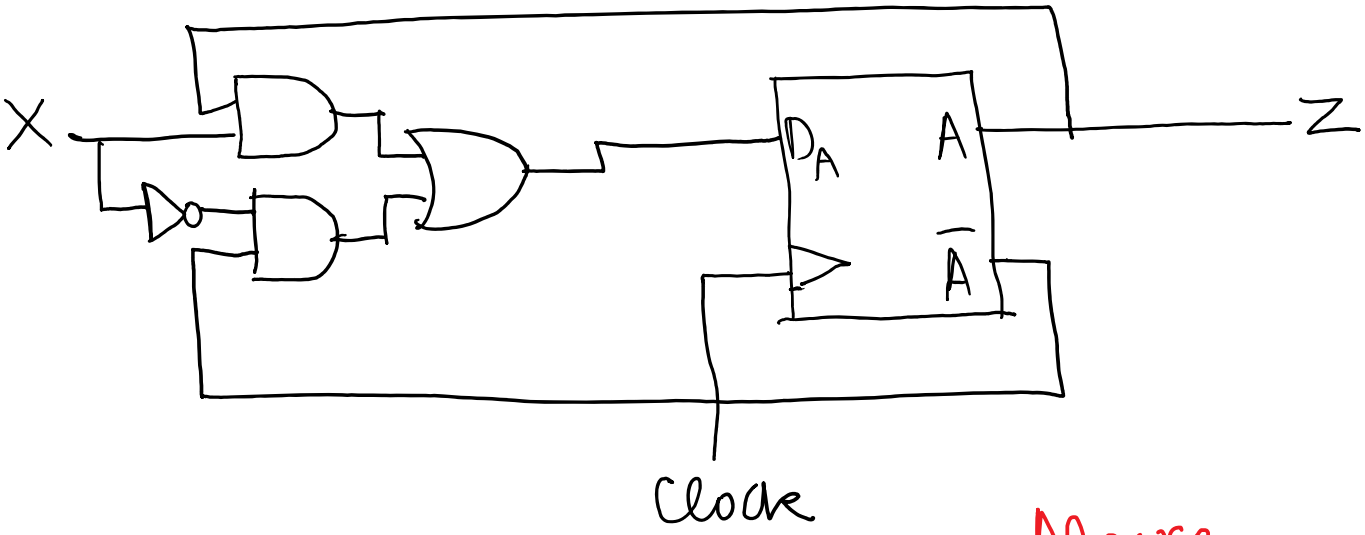
MT2 Solutions ECE2060 Sp 2022

Problem 1 (30 points): Consider the circuit in the figure below.

i) Is this a Mele or Moore machine?

ii) Draw the state graph corresponding to this circuit



$$D_A = AX + \bar{A}\bar{X}$$

$$Z = A$$

Moore Machine

Output does not depend on input

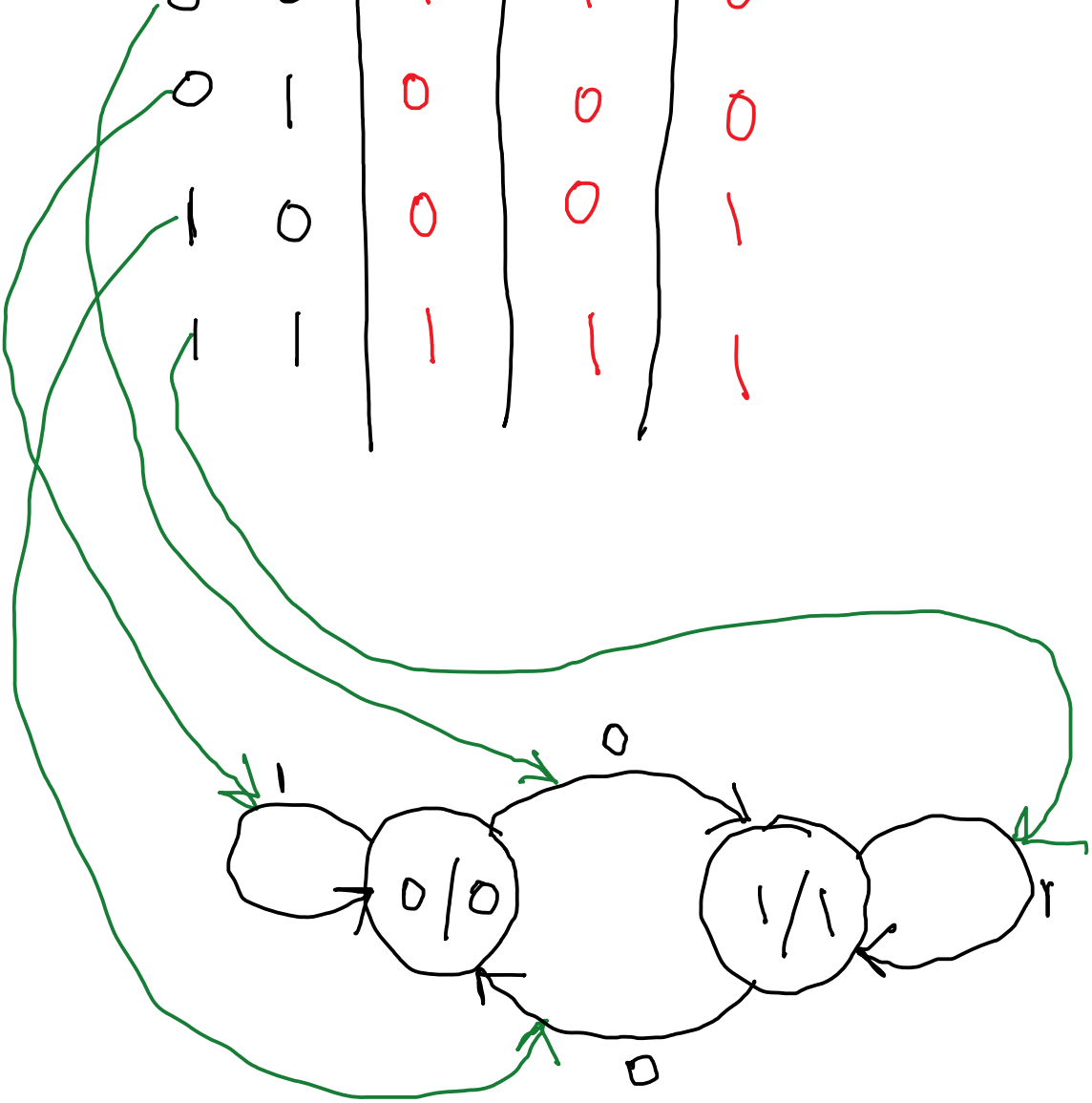
Space for Problem 1 solution ….

$D_A = A X + \bar{A}\,\bar{X}$

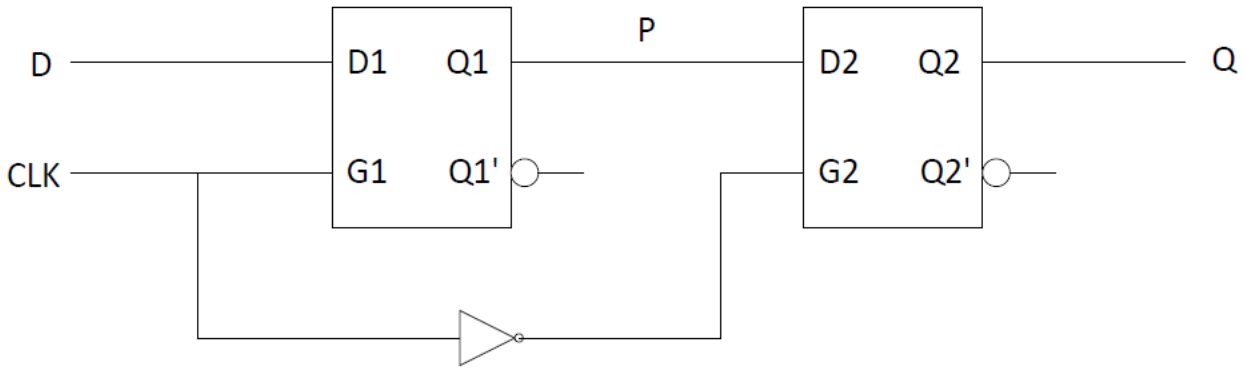
$A^+ = D_A$

$Z = A$

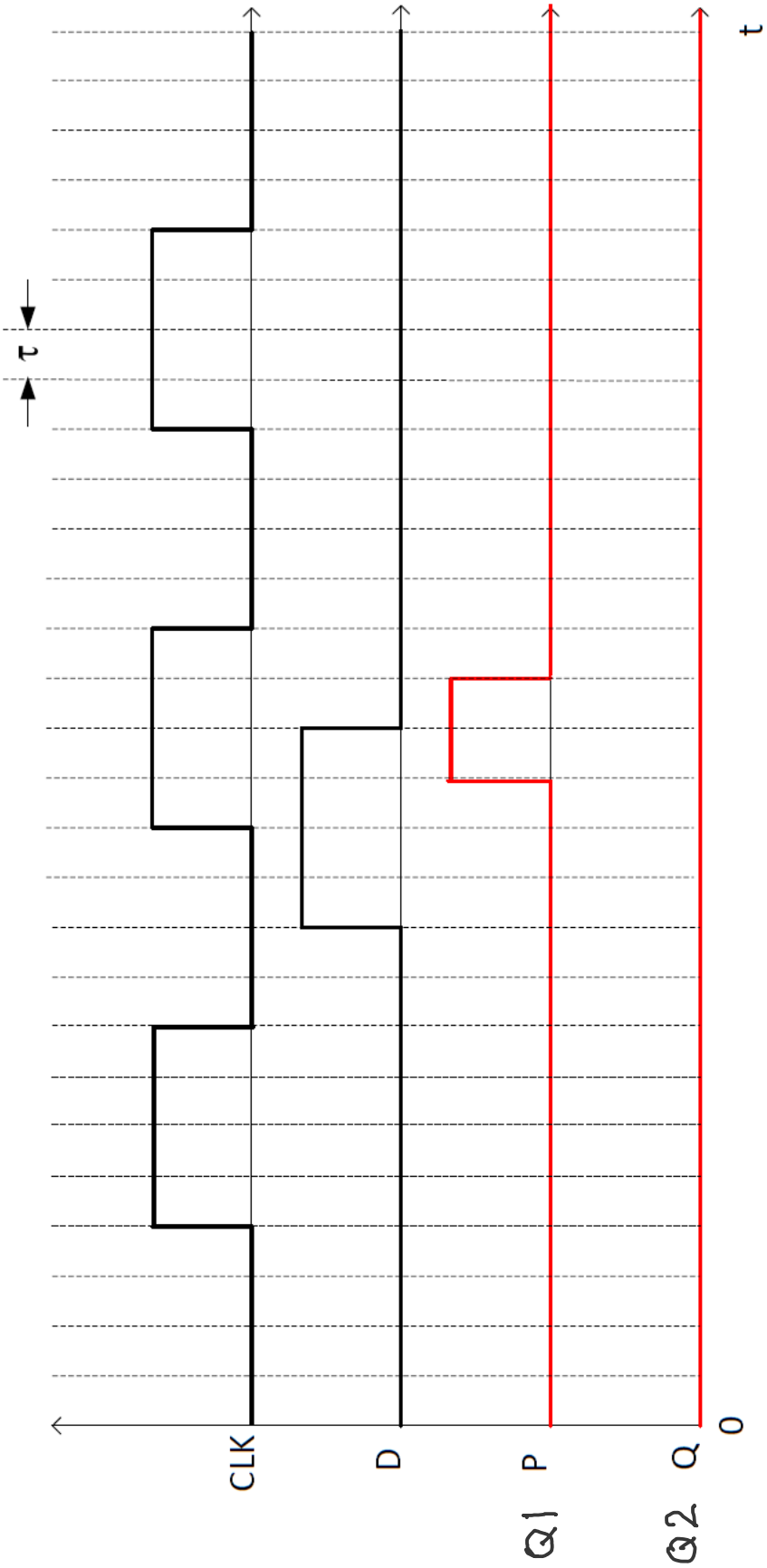
A	X	D_A	A^+	Z
0	0	1	1	0
0	1	0	0	0
1	0	0	0	1
1	1	1	1	1



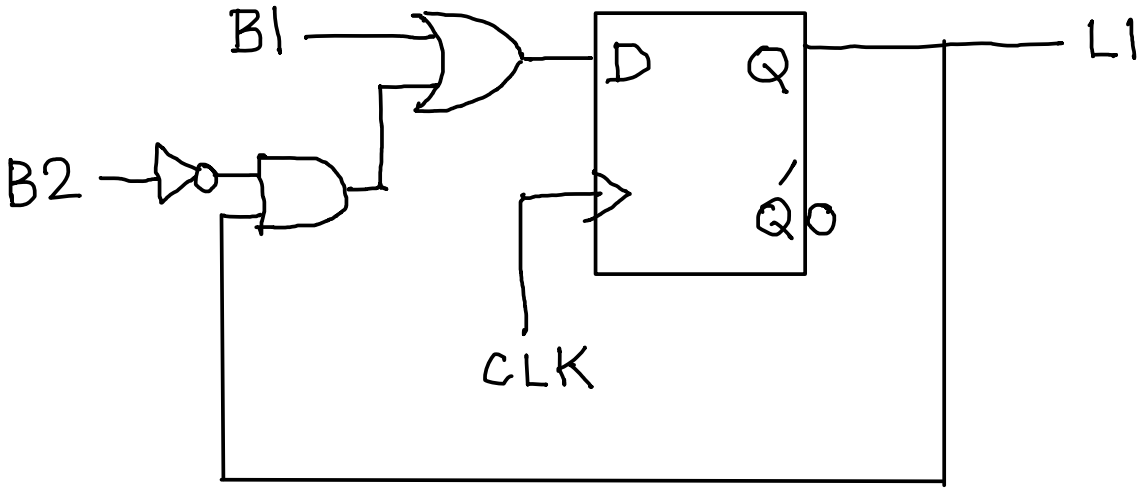
Problem 2 (35 points): Consider the circuit in the figure below containing two **gated D latches**. Given the timing diagrams of CLK and D in the graph on the next page, complete the timing diagrams for Q1 and Q2. Consider that the latches have a delay of τ and the not-gate has zero delay. Assume that Q1 = 0 at t = 0.
Note: The two components in this circuit are **Gated D-Latches**, not D Flip-Flops.



Space for Problem 2 solution ….



Problem 3 (35 points): Consider the circuit in the figure below containing a D Flip-Flop. Given the timing diagrams of CLK, B1 and B2 in the graph given on the next page, complete the timing diagrams for D and Q. Consider that the Flip-Flop has a delay of τ and the gates have zero delay. Assume Q = 0 at t = 0.



Easear to do the timing diagram by figuring out the state table first

$D = B1 + \overline{B2} \cdot Q$

$Q^+ = D$

$L1 = Q$

$\overline{B1 + B2}$

Q	B1	B2	D	Q^+	L1
0	0	0	0	0	0
0	0	1	0	0	0
0	1	0	1	1	0
0	1	1	1	1	0
1	0	0	1	1	1
1	0	1	0	0	1
1	1	0	1	1	1
1	1	1	1	1	1

Space for Problem 3 solution ….