Project 1: Controlling LEDs using IR Remote and Arduino UNO

- **Description**: This project involves controlling three LEDs (Blue, Orange, and Green) using an IR remote. Each LED is turned on or off by pressing corresponding buttons on the IR remote.
- **Components Used**:
  - **IR Receiver**: Detects the signals from the IR remote control and decodes them into commands that can be interpreted by the Arduino.
  - **Arduino UNO**: The microcontroller used to control the LEDs based on the received IR commands.
  - **LEDs (Blue, Orange, Green)**: Indicators that turn on or off based on IR remote commands.
  - **Resistors (220Ω)**: Protects the LEDs from excess current.
- **Basic Principles**:
  - **IR Receiver**: The receiver detects modulated infrared light from the remote, decodes it, and sends the corresponding signal to the Arduino.
  - **Arduino UNO**: It processes the IR signal and sends the appropriate output to control the LEDs.
  - **LEDs**: Emit light when current flows through them, and the current is controlled by the Arduino.

Project 2: Servo Motor with IR Remote and Arduino

- **Description**: This project controls the position of a servo motor using an IR remote. The servo motor moves to preset angles (45°, 90°, 135°, 180°) based on remote button presses.
- **Components Used**:
  - **IR Receiver**: Detects the signal from the remote and decodes it.
  - **Arduino UNO**: Controls the servo motor's position based on the decoded IR signal.
  - **Servo Motor**: A motor capable of precise angular positioning.
  - **IR Remote**: The remote control used to send commands to the Arduino.
- **Basic Principles**:
  - **IR Receiver**: Detects modulated infrared light from the remote.
  - **Arduino UNO**: Decodes the command and sends signals to the servo motor to set its angle.
  - **Servo Motor**: Uses a PWM signal to rotate to a specific angle based on input from the Arduino.

Project 3: Traffic Light System Using Arduino

- **Description**: A simple traffic light system simulation using LEDs and Arduino. The LEDs represent the red, yellow, and green lights, which change in sequence with the press of a button.
- **Components Used**:
  - **Arduino UNO**: Controls the LED lights to simulate traffic signals.

- - **LEDs (Red, Yellow, Green)**: Represent traffic lights.
  - **Push Button**: Allows the user to change the sequence of the traffic lights.
- **Basic Principles**:
  - **Arduino UNO**: Controls the timing for each LED and changes the sequence based on button press.
  - **LEDs**: Emit light when powered by the Arduino, with current controlled through resistors.
  - **Push Button**: Provides an input signal to the Arduino to change the light sequence.