Project 6
Accurate Angular Position Controller

Project Description

- The aim of this project is to design and implement an Accurate angular position controller that will be used in industries, vehicles and in the manufacture of Robotic arms.
- The project is built using a Servo that is geared to change the angular position of the propellers. The angles that are used in this project are 0, 90 and 180 degrees.
- The servo motor is controlled by the IR remote with the IR Receiver sensor module.

Components involved

- Arduino UNO R3 board
- Servo Motor (SG90)
- 3 x LEDs
- 3 x 220 ohms resistors
- IR Receiver sensor
- IR Remote
- Breadboard

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IR Receiver sensor

Arduino UNO R3 board

Servo motor SG90

IR Remote

LED

220 ohms Resistor

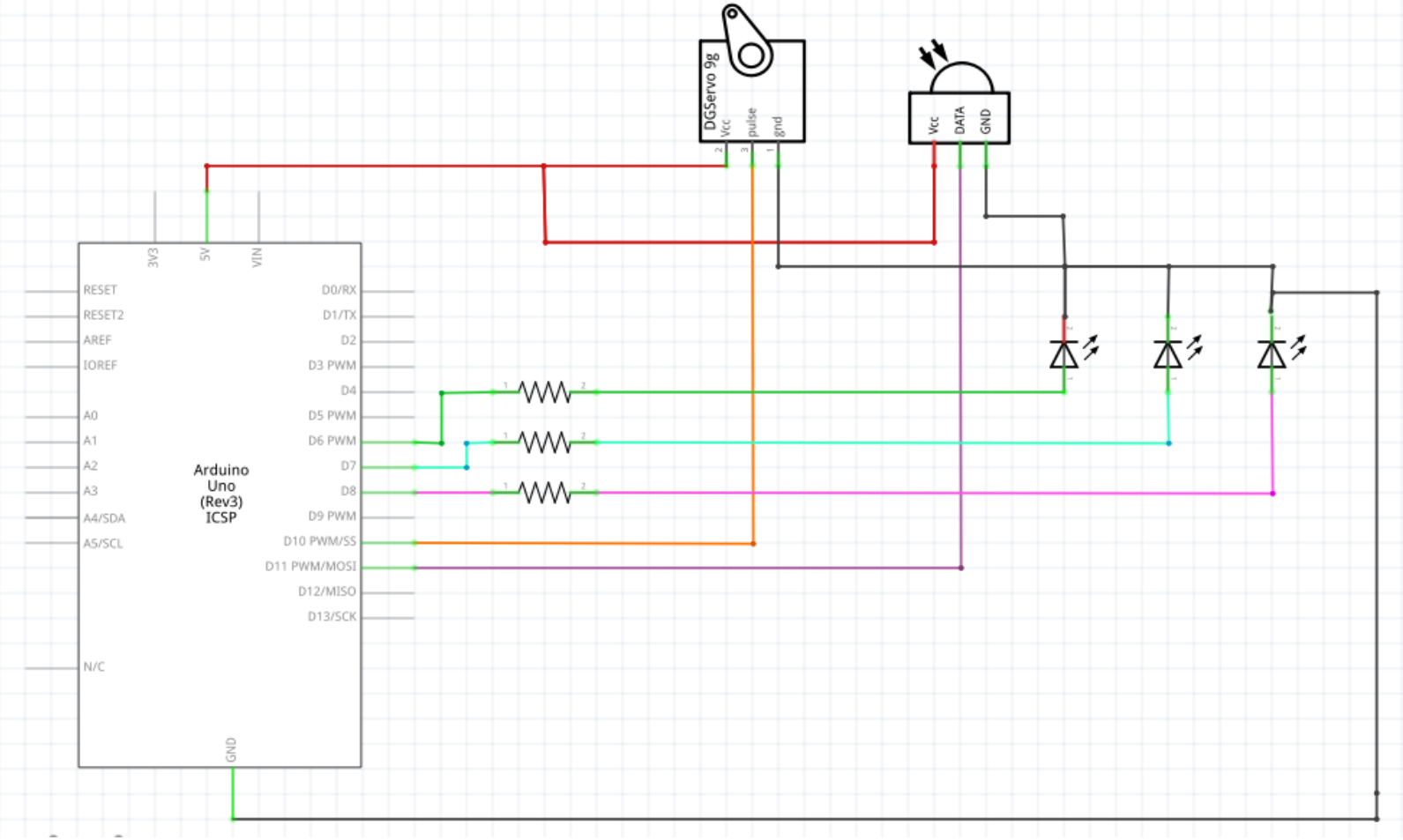
Half breadboard

Jumpers

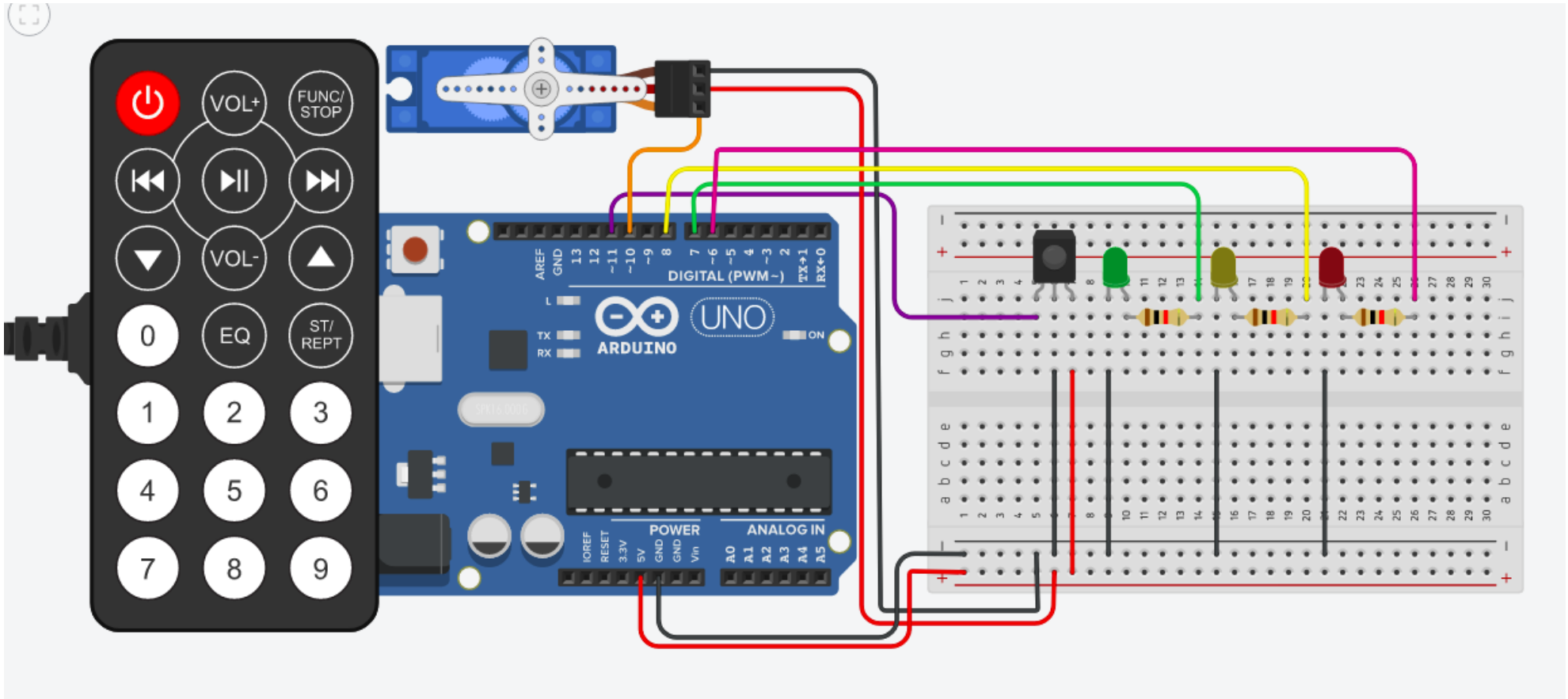
Working principle of Servo motor SG90

- Servo motor (SG90) is a type of geared motor that can only rotate 180 degrees.
- It is controlled by sending electrical pulses from the voltage source (Arduino UNO board for our case), the pulses tell the servo what position it should move to.
- The pulses are of variable width or pulse width modulation. There is a minimum pulse, maximum pulse and a repetition rate.
- The PWM sent to the motor determines the position of the shaft, and based on the duration of the pulse sent via the control wire, the rotor will turn to a desired position.
- The maximum amount of force that a servo can resist is called torque rating.
- The servo will not hold the position forever though; the position pulse must be repeated to instruct the servo to stay in position.

Schematic Circuit



Breadboard Circuit



Applications of the Project

- Radio-controlled airplanes to position control surfaces like elevators.
- Walking a robot
- Operation grippers
- In Food services and Pharmaceuticals.
- In-line manufacturing where high repetition yet precise work is necessary.