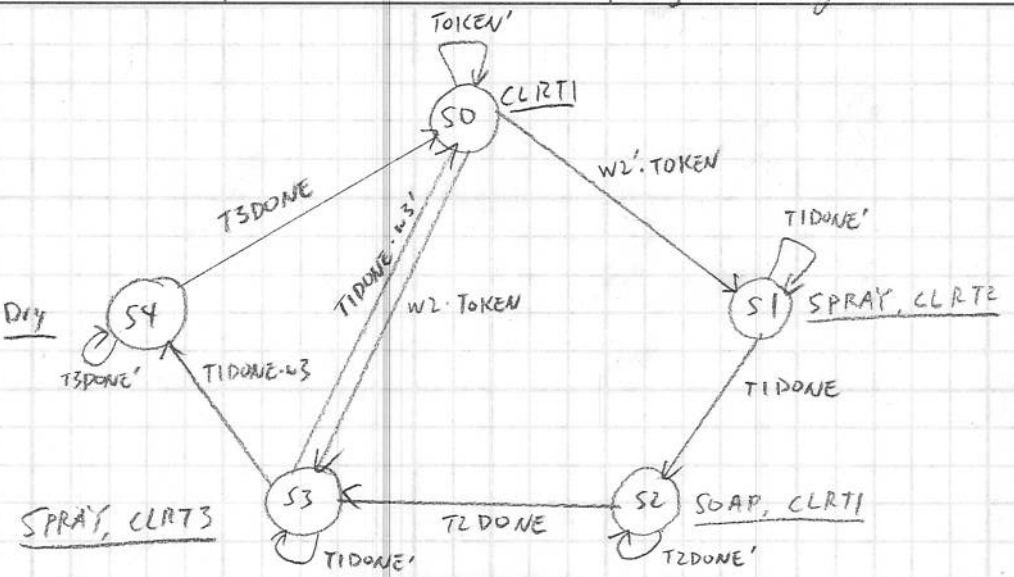
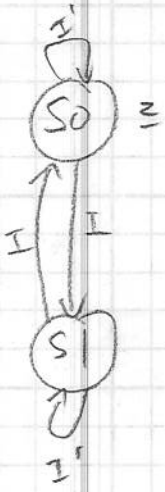
16.1



Assume there are 3 buttons (w1 = rinse w2 = rinse soap rinse w3 = w2 + Dry)
The user won't push any buttons during the wash.

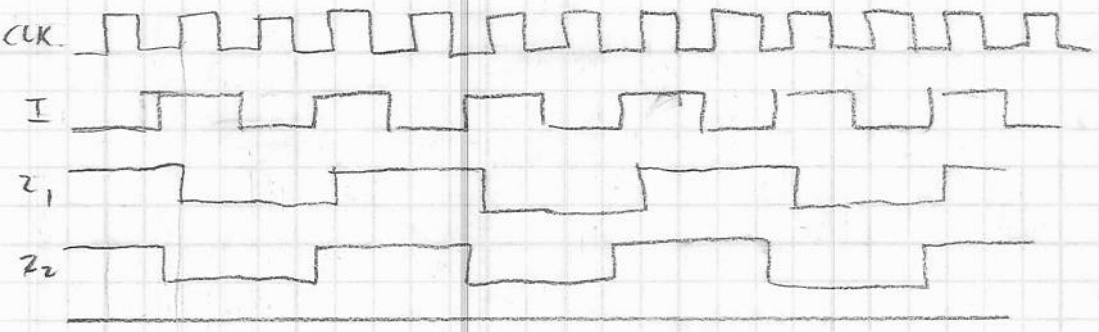
16.2

INPUT : I
OUTPUT : Z

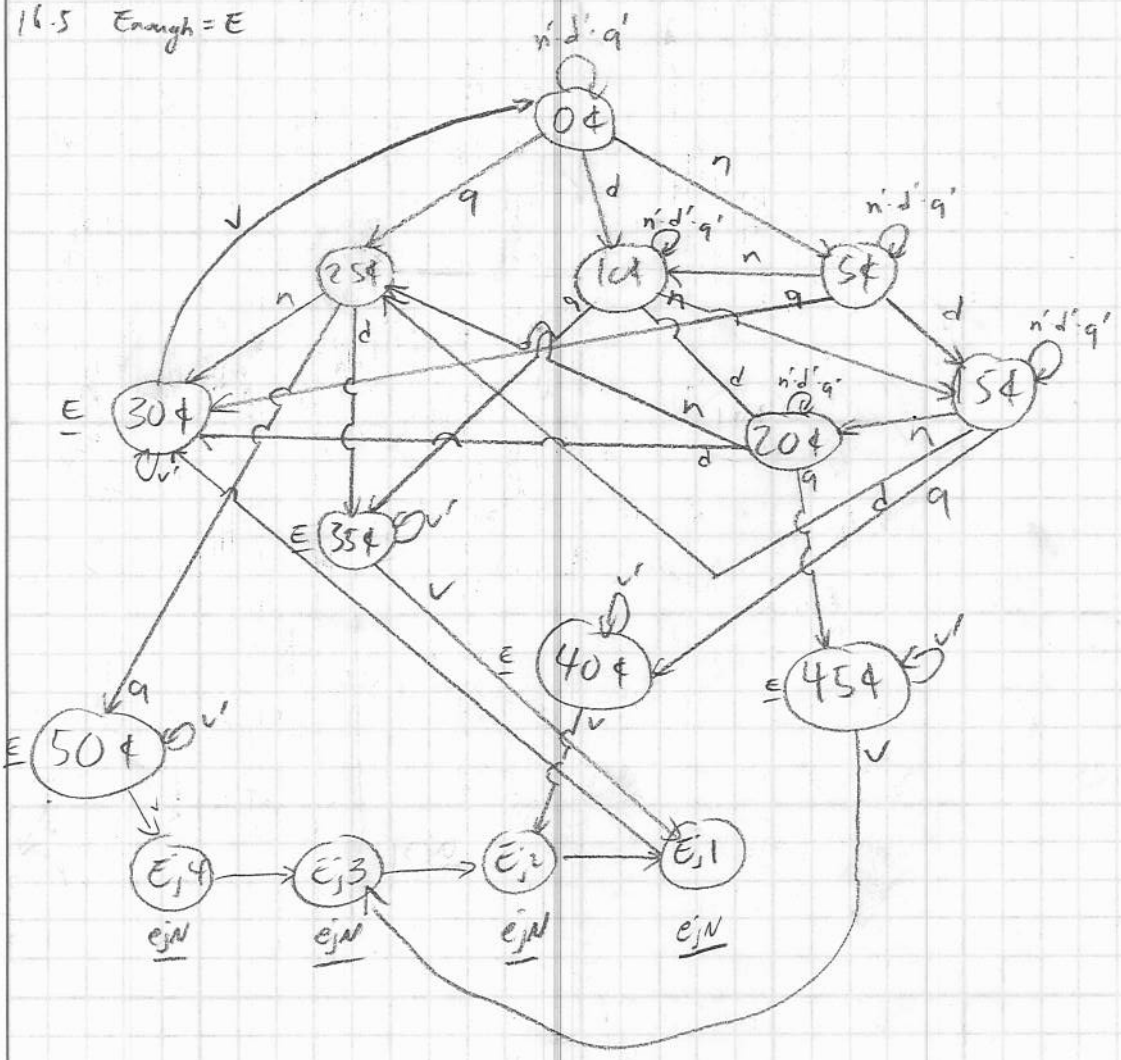


16.3

16.4 $Z_1 = 16.2$
$Z_2 = 16.3$

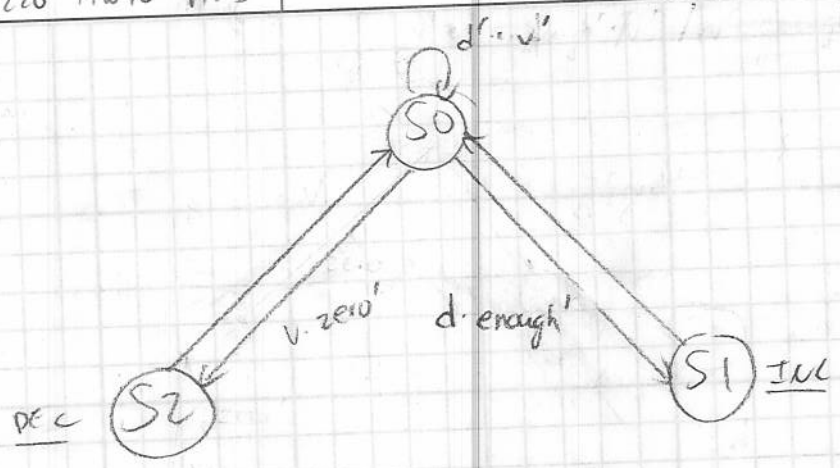


16.5 Enough = E



All states below 30¢ remains in the same state until more input comes in. Since only 1 input can come in at a time there doesn't have to be redundancies.
All states above 30¢ remains in the same state until V is inputed.
No coin inputs can come in once Enough is asserted. So no need to account for those inputs in states more than 30¢.

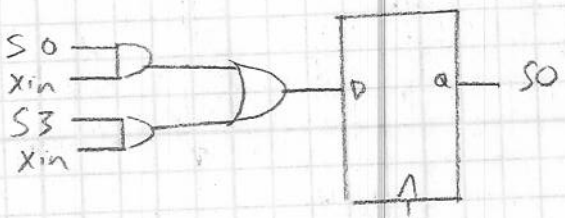
16.6

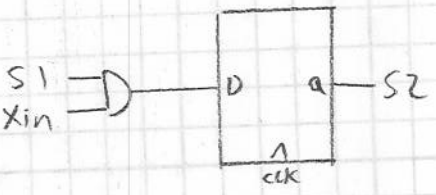


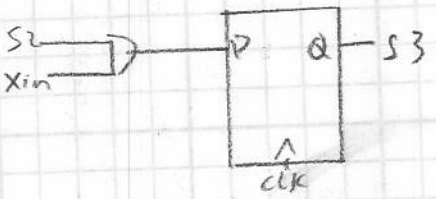
Assume the vend button won't be pushed until there's enough money.
Assume the d input remains high until sampled
Assume v goes low when the accumulator is at 0 (v·zero will never happen)
Assume dimes can't be put in while there is 30¢ in the machine
(d·enough will never happen)

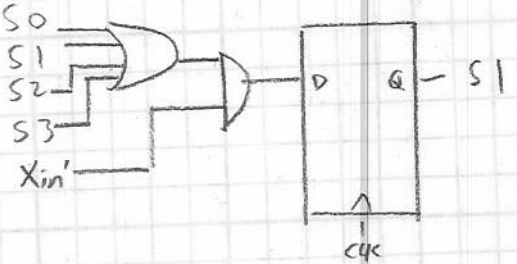
17.1

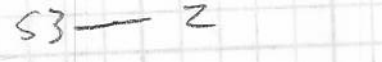
$$NS0 = S0 \cdot Xin + S3 \cdot Xin$$
$$NS1 = 'S0 \cdot Xin' + S1 \cdot Xin' + S3 \cdot Xin' + S2 \cdot Xin'$$
$$= Xin'(S0 + S1 + S2 + S3)$$
$$NS2 = S1 \cdot Xin$$
$$NS3 = S2 \cdot Xin$$
$$Z = S3$$











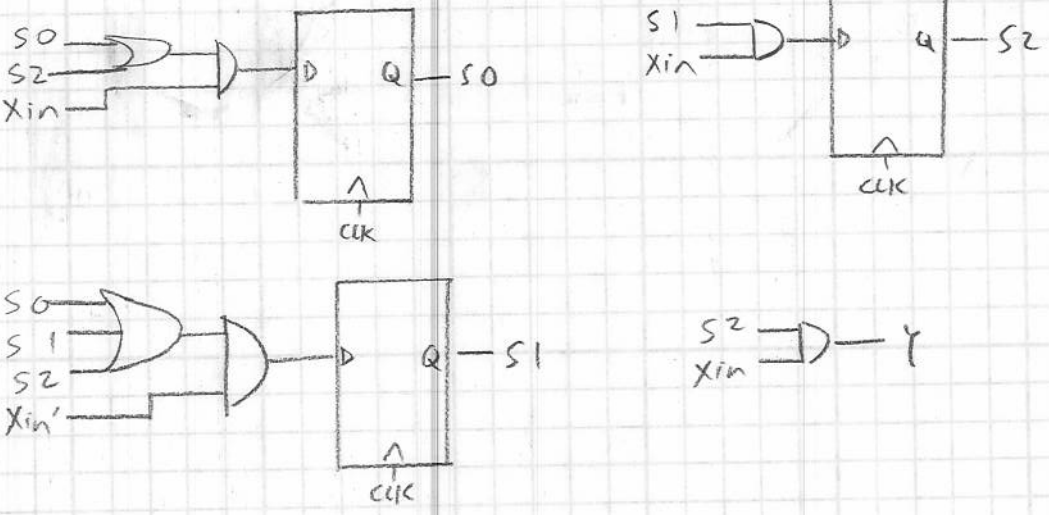
17.2

$NS0 = S0 \cdot Xin + S2 \cdot Xin = Xin(S0 + S2)$

$NS1 = S0 \cdot Xin' + S1 \cdot Xin' + S2 \cdot Xin'$
$= Xin'(S0 + S1 + S2)$

$NS2 = S1 \cdot Xin$

$Y = S2 \cdot Xin$



Cascaded Counters.