

**ECE 3300L**

**Lab Report #7**

**Group E**

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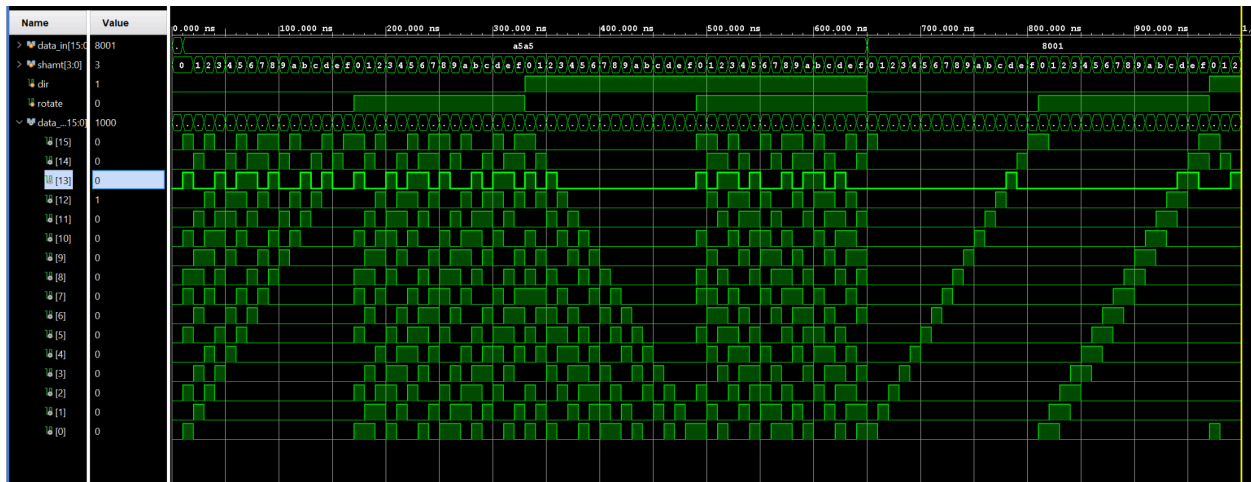
August 06, 2025

### **Design:**

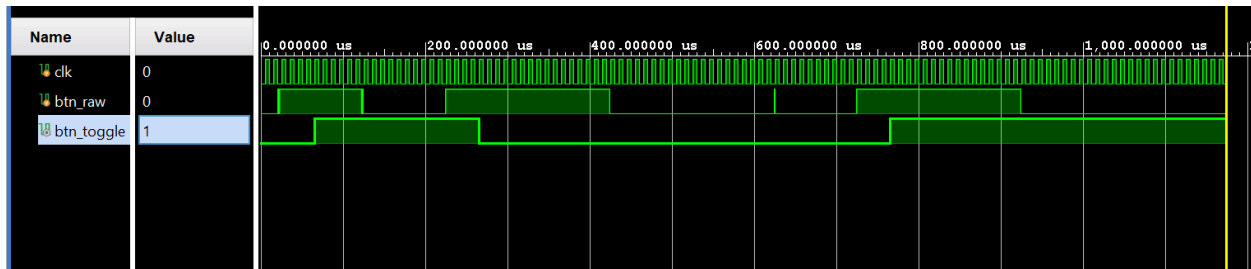
- a) clock\_divider\_fixed.v – Divides 100 MHz into 1 kHz for display scanning and 2 Hz for demo using cascaded counters.
- b) debounce\_toggle.v – Debounces a button at 1 kHz and toggles output on each clean press.
- c) shamt.v – 2-bit counter that increments on each debounced BTNC press to generate shamt[3:2].
- d) barrel\_shifter16.v – Performs logical or rotate left/right shifts on a 16-bit input in one cycle based on dir, rotate, and shamt.
- e) hex\_to\_7seg.v – Converts a 4-bit value to a 7-segment display pattern.
- f) seg7\_scan8.v – Cycles through 8 digits at 1 kHz, outputting the active-low digit enable and segment pattern.
- g) top\_lab7.v – Integrates all modules to read switches/buttons, shift the input, and display the result with debug LEDs.

Simulation:

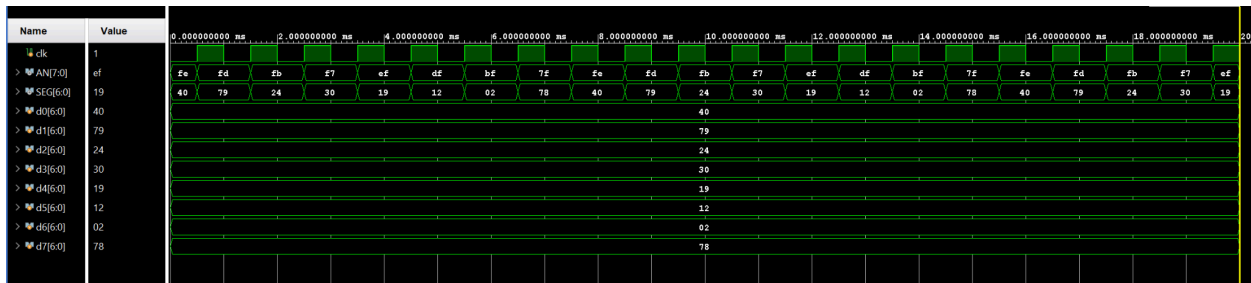
barrel\_shifter16\_tb:



debounce\_toggle\_tb:



seg7\_scan8\_tb:



### **Implementation:**

Site Type	Used	Fixed	Prohibited	Available	Util%
Slice LUTs*	33	0	0	63400	0.05
LUT as Logic	33	0	0	63400	0.05
LUT as Memory	0	0	0	19000	0.00
Slice Registers	67	0	0	126800	0.05
Register as Flip Flop	67	0	0	126800	0.05
Register as Latch	0	0	0	126800	0.00
F7 Muxes	0	0	0	31700	0.00
F8 Muxes	0	0	0	15850	0.00

### **Contributions:**

Paul Kim - Source Codes, Testbench, Simulation - 50% contribution

Winson Zhu - Source Codes, Implementation, Hardware Demo - 50% contribution