Dimmer Controlled Fan

This is the tutorial that you can follow for making a circuit that controls a dc motor(fan) using a dimmer (potentiometer) through an Arduino. It is a step by step approach through which you will understand the following concepts.

- Using analog input on Arduino
- Serial Monitor on Arduino IDE
- Using a Transistor as a switch
- Controlling the speed of the dc motor using Arduino's PWM pin

Circuit 1 (Analog Input from a dimmer)

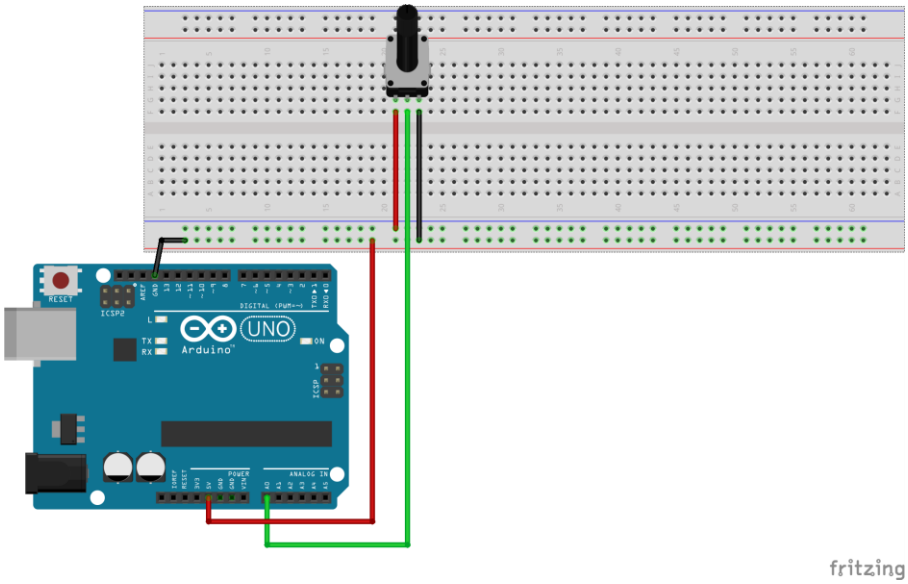
This is the part where we connect the dimmer to Arduino to get analog (variable) input values. After making the circuit we will display these values on the serial monitor of Arduino's IDE. For making this circuit you will need the following components.

1x Dimmer (Potentiometer)

4 x m-m jumper wires

Arduino Uno

The dimmer or potentiometer is essentially a variable resistance. The value of the resistance can be changed by rotating the knob clockwise or anticlockwise.



We are using A0 on Arduino to read the analog value of the voltage that is coming from the dimmer to Arduino. To display this value, we will use Serial Monitor of the Arduino IDE. To do this we need to start the serial monitor inside the void setup() construct of the arduino, like this:

```
void setup() {
  // put your setup code here, to run once
  Serial.begin(9600);
}
```

The full code for getting potentiometer values can be found in the repository. Folder name is dimmervalue.

Circuit 2 – Connecting the fan with Arduino

Now we will make a circuit to control the speed of the motor directly from Arduino. Please note that motor will be directly controlled from the Arduino, not from the potentiometer values. Following are the components that you need:

1 x DC motor

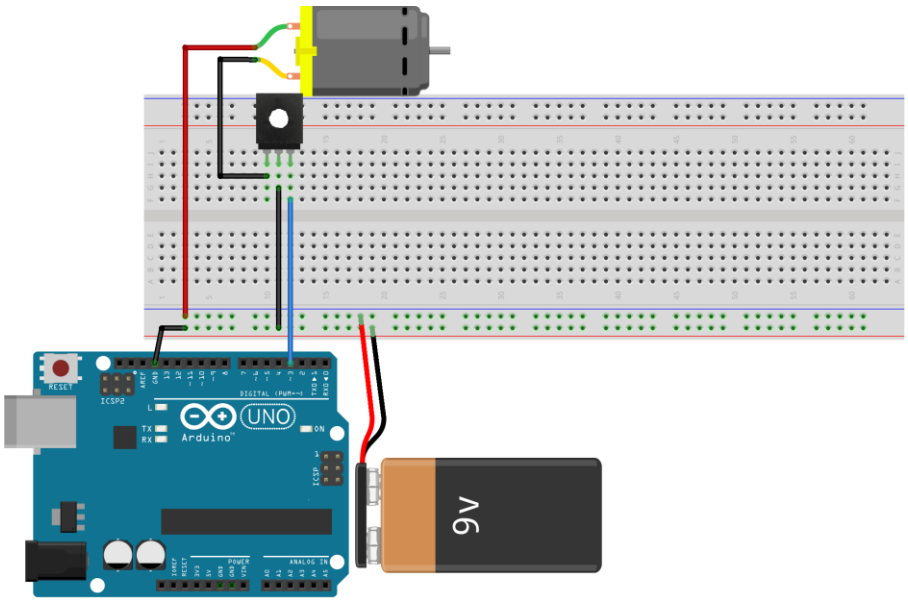
1 x Fan blade

1 x bd139 Transistor

1 x Battery

1 x Battery connector

5 x m-m jumper wires



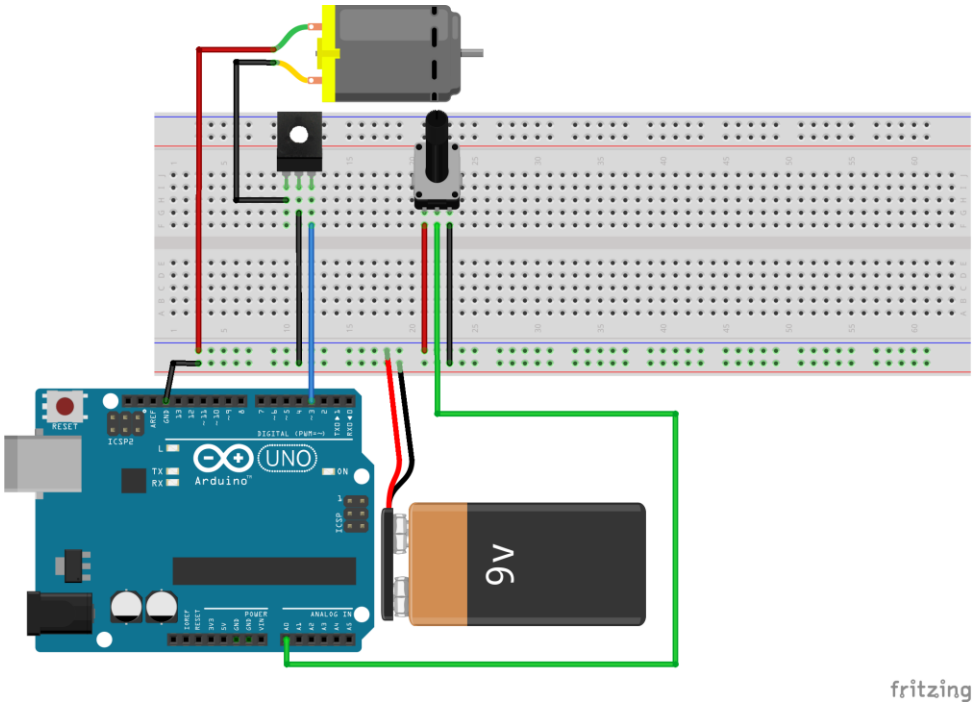
The transistor is being used as a switch here. The reason we are not powering the dc motor directly from Arduino is that the 5V pin on Arduino cannot provide sufficient current to the motor to run so we have to use an external power source (9 V battery). Arduino pin 3 is used to control the speed of the motor but the power is being provided by the battery through the transistor. You can read more about transistors being used as switches here:

http://www.dummies.com/programming/electronics/components/electronics-components-use-a-transistor-as-a-switch/

Now run code 2 (motorspeed) with this circuit.

Final Circuit (Dimmer Controlled Fan):

In this step we combine the circuit 1 and circuit 2 to make a dimmer controlled fan through the Arduino. The component list remains the same as the above 2. Here's how the full circuit looks like:



Now run the final code with the above circuit.

Code:

In this code (fancontrol), we are using `if` & `else if` statements to control the speed of the fan by checking the dimmer values. We have also defined a separate function of `fanSpeed(int fanVal)`, which sets the speed of the motor depending upon the dimmer value.

Challenge:

Now that you have learned how you can control the speed of the fan, now try to use a temperature sensor to control the speed of the fan. If it's hot the fan should run faster, but if it is cold it should run slower.