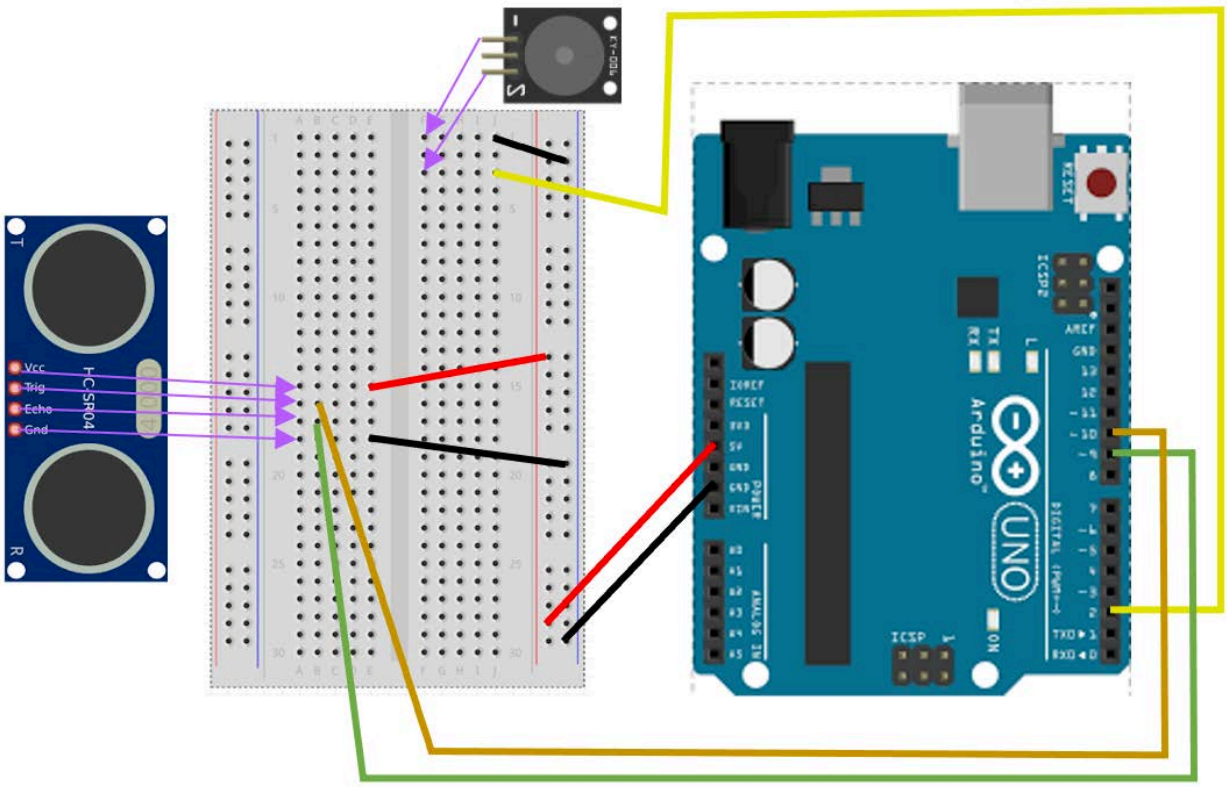
Discover Engineering!
Workshop to make an *Ultrasonic Sight Device* to aid a person with a vision impairment

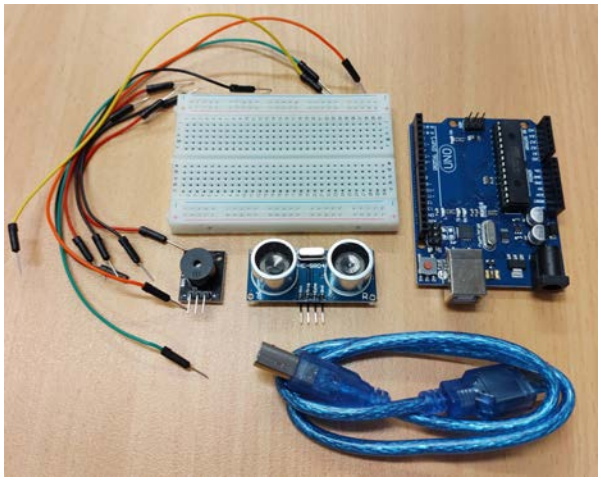
Circuit for the Ultrasonic Sight Device:



Circuit Building Instructions:

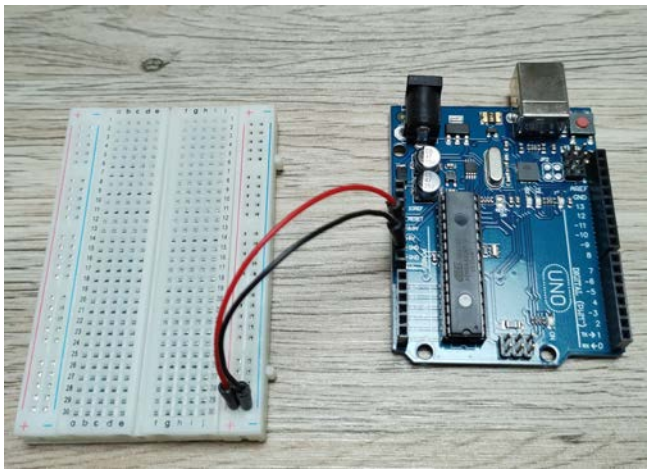
Step 1: Start by un-packing the parts needed:

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



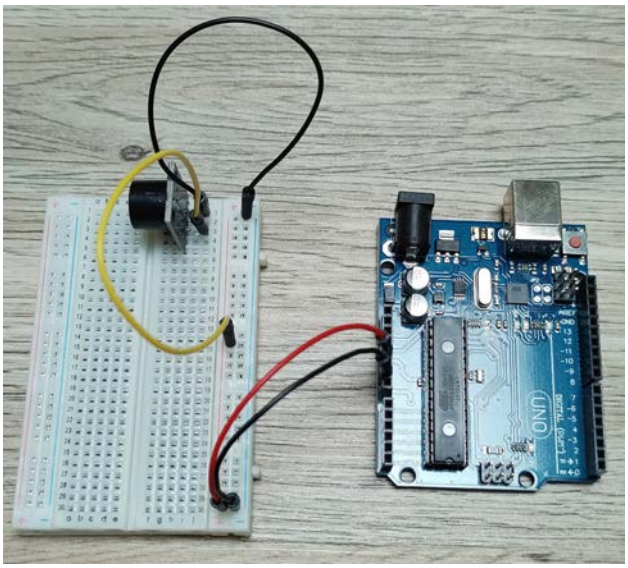
Step 2: Connect power to the breadboard rails:

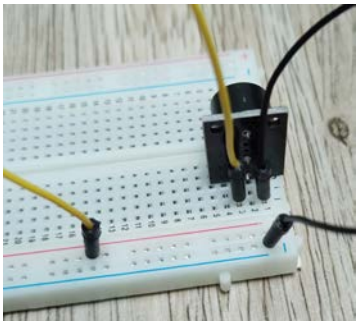
- Connect one wire between the "+" power rail on the breadboard and the "5V" pin on the Arduino (use a red wire).
- Connect a second wire (use black) between the "-" power rail on the breadboard and any one of the "GND" pins on the Arduino
- The colour doesn't really matter but we will try to follow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



Step 3: Connect the Buzzer module:

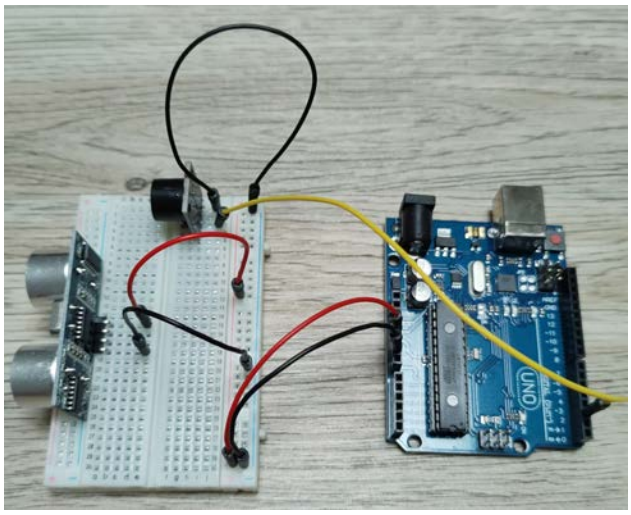
- Plug-in the three pins on the buzzer module into a position on the breadboard as shown: each pin must be on a different numbered row on the breadboard (try using rows 1, 2 and 3 for the pins)
- Connect (using a black wire) the "-" breadboard power rail to a connection on the same row as the top pin (row 1 as shown here) of the buzzer
- Connect (using any colour other than red/black: yellow shown here) the "+" breadboard power rail to the rows of the bottom pin of the buzzer (row 3 as shown here)
- **Test your circuit!** Get ready to hear the buzzer (it's fairly loud!): using the blue USB cable, connect up the Arduino to you computer: this provides power to the circuit and switches the buzzer on
- Once you have confirmed the buzzer is working, unplug the USB cable from your computer.





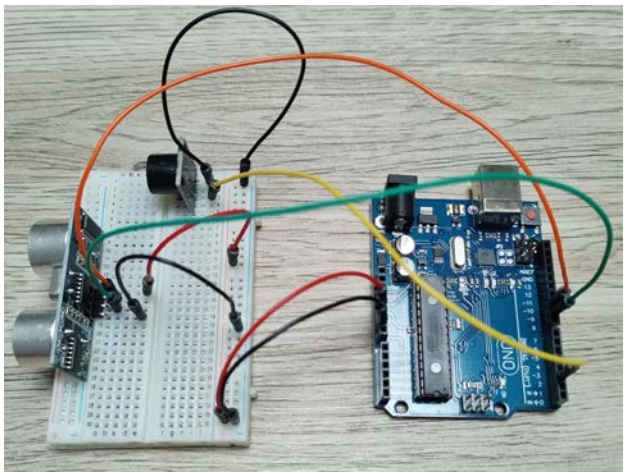
Step 4: Connect power for the Ultrasonic Sensor:

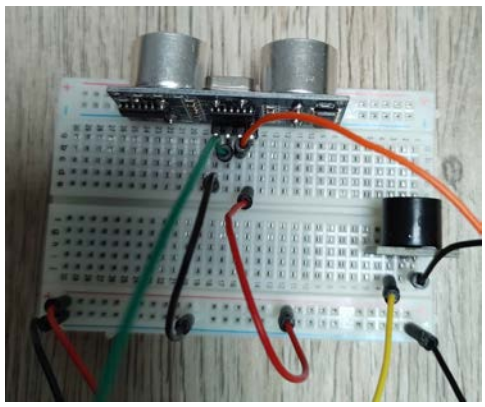
- Pull one end of the yellow wire out (the end connected to the "+" power rail) and move this connection to Pin 2 of the Arduino.
    - This now lets the Buzzer be controlled by the Arduino
- Plug in the Ultrasonic sensor's four pins into the breadboard as shown:
    - The sensor is facing outwards
    - In the image, we are using rows 15, 16, 17 and 18 on the breadboard
- Use a red wire to connect the "+" breadboard power rail to the sensor's top pin (row 15)
- Use a black wire to connect the "-" breadboard power rail to the sensor's bottom pin (row 18)



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 17 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 16 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.