Homework 8

Name: **Section:**

Homework Assignment: submit via gradescope

Design the control unit for the keyboard scancode converter started in lecture 11, based on the given mini-C code using the methods taught in lesson 10 and the state machine code style taught in lesson 9. Integrate it into the code and run a testbench showing two keys pressed - not the same ones that the existing testbench presses. Note: Line 10 of the mini-C "scan = shift[9-2]" implies the variable "scan" should be a register. Make the 8-bit output scan code be the output of an 8-bit register in your datapath, such that on system reset its value is 0x00 and it does not change until the final 8-bit scan code is known (and the following clock cycle, busy goes low [Line 2], indicating to the user that scan code can be used).

On the class website for lecture 11, you are given the VHDL code for: lec11_tb.vhdl, keyboard.vhdl, lec11.vhdl, and lec11_dp.vhdl. You need to write the VHDL code for lec11_cu.vhdl.
Turn in:
1. Hand-drawn datapath using BBBs

2. Hand-drawn state diagram for the control unit FSM.

3. Control Word (CW) output table for your control unit.

4. Your Control Unit VHDL code uploaded to your GitHub repo.

5. Image of your testbench simulation showing the following signals - remove all other signals.
    clk
    reset
    keyboard clock
    keyboard data
    control unit state
    Status word
    Control word
    busy signal
    shift register
    scan code
    keyCntr

Documentation Statement: For all assignments in this course, you may work with any faculty members or students **currently** enrolled in ECE383 unless otherwise indicated. We expect all graded work, to include software programs, wired circuits, lab notebooks, and written reports, to be your own work. If they aren't, you've copied and will receive **no academic credit** even if the copying is documented. Further, copying without attribution is dishonorable and will be dealt with as a suspected honor code violation. As in all courses, cadets must document any assistance received in the execution of graded work. If you receive no assistance on an assignment, the use of the **Documentation: None** statement is mandatory. If no documentation statement exists, the assignment will be returned for correction and the work will be considered at least one day late.