

# CSCE 236 Embedded Systems, Spring 2015

## Homework 0

Started: Tuesday, January 13, 2015

Due: Beginning of class Tuesday, January 20, 2015

**Instructions:** This homework is an individual assignment, collaboration is not allowed. If you discuss any problems with others, please note this on the assignment as described in the syllabus. Also note any materials outside of lecture notes, course textbooks, and datasheets that you used. Show your work and describe your reasoning to get partial credit if your solution is incorrect. This homework is due on the date listed above before the start of class.

**Name:**

**Problem 1.** *(To be completed at end of assignment) Approximately how much time did the total assignment take? Which problem took longest and how much time did it take?*

**Problem 2.** *Arduino Setup and Programming (Note you only need the Arduino for this problem, you will not need a breadboard or any other components until the next part.)*

**a).** *For this problem, you should configure the Arduino programming software on your computer. Then program your Arduino with the sample Blink program (file->examples->basics->blink). Once you have verified that you can compile and program your board with this sample program, modify it so that it blinks a long on, short off, short on, long off, long on, short off pattern of blinks. Repeat this 5 times at startup (and then do nothing). Use a loop, do not just copy and paste code. Before doing this, make sure to read through and complete the rest of the questions in this section.*

**b).** *How did you specify the delay for the short and long on/off's in the blinks?*

**c).** *How did you specify the version of the Arduino you are using in the Arduino programming environment?*

**d).** *How did you specify the serial port the Arduino is connected to in the software? What is the port name on your computer?*

### Problem 3. Resistors

a). In your packet you should have different types of resistors. Resistors are color coded to indicate their values. What value resistors do you have and what color pattern indicates that? (Hint: This is one problem that is easily solved by googling.)

### Problem 4. Button Input

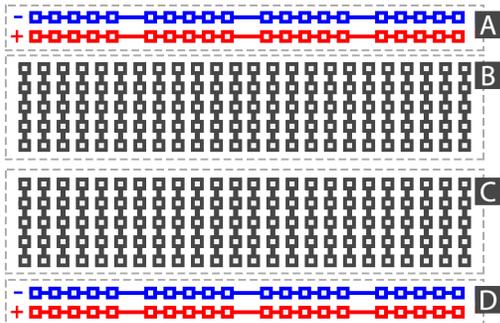


Figure 1: Breadboard connections.



Figure 2: Button connection (when not pressed).

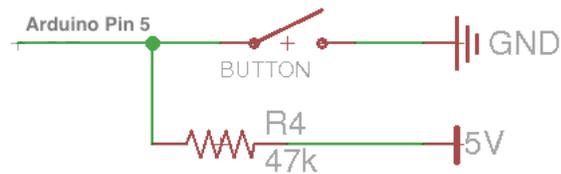


Figure 3: Schematic diagram to connect the button.

Remember, you should only connect wires and components when the Arduino is not powered or connected to your computer! Read this section and examine the sample code before doing any of the connections.

For this part of the homework you will need to use the breadboard, wires, a resistor, and button. Figure 1 shows how the wires in the breadboard are connected to each other. Areas A and D are connected horizontally and are usually used as power buses (use the standard convention of connecting positive voltage to red and ground to black/blue). Sections B and C of the breadboard are connected vertically within the block. **If you are unsure about how to use or connect to a breadboard please ask the instructor or a TA before connecting.**

Figure 3 shows a schematic for connecting the button to the Arduino and Figure 2 gives details on the button itself. When the button is pressed, all of the terminals are connected together. When it is not pressed, the top and bottom terminals are not connected, but the bottom two pins are still connected to each other as are the top two pins. Note that you can determine the orientation by looking at the slight “D” shape of the button and drawing. Following the schematic in Figure 3, connect the button to the Arduino, if you are unsure how to properly wire this connection, please ask an instructor. Note that you should connect the button to the pin labeled 5 on your arduino.

In order to read the button press, look at the example code for the button (file->examples->digital->button). You will need to look at the code and modify it slightly to switch the button input to pin 5.

**a).** *Include a printout of a picture of your final configuration that shows the breadboard and Arduino. Make sure the wires are organized in such a way that you can tell where everything is connected.*

**b).** *Modify the code so that the LED blinks slowly when the button is not pressed and blinks quickly when it is pressed. Include a copy of the relevant code (mainly the code in `loop()`) below or as an attachment.*

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Do not forget to fill in the amount of time you spent on this assignment in Question 1.