

Embedded System Workshops

Simon Says Game

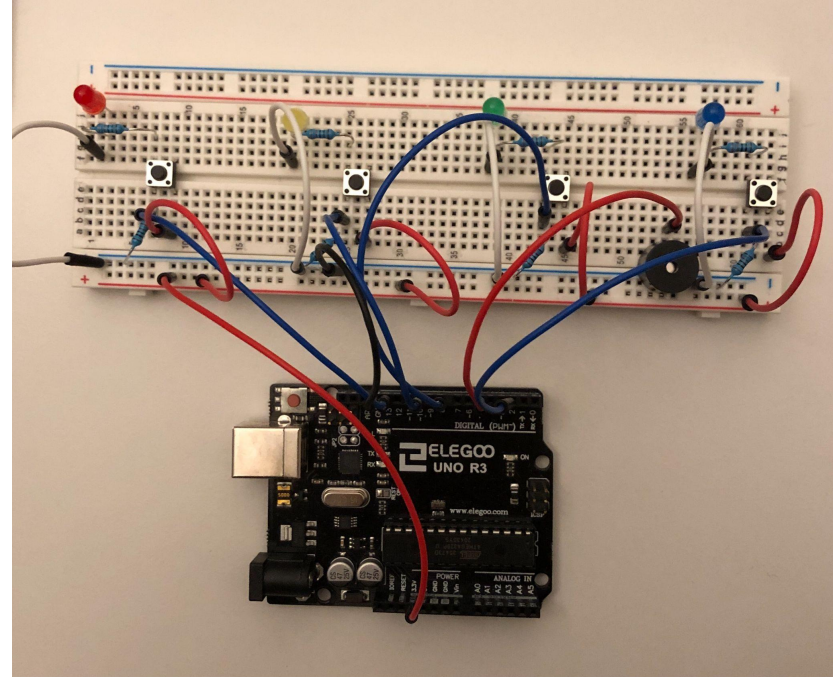
Claire Kim

CCA Girls Who Code



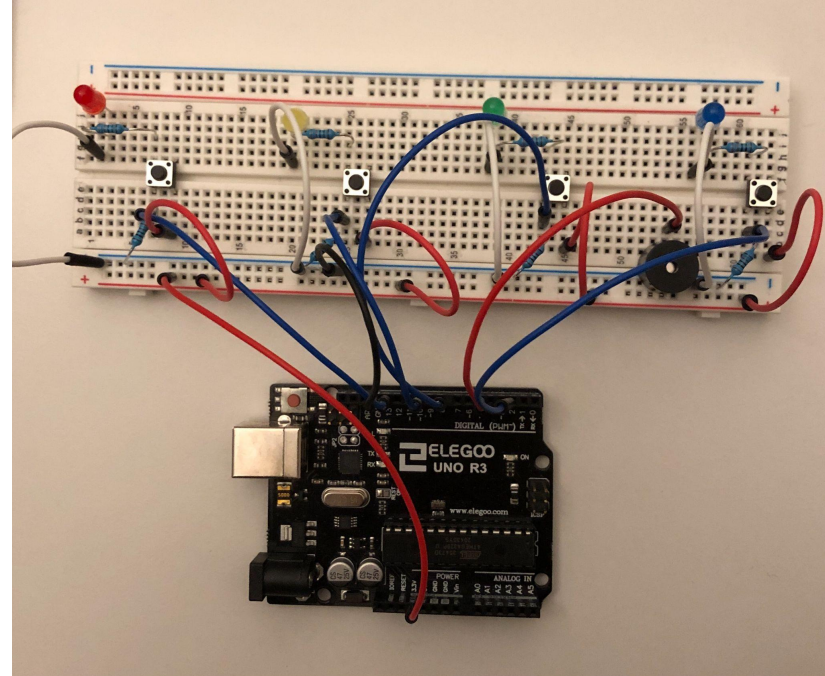
Project Overview

- Purpose
 - ◆ Learn how to use buttons, leds, and buzzers to create a sequence game
 - ◆ Combine skills and parts used in previous projects
- Grab your kit, and let's get started!



What are we making?

- Simon Says Game
 - ◆ The circuit runs “Simon,” a sequence memory game with 4 LEDs where you follow the given light sequences by pressing buttons.
 - ◆ Based off [Jeremie's Arduino Memory Game](#)

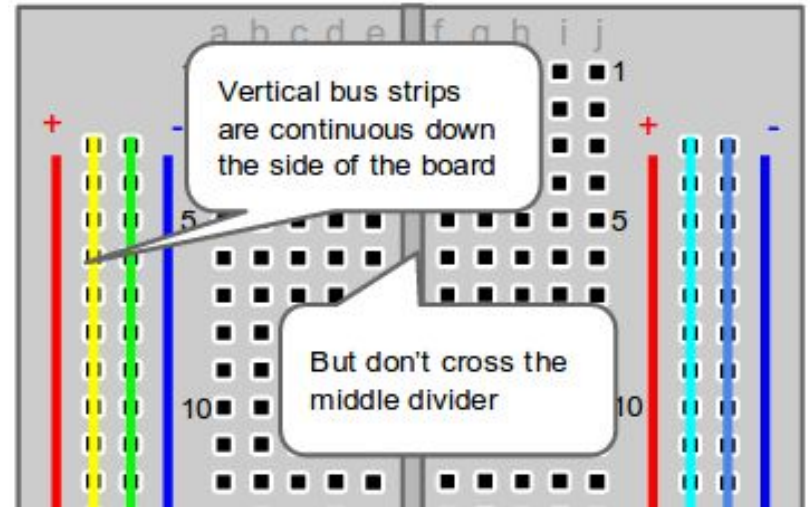
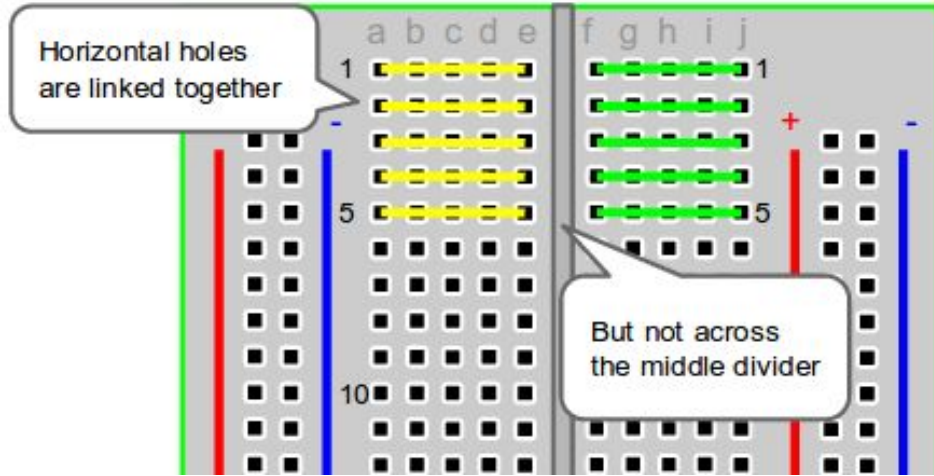


Parts List

- Arduino UNO R3 Controller Board
- USB Cable
- Breadboard
- Active Buzzer
- LED
- Button
- Resistor, 330 ohm (x4)
- Resistor, 10k ohm (x4)
- Male-to-male jumper wires

Theory

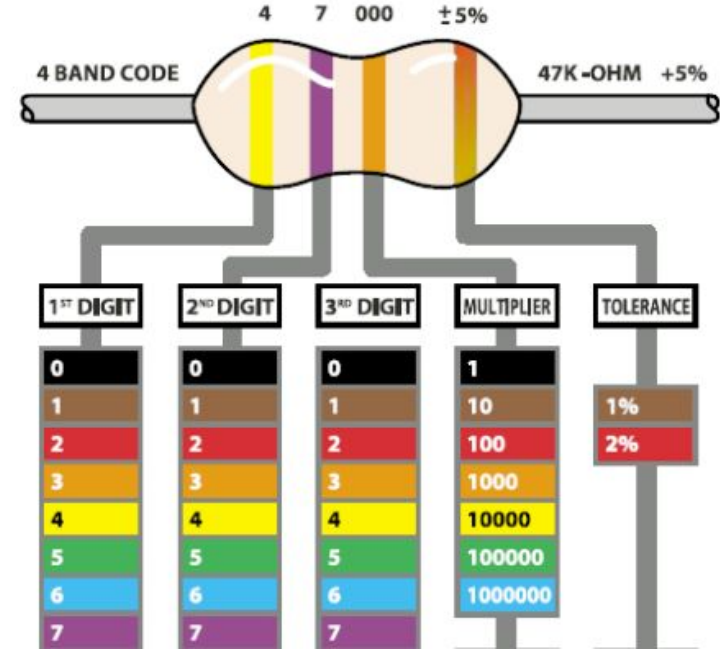
Review: Breadboards Explained



Tip: It is good practice to have your power input connected to the red/positive rail and your ground pin connected to the blue/negative rail.

Review: Resistors

- Resistors slow the electric current, and control where and how fast the current flows
- Resistance value is measured in ohms Ω , which is represented by colored stripes on the body of the resistor
- Each stripe has a different value depending on the color and location as shown in the reference chart
- A potentiometer is a variable resistor



Project

Types of I/O in this project

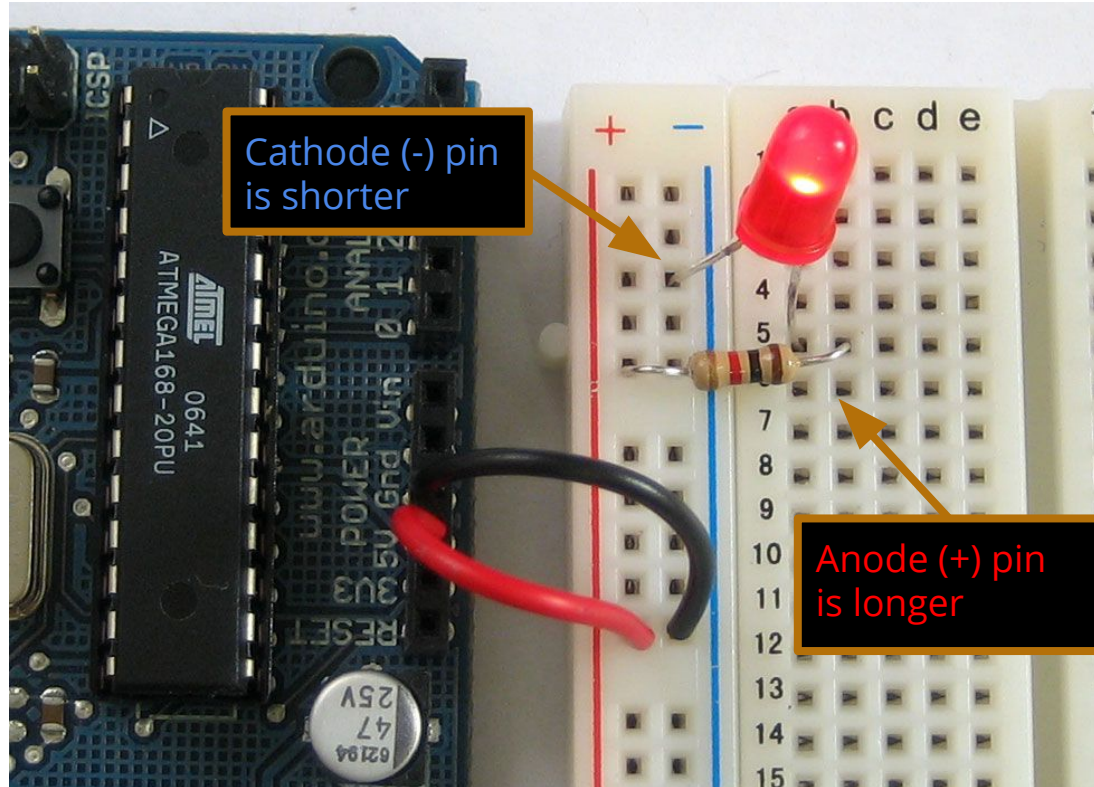
Inputs

- Button/Switches
 - ◆ Allows player input for the game

Outputs

- Piezo buzzer
 - ◆ Makes beeping sound once the game is done giving one sequence
- LED
 - ◆ Blinks to show sequence

Review: LEDs



NOTE: Make sure the power input is connected to the Anode, and the ground pin is connected to the Cathode. Make sure you also have a resistor between either the power input and Anode, or the Cathode and ground pin. Failing to do either of these things can damage the LED or the Arduino.

Review: What are Switches?

A switch is a device that you can use to open or close a circuit at will. A closed circuit allows current to flow through it. An open circuit has a gap in the circuit, preventing current from flowing through it.

Why is this relevant?

A button is a type of switch that closes the circuit when pressed down and opens it when released.

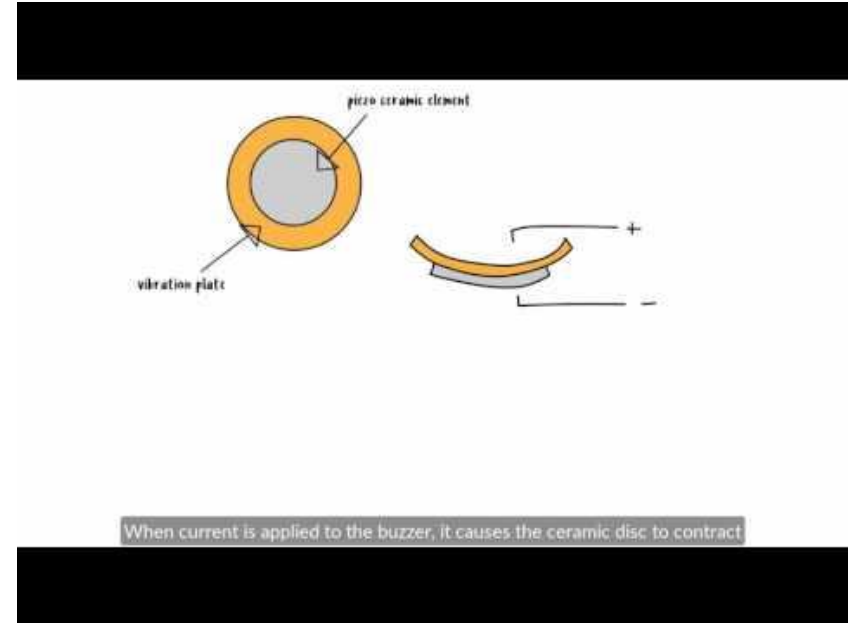


A button

Review: Buzzers

A buzzer is designed to play a specific tone when given an input. Different frequencies correspond to different tones being played.

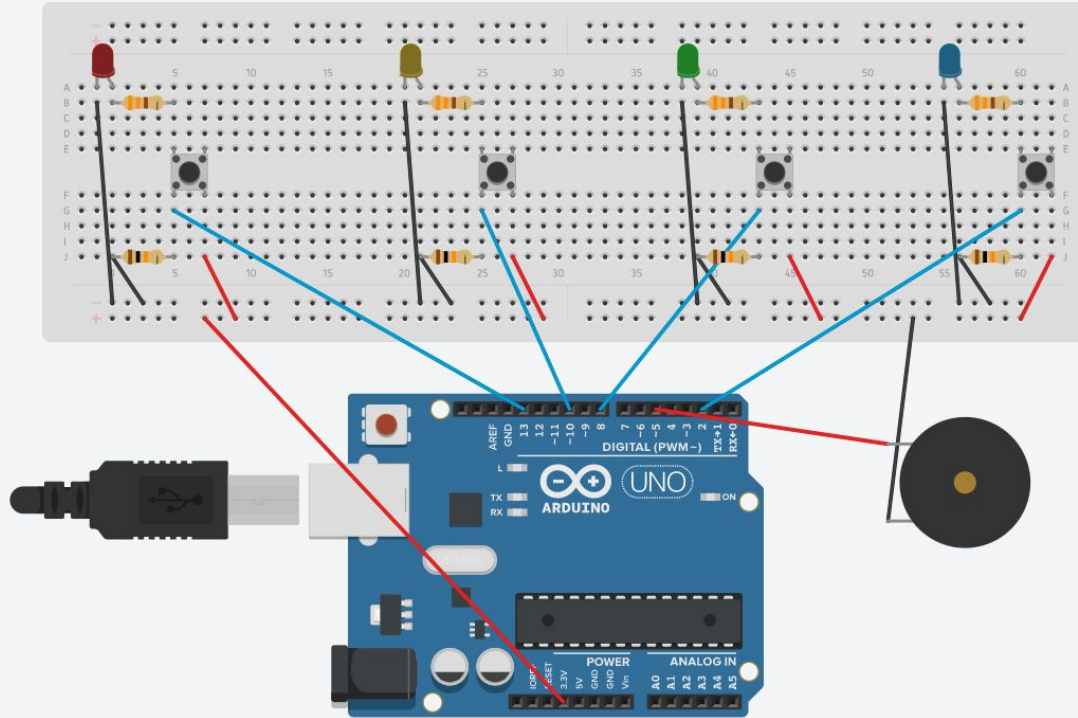
When current is applied to the buzzer, an internal ceramic disk contracts or expands against a surrounding disk, creating sound.



Schematic

330 ohm
resistors -->

10k ohm
resistors -->



Simon Says Code

```
SimonSaysCode
#define PLAYER_WAIT_TIME 2000 // The time allowed between button presses - 2s

byte sequence[100];           // Storage for the light sequence
byte curLen = 0;              // Current length of the sequence
byte inputCount = 0;          // The number of times that the player has pressed a (correct) button in a given turn
byte lastInput = 0;          // Last input from the player
byte expRd = 0;               // The LED that's suppose to be lit by the player
bool btnDwn = false;         // Used to check if a button is pressed
bool wait = false;           // Is the program waiting for the user to press a button
bool resetFlag = false;      // Used to indicate to the program that once the player lost

byte soundPin = 5;           // Speaker output

byte noPins = 4;              // Number of buttons/LEDs (While working on this, I was using only 2 LEDs)
// You could make the game harder by adding an additional LED/button/resistors combination.
byte pins[] = {2, 13, 10, 8}; // Button input pins and LED output pins - change these values if you want to connect your buttons to other pins
// The number of elements must match noPins below

long inputTime = 0;          // Timer variable for the delay between user inputs

void setup() {
  delay(3000);                // This is to give me time to breathe after connection the arduino - can be removed if you want
  Serial.begin(9600);         // Start Serial monitor. This can be removed too as long as you remove all references to Serial below
  Reset();
}
```

To test your code,
click the checkmark
then the arrow!



Thank you!

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