X	S0

current state s	inputs			nextstate s'
	nickel	dime	quarter	
0000000001	0	0	0	0000000001
0000000001	0	0	1	0000001000
0000000001	0	1	0	0000000100
0000000001	1	0	0	0000000010
0000000010	0	0	0	0000000010
0000000010	0	0	1	0000010000
0000000010	0	1	0	0000100000
0000000010	1	0	0	0000000100
0000000100	0	0	0	0000000100
0000000100	0	0	1	0010000000
0000000100	0	1	0	0001000000
0000000100	1	0	0	0000100000
0000001000	X	X	X	0000000001
0000010000	X	X	X	0000000001
0000100000	0	0	0	0000100000
0000100000	0	0	1	0100000000
0000100000	0	1	0	0000001000
0000100000	1	0	0	0001000000
0001000000	0	0	0	0001000000
0001000000	0	0	1	1000000000
0001000000	0	1	0	0000010000
0001000000	1	0	0	0000001000
0010000000	X	X	X	0000000001
0100000000	X	X	X	0000000001
1000000000	X	X	X	0000000001

$$S'_0 = S_0 \bar{N}\bar{D}\bar{Q} + S_3 + S_4 + S_7 + S_8 + S_9$$

$$S'_1 = S_0 N\bar{D}\bar{Q} + S_1 \bar{N}\bar{D}\bar{Q}$$

$$S'_2 = S_0 \bar{N}D\bar{Q} + S_1 N\bar{D}\bar{Q} + S_2 \bar{N}\bar{D}\bar{Q}$$

$$S'_3 = S_6 N\bar{D}\bar{Q} + S_5 \bar{N}D\bar{Q} + S_0 \bar{N}\bar{D}Q$$

$S'_4 = S_6 N D \bar{Q} + S_1 N \bar{D} Q$

$S'_5 = S_5 N \bar{D} \bar{Q} + S_2 N \bar{D} \bar{Q} + S_1 N D \bar{Q}$

$S'_6 = S_6 \bar{N} \bar{D} \bar{Q} + S_5 N \bar{D} \bar{Q} + S_2 \bar{N} D \bar{Q}$

$S'_7 = S_2 \bar{N} \bar{D} Q$

$S'_8 = S_5 \bar{N} D Q$

$S'_9 = S_6 \bar{N} \bar{D} Q$

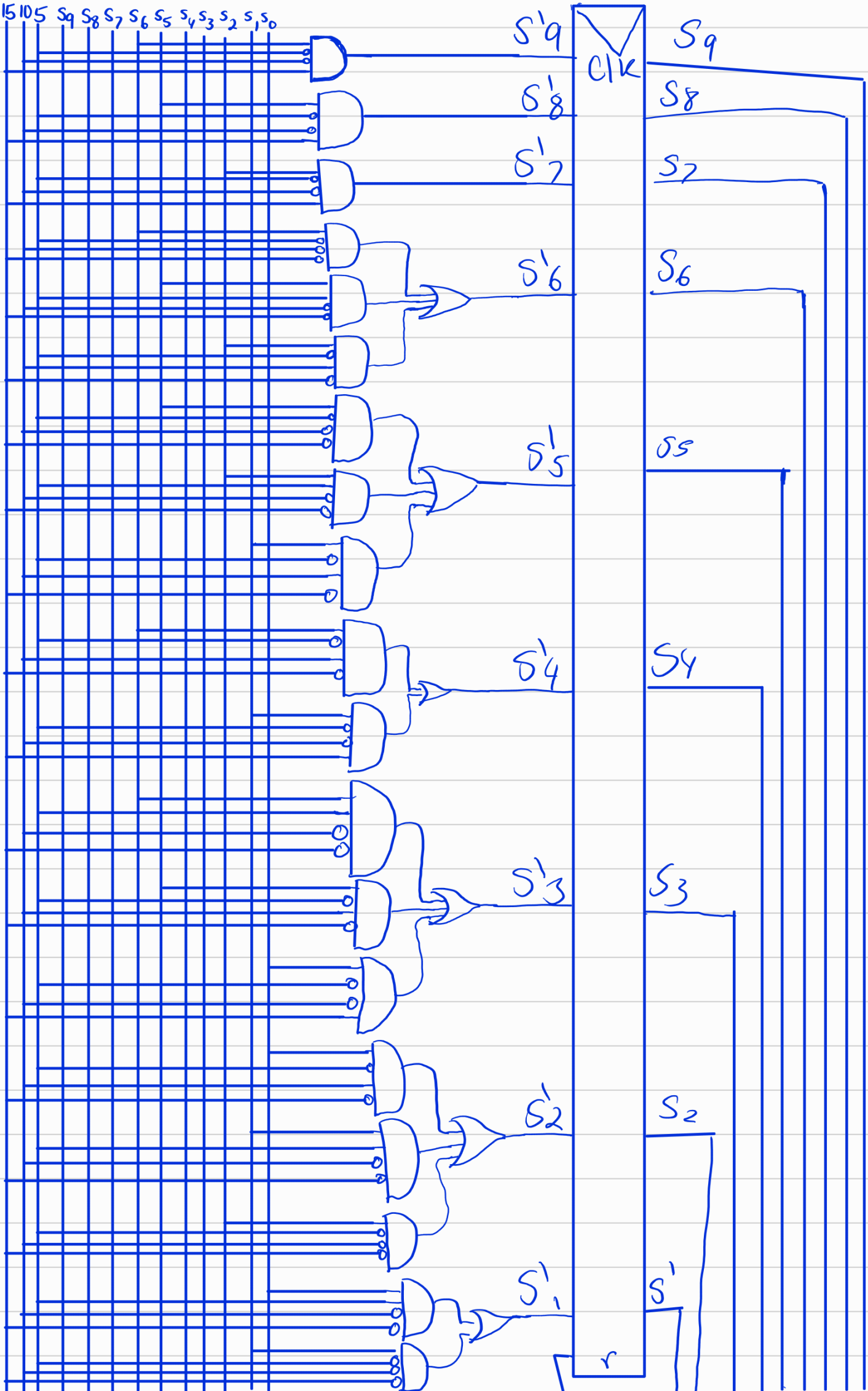
Current State	Dispense	r5	r10	r20
0000001000	1	X	X	X
0010000000	1	1	X	X
1000000000	1	X	X	1
0100000000	1	1	1	X
0000010000	1	X	1	X

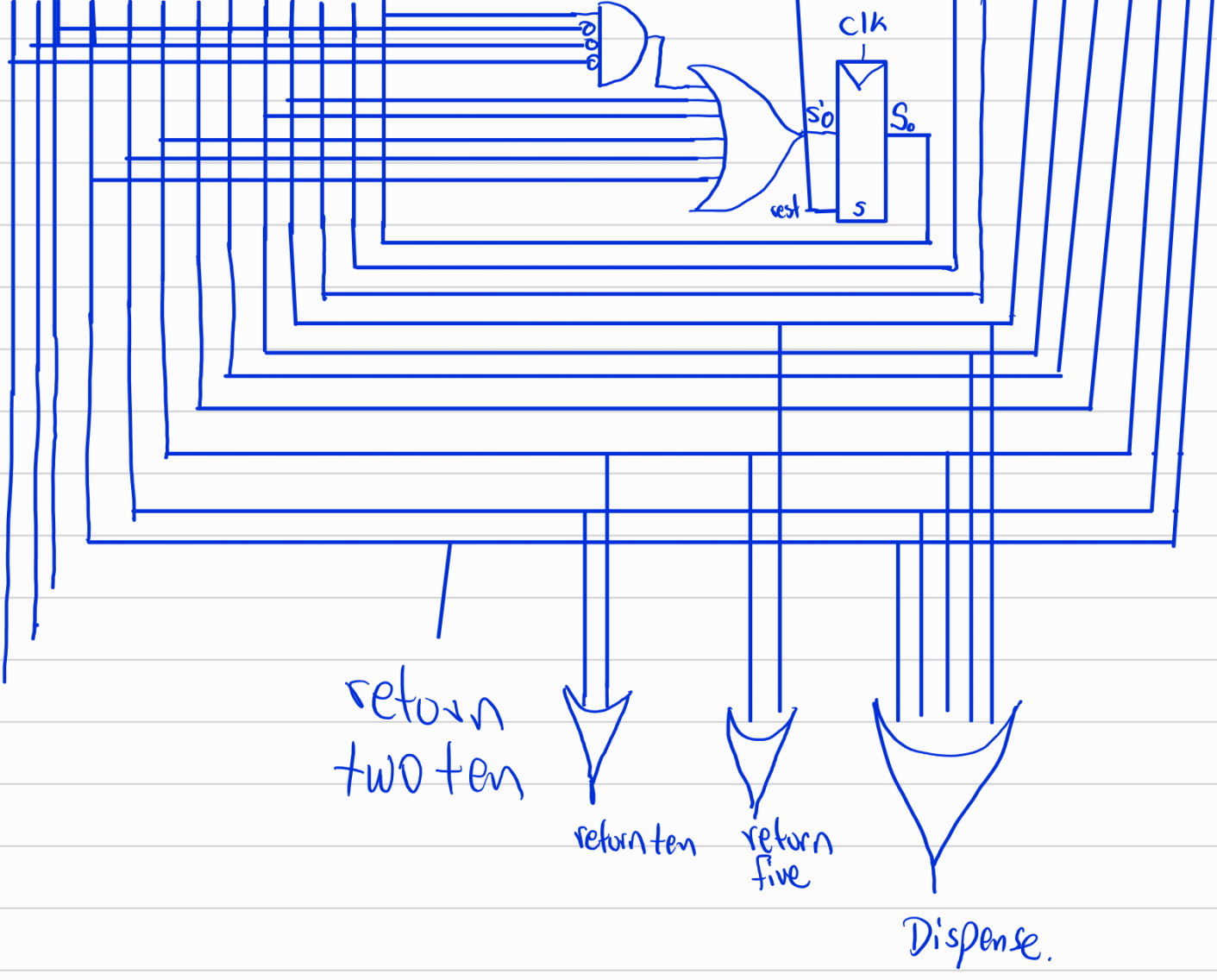
$Dispense = S_3 + S_4 + S_7 + S_8 + S_9$

$return\ five = S_4 + S_8$

$return\ ten = S_7 + S_8$

$return\ two\ ten = S_9$


15 10 5
S_9 S_8 S_7 S_6 S_5 S_4 S_3 S_2 S_1 S_0
S'_9
S'_8
S'_7
S'_6
S'_5
S'_4
S'_3
S'_2
S'_1
Clk
r
S_9
S_8
S_7
S_6
S_5
S_4
S_3
S_2
S'



return two ten

return ten

return five

Dispense.