

Can permission bypass enable?

Name / group: _____ Date: _____

Your task: implement Y so that it is on only when E is on and at least one of A or B is on. This is a teaching circuit. Use E = SW2, A = SW1, B = SW0 and Y = LEDR0. LEDs 3, 2 and 1 mirror E, A and B.

Use the DE1-SoC Verilog profile, file `leds_mirror.v` and module `leds_mirror`. Start from `student-starter.v`. Replace the constant assigned to LEDR0 with your expression.

Before using the board

Complete the prediction column and explain the roles of E and the permission inputs. Keep your original prediction if you revise it later.

E	A	B	Predicted Y	Observed Y	Mismatch / note
0	0	0			
0	0	1			
0	1	0			
0	1	1			
1	0	0			
1	0	1			
1	1	0			
1	1	1			

My explanation:

Build and collect evidence

1. Synthesize, resolve errors and Upload to FPGA. Record the final code version or filename.
2. Set all three inputs explicitly for every row. Wait for a stable camera view and record Y (lit = 1).
3. Capture EAB = 001 and one row assigned by your teacher from 101, 110 and 111. Caption each with input settings, Y, diagnostic LEDs and code version.
4. Vary an unused switch with EAB fixed. Record the setting and whether Y changed.

If you cannot read or access the camera, record the issue. Do not fill the observation column with predictions.

Challenge and submission

A classmate proposes $Y = (E \text{ AND } A) \text{ OR } B$. Find a row that distinguishes it from the requirement. Explain why testing only 111 is insufficient.

Submit your source, completed table, two labeled captures and the counterexample explanation. Distinguish physical observations from any local simulation.

Marking · 16 points

Four points each for requirement/predictions, implementation, hardware evidence, and debugging explanation. In each: 4 = complete and correct; 3 = minor omission; 2 = substantial but incomplete; 1 = minimal relevant evidence; 0 = no evidence. Hardware evidence remains pending if access fails and you document it.