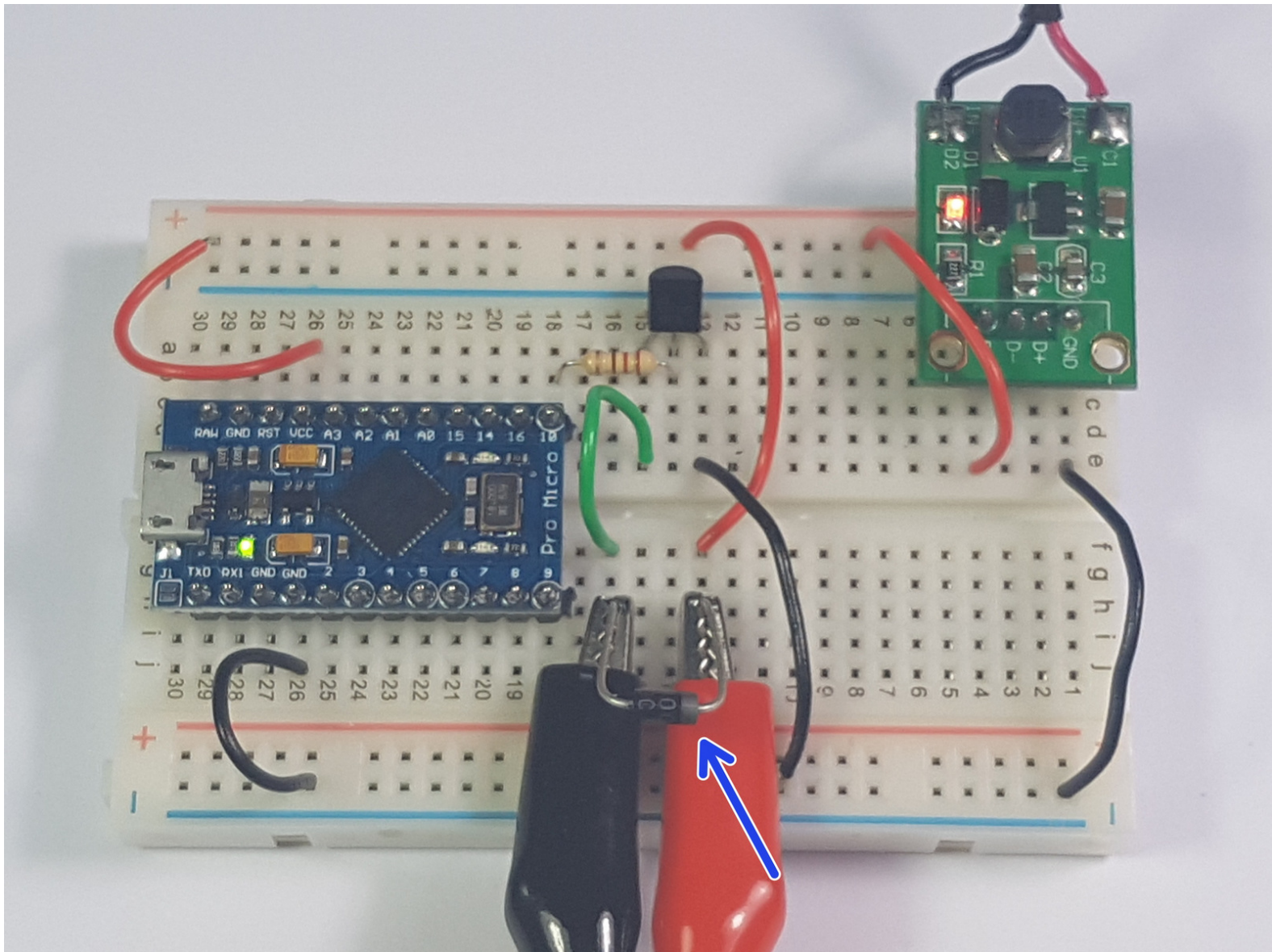
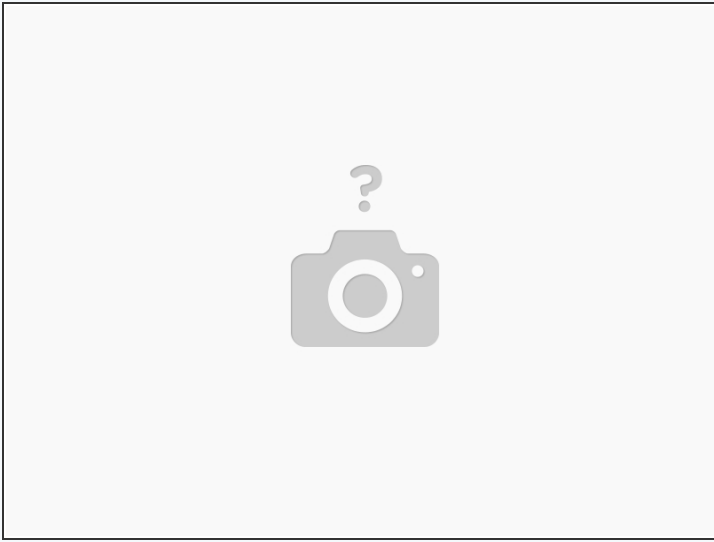


Inventor School Session 6 - Laser Projector

Learn how to build a laser projector!



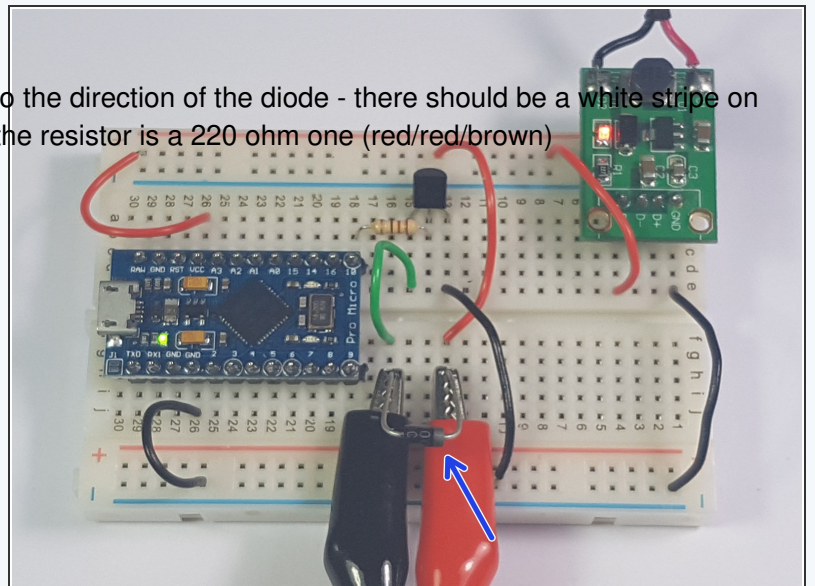
Step 1 — Building the laser projector mechanics



- [Click here to view the video about how to build the laser projector mechanics \(https://vimeo.com/120057216/abf9e482f4\)](https://vimeo.com/120057216/abf9e482f4)

Step 2 — Build the laser projector electronics

- Wire up the circuit as shown. Pay particular attention to the direction of the diode - there should be a white stripe on the right where the blue arrow is indicating. Note that the resistor is a 220 ohm one (red/red/brown)



— Writing the programme

- As a test to see if your transistor control circuit is working, write a simple programme to turn the motor on and off automatically. It should turn on for one second, then off for one second, and keep repeating.



— Wiring the second motor

- Now wire up a second transistor circuit to control a second motor. Make sure you connect this second transistor to pin 9.
- You'll also need another diode and resistor.

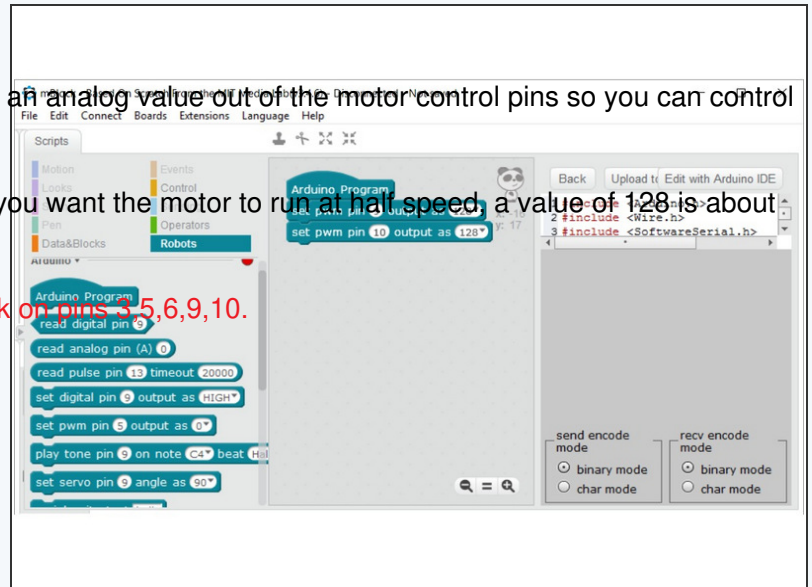


Step 5 — Adjusting the speeds (M)

- Try using the 'set pwm' block - this allows you to output an analog value out of the motor control pins so you can control the speed

i A value of 0 is off, and a value of 255 is fully on, so if you want the motor to run at half speed, a value of 128 is about right.

! This function only works on certain pins. It should work on pins 3,5,6,9,10.



Step 6 — Adjusting the speeds (A)

- Try using the analogWrite function as shown in the sample code. This is a way we can turn an output only partially on

i The range is from 0 to 255, so 128 should be about half speed for the motor

! This function only works on certain pins. It should work on pins 3,5,6,9,10.

```
void setup() {  
  
}  
  
void loop() {  
  analogWrite(9, 128);  
  analogWrite(10, 128);  
}
```


Step 7

— Cool patterns

- By adjusting the speeds you can make some interesting patterns, particularly if one motor is running at a multiple of the other motor's speed.
- For example, if you've set one at 100, try the other motor at 200 or 50.
- There is a minimum value that will work - if you set a value too small, the motor won't have enough voltage to start running.
- For this challenge your aim is to show your tutor a really interesting pattern! You might have to adjust the speeds a little each time to get steady patterns.



Step 8

— Slowly changing patterns

- Using loops and variables you should be able to make the speeds of the two motors vary continuously.
- ⓘ Hint: you'll want to increment or decrement two variables - one for each of the motor's speeds.
- ⓘ Try to make the amounts you increment or decrement different for the two motors to make more interesting patterns.

