Servo Motor Control Using IR Remote and Arduino

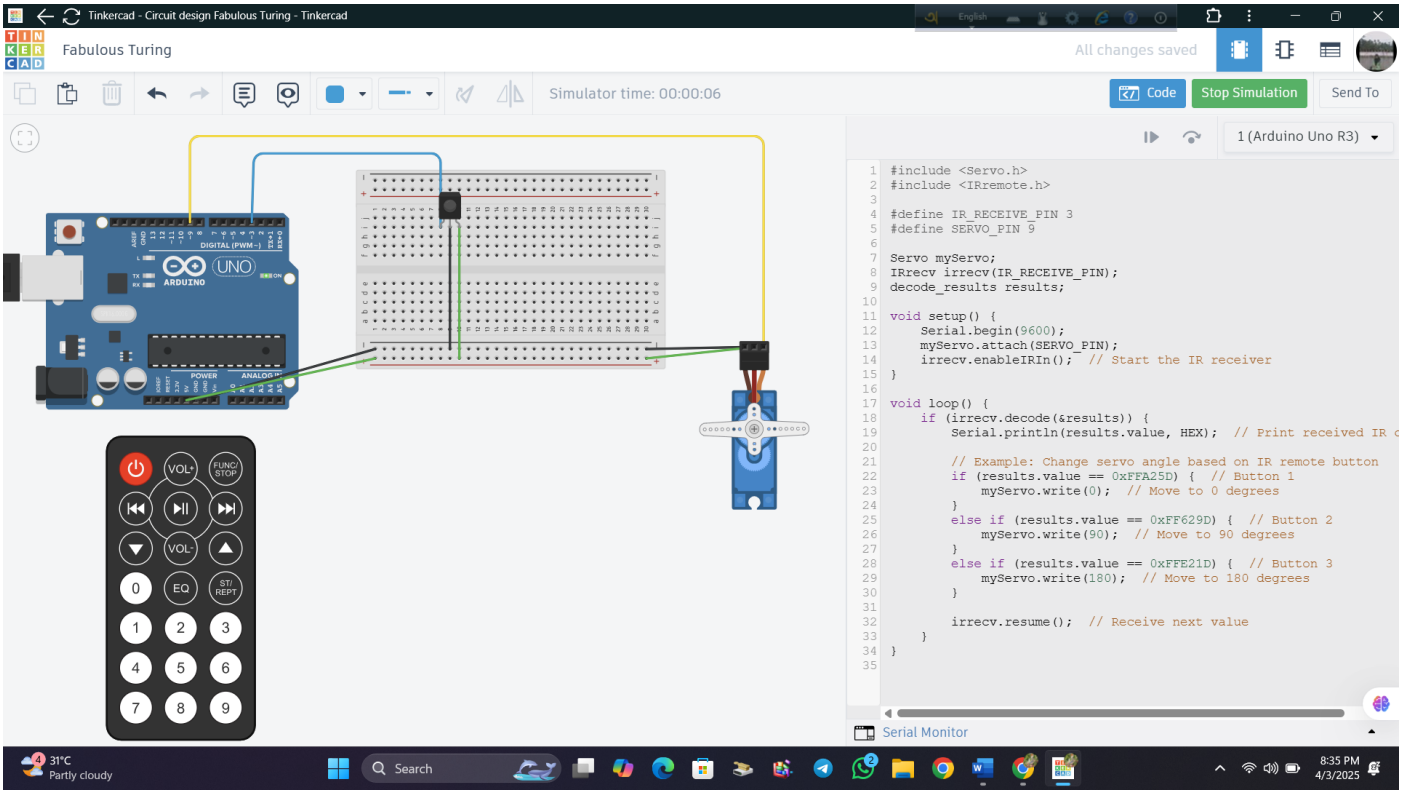
Introduction

This project demonstrates controlling a **servo motor** using an **IR remote and an Arduino**. Infrared (IR) remotes are widely used for wireless communication in TVs, music systems, and other devices. By integrating an **IR receiver with an Arduino**, we can decode IR signals and use them to control a **servo motor**.

Key Components

1. **Arduino Uno** – The microcontroller board that processes the IR signals and controls the servo.
2. **Servo Motor (SG90 or MG995)** – A small motor that rotates based on the received signal.
3. **IR Remote** – Sends infrared signals to the IR receiver module.
4. **IR Receiver Module (TSOP1738 or VS1838B)** – Detects IR signals and sends data to the Arduino.
5. **Jumper Wires** – For electrical connections.
6. **External Power Supply (if needed)** – Some high-torque servos require extra power

Circuit Diagram:



Connections:

- **Servo Motor:**
  - Red (VCC) → 5V (Arduino)
  - Brown (GND) → GND (Arduino)
  - (Signal) → Pin 9 (Arduino)
- **IR Receiver Module:**

- VCC → 5V (Arduino)
- GND → GND (Arduino)
- Signal → Pin 3 (Arduino)

Arduino Code

```
#include <Servo.h>
#include <IRremote.h>
#define IR_RECEIVE_PIN 3
#define SERVO_PIN 9
Servo myServo;
IRrecv irrecv(IR_RECEIVE_PIN);
decode_results results;
void setup() {
  Serial.begin(9600);
  myServo.attach(SERVO_PIN);
  irrecv.enableIRIn();  // Start the IR receiver
}
void loop() {
  if (irrecv.decode(&results)) {
    Serial.println(results.value, HEX);  // Print received IR code
    // Example: Change servo angle based on IR remote button
    if (results.value == 0xFFA25D) {  // Button 1
      myServo.write(0);  // Move to 0 degrees
    }
    else if (results.value == 0xFF629D) {  // Button 2
      myServo.write(90);  // Move to 90 degrees
    }
    else if (results.value == 0xFFE21D) {  // Button 3
      myServo.write(180);  // Move to 180 degrees
    }
    irrecv.resume();  // Receive next value
  }
}
```

Code Explanation

1. **Libraries Used:**
    - Servo.h → Controls the servo motor.
    - IRremote.h → Decodes IR signals.
2. **Setup:**
    - **IR Receiver Pin (3)** is initialized to receive signals.
    - **Servo Motor Pin (9)** is attached.
3. **Loop:**
    - The IR remote sends signals, and the **IR receiver decodes** them.
    - The received IR codes are printed on the serial monitor.
    - If the **"Button 1"** is pressed, the servo moves to **0°**.
    - If the **"Button 2"** is pressed, the servo moves to **90°**.
    - If the **"Button 3"** is pressed, the servo moves to **180°**.

Working Principle

1. The **IR remote sends signals** when a button is pressed.
2. The **IR receiver module** detects the signal and sends the corresponding code to the Arduino.
3. The Arduino **decodes the IR signal** and checks which button was pressed.
4. Based on the received IR code, the Arduino **commands the servo motor** to move to a specific angle.
5. The **servo rotates** accordingly.

Conclusion

This project demonstrates **wireless servo motor control** using an **IR remote and Arduino**. This technique can be applied in **robotics, home automation, and remote-controlled mechanisms**. By modifying the code, additional features like **multiple servos, different movements, or other controlled devices** can be integrated.