My First Arduino Projects

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Project 1: Blinking LED

Objective

Make an LED blink on and off every second using Arduino.

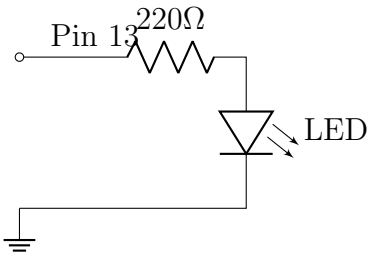
Components

- Arduino Uno
- LED
- 220Ω resistor
- Breadboard and jumper wires

Schematic Explanation

Connect the anode (long leg) of the LED to digital pin 13 through a 220Ω resistor. Connect the cathode (short leg) to GND.

Drawn Schematic



Code

Listing 1: Arduino Code for Blinking LED

```
void setup() {
  pinMode(13, OUTPUT);
}

void loop() {
  digitalWrite(13, HIGH);
  delay(1000);
  digitalWrite(13, LOW);
  delay(1000);
}
```

Project 2: Button Controlled LED

Objective

Turn an LED on or off using a push button.

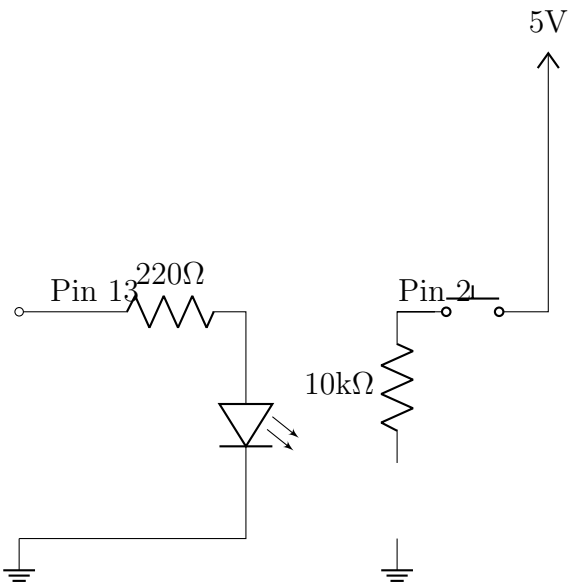
Components

- Arduino Uno
- LED
- 220Ω resistor
- Pushbutton
- 10kΩ pull-down resistor
- Breadboard and jumper wires

Schematic Explanation

The button connects between pin 2 and 5V. A pull-down resistor (10kΩ) keeps pin 2 LOW when the button is not pressed. LED is connected to pin 13 with a 220Ω resistor.

Drawn Schematic



Code

Listing 2: Arduino Code for Button Controlled LED

```
int buttonPin = 2;
int ledPin = 13;
int buttonState = 0;

void setup() {
  pinMode(ledPin, OUTPUT);
  pinMode(buttonPin, INPUT);
}

void loop() {
  buttonState = digitalRead(buttonPin);
  if (buttonState == HIGH) {
    digitalWrite(ledPin, HIGH);
  } else {
    digitalWrite(ledPin, LOW);
  }
}
```

Project 3: Potentiometer-controlled LED Brightness

Objective

Use a potentiometer to control LED brightness via PWM.

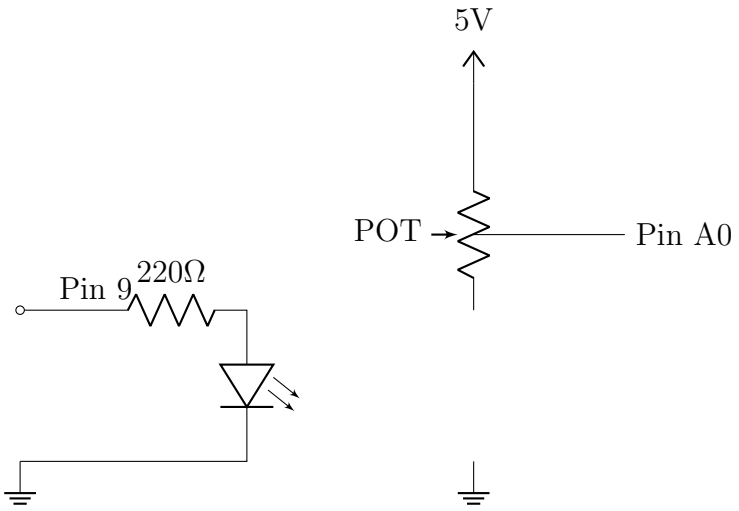
Components

- Arduino Uno
- LED
- 220Ω resistor
- 10kΩ potentiometer
- Breadboard and jumper wires

Schematic Explanation

The potentiometer is connected to 5V and GND, with its wiper (middle pin) going to analog pin A0. The LED is connected to PWM pin 9 via a 220Ω resistor.

Drawn Schematic



Code

Listing 3: Potentiometer to LED Brightness Control

```
int potPin = A0;
int ledPin = 9;

void setup() {
```

```
  pinMode(ledPin, OUTPUT);
}

void loop() {
  int val = analogRead(potPin);
  int brightness = map(val, 0, 1023, 0, 255);
  analogWrite(ledPin, brightness);
}
```

Project 4: Light-sensitive LED

Objective

Turn an LED on in the dark using an LDR (light-dependent resistor).

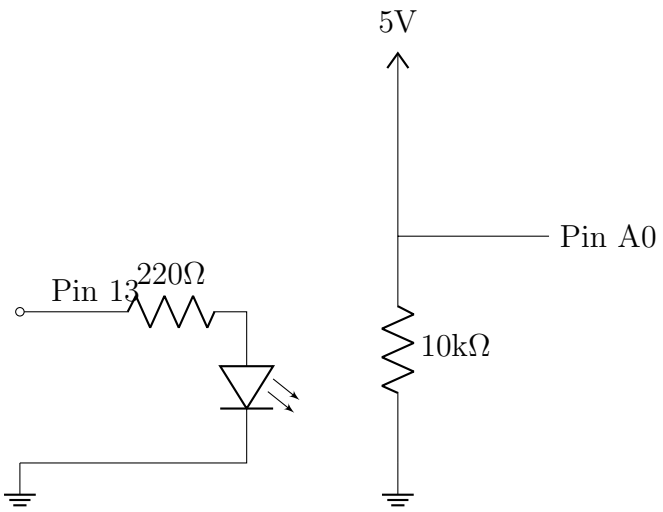
Components

- Arduino Uno
- LED
- 220Ω resistor
- LDR
- 10kΩ resistor
- Breadboard and jumper wires

Schematic Explanation

The LDR and 10kΩ resistor form a voltage divider. The analog voltage is read via A0. If light level is low (high resistance on LDR), the LED is turned on.

Drawn Schematic



Code

Listing 4: Light Sensitive LED

```
int sensorPin = A0;
int ledPin = 13;
```

```
void setup() {
  pinMode(ledPin, OUTPUT);
}

void loop() {
  int val = analogRead(sensorPin);
  if (val < 300) {
    digitalWrite(ledPin, HIGH);
  } else {
    digitalWrite(ledPin, LOW);
  }
}
```

Project 5: Temperature Sensor LED Alert

Objective

Turn on an LED when temperature exceeds a threshold using an LM35.

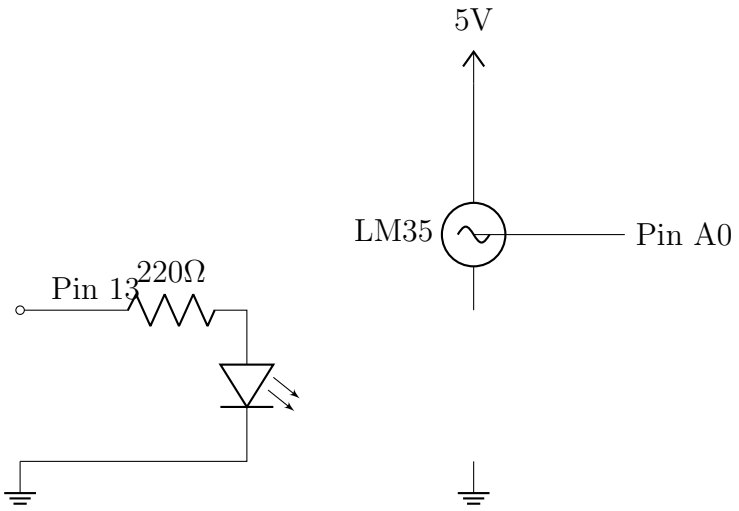
Components

- Arduino Uno
- LED
- 220Ω resistor
- LM35 temperature sensor
- Breadboard and jumper wires

Schematic Explanation

The LM35 outputs an analog voltage corresponding to temperature (10mV/C). Connect the sensor's output to A0 and power it with 5V/GND.

Drawn Schematic



Code

Listing 5: Temperature LED Alert

```
int tempPin = A0;
int ledPin = 13;

void setup() {
```

```
  pinMode(ledPin, OUTPUT);
}

void loop() {
  int val = analogRead(tempPin);
  float voltage = val * (5.0 / 1023.0);
  float tempC = voltage * 100;
  if (tempC > 30) {
    digitalWrite(ledPin, HIGH);
  } else {
    digitalWrite(ledPin, LOW);
  }
}
```