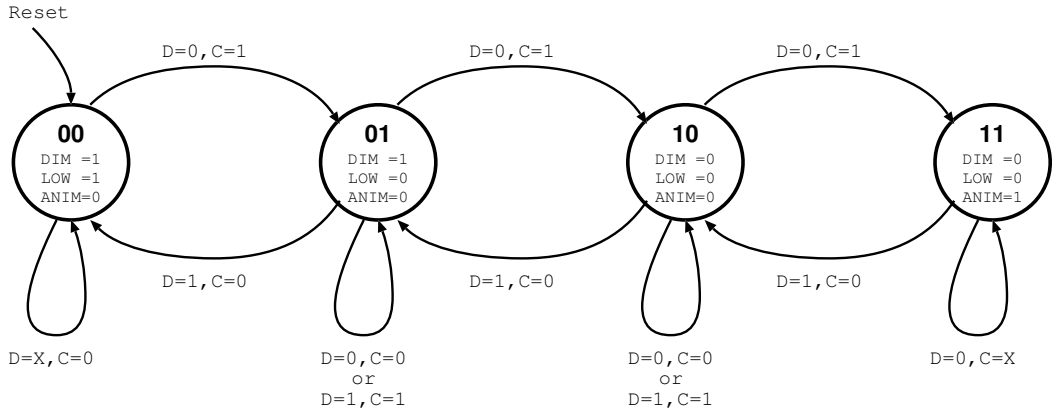
3. In this question you will be asked to draw design the FSM for a power saving control module of a mobile device.

   (a) (4 points) We want to design the power saving control module of a mobile device.

   - There are two inputs: C (charging) and D (discharging)
   - There are four power levels (0,1,2,3) for the device
   - When both inputs (C, D) are the same the power level does not change
   - When only C is active, power level increases until the last level (3) is reached
   - When only D is active, power level decreases until the lowest level (0) is reached
   - There are 3 outputs: DIM (dimmer), LOW (low power), $ANIM$ (animations)
   - DIM is active at power level 1 or lower
   - LOW is active at power level 0 only and signals that we are at low power
   - $ANIM$ is active at power level 3 only and enables power hungry animations on the device
   - the reset state corresponds to power level 2.

   Draw the State Transition Diagram for a Moore type FSM that implements this state machine

Solution:



(b) (4 points) Using the State Transition Diagram, complete the following table for both State Transitions and the outputs.

Present State	**Inputs**		**Next State**	**Outputs**		
name	C	D	name	DIM	LOW	$ANIM$
00	0	X	00	1	1	0
00	1	0	01	1	1	0
00	1	1	00	1	1	0
01	0	0	01	1	0	0
01	0	1	00	1	0	0
01	1	0	10	1	0	0
01	1	1	01	1	0	0
10	0	0	10	0	0	0
10	0	1	01	0	0	0
10	1	0	11	0	0	0
10	1	1	10	0	0	0
11	0	0	11	0	0	1
11	0	1	10	0	0	1
11	1	X	11	0	0	1