Dynamics Systems and Controls Lab4

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1. An analog pin can read / output any voltage in a range of values, whereas a digital pin can read / output '1's and '0's, which means either maximum voltage or no voltage. For example: digitalRead() returns 1 or 0, where analogRead() returns any number between 0-1023. An analog signal can therefore store more information in a single input, since its range is 1023 values instead of on/off. Digital is nice because of its 'guaranteed' nature, that the value you want to transfer will transfer exactly.

2. Analog pins 0 and 1 are used to find voltage across the resistor, and therefore current through LED. The pins also give us voltage across the LED, to find total power through the LED.
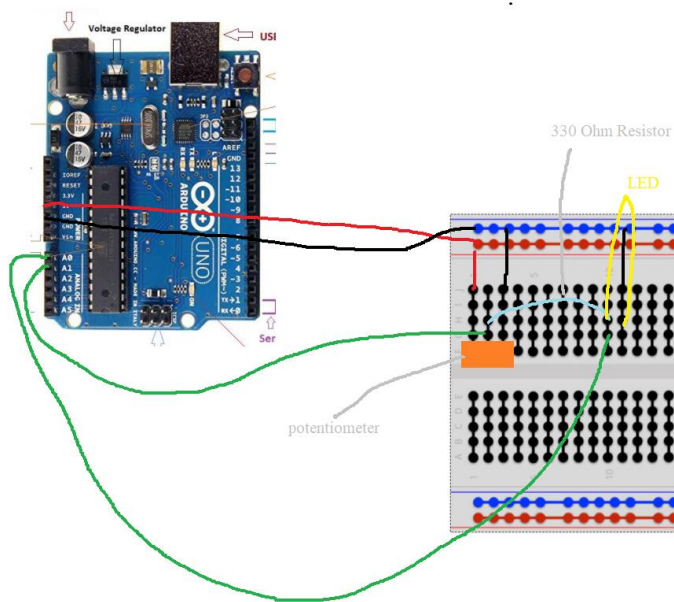
3. Experimental Data Collection

LED Color	A0 Voltage [V] @ constant current	A1 Voltage [V] @ constant current	Current Value [mA]	Diode Power Consumption [mW]
Red	3.01	2.69	1	2.69
Blue	4.74	4.41	1	4.41
Yellow	3.10	2.77	1	2.77
Orange	3.09	2.76	1	2.76

Green	3.14	2.81	1	2.81
Violet	4.17	3.84	1	3.84

Current is found by using the resistance and voltage across the resistor. The power through the diode is then found by using this current with the voltage across the diode (LED). The LED color can be found from the voltage measurements because the diode power & voltage across the diode is quite distinguishable between different colored LEDs (when current is held constant by changing the overall forced voltage on the system with the potentiometer). The difference in voltage is low for some values likely because I chose such a small current value to measure at, in the future I would use a higher current to distinguish the LEDs more. The reason I picked 1 Amp is because the LED was taking up most of the 5V already at 1Amp for the blue color, so I decided I couldn't choose a different current for my setup because it would make it un-reachable by the blue LED (given I was using the RedBoard Turbo for my setup).