# ECE 4401 (Fall 2014)
# Lab 9 – Embedding PicoBlaze Microcontroller

**Pre-lab:** Picoblaze demo shows how to integrate the Picoblaze microcontroller with the FPGA. It reads the values on the switches and displays it on LEDs. This is done using a simple routine in the Picoblaze. The code demonstrates how to write a simple Picoblaze task as well as the use of the INPUT and OUTPUT instructions to interface with external I/O.

**Lab:** The goal of lab 9 is to get familiar with the picoblaze 8-bit microcontroller. The lab will build on lab 8 and embed the picoblaze microcontroller in the system. The picoblaze module will be used to read in the switch values and update a global register that is accessible to all masters. The value of this global register will determine the text and background colors.

Your starting point is lab 8 and you will design a new picoblaze module. Following is the description for each module and what needs to be done for lab 9.

- **picoblaze wrapper module**:
    o Design a wrapper around the picoblaze module that communicates with the SRAM through the wishbone bus.
    o Picoblaze will execute a routine that reads the switches and send that information to the picoblaze module through an OUTPUT port. It then waits for 1 ms and repeat this process.
    o The picoblaze module captures the output value of the switches in a local register. Each time picoblaze acquires the bus, it writes the local register contents in a dedicated SRAM. The bus is then released for at least one cycle to ensure other masters can make forward progress.
- **wb_kb_read_sram_write module**:
    o The starting point for this module is lab 8. However, note that you need to change the bus accusation policy. Every time this module acquires the bus, it performs its task and releases the bus for at least 1 cycle.
    o This module should read the switch values from the dedicated SRAM location and update the text and background colors accordingly.
- **wb_vga640x480 module**:
    o The starting point for this module is lab 8. However, note that you need to change the bus accusation policy. Every time this module acquires the bus, it performs its task and releases the bus for at least 1 cycle.
    o This module should read the switch values from the dedicated SRAM location and update the background color accordingly.