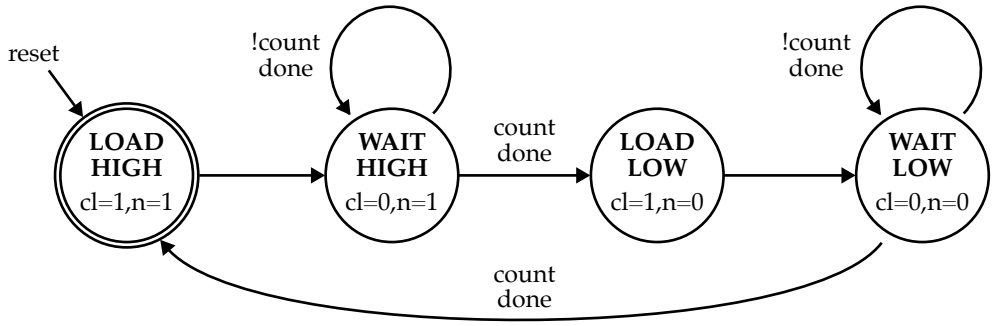
ECE 2300 Digital Logic and Computer Organization, Fall 2026

Lab 3C: Worksheet

Note Player FSM Next State and Output Table

The FSM and and encoding for the note player are shown below.



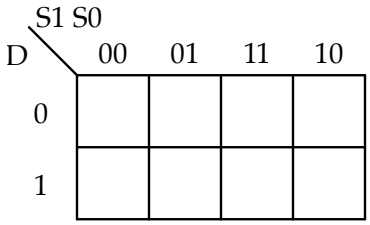
State	Encoding
LOAD_HIGH	2'b00
WAIT_HIGH	2'b01
LOAD_LOW	2'b10
WAIT_LOW	2'b11

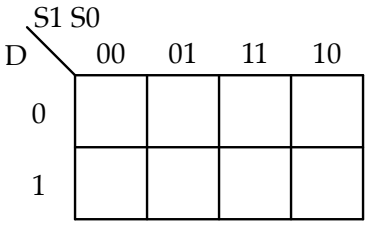
Fill in the following FSM next state and output table for the note player. done is the count done input. cl is the count load output. n is the note output.

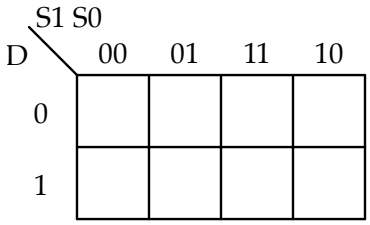
$S1$	$S0$	**done**	$S1_{next}$	$S0_{next}$	**cl**	**n**
0	0	0				
0	0	1				
0	1	0				
0	1	1				
1	0	0				
1	0	1				
1	1	0				
1	1	1				

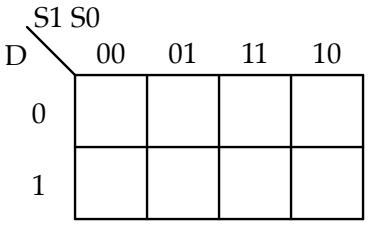
Note Player FSM Next State and Output Equations

Complete the Karnaugh maps below to derive a minimal sum-of-products (SOP) Boolean equation for each output. Each circle in your Karnaugh map must correspond exactly to the products in the minimal sum-of-products equation. **Label each circle with the corresponding product and write the final minimal SOP equation.**



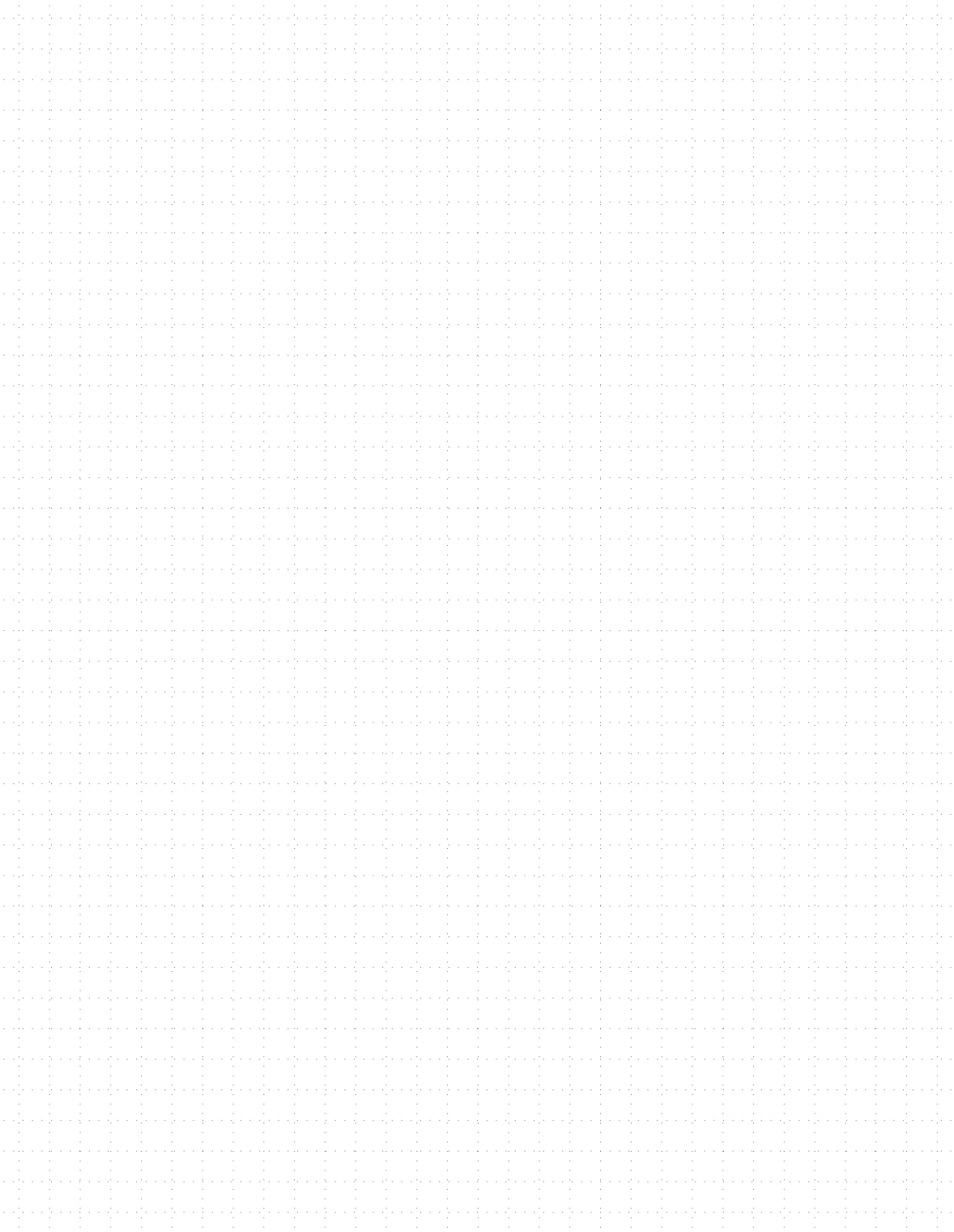






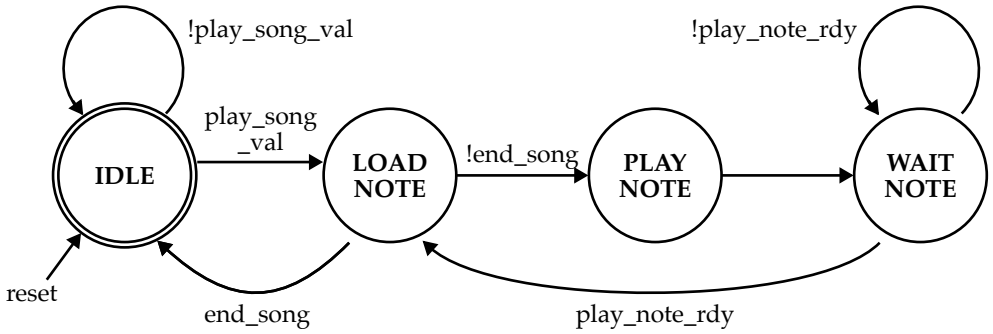
Note Player FSM Gate-Level Implementation

Draw the gate-level implementation of this FSM.



Music Player FSM Next State and Output Table

The FSM and and encoding for the music player control unit are shown below.



State	Encoding
IDLE	2'b00
LOAD_NOTE	2'b01
PLAY_NTOE	2'b10
WAIT_NOTE	2'b11

Fill in the following FSM next state table for the music player control unit. There are four states and three input signals. This means the truth table would have 32 rows. To make the truth table more compact, use don't cares for the inputs when that input does not impact the corresponding state transition.

state	play_song _val	play_note _rdy	end_song	next state

Fill in the following FSM output table for the music player control unit.

	play song rdy	mem val	play note val	addr ctr en	addr ctr load	note num reg en
IDLE						
LOAD_NOTE						
PLAY_NOTE						
WAIT_NOTE						