

Collision warning / motion activated light switch







Introduction:

An ultrasonic sensor is something that can constantly measure the distance of itself to any other object in its way. It is useful in many different applications. Many cars have these sensors in their bumpers to warn the driver of possible collision with an obstacle. Same sensor can be used to detect if someone crosses the threshold of a room so that lights can be switched on. You're going to implement both of these circuits separately, and if you are able to do that well within time, there's a challenge for you as well at the end.

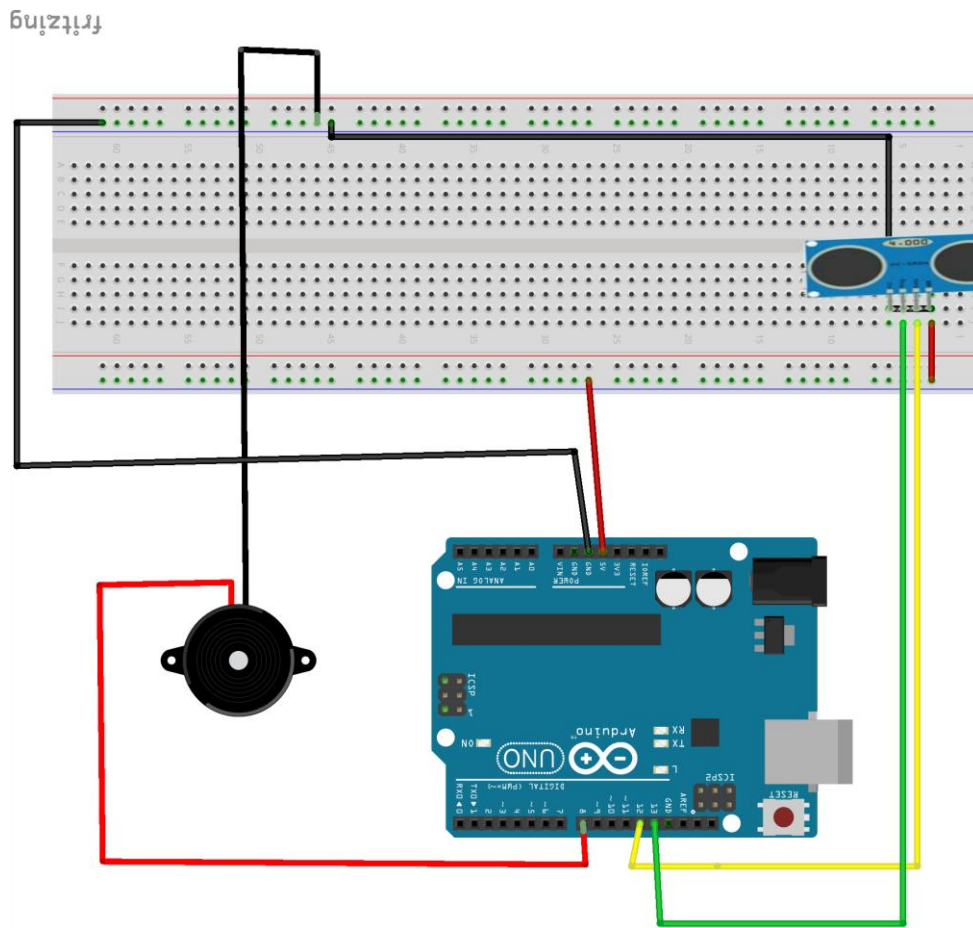
Circuit 1: Collision Warning

In this implementation, whenever the sensor will detect an object, the buzzer will start ringing. Following is a list of components that you are provided with. Your facilitators can help you identify which ones are which.

COMPONENTS:

-  Ultrasonic Sensor HC-SR04
-  Arduino UNO
-  Breadboard
-  Buzzer
-  Male to male jumper wires
-  Male to female jumper wires

Here is the schematic diagram of the project that you need to recreate.



The Code:

You are provided code in code folder in dropbox. Here:

https://www.dropbox.com/sh/byewlygwy7nkji4/AACdUKUwq8vj4MGhY4C_F4nSa?dl=0

Once you're able to patch the circuit as drawn above and run the code on Arduino, make changes in the code to:

- ✓ Change the sound of the buzzer by changing the frequency value in the code.
- ✓ Change Ultrasonic sensor value to differentiate objects at different distances.

Circuit 2: Motion activated light switch

Introduction:

Now you need to turn on LEDs on a breadboard using the same sensor. The idea is to turn LEDs of different colors on depending upon the distance of the obstacle from the sensor in the following order.

Turn red LEDs on from distance $< 10\text{cm}$

Yellow LEDs on for distance range between 10cm and 30cm

Green LEDs on for distance longer than 30cm

Following is the list of components that you need for making this circuit.

Components:

- ✓ Arduino UNO
- ✓ Ultrasonic Sensor HC-SR04
- ✓ 3 Red LEDs
- ✓ 3 Yellow LEDs
- ✓ 3 Green LEDs
- ✓ 9 x 470 ohm resistors
- ✓ Breadboard
- ✓ Male to Male jumper wires

Here is the schematic diagram

- ✓ For Yellow LEDs you have to write code in such a way that when distance is greater than 10cm and distance is less than 30cm the yellow led should glow
- ✓ For Green LED you have to write code in such a way that when distance is greater than 30cm than green LED should glow

CHALLENGE:

Now try to make a new circuit by combining the above two circuits and make one that lights up the LEDs and also turn on the buzzer sound.

You can change and combine the two sketches to build a new one. You should also try to figure out the application of such a circuit.

Hint:

