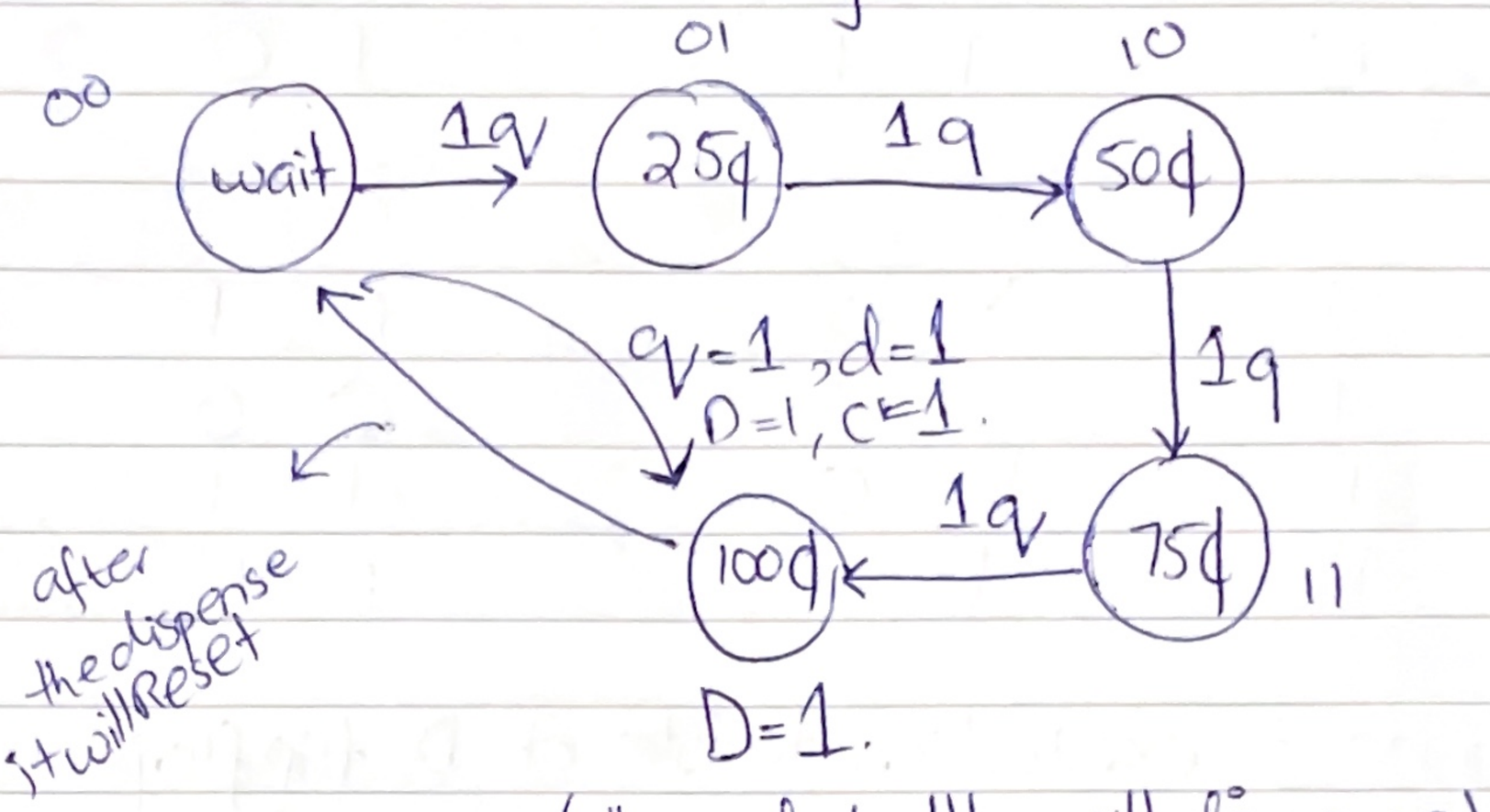
Date

Vending Machine Design.

quarter = 25 cents.

Step no. 1 state Machine Modeling.



Step no. 2 Next state table.

Present state		D		Next state		Dispense	Change
φ_1	φ_0			$\varphi_{1(n)}$	$\varphi_{0(n)}$		
0	0	0	0	0	0	0	0
0	0	0	1	0	1	0	0
0	0	1	0	0	1	0	0
0	0	1	1	0	1	0	0
0	1	0	0	0	1	0	0
0	1	0	1	1	0	0	0
0	1	1	0	0	1	0	0
0	1	1	1	0	1	0	0
1	0	0	0	1	0	0	0
1	0	0	1	1	1	0	0
1	0	1	0	1	1	0	0
1	0	1	1	1	1	0	0
1	1	0	0	1	1	0	0
1	1	0	1	0	0	1	0
1	1	1	0	1	1	0	0
1	1	1	1	1	1	0	0

Present State		D	Q	Next state		Dis change	
Q_1	Q_0						
1	0	0	0	1	0	0	0
1	0	0	1	1	1	0	0
? 1	0	1	0	1	0	0	0
? 1	0	1	1	1	0	0	0
1	1	0	0	1	1	0	0
1	1	0	1	0	0	1	0
? 1	1	1	0	1	1	0	0
? 1	1	1	1	1	1	0	0

Step no. 3 excitation table of D flipflop.

Q_n	Q_{n+1}	D
0	0	0
0	1	1
1	0	0
1	1	1

Step no: 4 kmaps.

D_0

Q_1Q_0 \ D_0Q_0	00	01	11	10
00	0	1		0
01	1	0	1	1
11	1	0	1	1
10	0	1		0

input for 1st flip flop.

$$D_0 = Q_0 D + Q_0 \overline{Q_0} + \overline{Q_0} D \overline{Q_0}$$

Date

no. of groups minimize.

input for the second flip flop.

D_1

Q_1Q_0	00	01	11	10
00	0	0	0	0
01	0	1	0	0
11	1	0	1	1
10	1	1	1	1

$D_1 \Rightarrow Q_1 D_{ollar} + Q_1 \cdot \overline{Q_{quater}} + Q_1 \cdot \overline{Q_0} + \overline{Q_1} \cdot Q_0 \cdot D_{ollar} \cdot Q_q$

$Change \Rightarrow \overline{Q_1} \cdot \overline{Q_0} \cdot Dollar \cdot Q_q$

Discharge Dollar Q_q

Q_1Q_0	00	01	11	10
00	0	0	1	1
01	0	1	0	0
11	0	0	0	0
10	0	0	0	0

Dispense.

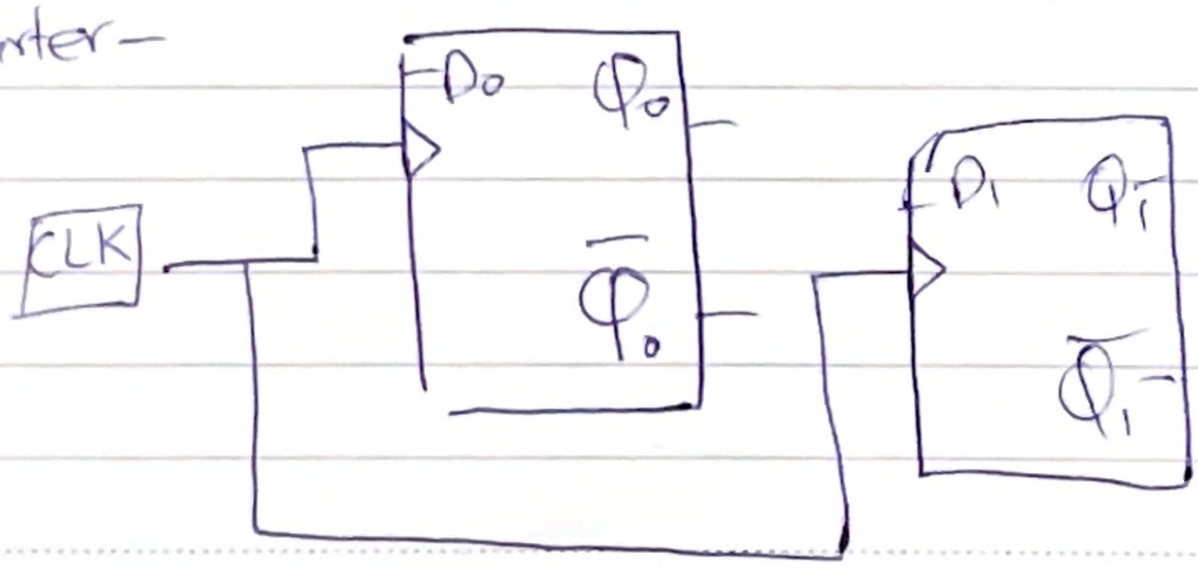
$Discharge = Q_1 \cdot Q_0 \cdot \overline{D_{ollar}} \cdot Q_q$

$+$

$\overline{Q_1} \cdot \overline{Q_0} \cdot Dolla.$

Dollar –

Quarter –



Now use All the equation to complete the circuit diagram.