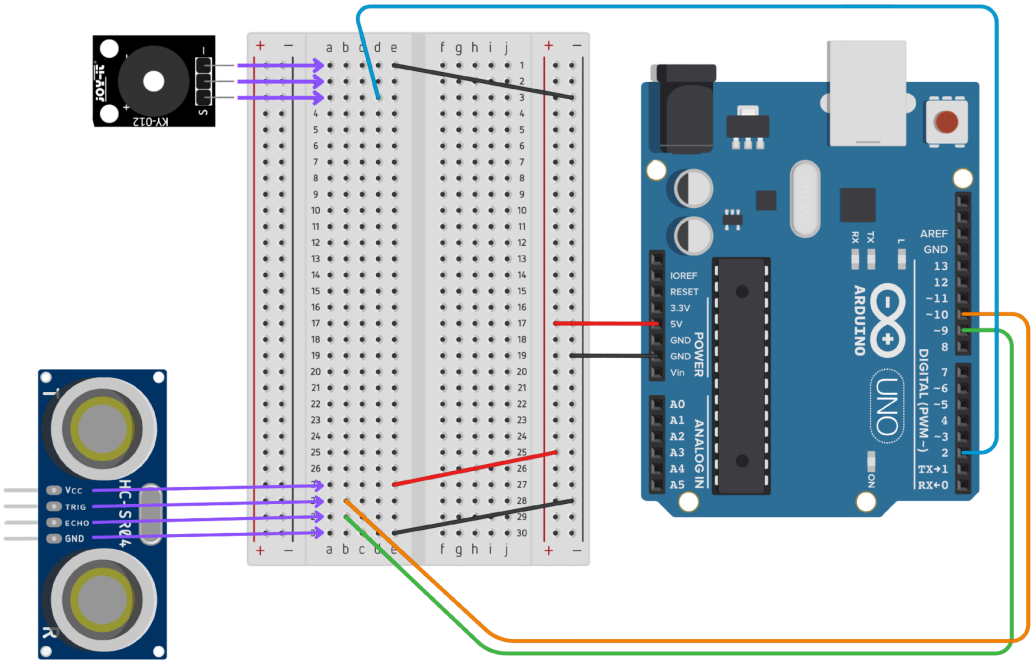
Ultrasonic Sight

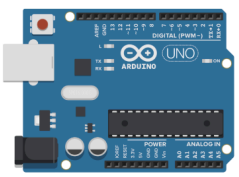
Instructions for <u>building</u> your circuit!



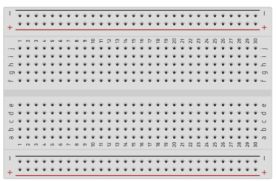
This is what your final circuit will look like!

Note: Follow the steps one-by-one and pay close attention to where each wire goes.

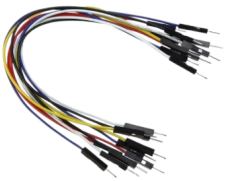
Step 1: Identify the components in your robotics kit.



1x Arduino UNO



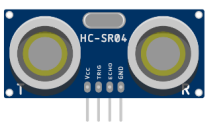
1x Breadboard



9x Jumper Wires

NOT TO BE USED

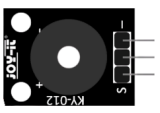
1x Potentiometer **2x Resistors**



1x Ultrasonic Sensor

1x USB Cable

1x USB-C Adapter



1x Buzzer

2x LEDs

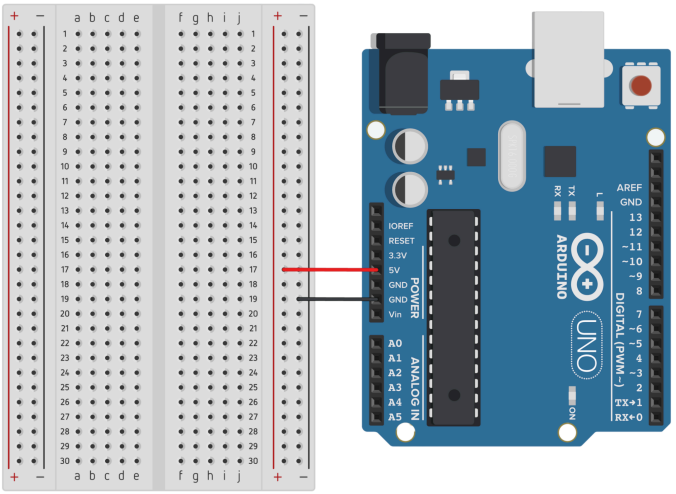
Step 2: Connect power to the breadboard rails:

A. Connect one wire (preferably **red**) between the '+' power rail on the breadboard and the '5V' pin on the Arduino.

B. Connect one wire (preferably **black**) between the '-' power rail on the breadboard and any one of the two 'GND' pins on the Arduino.

C. **Note:** If the colour of your wires does not match the diagram, that is okay! The convention that we try to follow is :

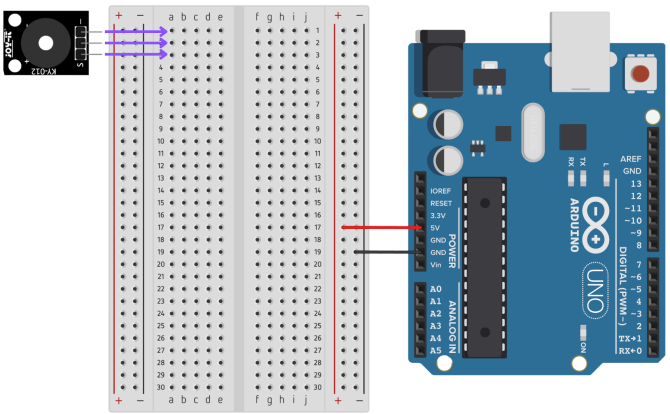
- **RED** for connection to Power
- **BLACK** for connection to Ground



Step 3: Connect the Buzzer:

A. Plug-in the three pins on the buzzer into a position on the breadboard as shown.

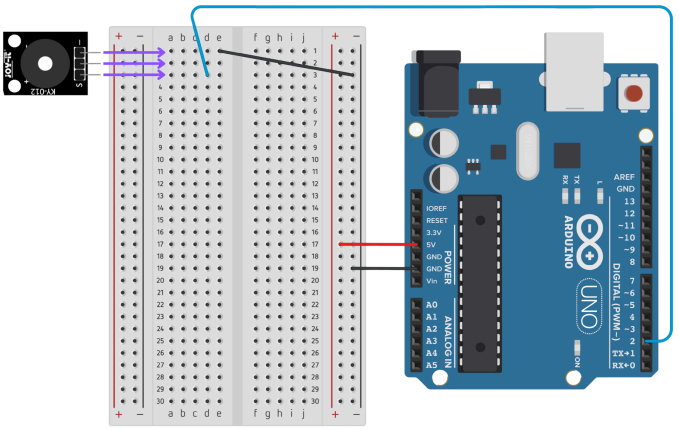
B. Each pin must be on a different numbered row on the breadboard. In this case, pins 1(a), 2(a) & 3(a).



Step 4: Wire up the Buzzer:

A. Take a **wire** and connect the '-' breadboard power rail to a connection on the same row as the top pin (row 1 as shown here) of the buzzer.

C. Take a **wire** and connect the '2' pin on the Arduino to the bottom pin (row 3 as shown here) of the buzzer.



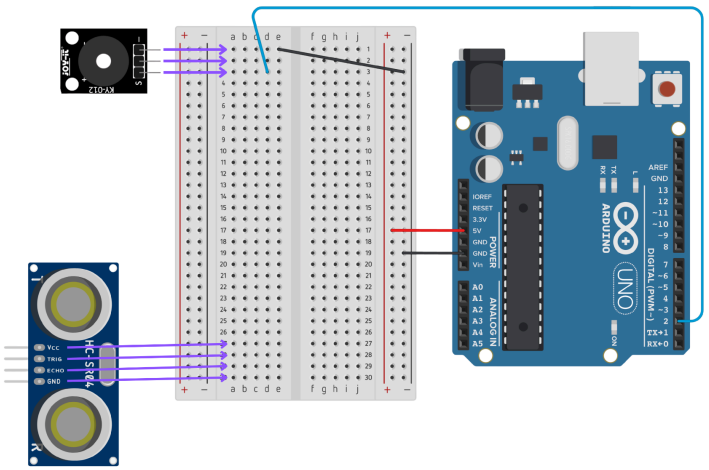
Step 5: Connect the Ultrasonic Sensor:

A. Plug in the Ultrasonic Sensor's four pins into the breadboard as shown.

B. The sensor should be facing outwards.

C. Use the rows 27-30 on the breadboard.

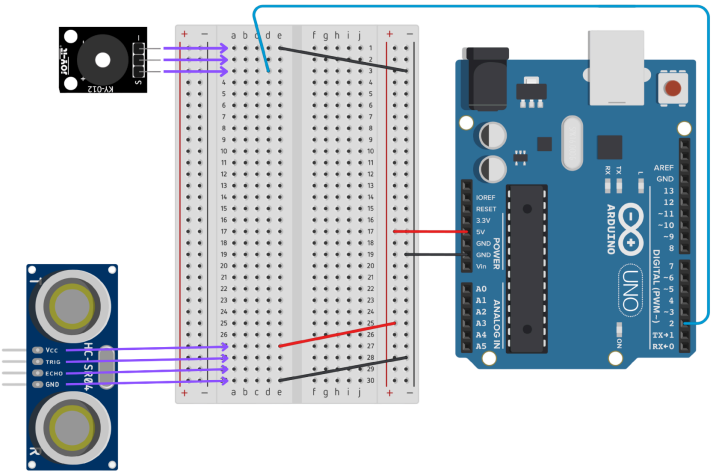
   a. VCC -> 27
   b. TRIG -> 28
   c. ECHO -> 29
   d. GND -> 30



Step 6: Wire up the Ultrasonic Sensor:

A. Take a **wire** and connect the '+' breadboard power rail to the VCC pin (row 27 as shown here) of the ultrasonic sensor.

B. Take a **wire** and connect the '-' breadboard power rail to the GND pin (row 30 as shown here) of the ultrasonic sensor.



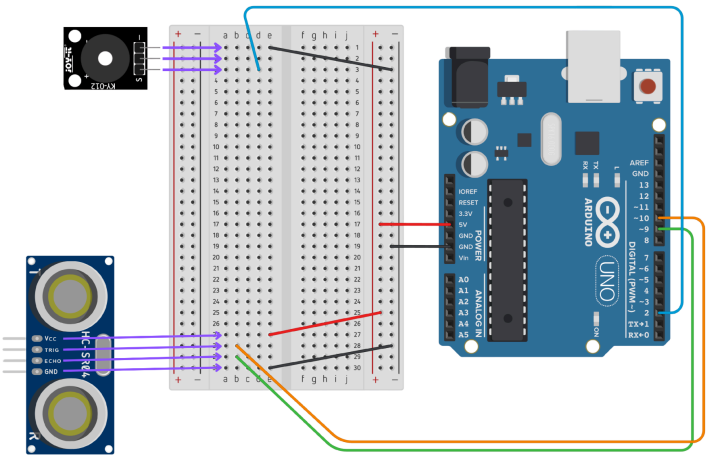
Step 7: Finish up wiring the circuit:

A. Take a **wire** and connect the '10' pin on the Arduino to the TRIG pin (row 28 as shown here) of the ultrasonic sensor.

B. Take a **wire** and connect the '9' pin on the Arduino to the ECHO pin (row 29 as shown here) of the ultrasonic sensor.

C. Your circuit is now complete!

D. Move on to the coding part of the worksheet on the next page.



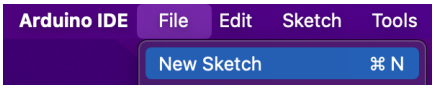
Ultrasonic Sight

Instructions for coding your circuit!

Step 1: Make sure you have the Arduino IDE software

A. You can find it at: https://www.arduino.cc/en/software.
B. Download the latest version.
C. Open it once it finishes downloading.

Step 2: Get the Arduino IDE ready

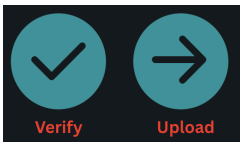


A. Open a new Arduino file
    a. If using Arduino IDE for the first time, it will automatically open into a new file.
    b. If a different file opens, just start a new one using '*File* > *New*' in the menu above.
B. Delete all the contents of the new file
    a. Arduino puts in some starter code by default that we do not require.

Step 3: Download the required code for our circuit

A. In a browser, go to the website: https://github.com/engoext/sight.
B. Click on the file named : '*code.ino'* & copy the contents of this file.

Step 4: Connect your circuit to your device



A. Connect your arduino to your device using the given blue cable.
    a. If required, use the USB-C adapter in your kit to connect.
B. Paste the copied code into the new file.
C. Click on the '*Verify*' button (the big tick inside a circle, in the top-left of the window).
    a. Check for the '*Done Compiling*' confirmation message in the bottom-right.
D. Once verified, click on the '*Upload*' button next to it (big arrow inside a circle).
    a. Check for the '*Done Uploading*' confirmation message in the bottom-right.

Step 5: Interact with the Ultrasonic Sight device

A. Put your hands at different distances in front of the ultrasonic sensor.
B. Observe how the buzzer's sounds change relative to the distance.
