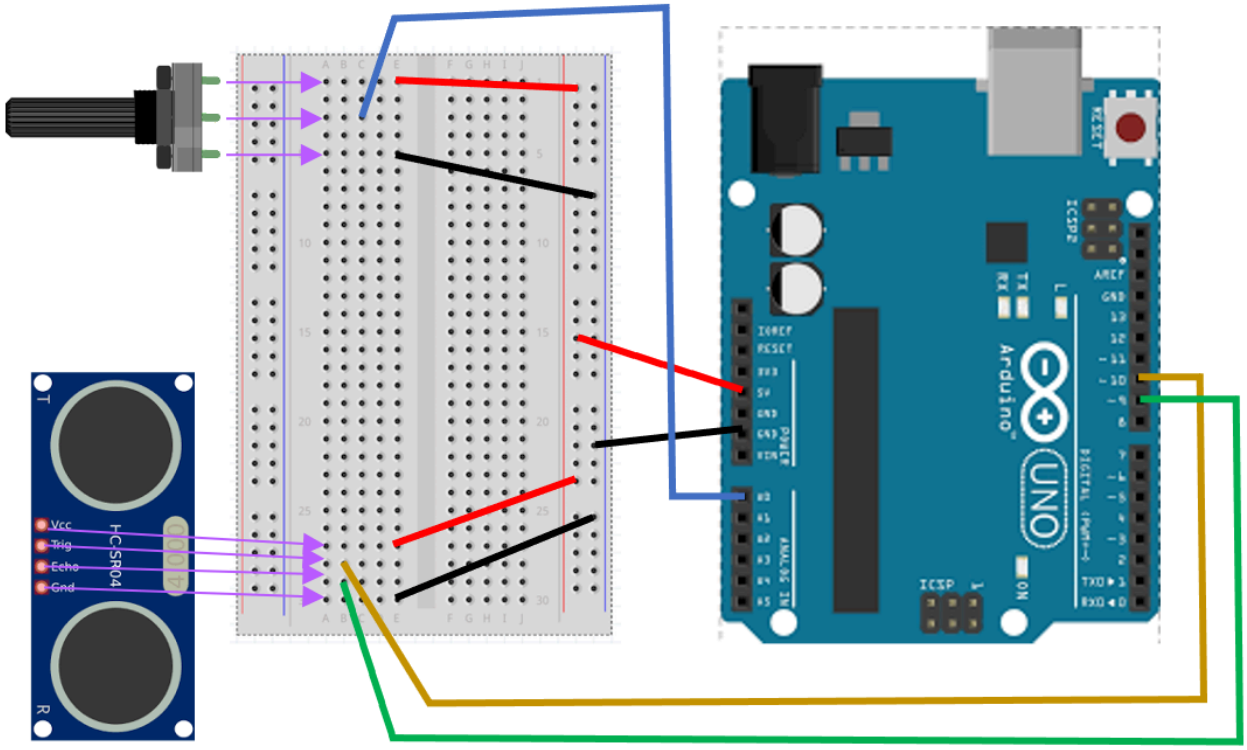
Girls Conference 2023
Workshop on rapid prototyping of a custom electronic musical instrument

THE UNIVERSITY OF SYDNEY | ACFR AUSTRALIAN CENTRE FOR FIELD ROBOTICS | ARIAM

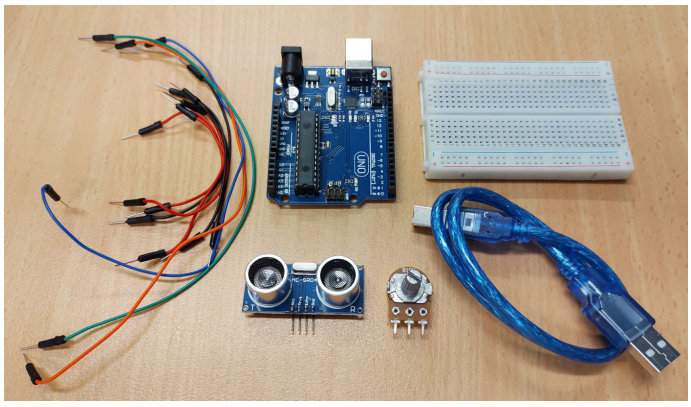
Circuit for the Ultrasonic Musical Instrument:



Circuit Building Instructions:

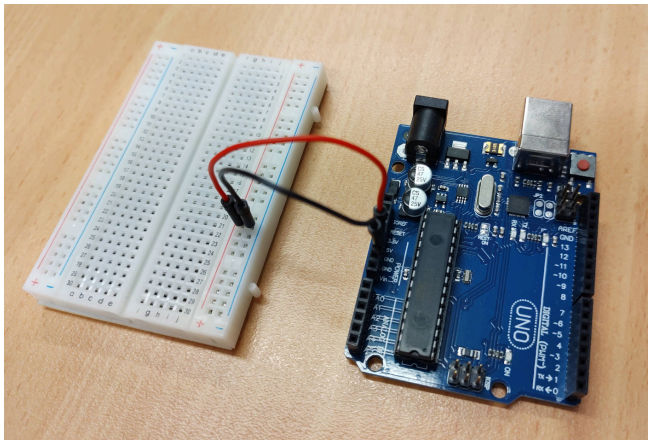
Step 1: Start by un-packing the parts needed:

- Arduino Uno
- Breadboard
- Dual Ultrasonic Sensor Module
- Potentiometer
- Collection of jumper wires (snip the cable-tie off with scissors)



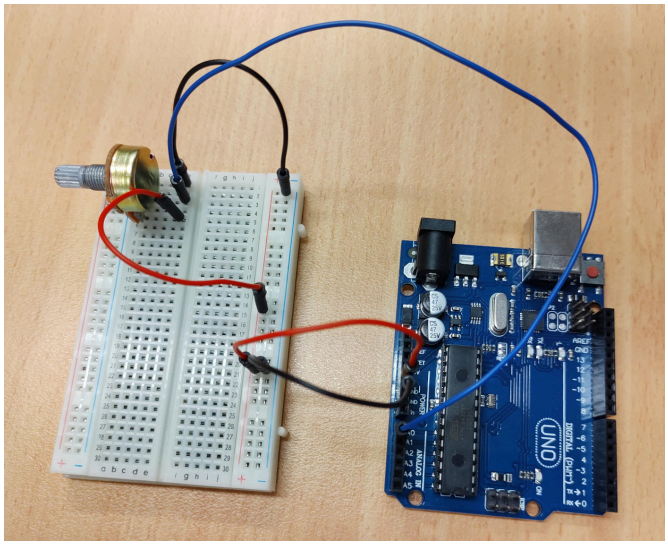
Step 2: Connect power to the breadboard rails:

- Connect one wire between the "+" power rail on the breadboard and the "5V" pin on the Arduino (use a red wire).
- Connect a second wire (use black) between the "-" power rail on the breadboard and any one of the "GND" pins on the Arduino
- The colour doesn't really matter but we will try to follow a convention:
    - Red: connected to 5V
    - Black: connected to "Ground"



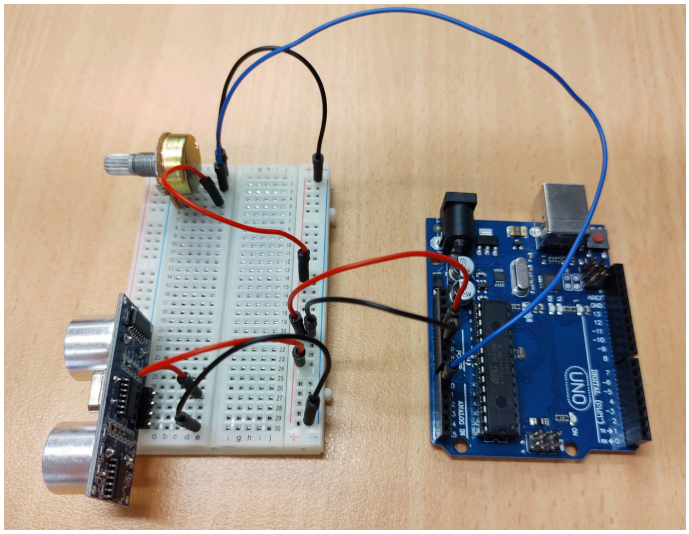
Step 3: Connect the Potentiometer:

- Plug-in the three pins on the potentiometer into a position on the breadboard as shown: each pin must be on a different numbered row on the breadboard (try using rows 1, 3 and 5 for the pins)
- Connect (using a black wire) the "-" breadboard power rail to a connection on the same row as the top pin (row 1 as shown here) of the potentiometer
- Connect (using a red wire) the "+" breadboard power rail to a connection on the same row as the bottom pin (row 5 as shown here) of the potentiometer
- Finally, connect (using any colour other than red/black: blue shown here) the middle pin of the potentiometer (row 3 as shown here) to pin "A0" on the Arduino.



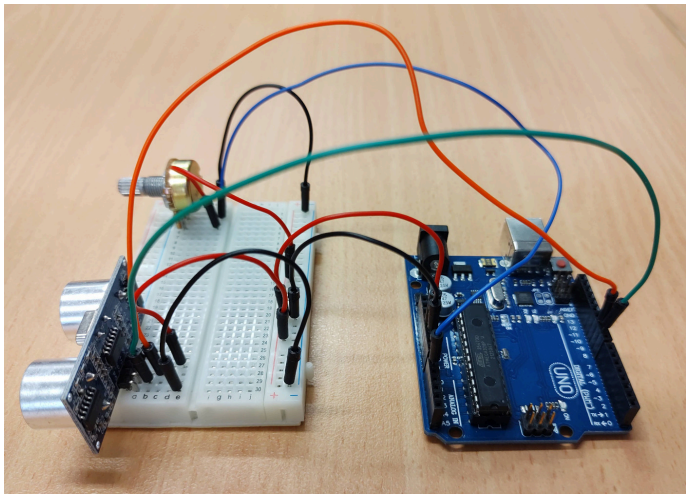
Step 4: Connect power for the Ultrasonic Sensor:

- Plug in the Ultrasonic sensor's four pins into the breadboard as shown:
    - The sensor is facing outwards
    - In the image, we are using rows 27, 28, 29 and 30 on the breadboard
- Use a red wire to connect the "+" breadboard power rail to the sensor's top pin (row 27)
- Use a black wire to connect the "-" breadboard power rail to the sensor's bottom pin (row 30)



Step 5: Connect signals for the Ultrasonic Sensor:

- Connect a wire (shown as green in the image) from the row on the breadboard connected to the "Echo" pin of the sensor (second row from bottom, or row 29 as shown in image) to Pin 9 on the Arduino.
- Connect a wire (shown as orange in the image) from the row on the breadboard connected to the "Trig" pin of the sensor (second row from top, or row 28 as shown in image) to Pin 10 on the Arduino.



Your circuit is now complete: move on to the Coding Worksheet to program the Arduino.