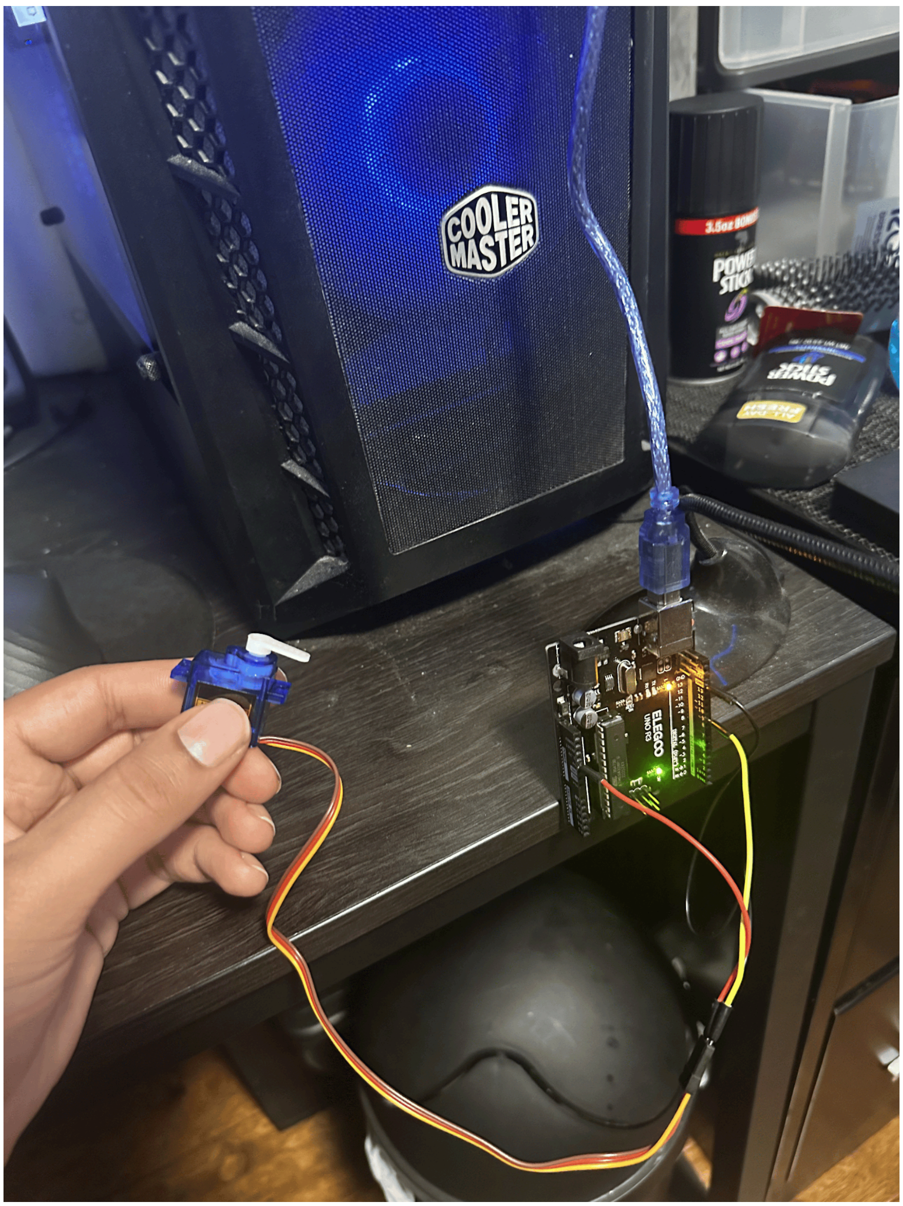
Etm 3301 Arduino Projects (Sensors and Actuators experiments) - Utkrisht Batra

Lesson 9 – Servo

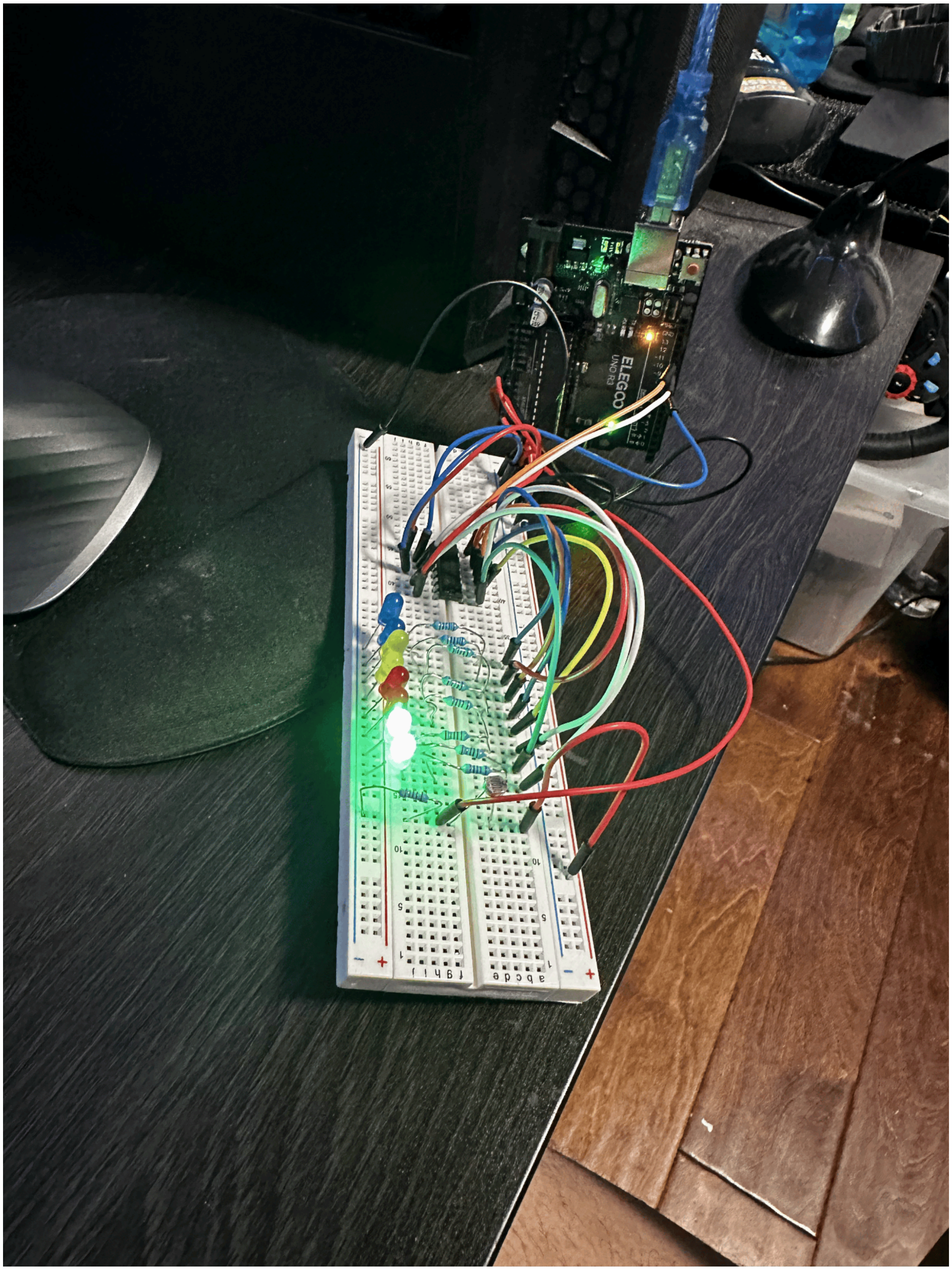
This experiment shows how to control a servo motor using Arduino. A servo is a small motor with a control circuit that can move to a specific position between 0° and 180°. The Arduino sends precise pulses to tell the servo what angle to go to. It’s like giving the motor exact orders to turn to a certain spot; used for robotics, cameras, etc.



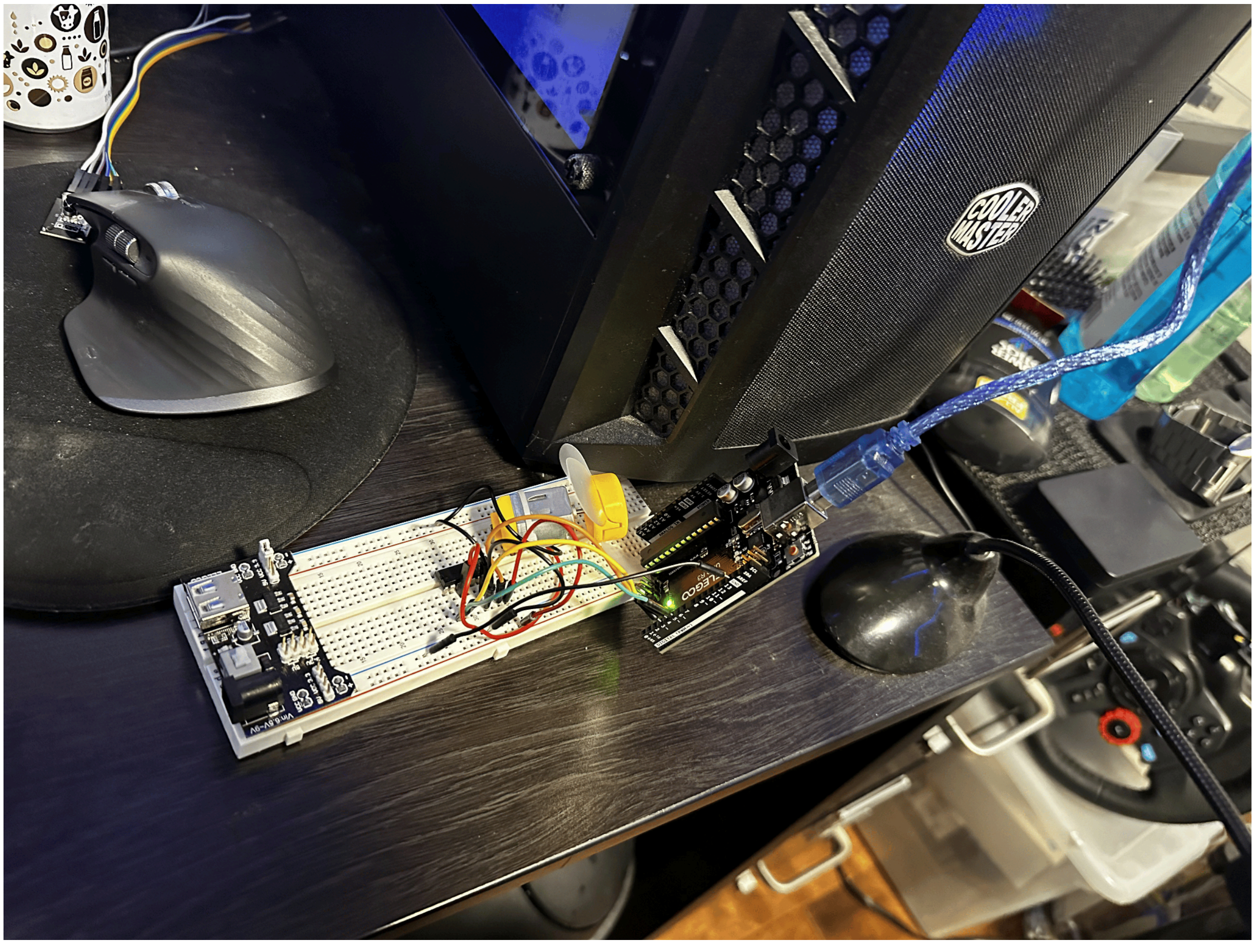
Lesson 10 – Ultrasonic Sensor Module
This one uses an ultrasonic sensor (HC-SR04) to measure how far away an object is. The sensor sends out sound waves, waits for the echo, and calculates the distance based on the time it takes to bounce back. It's similar to how bats see, and it's great for things like obstacle avoidance in robots.

Lesson 13 – IR Receiver Module
This is all about wireless control. You use an IR remote to send signals to an IR receiver connected to the Arduino. Each button on the remote sends a different code, and the Arduino can read those to perform specific tasks, like turning on an LED or moving a motor. We can make a DIY TV remote control.

Lesson 18 – Photocell (Light Sensor)
A photocell (or light-dependent resistor) changes resistance based on how much light hits it. With this, the Arduino can detect light levels and react, for example, turning on a light when it gets dark. Super useful for automatic lighting or solar trackers.

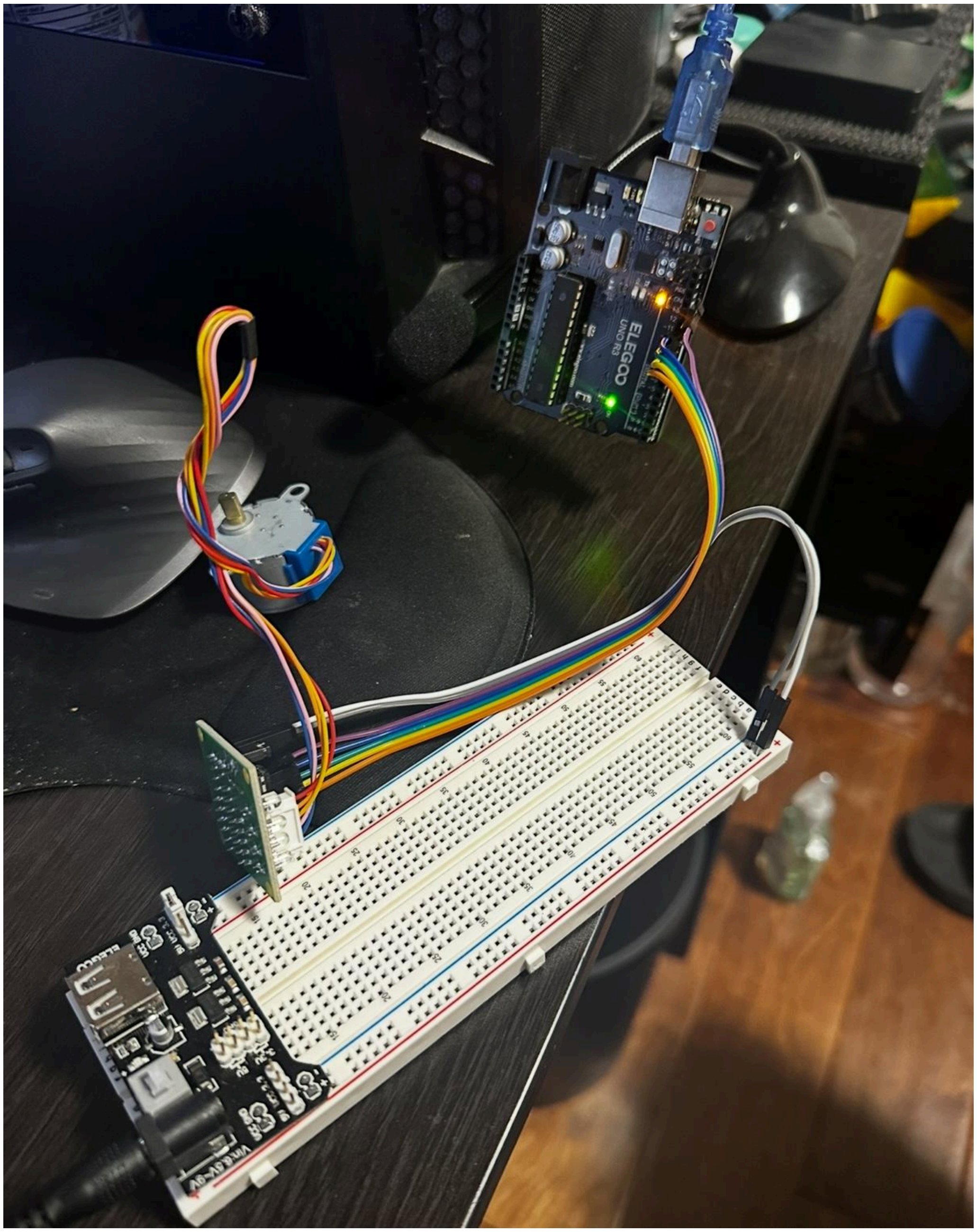


Lesson 21 – DC Motors
This setup controls a basic DC motor. It shows how to turn it on and off and control the speed with PWM (pulse-width modulation). You're learning how to control regular motors that spin freely, used in fans, cars, and anything that moves.



Lesson 23 – Stepper Motor

Unlike regular motors, stepper motors move in precise steps. This experiment lets you rotate the motor a certain number of steps (or degrees) by sending sequences of electrical pulses. Ideal for projects where you need exact positioning, like 3D printers or CNC machines.



Lesson 24 – Controlling Stepper Motor With Remote
This combines the IR remote from Lesson 13 with the stepper motor from Lesson 23. You can now control the stepper wirelessly: tell it to rotate forward, backward, or stop, just by pressing buttons on the remote. It's a wireless precision motor control.