

COL215P: ASSIGNMENT 5

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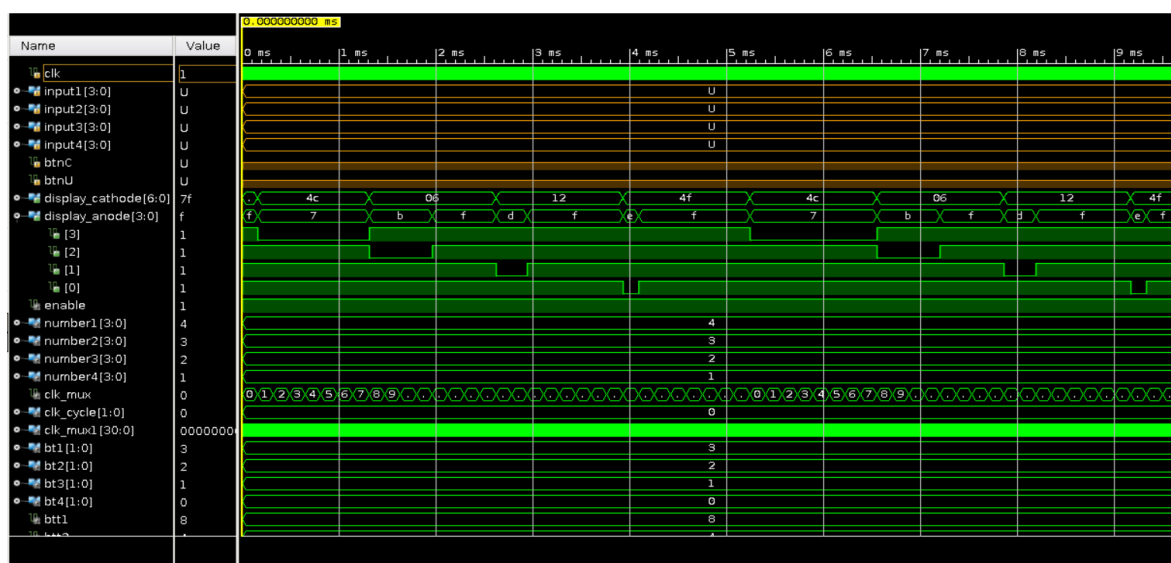
Objective:

- Using pre-designed circuit with PWM as a building block to build a design for scrolling effect.
- Controlling the brightness of the digits.

Implementation Overview:

- We use the four-digit seven-segment display implemented in Assignment 4.
- We've added two new buttons, btnC and btnU. The value on the four-digit seven-segment display is set only when btnC is pressed. The value of the brightness is set only when btnU is pressed.
- The right 16 switches are utilised to provide input for the 4 digits. Each digit corresponding to 4 switches. Similarly, the right 8 switches are utilised to provide input for the brightness level. The brightness level of each digit is represented by a two-bit value.
- To rotate the digits on the seven segment display, we use a new 28 bit counter. The order of digits to be displayed is determined by most significant two bits of this counter.

Simulation:



Resource utilisation:

Hierarchy				
	Name	Slice LUTs (20800)	Slice Registers (41600)	Bonded IOB (106)
	main	111	61	30
	create_mux_clock (ti...	89	29	0

Resource	Utilisation Count	Utilisation %
Slice LUTs	111	< 1
Slice Registers	61	< 1
Bonded IOB	30	28
BUFGCTRL	3	9

Utilization - utilization_1	
Hierarchy	
Summary	
Slice Logic	
Slice LUTs (1%)	
LUT as Memory (0%)	
LUT as Logic (1%)	
Slice Registers (<1%)	
Register as Latch (<1%)	
Register as Flip Flop (<1%)	
F8 Muxes (0%)	
F7 Muxes (0%)	
Memory	
Block RAM Tile (0%)	
RAMB18 (0%)	
RAMB36/FIFO (0%)	
DSP	
DSPs (0%)	
IO and GT Specific	
Bonded IPADs (0%)	
Bonded IOB (28%)	
IOB Master Pads	
IOB Slave Pads	
Bonded OPADs (0%)	
IBUFDS_GTE2 (0%)	
OUT_FIFO (0%)	
GTPE2_CHANNEL (0%)	
IBUFDS (0%)	
PHY_CONTROL (0%)	
OLOGIC (0%)	
ILOGIC (0%)	
IDELAYE2/IDELAYE2_FINEDELAY (0%)	
PHASER_IN/PHASER_IN_PHY (0%)	
PHASER_REF (0%)	
IN_FIFO (0%)	
PHASER_OUT/PHASER_OUT_PHY (0%)	
IDELAYCTRL (0%)	
Clocking	
BUFR (0%)	
BUFGCTRL (9%)	

FPGA Observation:

To set the values, we set the digits as 1,2,3,4 from the switches and press btnC. The brightness of the digits are different and moves with them, as can be seen in the photographs.

