

Lab 1 - Build Your Own Bike Light

Preparation

You should already have the Arduino development environment installed (but, in case you don't, you should [download it](#)). You'll now load the IDE and use it to program your microcontroller with a simple sketch that blinks an LED.

- 1) Open the Arduino software and select "Tools" → "Board" → "Arduino Uno"
- 2) Next, select the USB serial port the development board is attached to. On a Linux system it will be something like "/dev/ttyACM#", on a Mac, something like "/dev/tty.usbmodem612" and on Windows it will be something like COM9.
- 3) Open an example sketch by selecting "File" → "Examples" → "Basics" → "Blink." This is a sketch that blinks the LED on the board.
- 4) Program the Arduino by clicking the right arrow in the user interface.
- 5) You should see the LED on the board blinking.

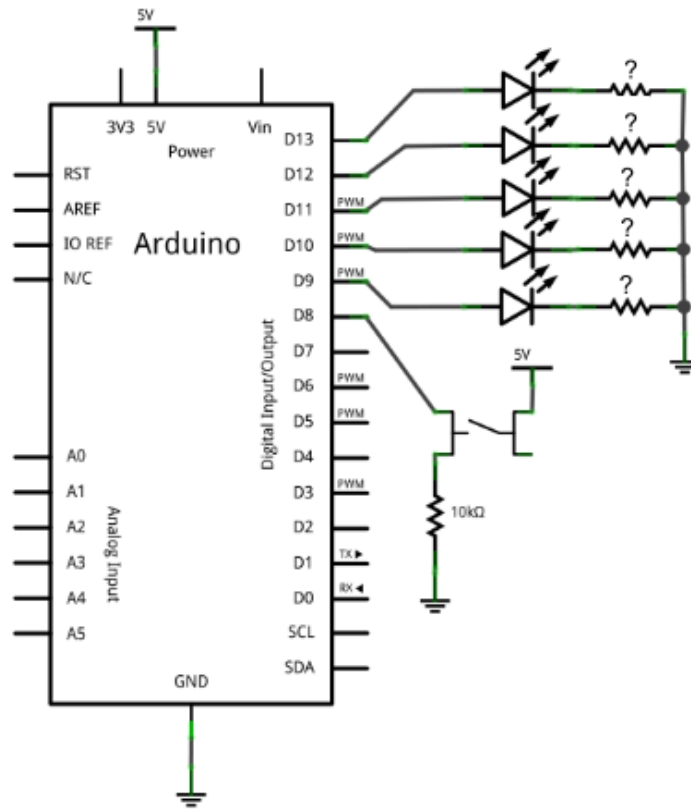
Part 1

In this lab you and your lab partner will build a bike light. Your goal is to set up LEDs such that pressing a button will switch the system of lights between several different modes: all off, all flashing; all on; and "bouncing" lights. Your system should demonstrate a minimum of five modes and use at least three LEDs.

Bill of Materials (BOM):

- At least three LEDs (in colors of your choice), but you may use more
- Current-limiting resistors for LEDs (you must size them appropriately)
- 1 Push button
- 1 Pull-down resistor for button (10kΩ)
- 1 potentiometer

Schematic:



Part 2

Use an analog input to modify the behavior of your bike light in an interesting way. One option is to use a potentiometer (an adjustable resistor). If you're feeling adventurous, you can use the [infrared distance sensor](#) that you'll use in lab 2 to, for example, have the light get brighter the closer an object is to the sensor using pulse width modulation (PWM) of the signal output on the digital pins. You could also change the speed at which the light flashes or "bounces."

Lab Report

Please read the [Lab Report Style Guide](#) carefully before writing your lab report.

Please submit your lab report as a **pdf** attachment to po.e.submit@gmail.com. Your lab report should be named lab1_<partner1 last name>_<partner2 last name>.pdf.