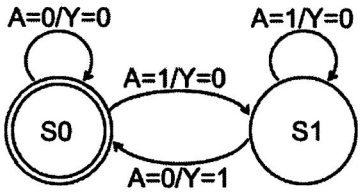
This page is left intentionally blank and can be used for scratch work.

Consider the following sequential machine with input A, output Y, and two states S1 and S0.



(a) If you encode these 2 states with a single state variable, Q, where Q=1 corresponds to S1 and Q=0 corresponds to S0. Write **down Boolean equations** for next state (Q_{next}), and output Y as function of the inputs (Q and A). Show your work (i.e. with a truth table).

A	Q	Y	Q_{next}	
0	0	0	0	
0	1	1	0	} Y=1 when A=0 and Q=1.
1	0	0	1	} Q_{next}=1 when A=1.
1	1	0	1	

Q_{next} = A

Y = ¬A ^ Q

(b) Explain in one sentence why this is a Mealy Finite State Machine.

The output Y depends not only on the current state Q but also directly on the input A, and Y is labeled on the state diagram's transitions (arrows).

(c) Explain in one or two sentences what this circuit does (functionality) in a brief high level description (for instance, when and under what conditions is the output asserted 1'b1 in relation to the input)

The output Y is asserted when the input A changes from 1 to 0.

(d) You are to change this from a Mealy to a Moore FSM maintaining the functionality but not the timing of the output. Draw the new state diagram.