



IOT DIGITAL ASSIGNMENT 2

SMART QUADRIPOD WALKING STICK FOR THE AID AND
SECURITY OF VISUALLY CHALLENGED AND ELDERLY PEOPLE.

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IMPLEMENTATION MODULES

- Adding Ultrasonic Sensor
- Adding Vibrating Motor to Arduino as an actuator (using with UV sensor as input)
- Adding LDR sensor and LED(actuator)
- Adding GSM(actuator) and GPS Module(sensor)

CONVENTIONS USED

Positive Rail (connected to
5V supply)

Positive Rail (connected to
3.3V supply)

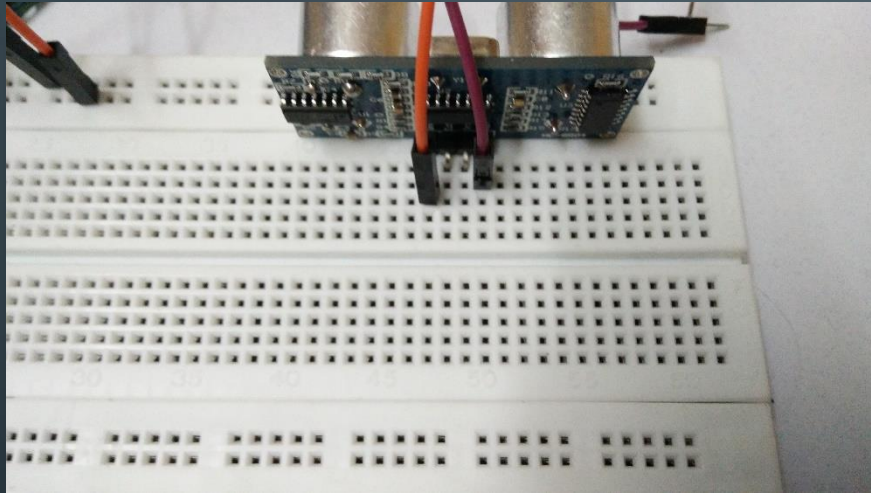


Negative Rails (connected
to Ground)

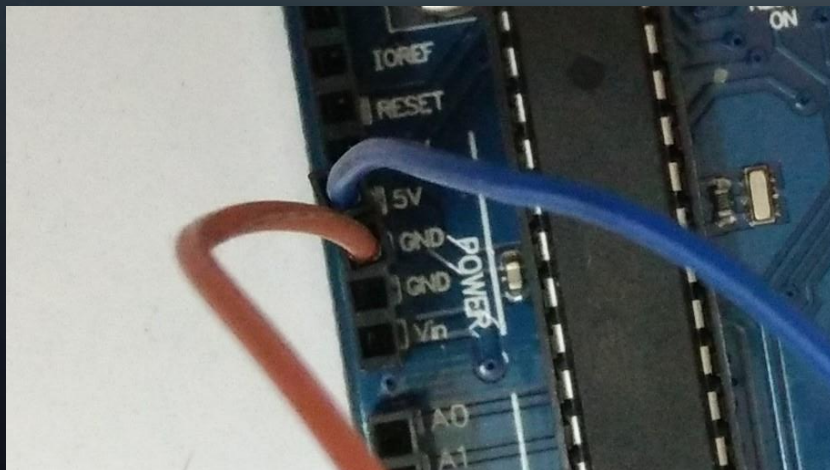


ADDING ULTRASONIC SENSOR TO ARDUINO

CONNECTING THE V_{CC} AND GND PIN TO ARDUINO

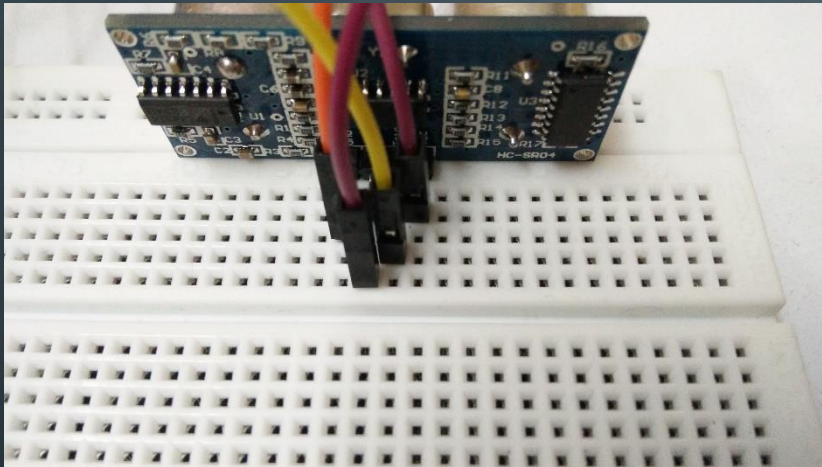


- Two Male to Male Jumper Wires W1 (orange) and W2 (violet) are taken and connected to the VCC and GND of the UV sensor respectively.

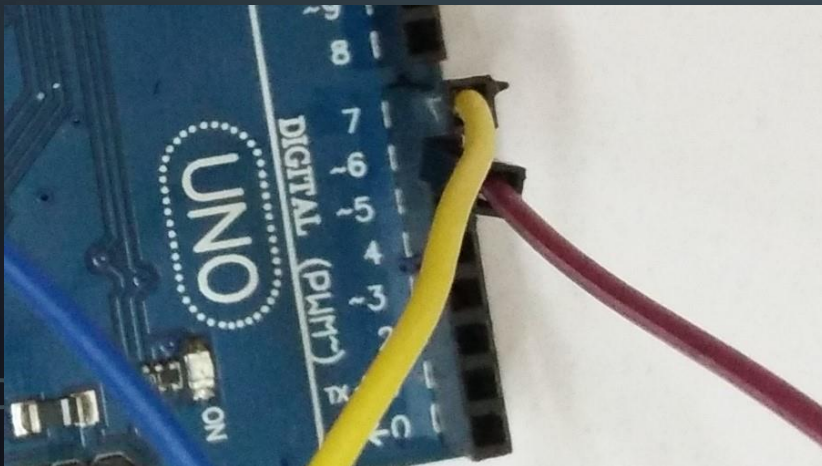


- W1 and W2 are connected to the top part of the Breadboard, from which two wires W1' and W2' are taken and connected to the 5V and GND of the Arduino respectively.

CONNECTING THE TRIG AND ECHO PIN TO ARDUINO

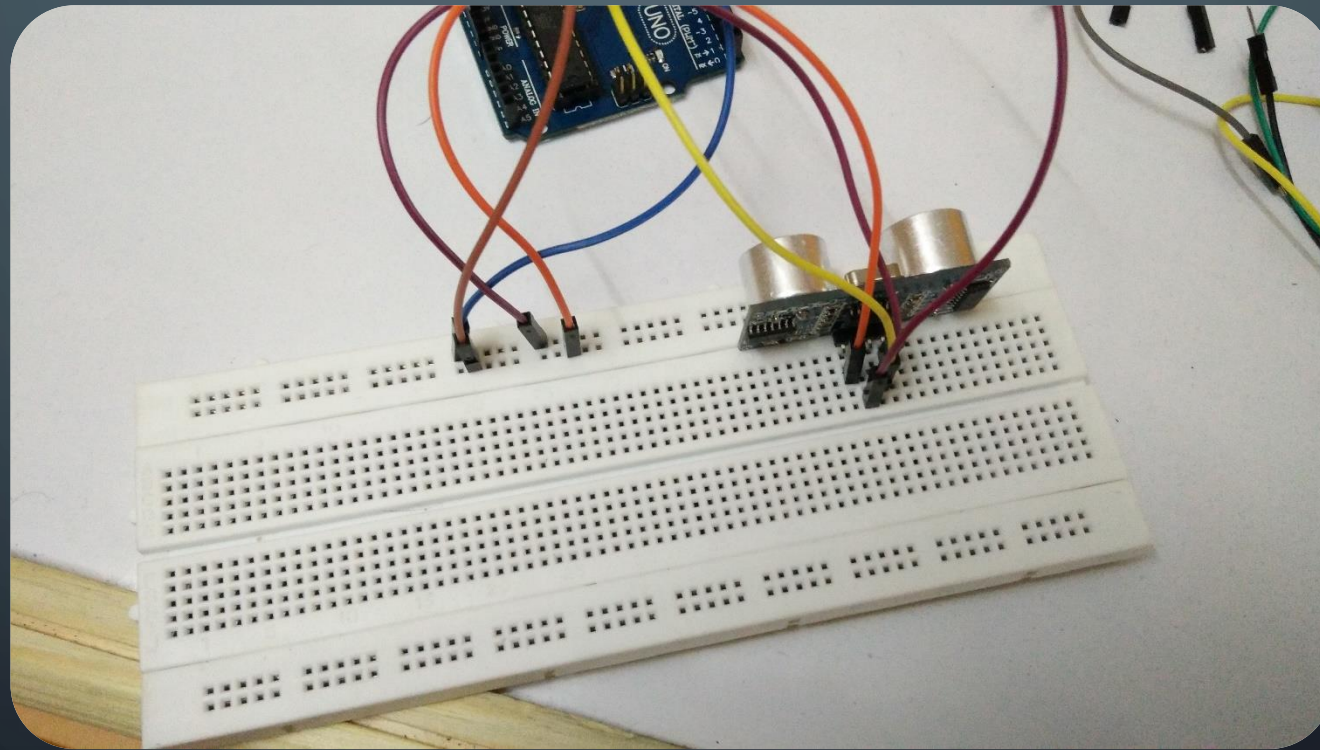


- After that two Male to Male Jumper Wires A1(white) and A2(yellow) are taken and are connected to the TRIG and ECHO of the sensor respectively.

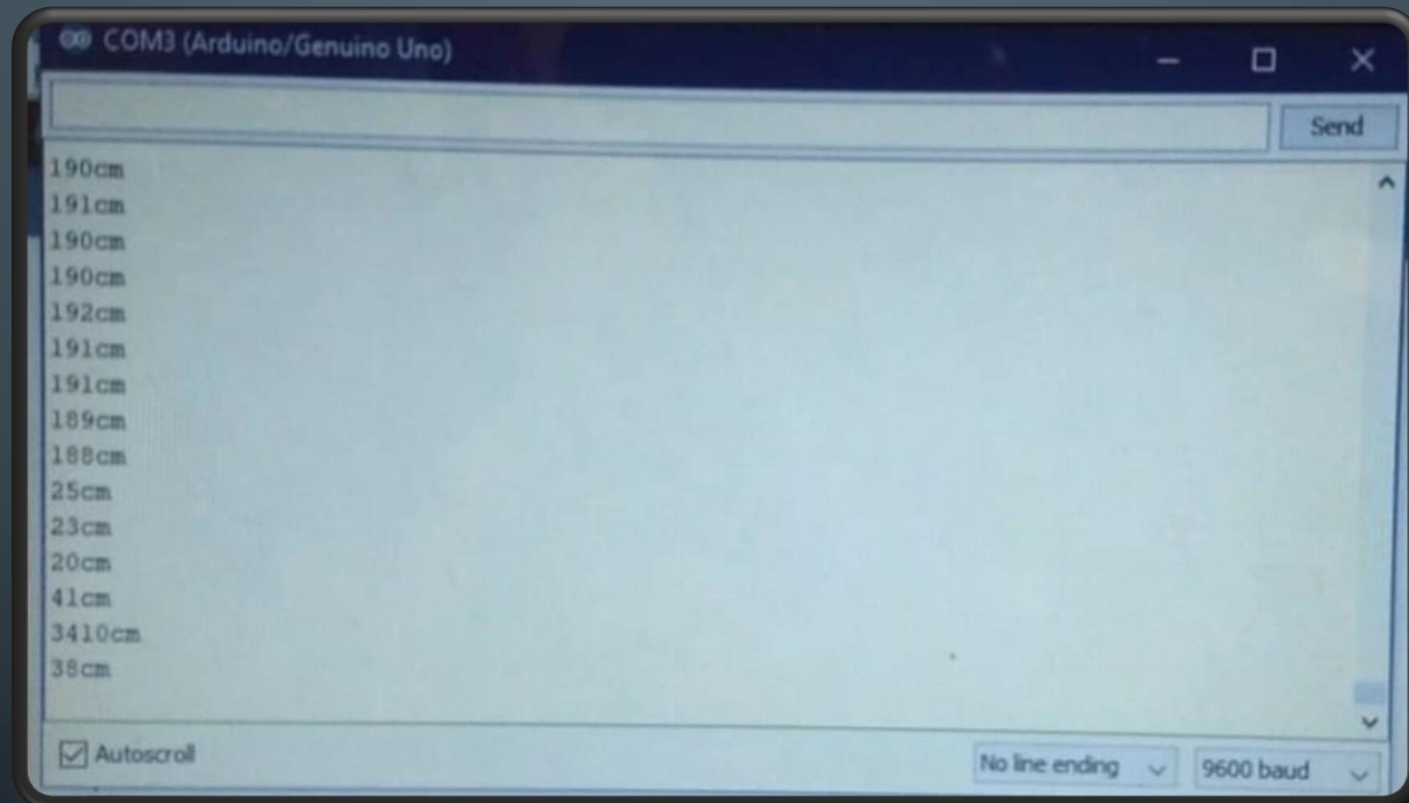


- A1 and A2 are directly then connected to the Digital pin 6 and 7 respectively.

FINAL REPRESENTATION AFTER CONNECTING THE SENSOR



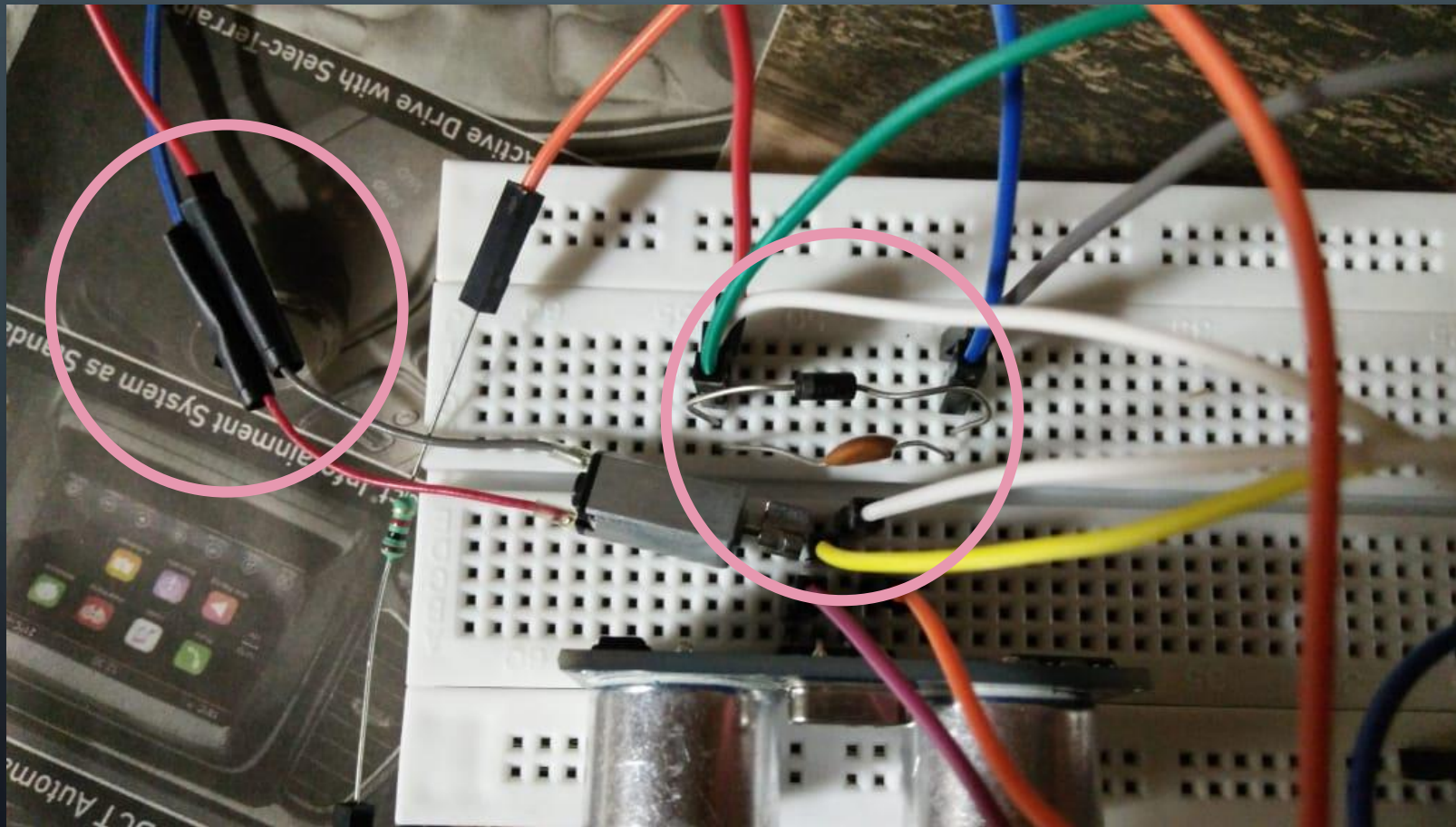
OUTPUT SCREENSHOT





ADDING VIBRATING MOTOR TO ARDUINO

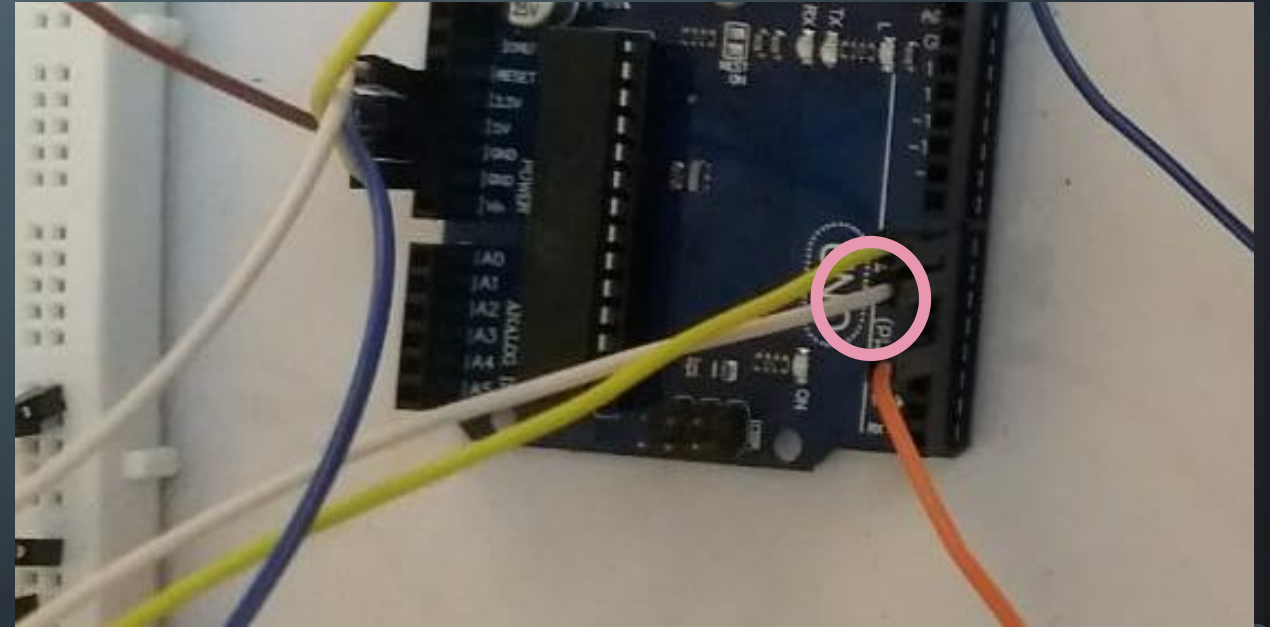
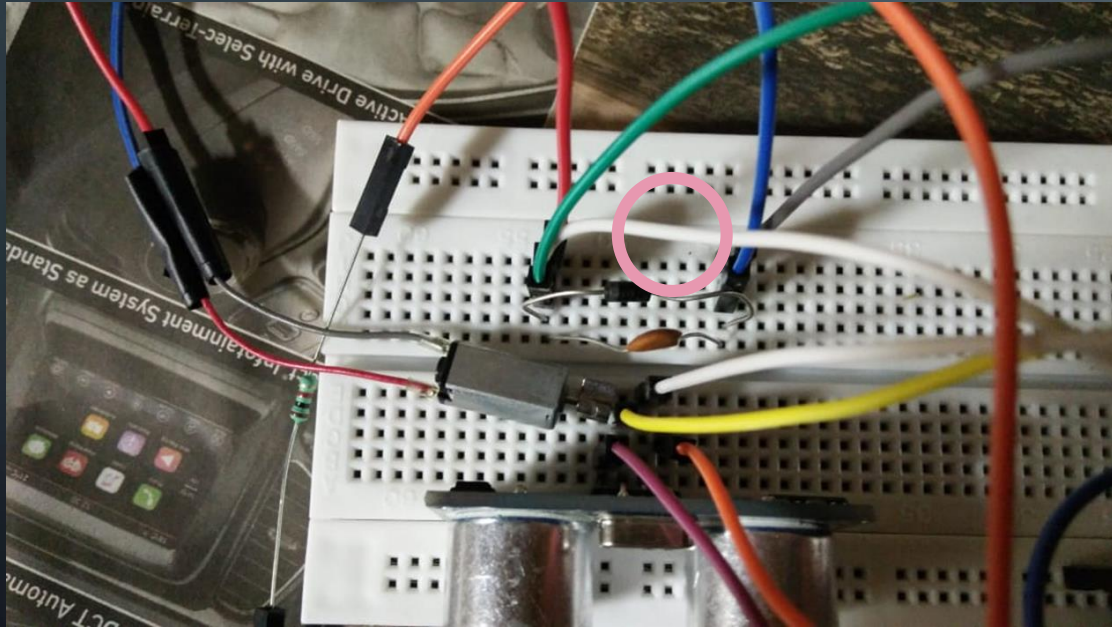
CONNECTING THE DIODE, CAPACITOR AND VIBRATING MOTOR IN PARALLEL



The ends of the vibrating motor are extended with red and blue connector wires.

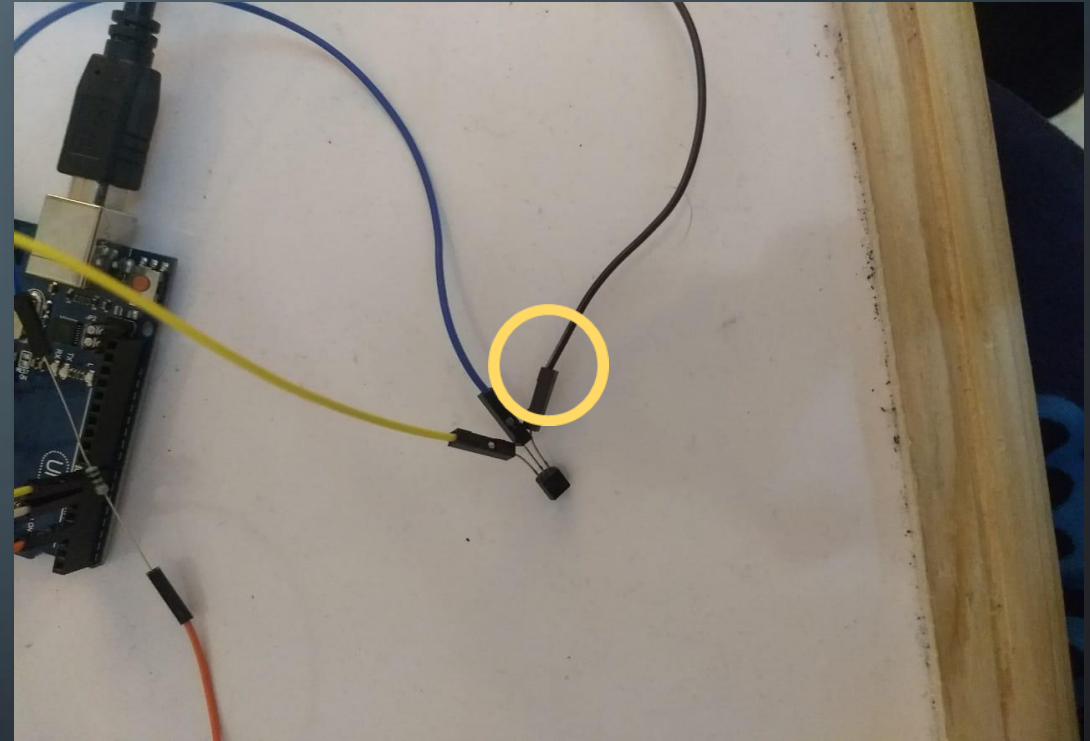
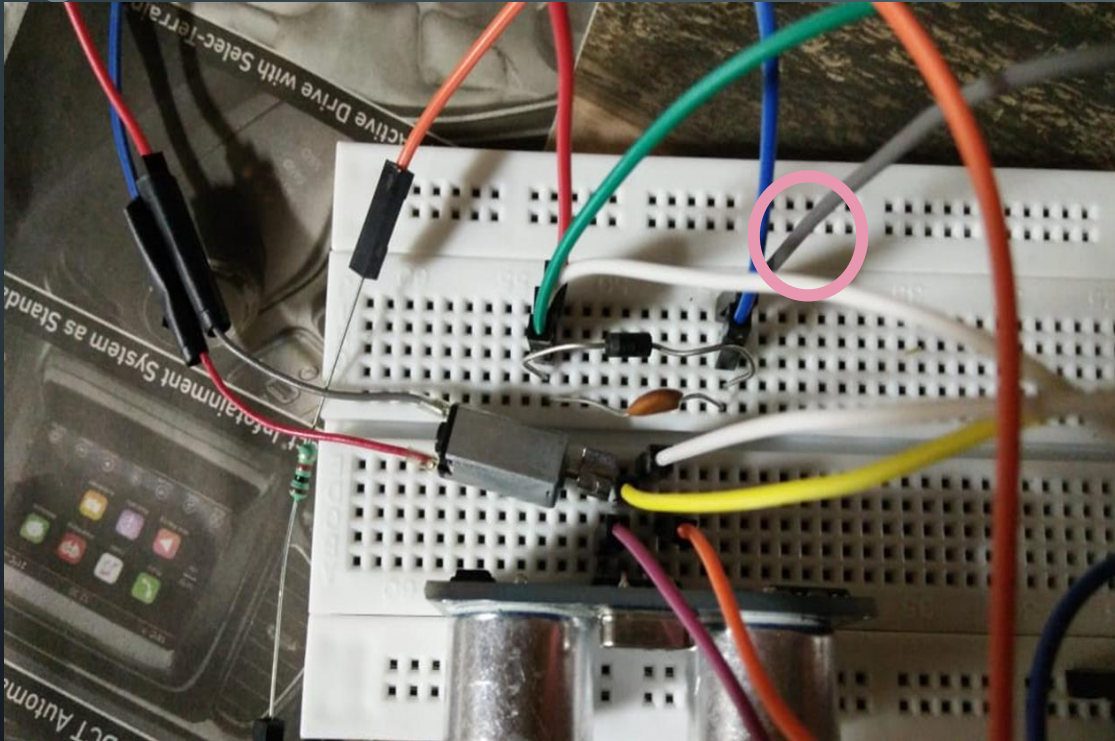
The ends of the vibrating motor, diode and capacitor are connected in parallel

CONNECT ONE END OF THE DIODE, CAPACITOR AND
VIBRATING MOTOR TO 3.3V POWER OUTPUT PIN OF
THE ARDUINO BOARD



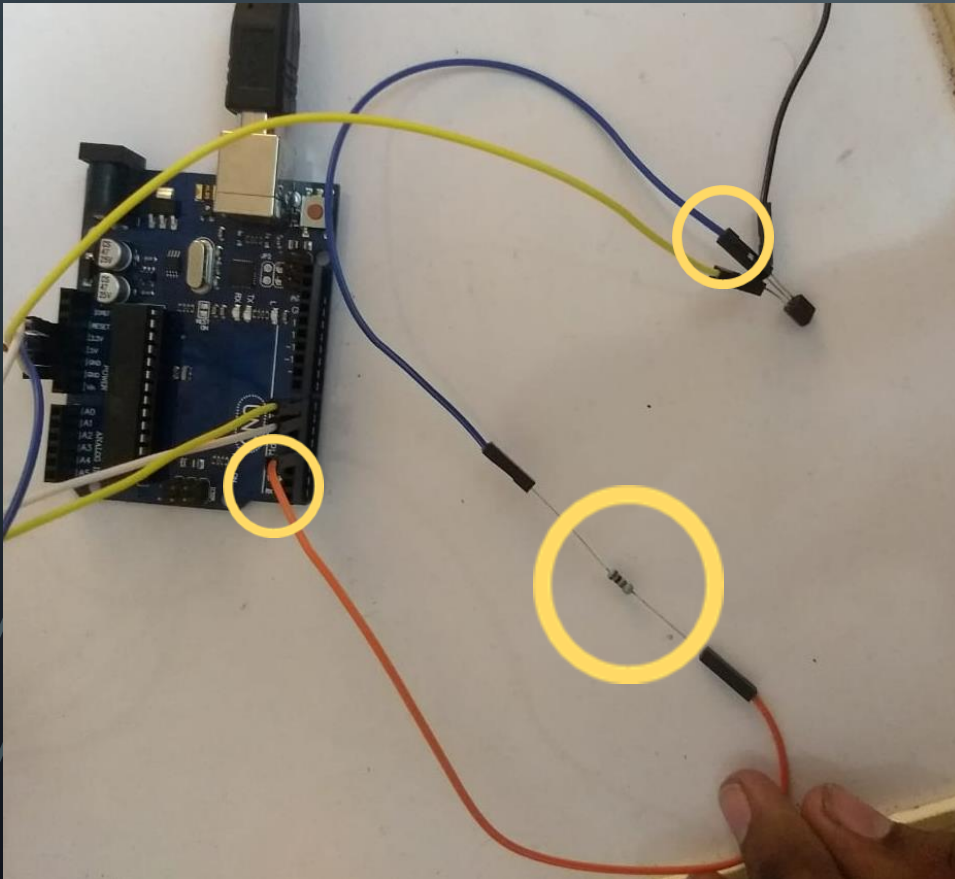
The white wire connects one end of the Diode, Capacitor
and Vibrating Motor to 3.3V power output pin

CONNECT ONE END OF THE DIODE, CAPACITOR AND VIBRATING MOTOR TO END TO N-END OF NPN TRANSISTOR



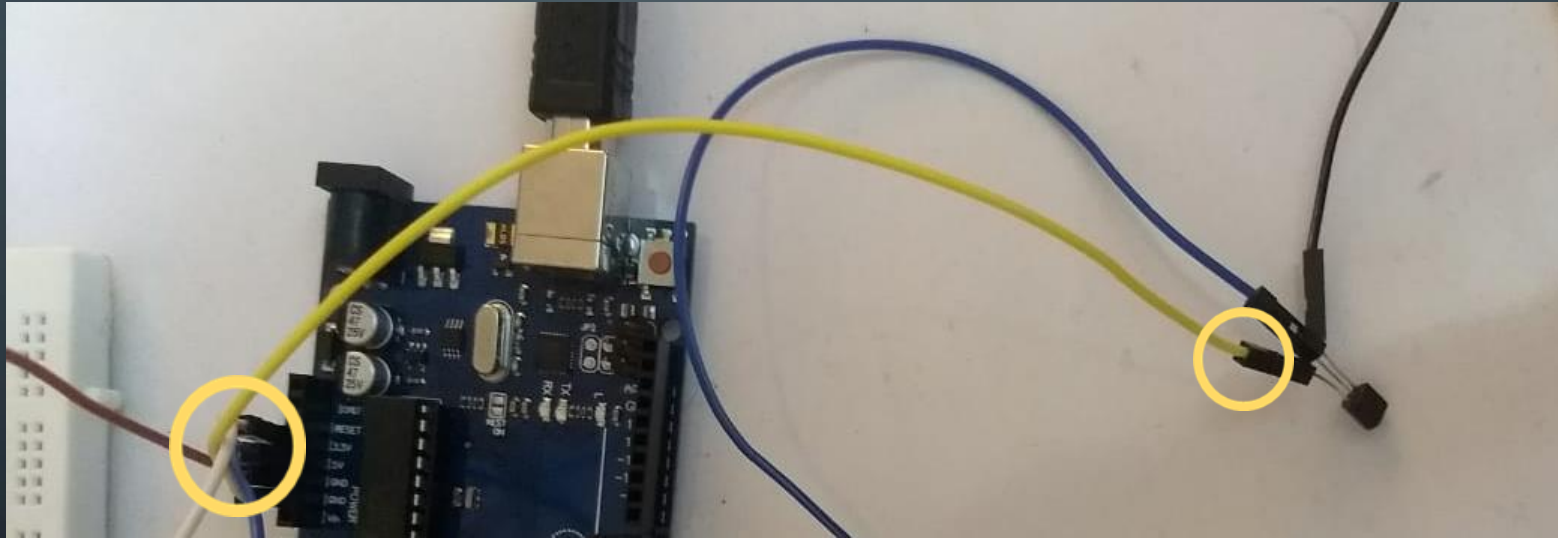
The grey wire connects one end of the Diode, Capacitor and Vibrating Motor to N-end of NPN transistor.

CONNECT P-END OF THE NPN TRANSISTOR TO PIN 3
OF THE ARDUINO BOARD WITH A RESISTOR IN
BETWEEN



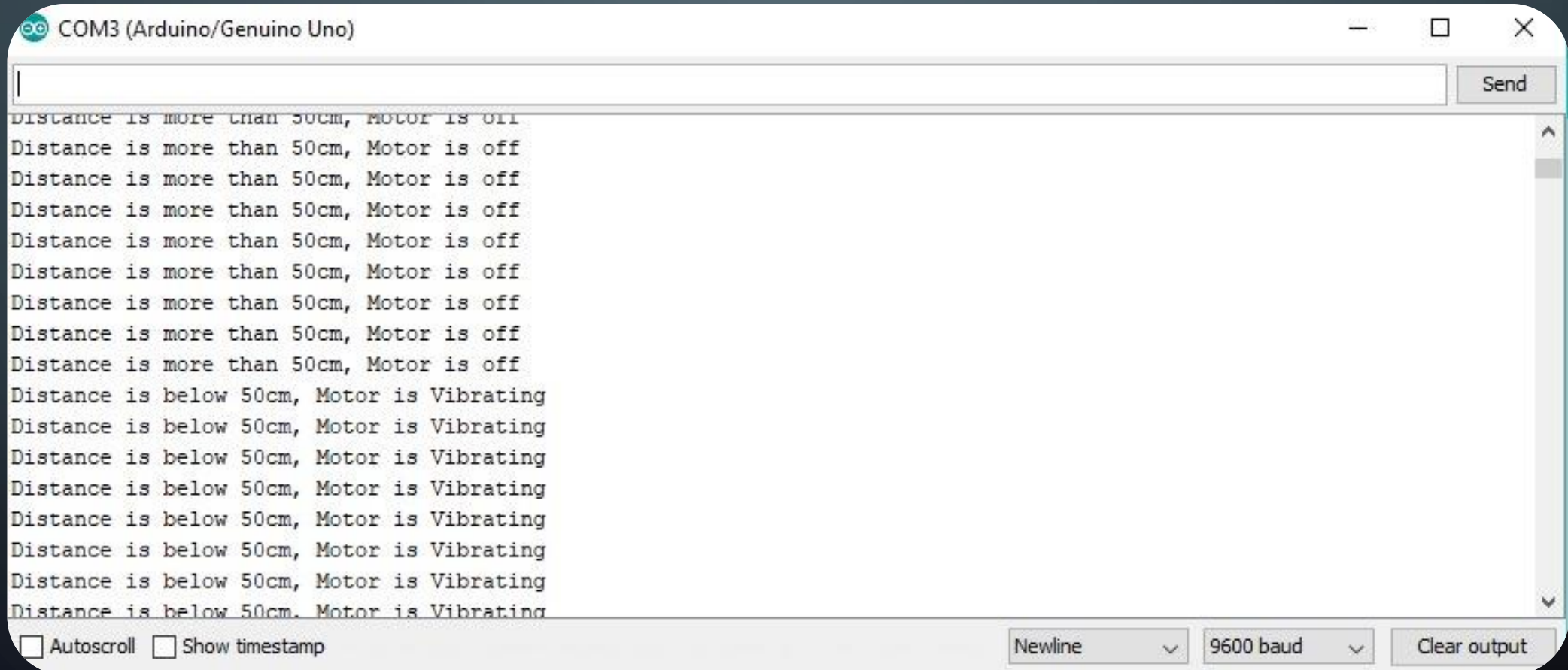
The blue wire and orange wire connects P-end
of the NPN transistor to pin 3 of the Arduino
Board with a 1 k Ω resistor in between

CONNECT THE 2ND N-END OF THE NPN TRANSISTOR
TO GND PIN OF THE ARDUINO BOARD



The yellow wire connects the 2nd N-end of the
NPN transistor to GND pin of the Arduino Board


OUTPUT



The screenshot shows a serial monitor window titled "COM3 (Arduino/Genuino Uno)". The window contains a text area with the following output:

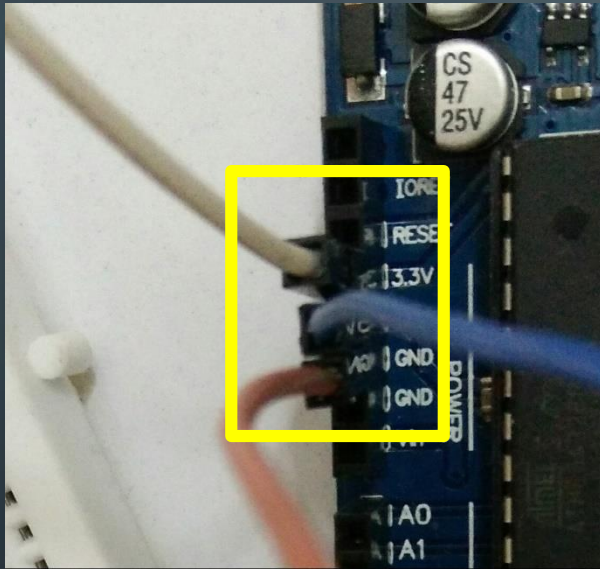
```
Distance is more than 50cm, Motor is Off
Distance is more than 50cm, Motor is off
Distance is more than 50cm, Motor is off
Distance is more than 50cm, Motor is off
Distance is more than 50cm, Motor is off
Distance is more than 50cm, Motor is off
Distance is more than 50cm, Motor is off
Distance is more than 50cm, Motor is off
Distance is more than 50cm, Motor is off
Distance is below 50cm, Motor is Vibrating
Distance is below 50cm, Motor is Vibrating
Distance is below 50cm, Motor is Vibrating
Distance is below 50cm, Motor is Vibrating
Distance is below 50cm, Motor is Vibrating
Distance is below 50cm, Motor is Vibrating
Distance is below 50cm, Motor is Vibrating
Distance is below 50cm, Motor is Vibrating
```

At the bottom of the window, there are checkboxes for "Autoscroll" and "Show timestamp", both of which are unchecked. To the right of these checkboxes are three dropdown menus: "Newline" (set to "Newline"), "9600 baud" (set to "9600 baud"), and "Clear output" (set to "Clear output").

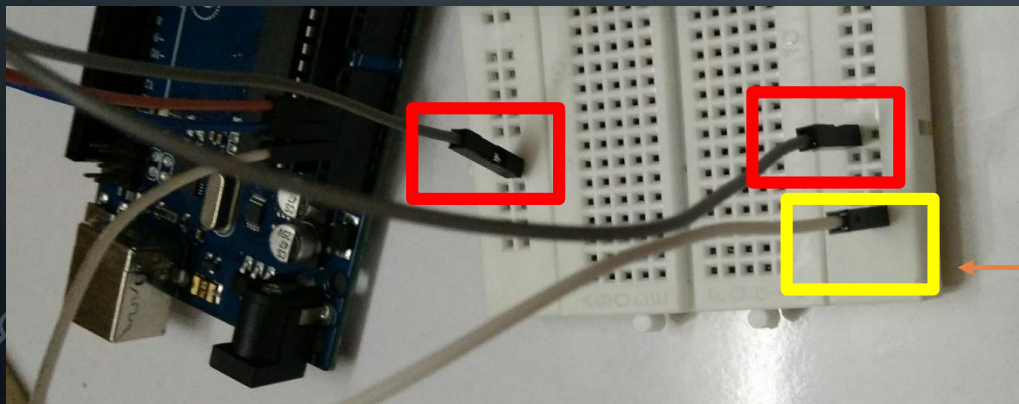


ADDING LDR AND LED TO THE CIRCUIT

CONFIRMING 3.3V POWER AND GND CONNECTIONS

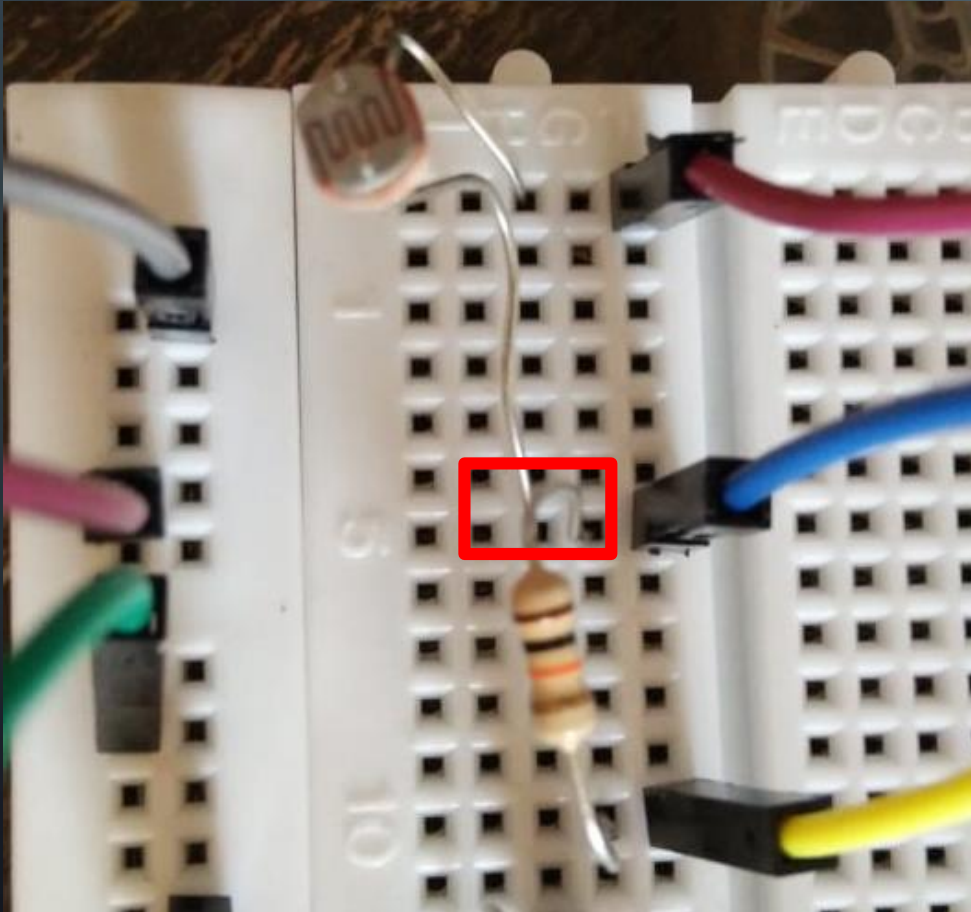


- 3.3V of Arduino is connected to one of the positive rail of the breadboard
- GND of Arduino is connected to the negative rail of the breadboard (connecting both the negative rails of the bread board (shown in red box) and one of the negative rail is connected to GND pin of arduino)



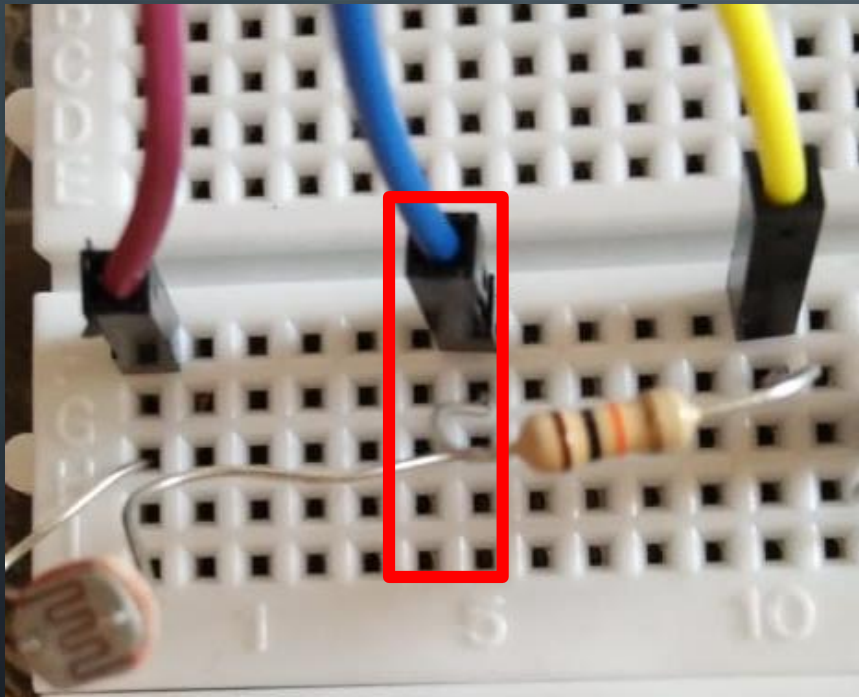
3.3V +ve rail

ADDING LDR SENSOR

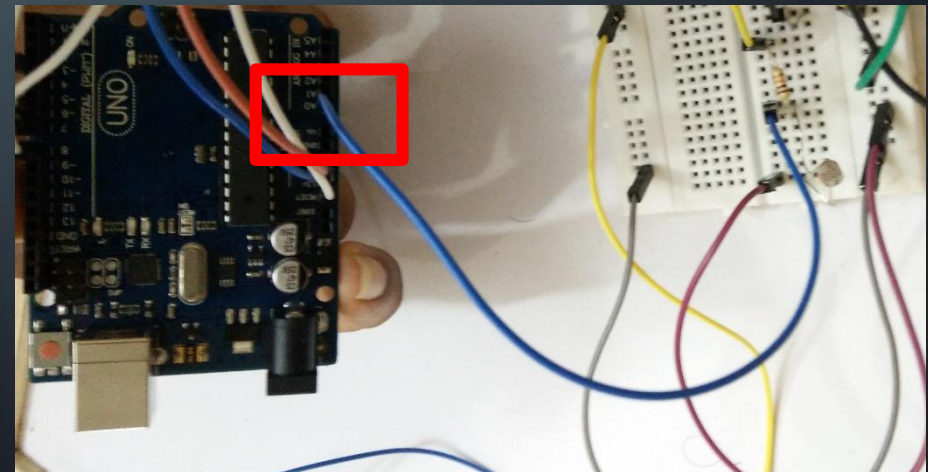


- Place the LDR (Light Dependant Resistor) sensor on the breadboard
- Place a 10K ohm resistance, such that it shares a common leg with the LDR sensor(highlighted in the adjacent image)

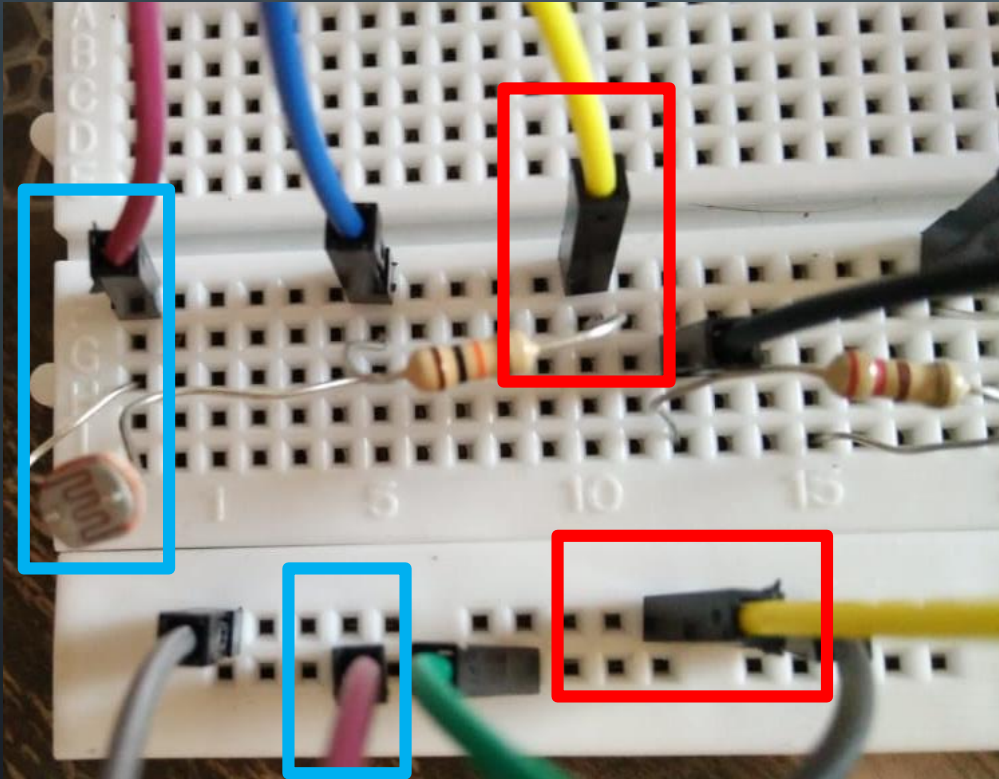
ADDING LDR SENSOR (CONT)



- Connect A_0 of Arduino at the junction where 10K resistor and one of the LDR's leg is connected (highlighted in the image)

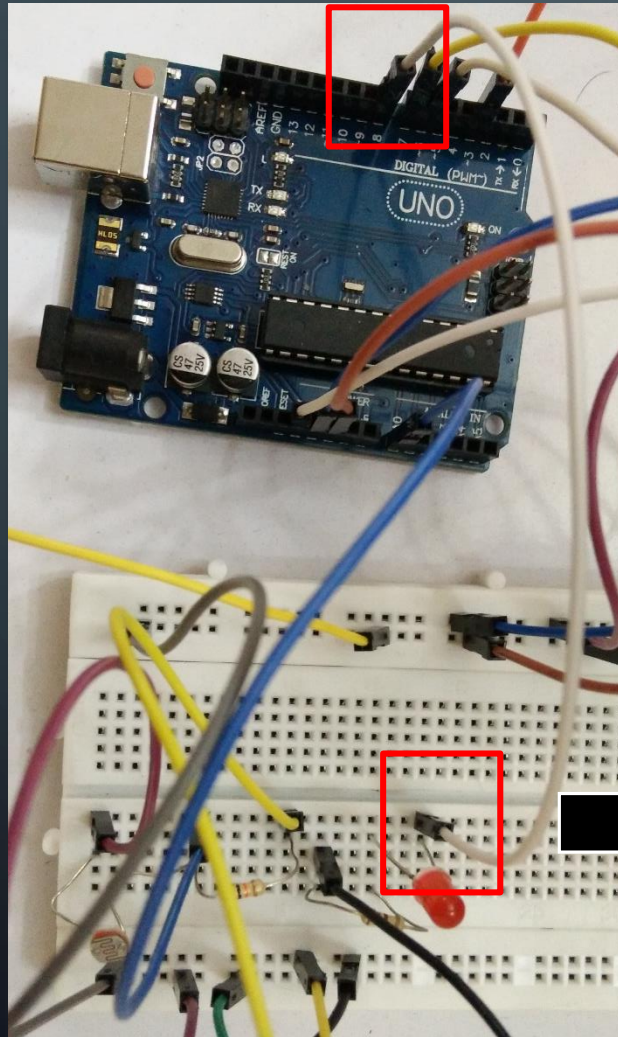


ADDING LDR SENSOR (CONT)

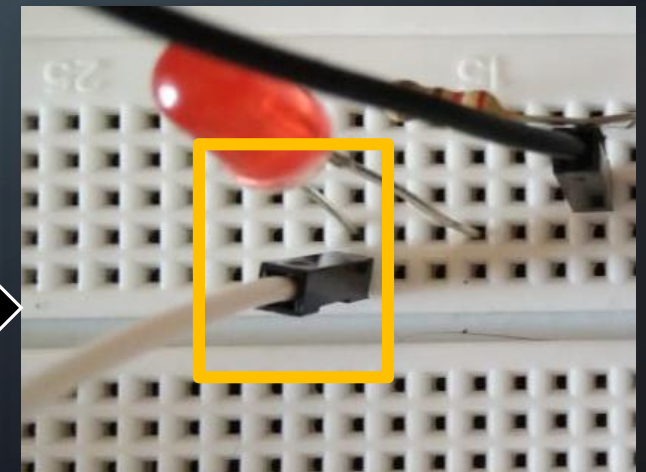


- Connect the other end of the 10K resistor to the negative rail of the breadboard (Yellow wire)
- Connect the other end of the LDR sensor to the positive rail (3.3V) of the breadboard (Maroon wire)

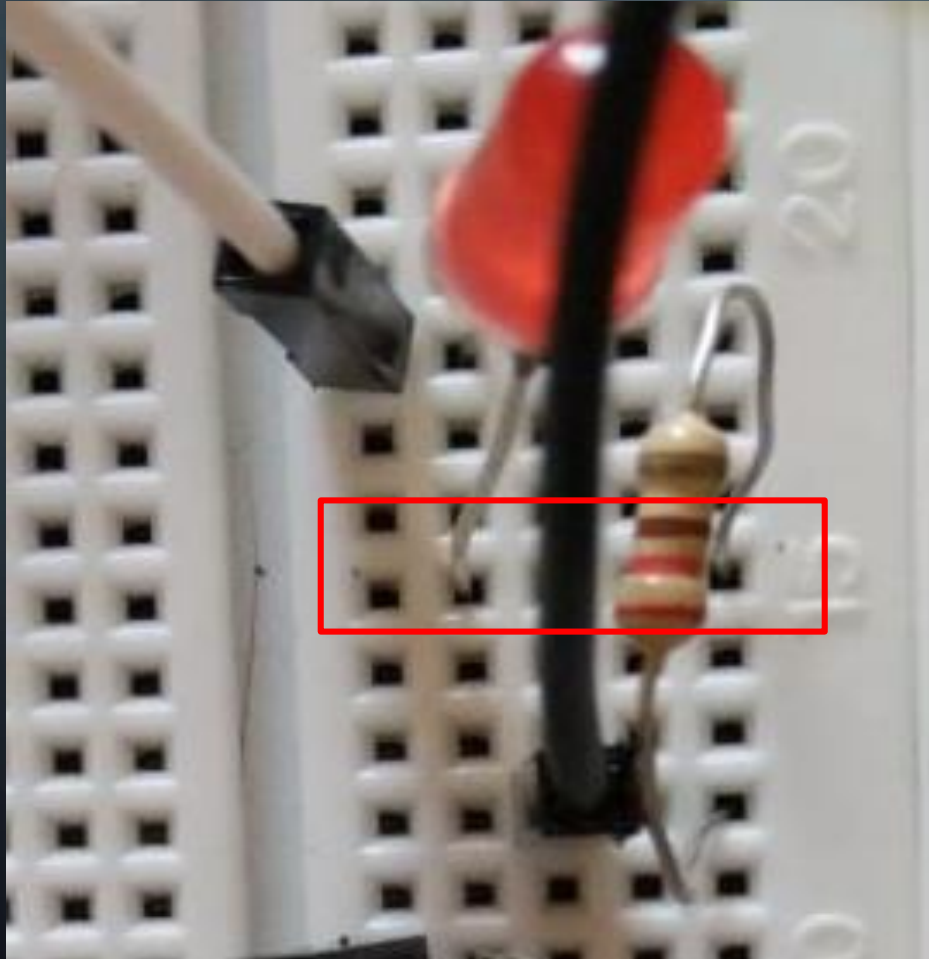
CONNECTION FOR LED AND ARDUINO TO THE CIRCUIT



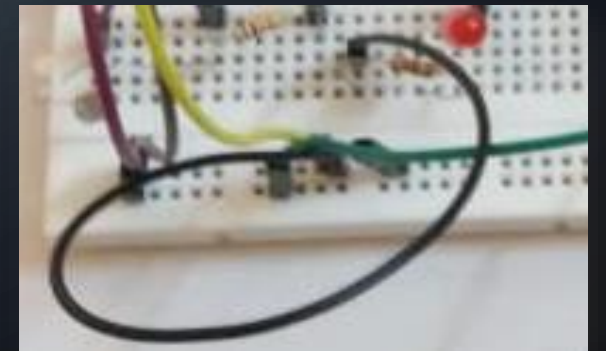
- Place LED on Breadboard
- Connect any of the digital pin of Arduino (here PIN8) to the positive (Long leg) of the LED (white wire)



CONNECTION FOR LED AND ARDUINO TO THE CIRCUIT (CONT)



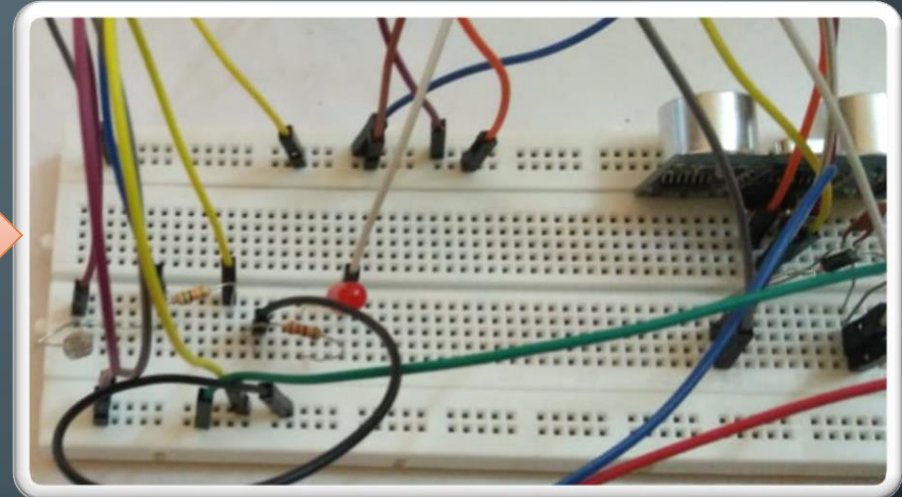
- Place the 220ohm resistor such that it shares a common junction with the negative leg of LED
- Connect negative rail and the other end of 220ohm resistor (Black wire) i.e. Ground



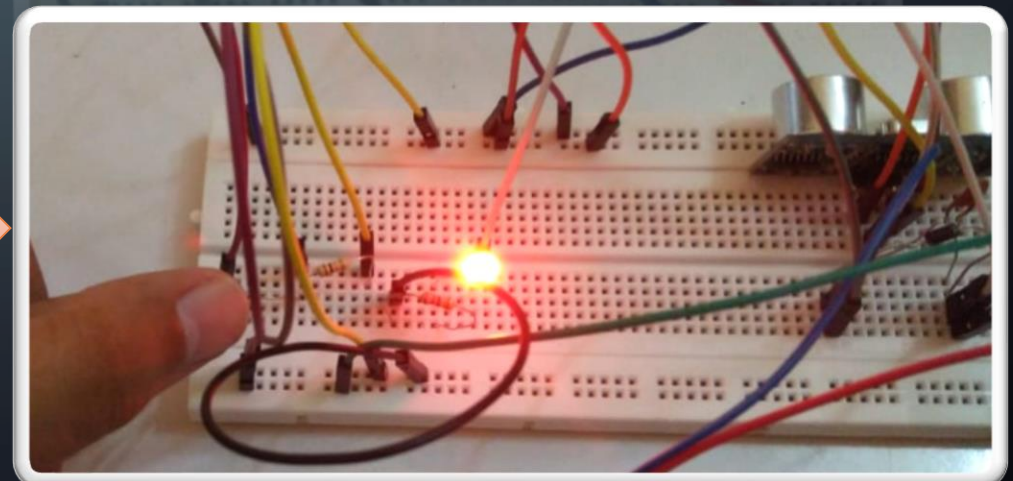
OUTPUT

COM3 (Arduino/Genuino Uno)

```
Its BRIGHT, Turn off the LED: 1409
Its BRIGHT, Turn off the LED: 9412
Its BRIGHT, Turn off the LED: 435
Its BRIGHT, Turn off the LED: 429
Its BRIGHT, Turn off the LED: 435
Its BRIGHT, Turn off the LED: 429
Its BRIGHT, Turn off the LED: 428
Its BRIGHT, Turn off the LED: 440
Its BRIGHT, Turn off the LED: 429
Its BRIGHT, Turn off the LED: 434
Its BRIGHT, Turn off the LED: 438
Its BRIGHT, Turn off the LED: 427
Its BRIGHT, Turn off the LED: 437
Its BRIGHT, Turn off the LED: 434
```



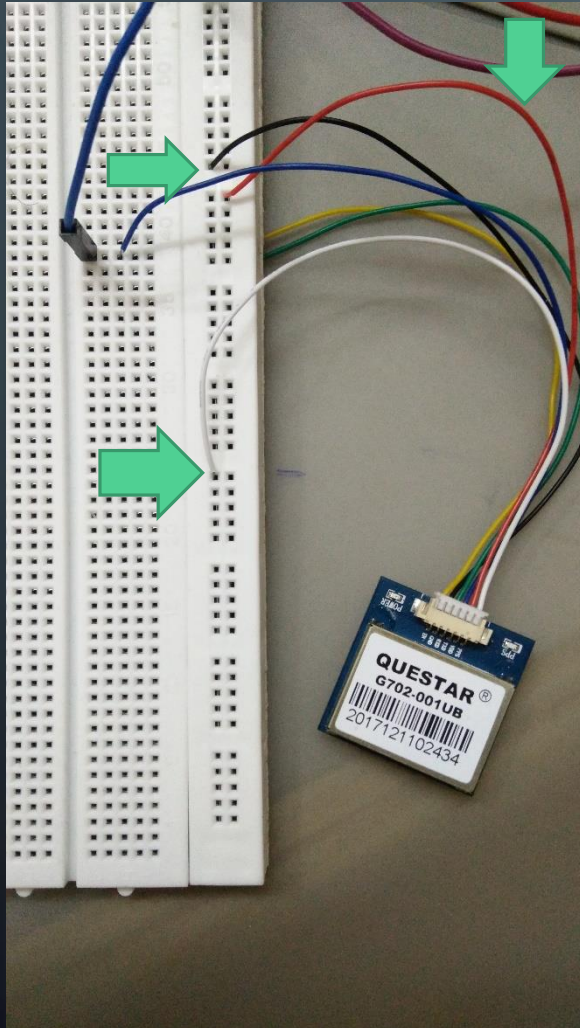
```
Its DARK, Turn on the LED: 353
Its DARK, Turn on the LED: 356
Its DARK, Turn on the LED: 359
Its DARK, Turn on the LED: 350
Its DARK, Turn on the LED: 348
Its DARK, Turn on the LED: 350
Its DARK, Turn on the LED: 345
Its DARK, Turn on the LED: 345
Its DARK, Turn on the LED: 349
Its DARK, Turn on the LED: 342
Its DARK, Turn on the LED: 339
Its DARK, Turn on the LED: 341
Its DARK, Turn on the LED: 335
Its DARK, Turn on the LED: 331
Its DARK, Turn on the LED: 335
```





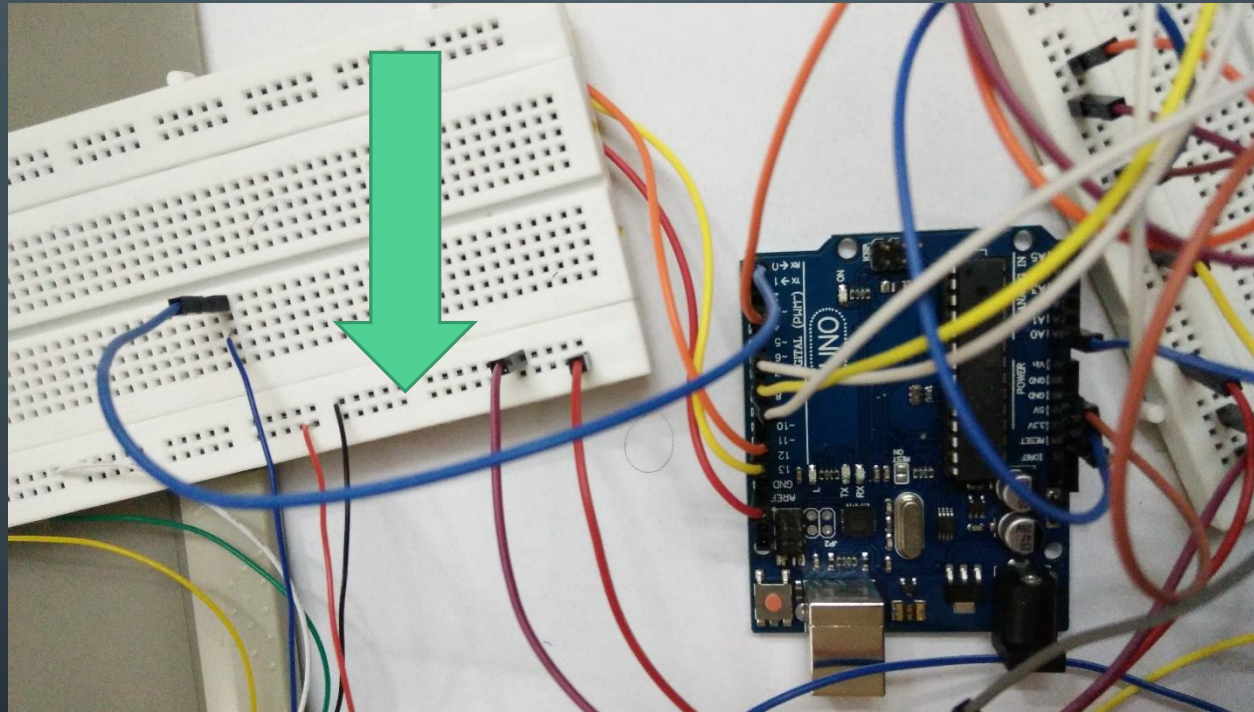
GSM AND GPS MODULE WITH ARDUINO

ADDING GPS MODULE TO ARDUINO



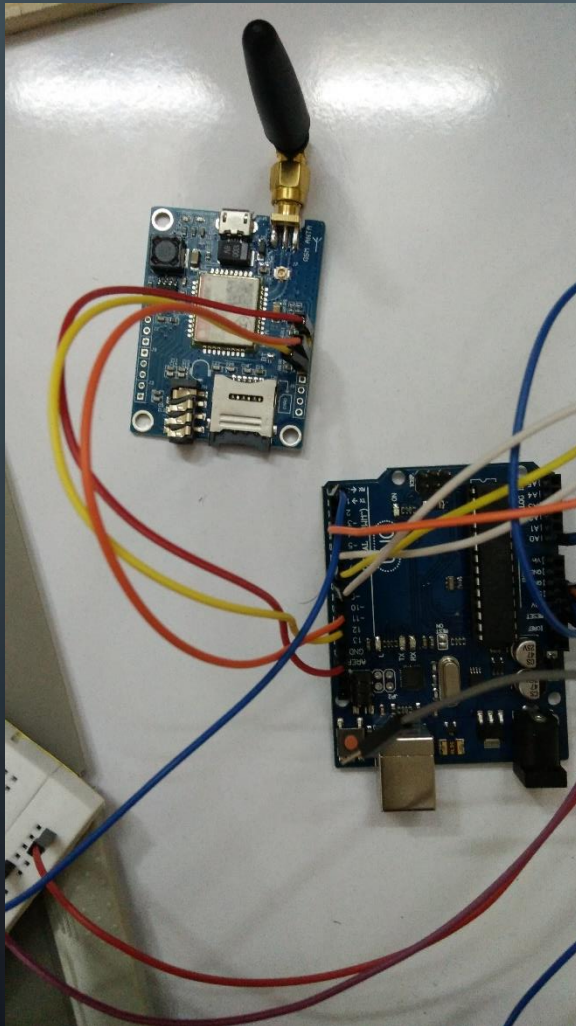
- The Vdd of the GPS module is connected to the positive rail of the breadboard having 5V supply (red wire).
- The GND and the PPS pin of the GPS module is connected to ground (black and white wire).

ADDING GPS MODULE TO ARDUINO



- The T_x pin of GPS module is connected to pin1 (Rx) of the Arduino (blue wire).
- Remove the T_x line while uploading the code

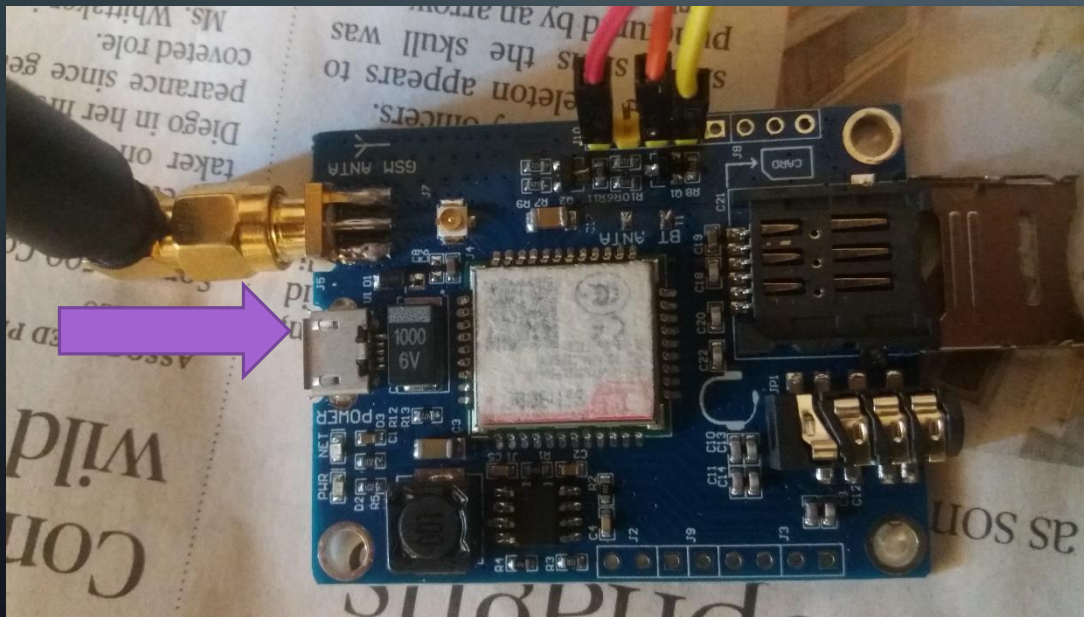
ADDING GSM MODULE TO ARDUINO



- The Rx of GSM is connected to digital pin7(Tx) of Arduino(orange wire)
- The Tx of GSM is connected to digital pin8(Rx) of Arduino(yellow wire)
- The GND of GSM is connected to GND of Arduino (red wire)

ADDING GSM MODULE TO ARDUINO

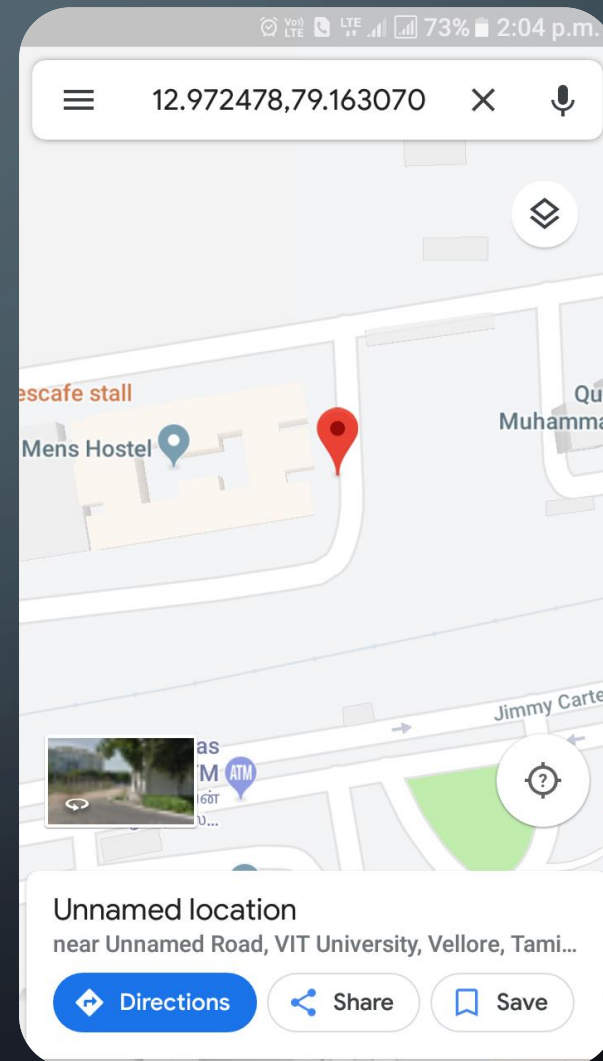
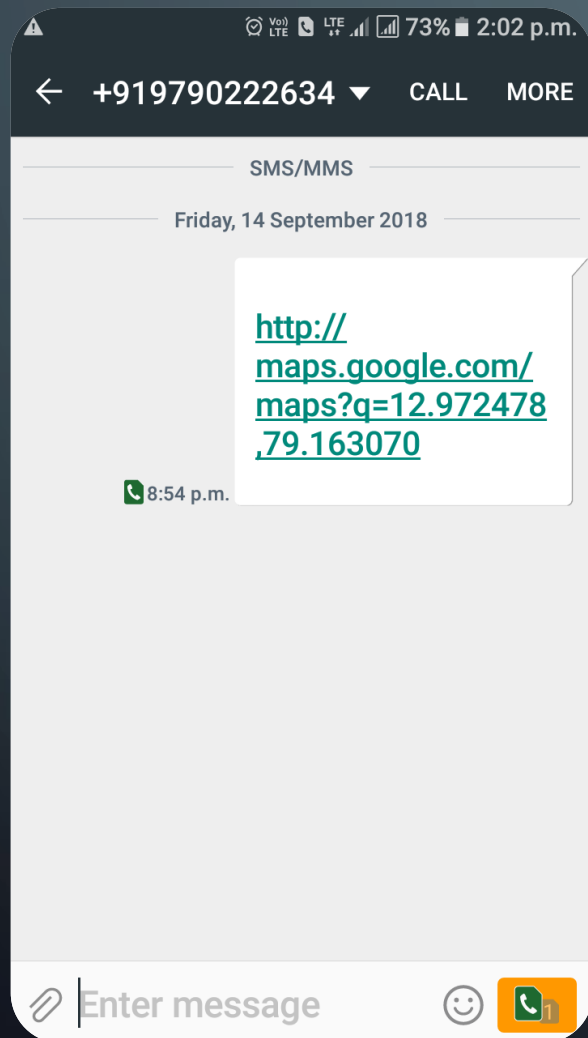
Provide a 5V external power supply to GSM module

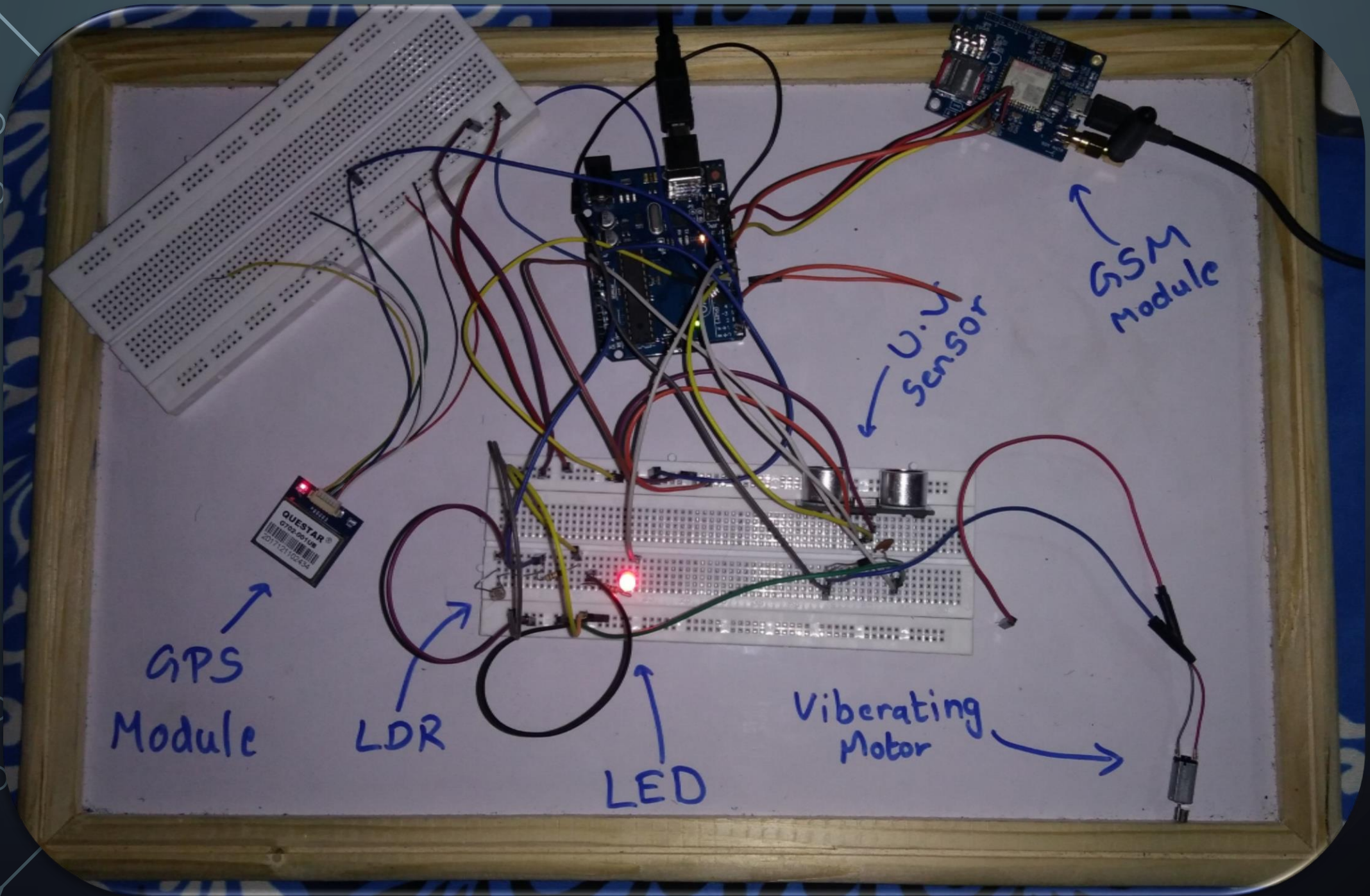


Insert a SIM card in the given slot



OUTPUT OF GPS AND GSM MODULE





GPS
Module

LDR

LED

Viberating
Motor

U.V.
sensor

GSM
Module