**ECE 3300L**

**California State Polytechnic University, Pomona**

**Group G**

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**Lab Report #3**

**07/2/2025**

**Explanation of Code:**

In this lab, we created a 16-to-1 multiplexer system using Verilog. The goal was to control the selection of one out of 16 slide switch inputs using four pushbuttons configured as toggle switches. The core functionality of the code was split between two key Verilog modules: toggle\_switch.v and top\_mux\_lab3.v. The toggle\_switch module takes a raw pushbutton input and converts it to a stable toggle signal. A debounce submodule filters out the mechanical noise from the button press, making sure that only clean, rising-edge transitions trigger a change. Internally, the toggle logic flips a one-bit state signal if a valid press is detected. This signal acts like a memory element that changes on each button press, which stores either a 0 or 1. In the top\_mux\_lab3 module, four toggle\_switch instances are used, one for each of the directional buttons. Their outputs form a 4-bit select line for a 16-to-1 multiplexer. The multiplexer chooses one of the 16 input values from the slide switches based on the current toggle states. The selected value is then sent to a single output LED (LED0), which shows the selected switch input.

**Mux2x1:**

**A screenshot of a computer program

AI-generated content may be incorrect.**

**Mux16x1:**

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AI-generated content may be incorrect.**

**Toggle\_switch:**

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**Debounce:**

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**Top\_mux\_lab3:**

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**Tb\_top\_mux\_lab3:**

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**A screenshot of a computer program

AI-generated content may be incorrect.**

**A screenshot of a computer code

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**Simulation Waveform:**

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**Vivado Utilizations:**

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AI-generated content may be incorrect.**

**Contributions:**

Source files were given and both contributed to the lab report

Nathaniel: testbench code and demo

Mikael: xdc file and simulation