28/1/14 Programming Arduino

Uploading sketches to arduino from IDE

* Boot loader is a small program in MC, which enables arduino to be programmed via USB interface.
* If Bootloader is not preinstalled on arduino, we will need a separate hardware device called programmer.
* Cheapest Programmer device «
  * USBasp programmer (₹200)
  * ⇒ can be connected to USB & wired to Arduino
* Arduino IDE comes with Bootloader image for ATMega 328P. If our MC does not have bootloader, we can use USBasp to first burn the bootload
* then use the regular USB interfa

Connecting Arduino to computer.

for Atmega 328P, use.

Type A & Type B USB 2.0 Cable.

NOTE: USB 3.0 slots are backward compatable with 2.0

LED Circuit

(x) Some LED's have different length of pins pointing out.

Long pin : (+) Anode => Vcc

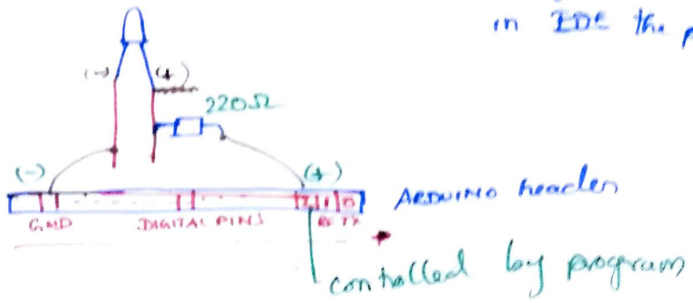
Short pin : (-) Cathode => GND

(x) Resistor is used to prevent the current from burning the LED

(x) It doesn't matter where you connect the resistor - (+) or (-) end of LED. Only the total resistance of the circuit is taken into account

LED Circuit (Change Digital o/p state)

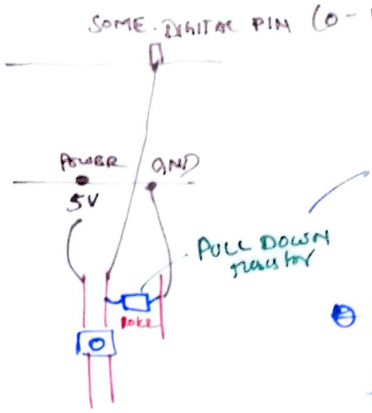
↳ Change Pin state in IDE the progra



Switch circuit: (Reading Digital pins)

⇒ Chage state of some digital pin with switch.

⇒ Read the state of pin using program



⇒ Button ON ⇒ Digital pin has 5

Button OFF ⇒ Digital pin has 0

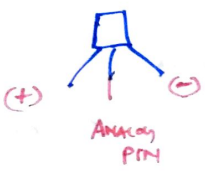
Exercise:

Write a sketch, that changes a state of some other digital pin to switch ON LED based on button state.

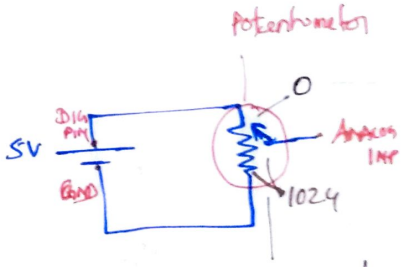
Analogue signals in UNO

- Obtained by Pulse width modulation (PMW)
- Instead of giving steady voltage of 5V, the circuit produces Square wave, which switches OFF output every x millsec, quickly

Using potentiometer Change potentiometer knob to get analog bit value



(measures the voltage)

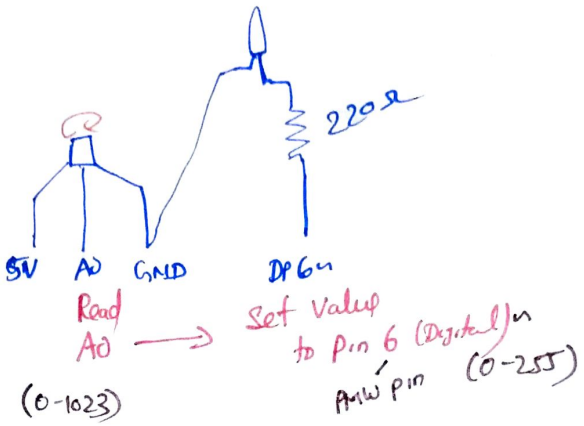


Value of Analog varies from 0-1024 as we change resistance.

10 bit resolution

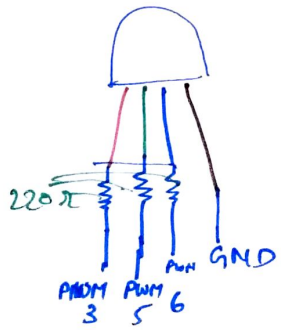
Fading LED ⇒ Change potentiometer knob to control brightness of LED

⇒ Write Analg value (PWM) value to digital pin



RGB Led

- There are four pins
- The long pin is Common Cathode (Some have common anode)
- The rest three pins are one for each color.



When 6 is HIGH & 5, 5 are LOW
= BLUE

When 5 is HIGH & 3, 6 are LOW
= GREEN

We can also combine voltages on PWM pins to produce blend of colors