IDD-Fa18-Lab1: Blink!

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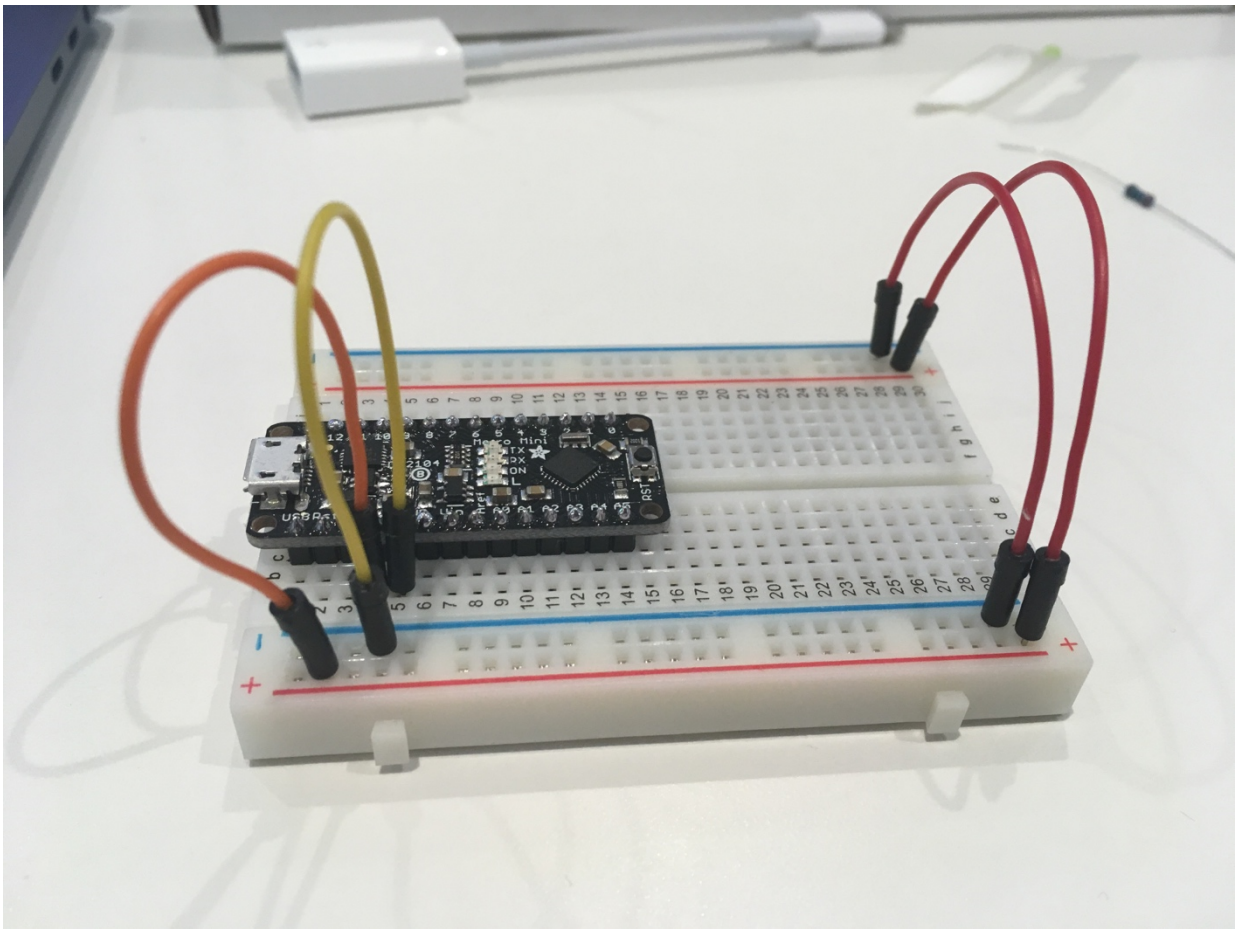
> Include your responses to the bold questions on your own fork of the lab activities. Include snippets of code that explain what you did. Deliverables are due next Tuesday. Post your lab reports as `README.md` pages on your GitHub, and post a link to that on your main class hub page.

We've copied the questions from the lab here. Answer them below!

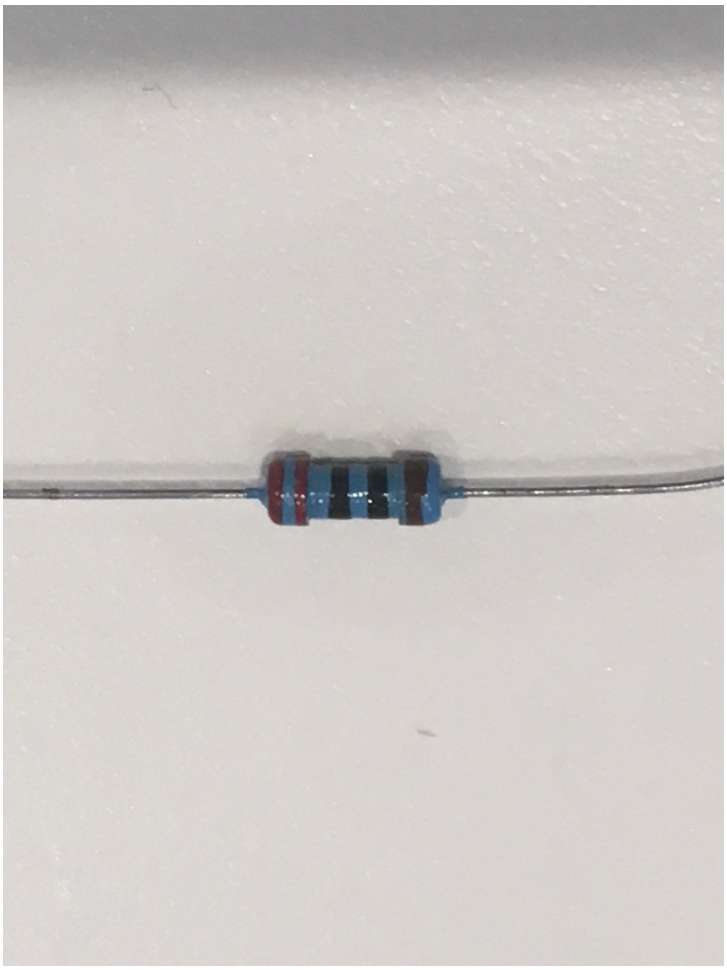
Part A. Set Up a Breadboard



Part B. Manually Blink a LED

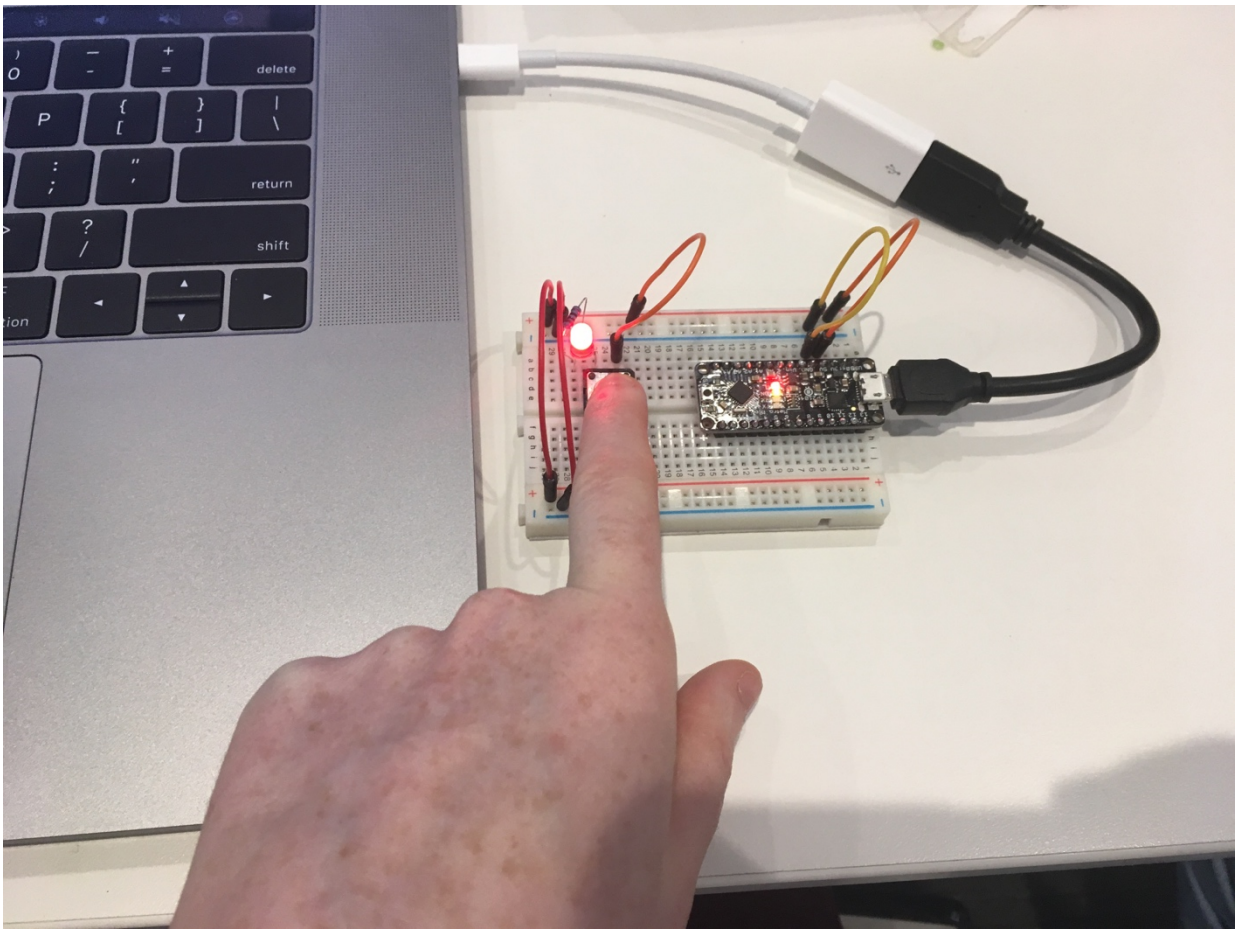
a. What color stripes are on a 100 Ohm resistor?

We used a 220 ohm resistor instead. The stripes are from right to left 2 red, two black and a brown stripe.



b. What do you have to do to light your LED?

Plug into the computer and press the button!



Part C. Blink a LED using Arduino

1. Blink the on-board LED

a. What line(s) of code do you need to change to make the LED blink (like, at all)?
None! I had to rearrange the wires so that the power coming out of the Arduino was on the default LED pin - 13 and I removed the button.

b. What line(s) of code do you need to change to change the rate of blinking?
You change the values of the delay(1000) line for both the LED on high voltage (this makes the light stay on for a longer or shorter amount of time) and LED on low voltage (this dictates how long or short of a period of time between turning the light on).

c. What circuit element would you want to add to protect the board and external LED?

I would want to add resistors to protect the board and the external LED from high voltage.

d. At what delay can you no longer *perceive* the LED blinking? How can you prove to yourself that it is, in fact, still blinking?

At delay(10) for both high and low voltage I can no longer perceive the LED blinking. I can prove to myself that it is still blinking because the light does not appear as bright as it does when it is fully on.

e. Modify the code to make your LED blink your way. Save your new blink code to your lab 1 repository, with a link on the README.md.

2. Blink your LED

Make a video of your LED blinking, and add it to your lab submission.

https://www.youtube.com/watch?v=kZQoKwmVtJU&feature=youtu.be

Part D. Manually fade an LED

a. Are you able to get the LED to glow the whole turning range of the potentiometer? Why or why not?

Yes, but the brightness changes as the resistance increases and decreases. The resistance is never so high that the circuit does not complete and fail to light the LED at all.

Part E. Fade an LED using Arduino

a. What do you have to modify to make the code control the circuit you've built on your breadboard?

I modify the pin used in the example Fade. I changed it from pin 9 to pin 13.

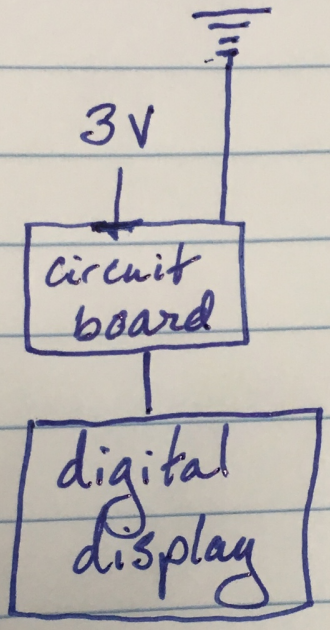
b. What is analogWrite()? How is that different than digitalWrite()?

analogWrite() uses pulse width modulation to make the like blink with a certain brightness. digitalWrite() uses delays with the light alternating between high and and low voltage.

Part F. FRANKENLIGHT!!!

1. Take apart your electronic device, and draw a schematic of what is inside.

Stop Watch Schematic



Presumably there are resistors present, but I was unable to decipher many of the components on the circuit board.

a. Is there computation in your device? Where is it? What do you think is happening inside the "computer?"

Yes there is basic computation for keeping time and operating a stop watch.

b. Are there sensors on your device? How do they work? How is the sensed information conveyed to other portions of the device?

No! This is a 10+ year old dumb watch and it does not react to any inputs from the environment other than completing the circuit

c. How is the device powered? Is there any transformation or regulation of the power? How is that done? What voltages are used throughout the system?

The device is powered by a 3 volt battery.

d. Is information stored in your device? Where? How?
The only information stored is keeping count for keeping time and operating the stop watch. Nothing is saved.

2. Using your schematic, figure out where a good point would be to hijack your device and implant an LED.

Describe what you did here.


maxell
CR2025
3V
THIS SIDE UP
+
3V
CHINA
WATER RESIST
330FT

Put the watch back together enough so that the circuit was complete and the face of the watch was lit up. And then I found where the metal edges on the circuit board were exposed for buttons on the outside of the watch and played around until I could get the LED lit. a good indicator that I was getting close was when I could make the watch beep by completing the circuit with the LED light.

3. Build your light!

Make a video showing off your Frankenlight.

https://www.youtube.com/watch?v=jsOT98K07j4&feature=youtu.be

Include any schematics or photos in your lab write-up.