ECE 4525/5525 DIGITAL DESIGN

FALL 2025

Homework Assignment #7

Total: 80 pts.

Due 11:30am, Friday, November 14, 2025

The solutions for the asynchronous sequential circuit in Hm#6 have been posted on the eLearning web page.

Tasks:

a) **Develop VHDL program and a .xdc file for this circuit and run the Implement step** for on the Artix -7 FPGA chip which is mounted on your Nexys A7. Submit your .vhd file, .xdc file and the **top page** of the Project Summary Report. (20 pts.)

b) **Develop a .tcl file to simulate your circuit** such that each state transition originating from stable states is traversed at least once. Comment on the simulation results. (30 pts.)

c) **Implement your circuit** using your Breadboard and your FPGA Board. Inputs X1 and X2 should be driven by **bounce-free switches**. The Y codes, the X1 & X2 inputs and the Z output should be displayed on LEDs. Verify the correct implementation of the circuit by taking pictures of the status of the LEDS in each stable state. **Create a narrated, short video clip** (**.mp4** file, up to **4mins**) to illustrate that your circuit works. (30 pts.)

Electronic submission: submit your single **.pdf** file through the **appropriate Drop Box in eLearning**.