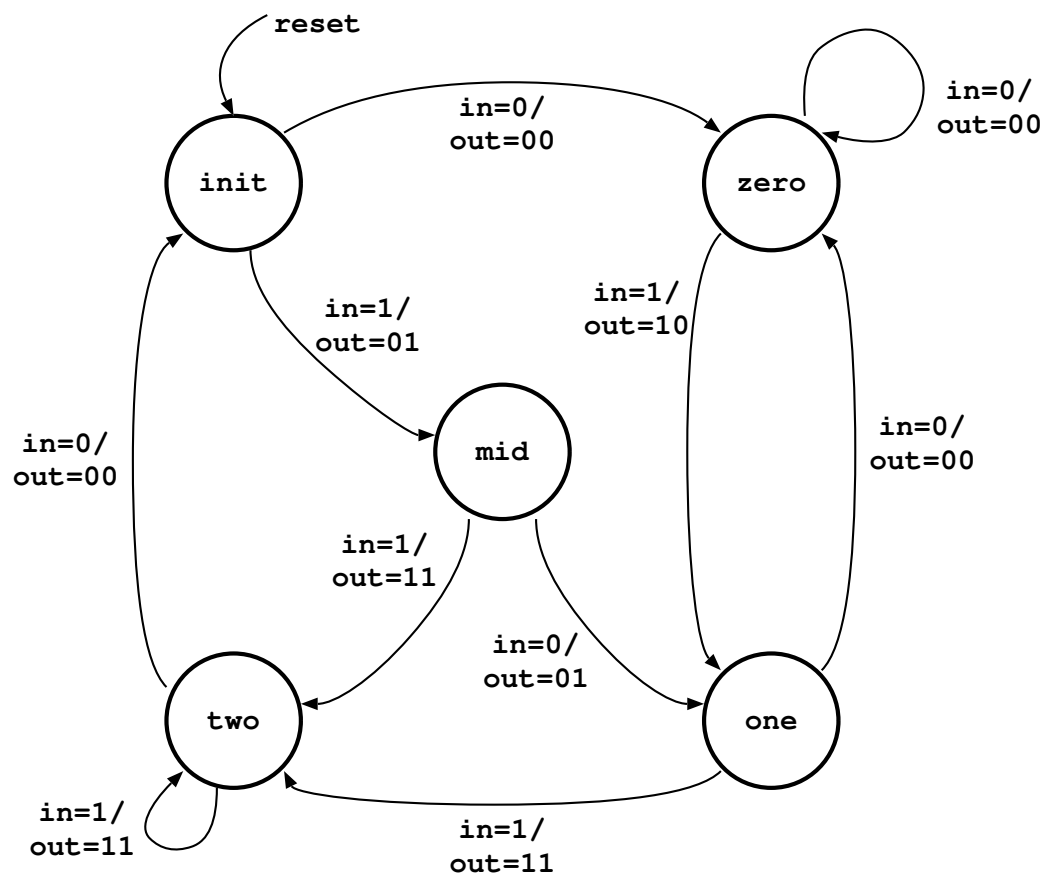


3. In this question you will be given the state transition diagram for a Finite State Machine (FSM). The FSM has a two-bit output "out [1:0]" as well as a single bit input "in".



- (a) (2 points) Is this a Mealy or Moore type of FSM, briefly explain why?

Solution: This is a Mealy type of FSM, as the output depends not only on the state but also on the present value of the input.

- (b) (5 points) Using the following state encoding table, complete the state transition and output table on the following page.

State	Encoding		
Name	S_2	S_1	S_0
init	1	1	1
mid	1	0	0
zero	0	0	0
one	0	0	1
two	0	1	0

Present State			Input	Next State			Outputs	
P_2	P_1	P_0	in	N_2	N_1	N_0	out_1	out_0
1	1	1	0	0	0	0	0	0
1	1	1	1	1	0	0	0	1
1	0	0	0	0	0	1	0	1
1	0	0	1	0	1	0	1	1
0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	1	1	0
0	0	1	0	0	0	0	0	0
0	0	1	1	0	1	0	1	1
0	1	0	0	1	1	1	0	0
0	1	0	1	0	1	0	1	1

- (c) (5 points) Draw a new state transition diagram for this FSM using a different type (if the original was a Moore, then draw a Mealy type or vice versa) that has the same functionality.

Solution: This is one possible solution. Note that states ZeroA and ZeroB can be merged, however this organization is slightly more regular, and shows the thinking behind the original FSM.

