Lab 6

Using the Photoresistor

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**Purpose of the Lab:**

The purpose of the lab was to learn how to use analog-to-digital conversions. In this lab we were given a photoresistor and taught to use the Arduino board and its assembly language to receive analog signals. In this same lab we also used assembly to cause delays and trigger a flag.

**Description of Solutions:**

There was 3 functions that we needed to implement in assembly language. The first one was the initSensor, followed by the readSensor and waitOneSecond functions. The first one, initSensor, was straight forward, it was simple initialization. The second one, however, was a lot harder, in this one most of it was easy except figuring out how to pass the parameters from the C function to the assembly function. To implement this, I tried every single register until I saw that it worked perfectly. The last one was pretty much a simple timer except I had to figure out the amount of cycles considering a prescaler of 1024 and a clock source of 16MHz.

**Test Results:**

In this lab I tested my program segment by segment starting with the first one to be implemented. Before testing if the parameters were passing to the assembly side or if the timer was working, I tested the photoresistor to see if it was working by itself. As I made it darker the values decreased and as I shun a light on it, the values increased. I then tested the timer, I used my computer clock to see if it was exactly 1 second. After that I tested the parameter passing to the readSensor function. This was just changing the number in its argument and connecting the appropriate pin and seeing if it worked.

**Answer to Questions:**

N/A

**Discussion:**

In this lab I learned a lot about analog signals. I was able to learn how these signals are transmitted. I also learned a lot on C to AVR parameter passing as that’s what I had the most difficulty with. I was also able to sharpen my skills using timers. This lab was very enjoyable lab overall although I struggled a lot with the parameters. To make it better I think we could have used a lot more material on the timer instructions as well as some of the analog instructions. Of course these analog instructions worked, but not much of teaching was done on this.

**Contribution to Team Work:**

N/A

**References:**

* *The AVR Microcontroller and Embedded Systems using Assemble and C*
* *AVR Instruction Set Manual*

[*http://ww1.microchip.com/downloads/en/devicedoc/atmel-0856-avr-instruction-set-manual.pdf*](http://ww1.microchip.com/downloads/en/devicedoc/atmel-0856-avr-instruction-set-manual.pdf)

* *https://msoe.us/taylor/tutorial/ce2810/candasm*
* *Used Lab 5 and 4 as Reference*