Contents

1 Arduino Intermediate Class

In this class each week will go over a specific circuit from the vilros book, going over some electronics and programming before building and testing the circuits. Students are welcome to try other circuits from the book if they have already completed this exercises, and we will try and provide tips as time allows.

1.1 This weeks Circuit: Potentiometer Circuit (Circuit 2)

1.2 Circuit Theory: Analog Input

1.3 Building the Circuit

1.4 Extras

2 Potentiomter

The potentiomter is a resistor with and connection in between the two ends that can be adjusted to vary the value of each side. So it forms a resistor divider circuit where the value of the two resistors can be adjusted. It's very commonly used for a user input, like a volume knob, or to "trim" a

voltage on a circuit to a specific value. For instance a supply circuit might have a potentiometer to allow a fine adjustment. In our circuit the middle connection is connected to the analog inout.

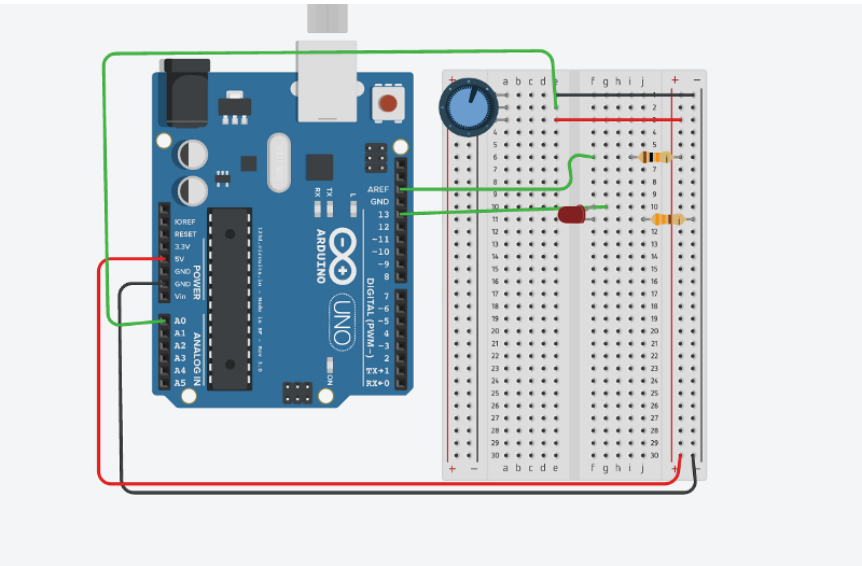
3 Analog input

This circuit is really all about using the analog input to "do something" with your circuit. In the example what we do is change the on time for the LED. When the potetiometer is turned all the way to one side the value of the middle connection (sometimes called a wiper) is 0V, and the analogRead returns 0. When turned all the way in the other direction the middle connection will read 5V.

4 Using a different Analog referernce.

The default Analog read is scaled so 0V = 0 and 5V = 1023. However you can choose a different Analog Reference using the analogReference() command. There are different choices depending upon which Arduino you have, for the UNO there are DEFAULT, INTERNAL, and EXTERNAL. DEFAULT is what you get by default, and choose 5V as a reference. INTERNAL uses a built in 1.1V reference (i.e. 1.1v = 1023). EXTERNAL uses the AREF Pin. Not it's possible to damage your ARDUINO with incorrect programming and AREF value, so in our circuit we will connect up AREF through a 10K home resistor.

5 Adding AREF input



6 Trying different values analogReference

I've provided a sketch similar to the circuit 2 sketch where it shows how to use the different analogReference sources

7 Other things to try

It's pretty straight forward to use analogWrite instead of digitalWrite to change the behavior from blinking to pure dimming. Can you figure out how? Note analogRead returns value from 0 to 1023 and analogWrite takes value from 0 to 255, so you might need to divide down the value of analogRead with an appropriate number before doing analogWrite.