

(10 pts) Approx. 2 days




The final part of our unit is about Programmable Logic Devices (PLDs). PLDs are used to create complex digital circuits in a small and compact way. Similar to an Arduino – which has multiple pins and can be programmed to work exactly how we want – a PLD can be used in a breadboard and each of the 48 pins can be assigned a different job (input or output) as needed. One of the great things about PLDs is that many of them like our CMOD S6 chips can be programmed from right inside Multisim. In this part of the unit, you’ll learn how to use PLDs and even use them to simplify your Birthday Problem.

1. **PLD Notes:** Take some time to watch the *PLD Overview* and *Example of using PLD Mode in Multisim* videos. Take a full page of notes on what the CMOD S6 PLD chip can do and what tools you’ll need to use in Multisim to get things working.

Super Secret Bonus: Watch the Super Secret Bonus Logic Converter Tutorial for fun Multisim Pro-tips. It’ll be 4 minutes well spent!

2. **Simple PLD Tutorial:** Get the PLD Tutorial handout and follow the directions to get your first PLD circuit built and uploaded to the PLD. Then, breadboard it as shown (very simple) and confirm that it works as expected. Once that’s done, it’s not too big of a step to reprogram it with multiple inputs (maybe 3) and multiple outputs (how about 7?) so that your Birthday Problem circuit can run off the CMOD chip.
3. **PLD Birthday Problem:** Finally, make a new PLD file that contains 3 inputs and 7 outputs. Copy your birthday problem circuit into the PLD mode. Some people are successful with literally copy-pasting their circuit... other students have been more successful rebuilding the circuit within the PLD mode. Either way should work.

Upload your circuit and get your CMOD chip wired into the breadboard. You should only have to connect 1 wire to the power pin, 1 wire to the ground pin, 3 wires from switches to the input pins, and 7 wires to the display segments. In theory, it’s much simpler! Confirm that it works as intended.

Part 3: Tasks	2 points	1 point	0 points
 PLD Notes	+ You took a full page of notes on the CMOD S6 chip + Your notes include some details about what Multisim tools we’ll use in PLD Mode	- Your notes are missing important elements	- Your notes are missing many parts - You took no notes
 Simple PLD Tutorial	+ You followed the simple PLD Tutorial to get your PLD to turn a light on and off using two switches	- N/A	- You did not complete the PLD Tutorial
	5 points	4-2 points	1-0 points
 PLD Birthday Problem	+ You created a PLD file and copied your birthday problem circuit components into the PLD file + You got your birthday problem uploaded to the PLD + You got the PLD breadboarded and the birthday problem working again	- You got things copied in but did not connect inputs/outputs - You did not get the breadboarding together after uploading your design	- You did not complete the birthday problem with the PLD

