Lesson Notes

Class Preparation

- Study.

Admin

- References: 1-side of hand-written notes.
- Test will be administered via Canvas.
- Questions will be taken from textbook, lesson slides/notes, code examples.
- Look over lesson objectives.

Lesson Outline

1. WPR 1 Study Guide

   Microcontroller
   - What is it? What does it consist of? How can it be used?

   AVR Port Manipulation
   - Understand how to set control register bits in order configure specific function.
   - Understand how to use the datasheet to find the registers that should be set in order to enable a specific function.
   - PORTx, DDRx, PINx

   USART
   - UART data, control, and status registers
   - Configure USART for baud rate, # of data bits, parity, interrupt enabled
   - Understand a USART data packet & how to transmit a string using simple I/O example

   A/D Conversion
   - Applications and proportion/conversion factors
   - ADCSRA register and settings, conversion time
   - Write a function (polling) or ISR (interrupt) to obtain an ADC value

   Interrupts
   - How interrupts work – compare them to polling
   - sei, cli, reti – what do these instructions do
   - Configure and use external interrupts

   Timers and Counters
   - Timer control and status registers, Clock prescalers
   - Frequency and period calculations
   - Timer 0, 1, and 2 (8 and 16 bit timers)

   PWM
   - How PWM is implemented and operates – pulse width (high time) used to control peripheral device (servo, motor controller, etc) with a set period between pulses
   - Output capture functionality and settings

Lesson Notes

- Write code to implement wave generation mode 14

ROS

- Nodes
- Topics
- Messages
- roslaunch
- Publisher
- Subscriber