

Arduino circuits

Week 6 exercises

Ardunios

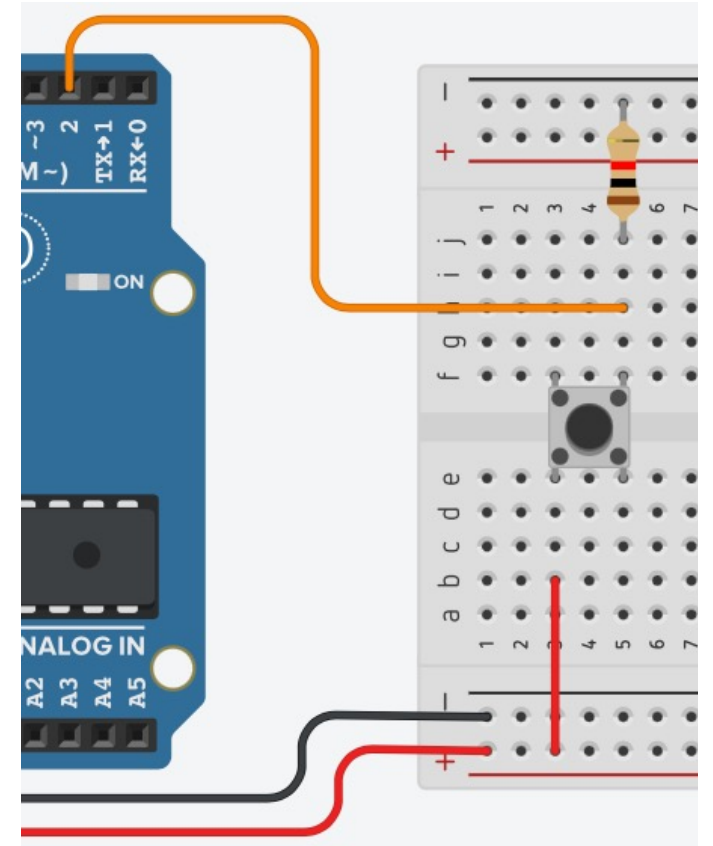
- This week, we'll be adding the Ultrasonic sensor to the set of components used with our Arduino
- Practice block programming using the different components covered

BRONZE Challenge:

- Step 1:
 - Add a 4-pin Ultrasonic sensor and connect it to an arduino using a breadboard
 - Write a program to print out the distances coming from the Ultrasonic sensor

BRONZE Challenge:

- Step 2:
 - Add a push button to your breadboard and connect it to the Arduino
 - Add an LED to your breadboard and connect it to the Arduino
- In your program, create a variable called On
- When the button is pressed, it should switch the value stored in On between HIGH and LOW
- If On is HIGH, your LED should turn on and you should print out the readings from the sensor

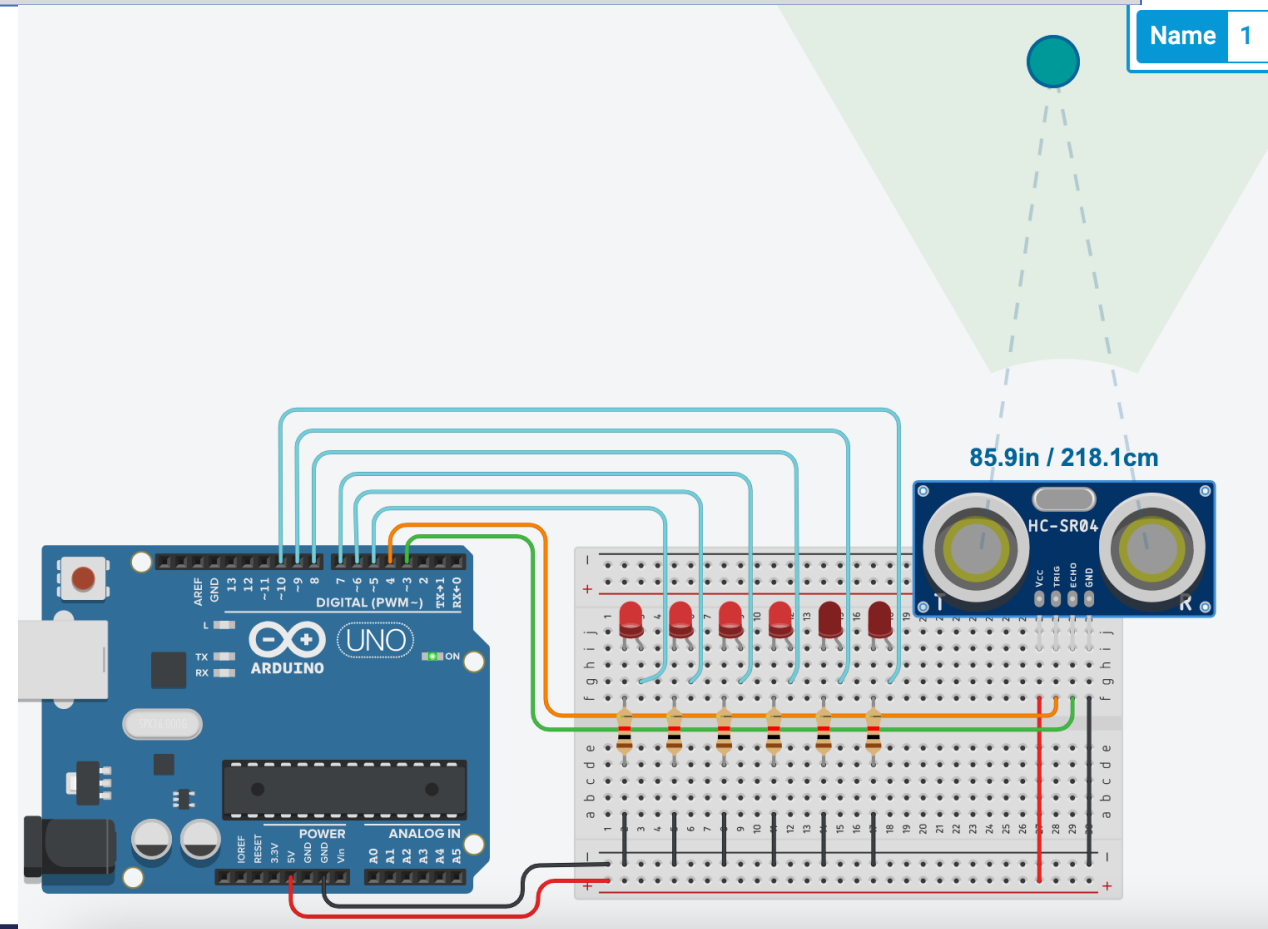


BRONZE Challenge:

- Step 3:
 - Add a second LED to your breadboard and connect it to your Arduino
 - The LED will be used for digital output
 - Update your program to turn on the second LED when something is detected by the Ultrasonic sensor within 100cm ONLY when the state is On

SILVER Challenge:

- In a new circuit:
- Step 1:
 - Add an ultrasonic sensor and 6 LEDs



SILVER Challenge:

- Step 2:
 - Use the LEDs to show how far away something is detected with the Ultrasonic sensor, e.g.:
 - 0-50cm no lights
 - 50-100cm 1 light
 - 100-150cm 2 lights
 - ...

GOLD Challenge:

- In a new circuit:
- Step 1:
 - Add the following components connected to an arduino using an breadboard:
 - RGB LED (analog output)
 - Potentiometer
 - LDR (Photoresistor) and
 - Ultrasonic sensor

GOLD Challenge:

- Write a program to change the colours on the RGB LED as follows:
 - Red controlled by input from Potentiometer
 - Green controlled by input from LDR
 - Blue controlled by input from Ultrasonic
- Remember to use the map function for the input
 - You may need to switch to Text based programming to modify ranges for maps input

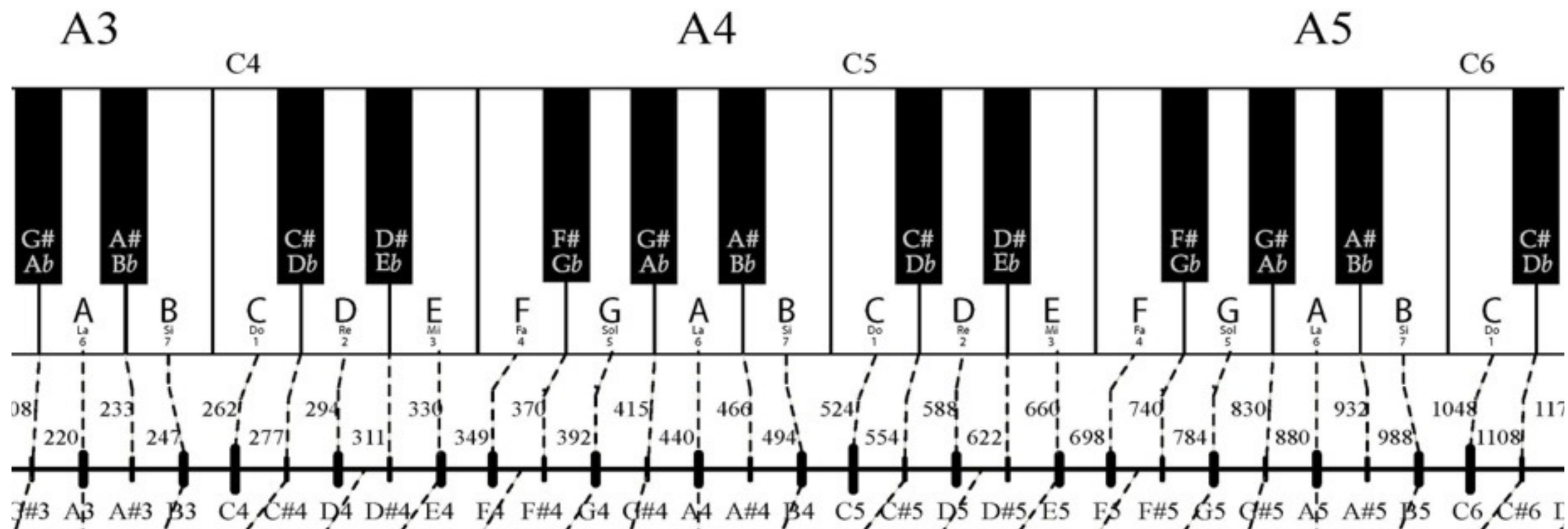
Extension Challenge 1

- Ear bleeding challenge:
 - Make a musical instrument using the ultrasonic sensor and piezo buzzer
 - Make the tone change based on the distance returned by the ultrasonic sensor

Extension Challenge 2

1. Create a new circuit in TinkerCAD.
2. Connect a piezo buzzer to an Arduino (with a breadboard)
3. Program the Arduino to play a simple short tune with the piezo buzzer – See next slide for the values needed to play notes.

Extension Challenge 2



Extension Challenge 3

Try and recreate this piece – you'll need 3 piezo buzzers.
Extended keyboard mappings are on the next slide, sort of.

[illegible]

Extension Challenge

