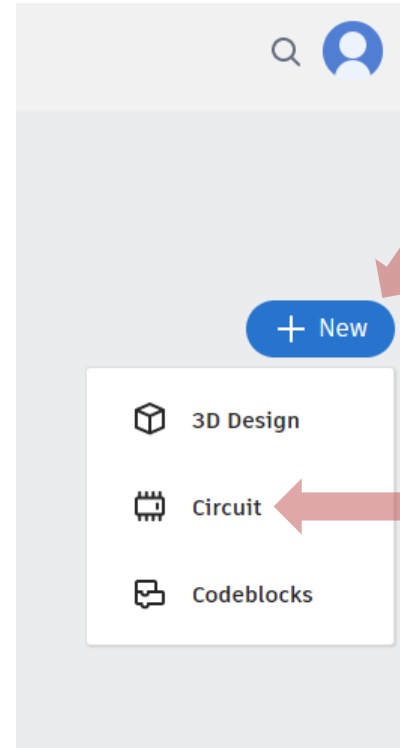
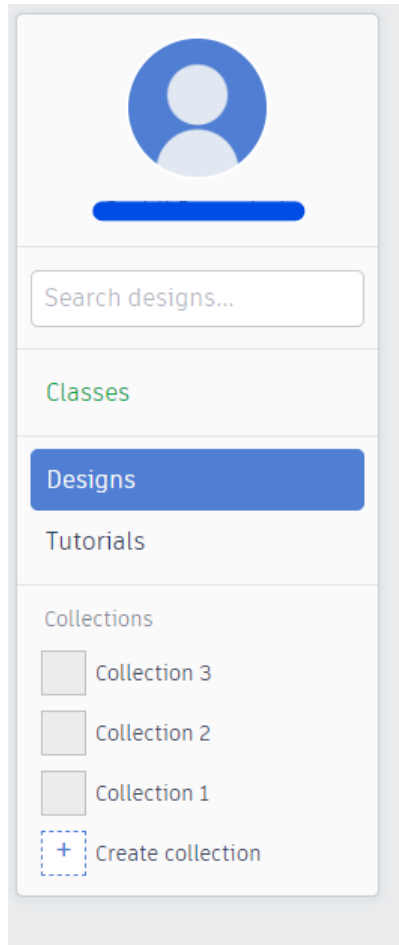


Grade 11 University Physics

# SOUND AND WAVES USING ULTRASOUND

**SELECT  
“DESIGNS”**

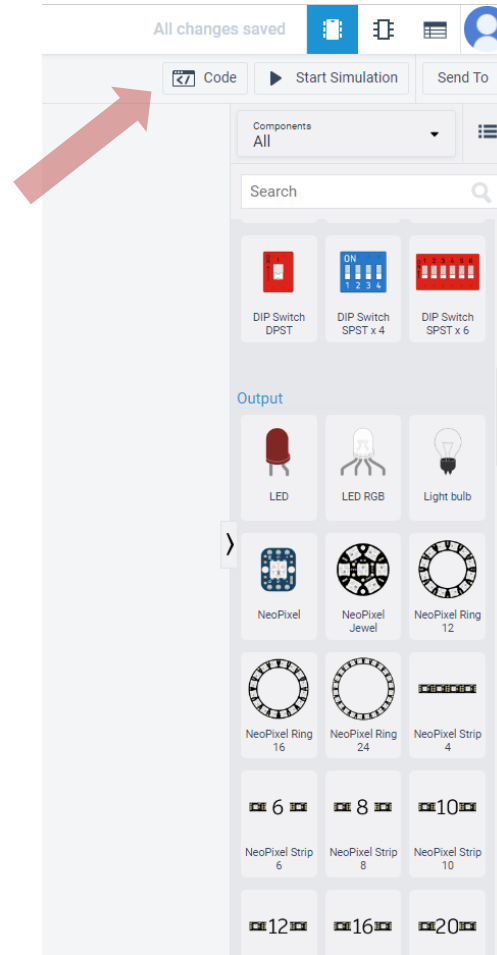


**Click  
“New”**

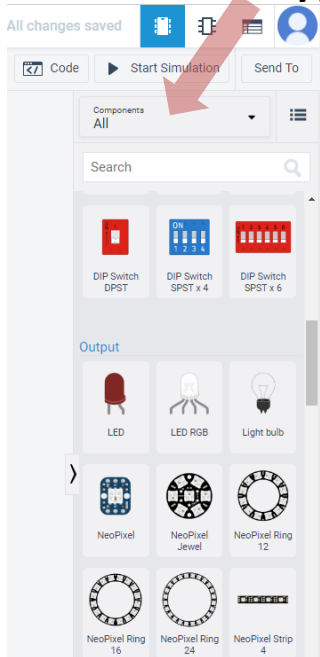
**Select  
“Circuit”**

# TRY THE PROGRAMMING ENVIRONMENT

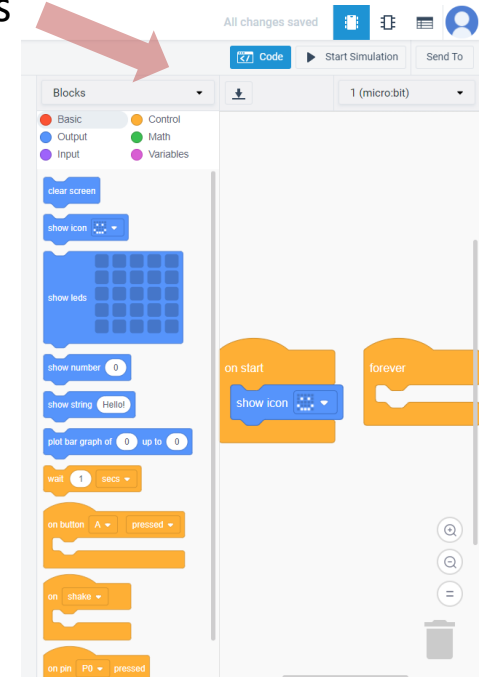
Click  
"Code"



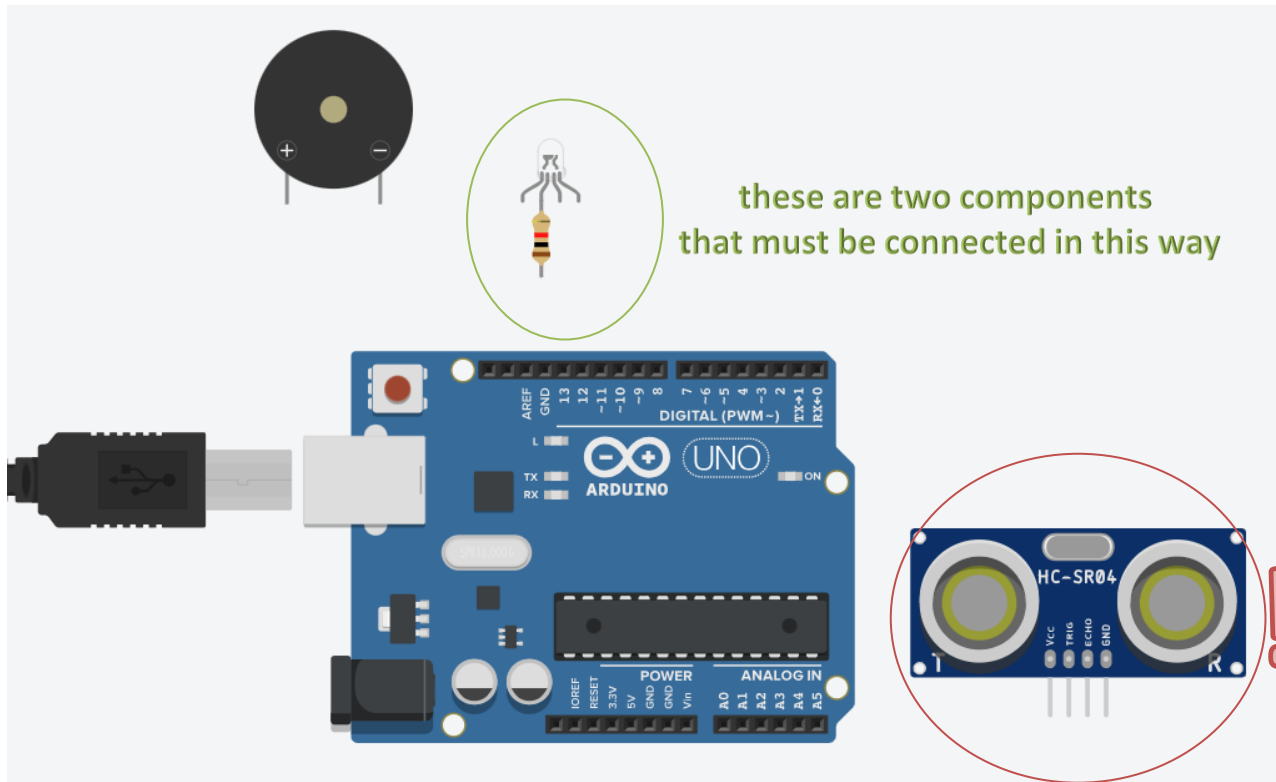
Components  
"ALL"



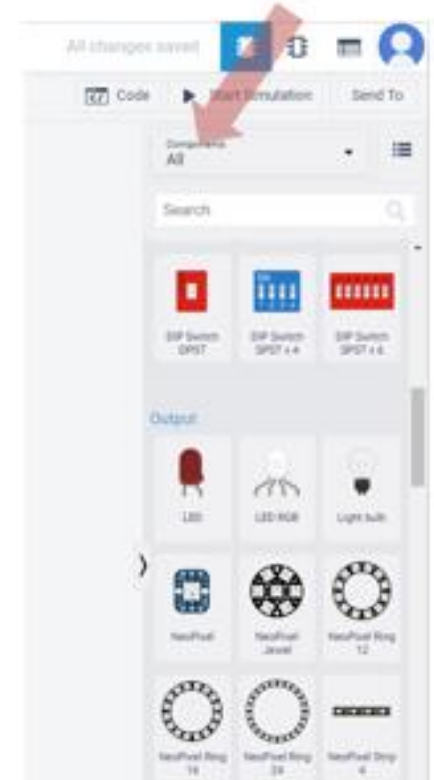
You will see  
this



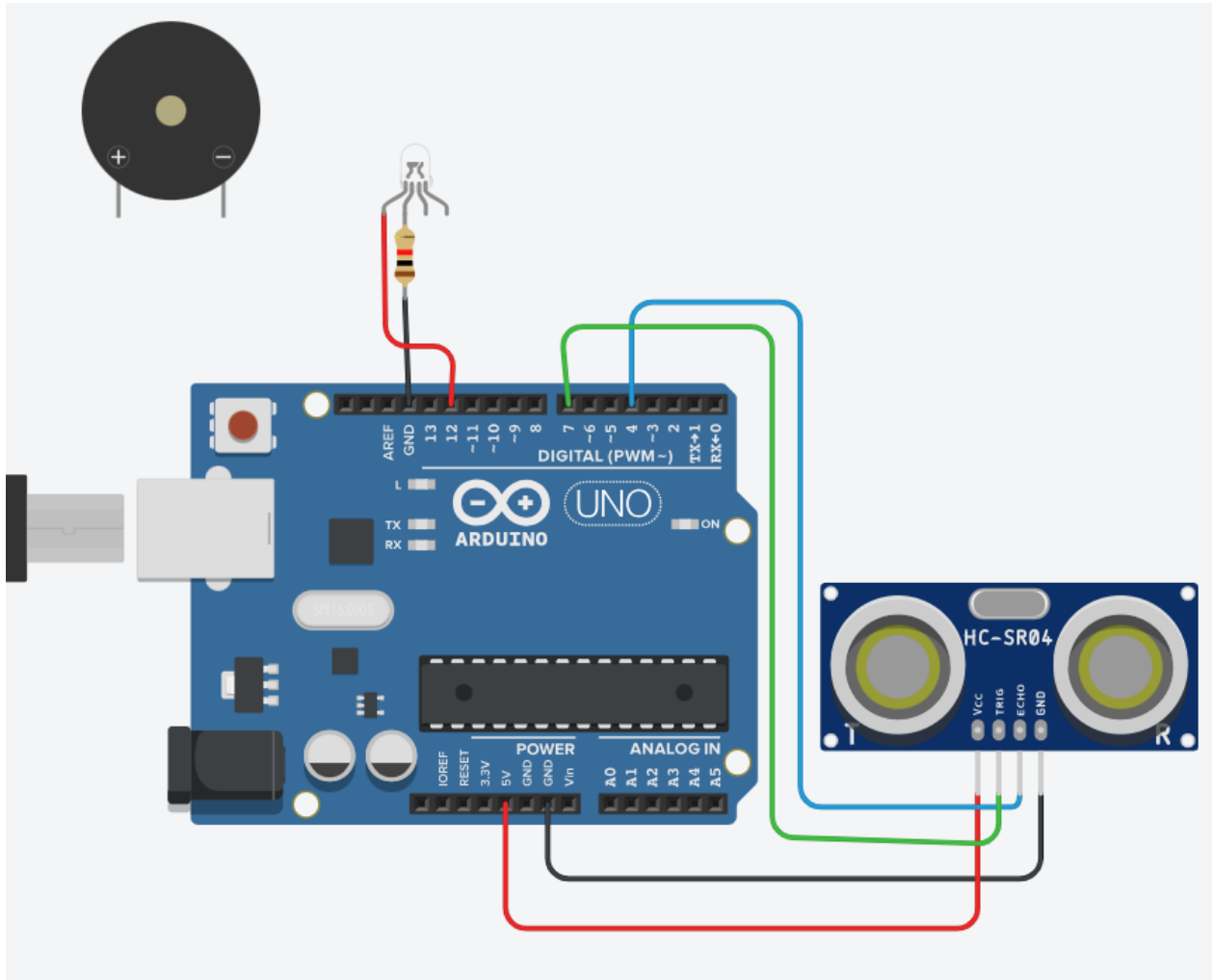
# STEP 1. DRAG AND DROP THES COMPONENTS INTO THE WORKSPACE



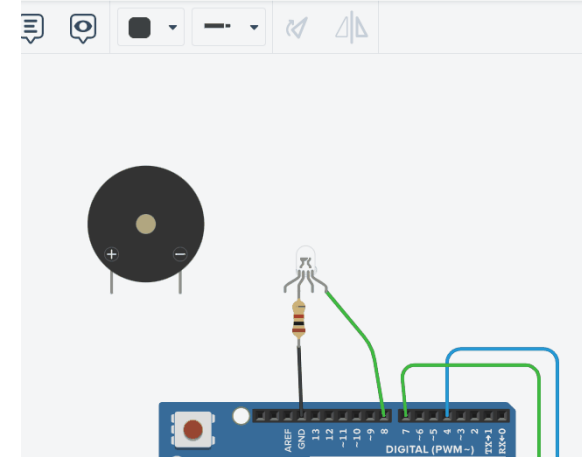
Components  
"ALL"



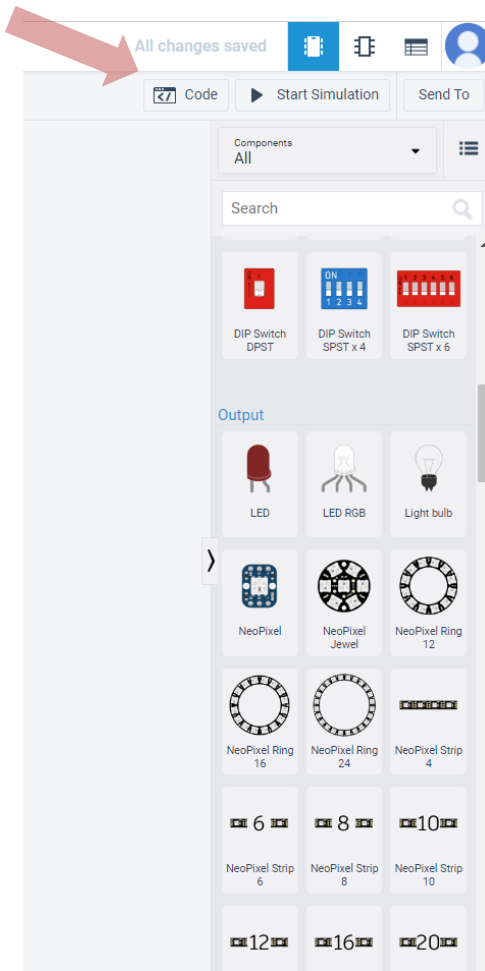
# STEP 2. CREATE THE WIRES EXACTLY AS SHOWN



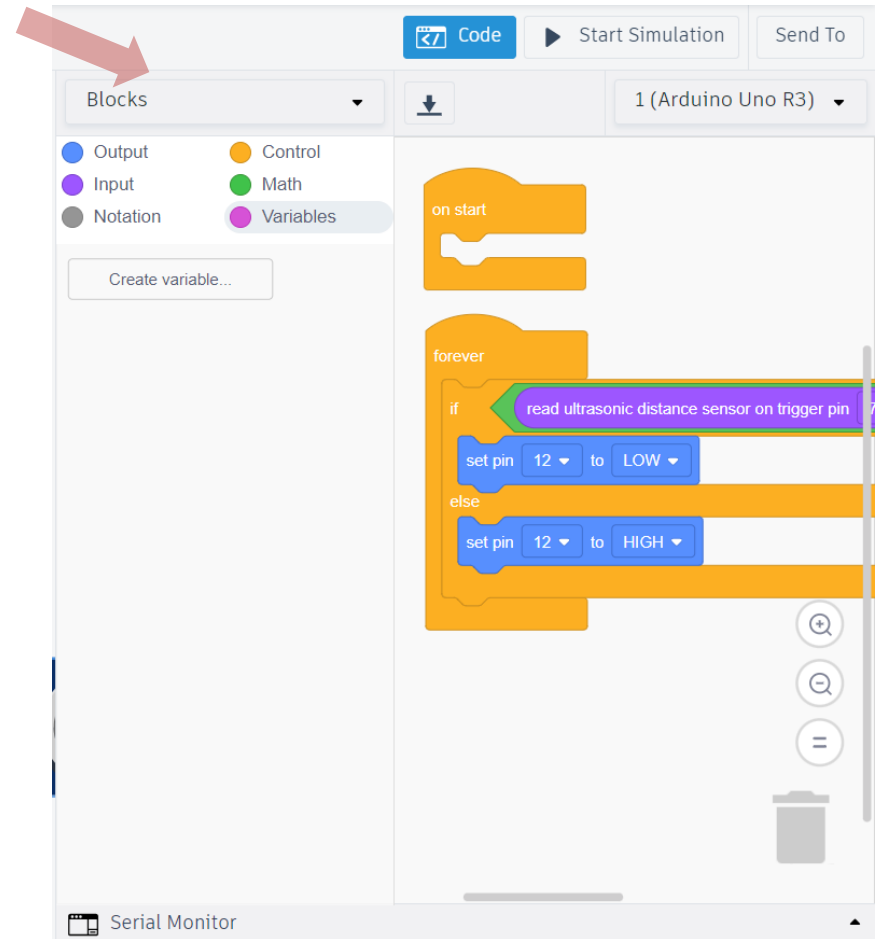
Example:



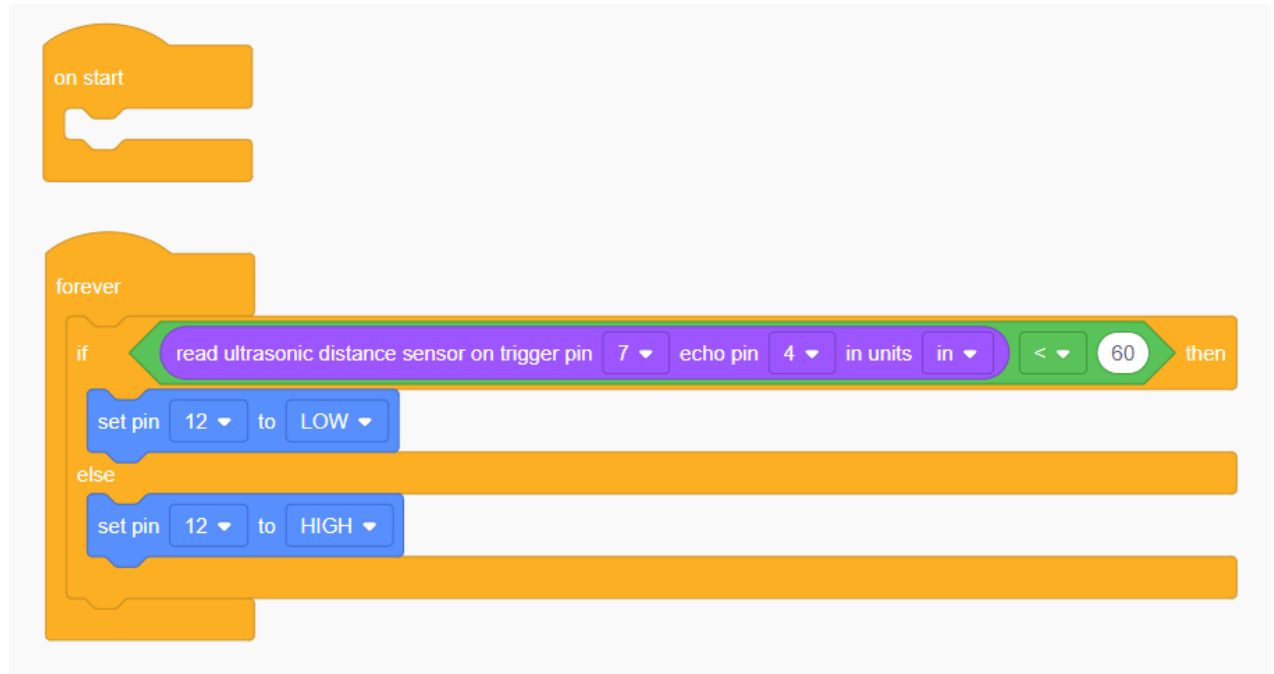
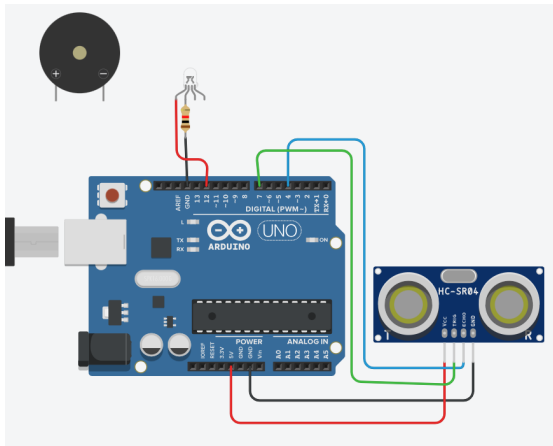
Click  
"Code"



You will see  
this



# STEP 3. CREATE A PROGRAM



**Description:** if we have a distance less than 60 inches, we turn on the light signal, if not - it is turned off

# Run the simulation

The screenshot displays the Arduino IDE interface. On the left, a virtual breadboard shows an Arduino Uno connected to an HC-SR04 ultrasonic sensor. The sensor's VCC pin is connected to the 5V pin, GND to GND, and the trigger pin to digital pin 7. The echo pin is connected to digital pin 4. The code editor on the right shows the following block-based program:

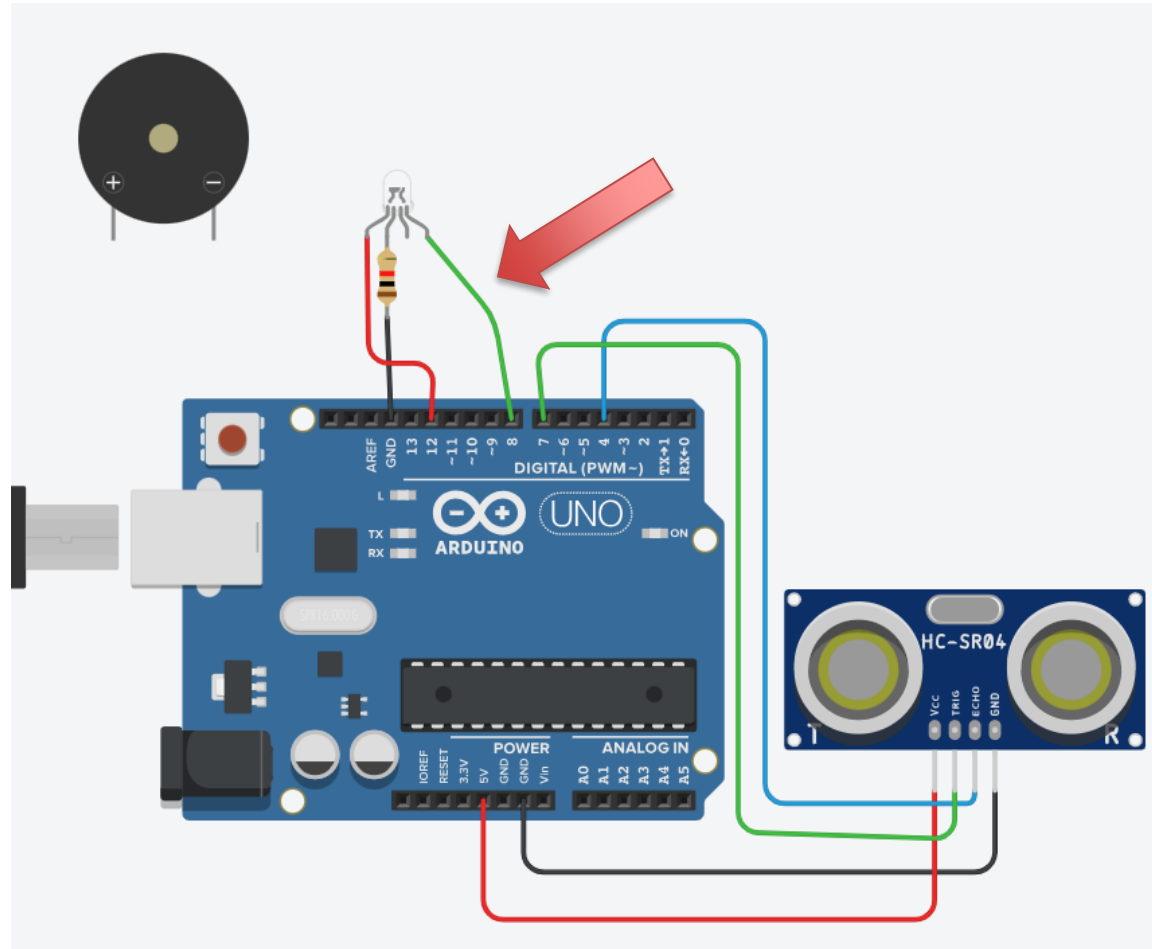
```
on start  
  [ ]  
  
forever  
  if [ read ultrasonic distance sensor on trigger pin 7 ] echo pin 4 in units in [ 60 ] then  
    set pin 12 to LOW  
  else  
    set pin 12 to HIGH
```

Code Start Simulation Send To

TRY



# Connect the green leg of the LED to port 8



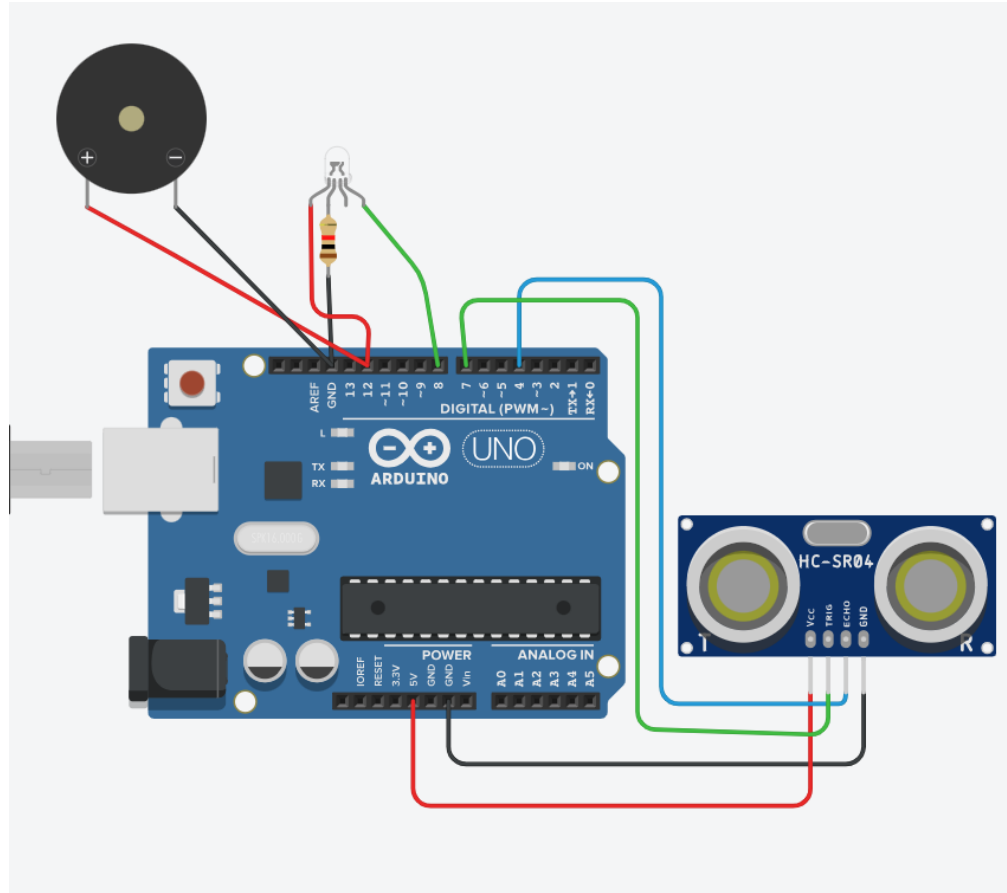
**Try changing the program yourself so that the light is green when the distance is less than 60 inches and red when it is more**

# A possible solution:

The image shows a Scratch script with the following blocks:

- on start** block
- forever** loop containing:
  - if** block: `read ultrasonic distance sensor on trigger pin 7 echo pin 4 in units in < 60 then`
  - then** block:
    - `set pin 12 to LOW`
    - `set pin 8 to HIGH`
  - else** block:
    - `set pin 12 to HIGH`
    - `set pin 8 to LOW`

# Plug in a sound element, see how it affects the circuit



# Offer and implement your ideas

