Assignment 3

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Steps to make a 4-Digit 7-Segment Display in Vivado are the following:

1. This assignment is built over Assignment 2.
2. In Vhdl code the inputs will be vector B0,B1,B2,B3 of size 4, clock clk,vector anode and Outputs will be A,H,C,D,E,F,G.

B0[0] → 1st Switch	B1[0] → 5th Switch
B0[1] → 2nd Switch	B1[1] → 6th Switch
B0[2] → 3rd Switch	B1[2] → 7th Switch
B0[3] → 4th Switch	B1[3] → 8th Switch
B2[0] → 9th Switch	B3[0] → 13th Switch
B2[1] → 10th Switch	B3[1] → 14th Switch
B2[2] → 11th Switch	B3[2] → 15th Switch
B2[3] → 12th Switch	B3[3] → 16th Switch

Boolean Logic

A = (Bi[2]'Bi[0]' + Bi[3]'Bi[1] + Bi[2]Bi[1] + Bi[3]Bi[0]' + Bi[3]'Bi[2]Bi[0] + Bi[3]Bi[2]'Bi[1]')'

H = (Bi[3]'Bi[2]' + Bi[2]'Bi[0]' + Bi[3]'Bi[1]'Bi[0] '+ Bi[3]'Bi[1]Bi[0] + Bi[3]Bi[1]'Bi[0])'

C = (Bi[3]'Bi[1]' + Bi[3]'Bi[0] + Bi[1]'Bi[0] + Bi[3]'Bi[2] + Bi[3]Bi[2]')'

D = (Bi[3]'Bi[2]'Bi[0]' + Bi[2]'Bi[1]Bi[0] + Bi[2]Bi[1]'Bi[0] + Bi[2]Bi[1]Bi[0]' + Bi[3]Bi[1]'Bi[0]')'

E = (Bi[2]'Bi[0]' + Bi[1]Bi[0]' + Bi[3]Bi[1] + Bi[3]Bi[2])'

F = (Bi[1]'Bi[0]' + Bi[2]Bi[0]' + Bi[3]Bi[2]' + Bi[3]Bi[1] + Bi[3]'Bi[2]Bi[1]')'

G = (Bi[2]'Bi[1] + Bi[1]Bi[0]' + Bi[3]Bi[2]' + Bi[3]Bi[0] + Bi[3]'Bi[2]Bi[1]')'

Design

To Get Output on a specific digit Led make its anode value 0 and others 1.
In this assignment, we add a clock, Four 4:1 MUX, and a 2:1 decoder, By these our code decides the anode value.
the signal factor will decrease the frequency of our circuit by a factor of (4*factor).

CIRCUIT

Only one digit Led is light at a time, But due to high frequency, it looks that all digit Led in circuit light simultaneously.
To see that all digit Led is not lit simultaneously we have to decrease the frequency.
The frequency of the given clock is 100MHz and at a range of 270 kHz to 4KHz we can see that all digit Led in the circuit does not light simultaneously.

Screenshots of our Simulations

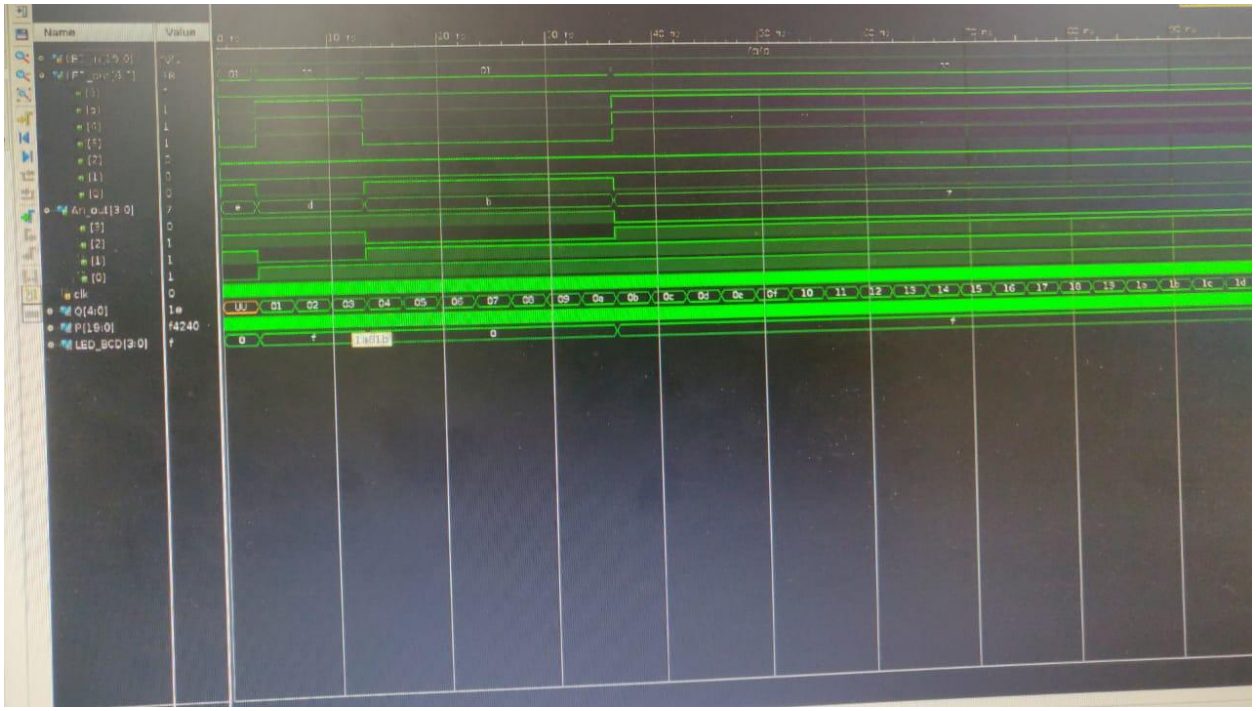
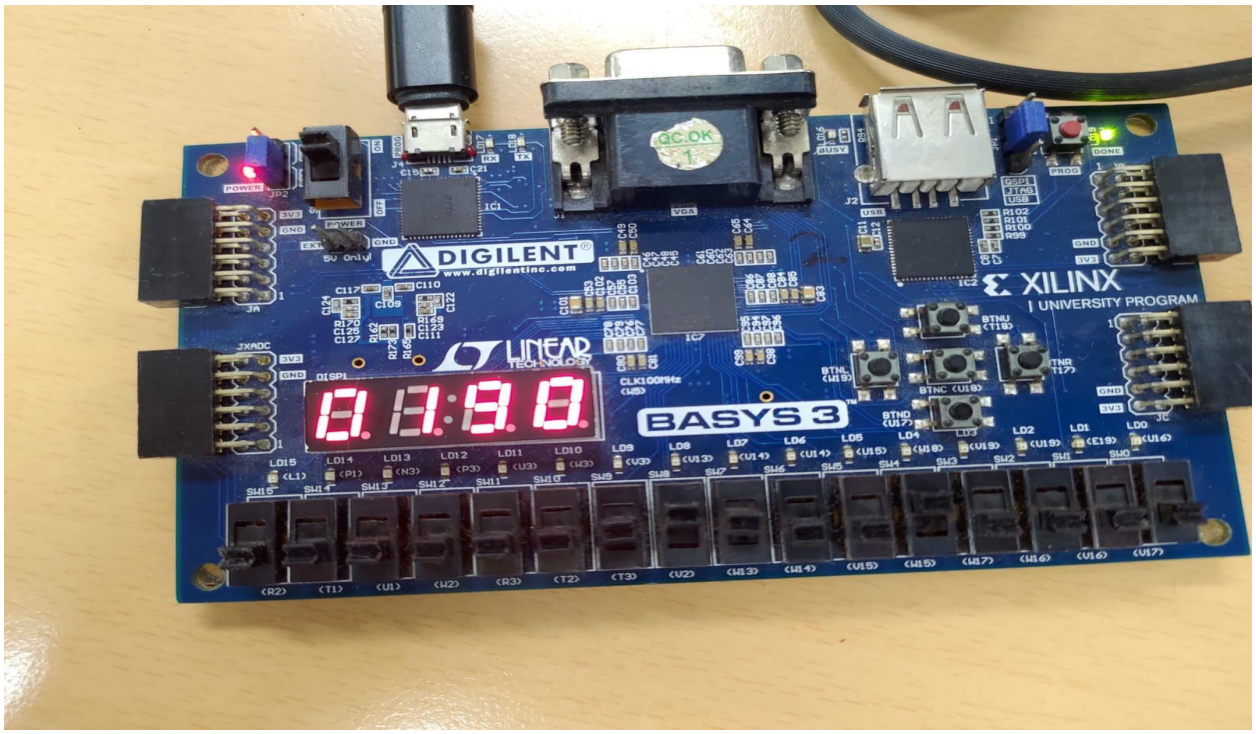


Photo of FPGAS

For Input = 0190



For Input = 0033