Lab 1 Deliverables

ECE341, University of Idaho

Spring 2015

Report

The following applies to the Lab 1 Report.

- A control flow and data flow diagram are not required for this report.
- The report should have a paragraph or two describing how to read from and write to specific IO pins on the processor without affecting any other pins.
- Below is an abstract representation of a PIC32 IO cell, along with external resistors and a button. The 10 MΩ resistors within the dashed box represent the effects of leakage currents inside the PIC32 that can influence the voltage observed at the IO pin. You can assume that the Ideal Buffers are configured for an Input operation and that no current flows into or out of the buffers.
- Include the circuit in your report (copy and paste the image), and derive an expression for the voltage at the IO pin (relative to ground) and the current through R2 for the scenario when the button is pressed as well as the scenario when the button is not pressed. Plug in the values shown on the schematic and compute the actual voltage and current using your derived expressions.

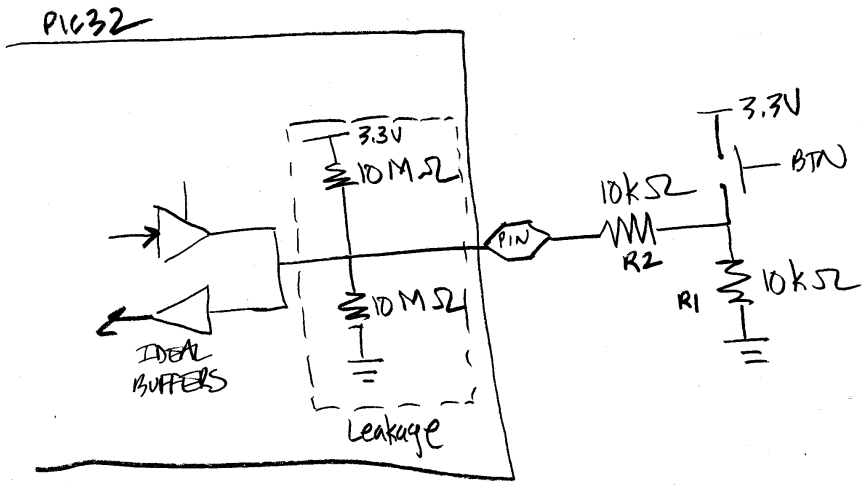

Figure 1: Cerebot push-button schematic

- Include a discussion about the external resistors. What is their purpose? What happens if an input pin doesn't have a pull-up or pull-down resistor? Refer again to the schematic (Figure 1) and describe what happens if R1 is removed from the circuit. What is the voltage at the IO pin when the button is not pressed? What effect might this have on software that is reading that pin?

- Refer to the schematic for the Cerebot 32MX7cK (on the website), page 6. LED1-4 are driven directly from an IO pin. Assume the IO pin is driving a logic '1' (3.3V), and the LED has a 0.7V forward voltage drop. How much current does the IO pin source in this case? What is the maximum current that any one IO pin can source or sink? What is the total maximum current that can be sourced by all the IO pins?
- The report should explicitly define the instrumentation you used and how you used each type of instrumentation during development. Examples of instrumentation you may have used:
  - Software Debugger Tools
    - Watch variables
    - Breakpoints
    - Step into
    - Step over
  - Visual Observation
- The testing and verification section should include step-by-step procedures for testing your project to determine if it works correctly.