EEC 417/517, Summer 2018

Lab 2 – Instructions

A/D Conversion Module, Timer0, the `banksel` Directive

1. Modify the circuit that you used in Lab 1 by removing the LED and 470 ohm resistor. Build the circuit for Lab 2 as shown in `lab02_slides.pdf` on Blackboard. Use a green diode for the least significant bit (bit 0) and red diodes for the other seven bits. **Double check all connections before applying power to your breadboard.**

2. Create a new MPLAB project called lab02. Connect the PICkit to your PC, build the project, program the PIC, and run the project.

3. Change the potentiometer setting to vary the voltage input at AN0. As you change the potentiometer, you should see the eight LEDs display a binary representation of the potentiometer setting.

4. Push and hold the button switch. The LEDs should all go off while you hold down the button, and return to the previous binary output when released.

5. Connect a multimeter to the AN0 pin to verify that the binary output correctly corresponds to the analog input. Do this for several analog inputs.

6. Add the ADRESH and TMR0 registers to the Watch window, and set their properties to display in decimal format. Arrange the editor and watch windows to be tiled horizontally. Rebuild and program the PIC, and run the project in animate mode. Observe the program counter cycling through the code, and observe the TMR0 register updating in the Watch window.

7. While still in animate mode, change the pot to a new setting and wait for the ADRESH register to update in the Watch window.

8. While still in animate mode, press the button and hold it down. After a while, you should see the PC looping in the LoopWhilePushed loop. If you don't observe this, you may have to reset or rebuild the project.

9. Halt the program. Add PORTC to the Watch window. Add a breakpoint at the "goto MAIN" instruction at the end of the program. Note that you can only specify one active breakpoint at a time.

10. Run the program again, and notice that the program halts at the breakpoint. (Actually the program may halt one or two instructions after the breakpoint.) The PORTC value shown in your Watch window should match the LED display on your breadboard. Change the pot setting and run again to the breakpoint. The new LED display and the new PORTC value should match.