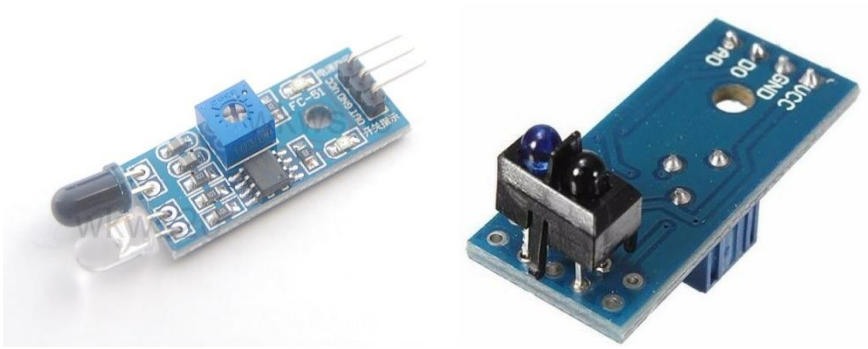
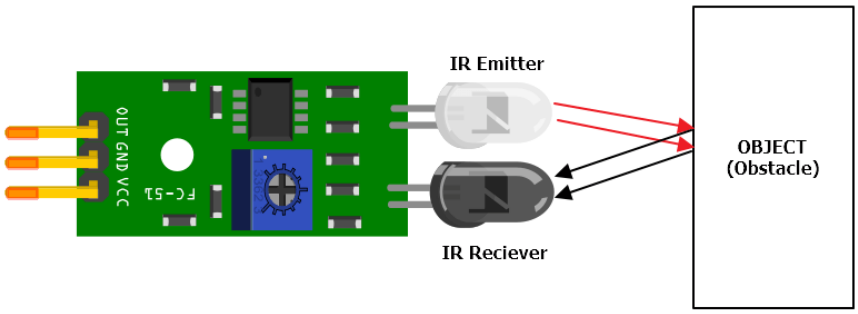
Proximity Sensors



Introduction



Note: Black surfaces absorbs light naturally. So it will not reflects much light on IR Reciever.
This concept is used in Line follower robot.

The module consists of two diodes. The clear one is an LED emits light in the IR spectrum. It also as a lens that allows the light it emits to have a narrower spread. The second diode, a photodiode, (darker) is the receiver. The diode's lens is colored in such a way that it will only be sensitive to the light emitted in the IR spectrum.

The transmitter diode lights up and any object in front of it will reflect the emitted IR light. Do note however, that there are limitations to this. Darker colors absorb light and thus less IR is reflected. Further, ambient lighting also affects the receiver diode.

You can power up the module by connecting VCC to 5V and GND to ground.IR light is not visible to the human eye. However, as a tip, you may use your phone camera to "see" that the transmitter is working.

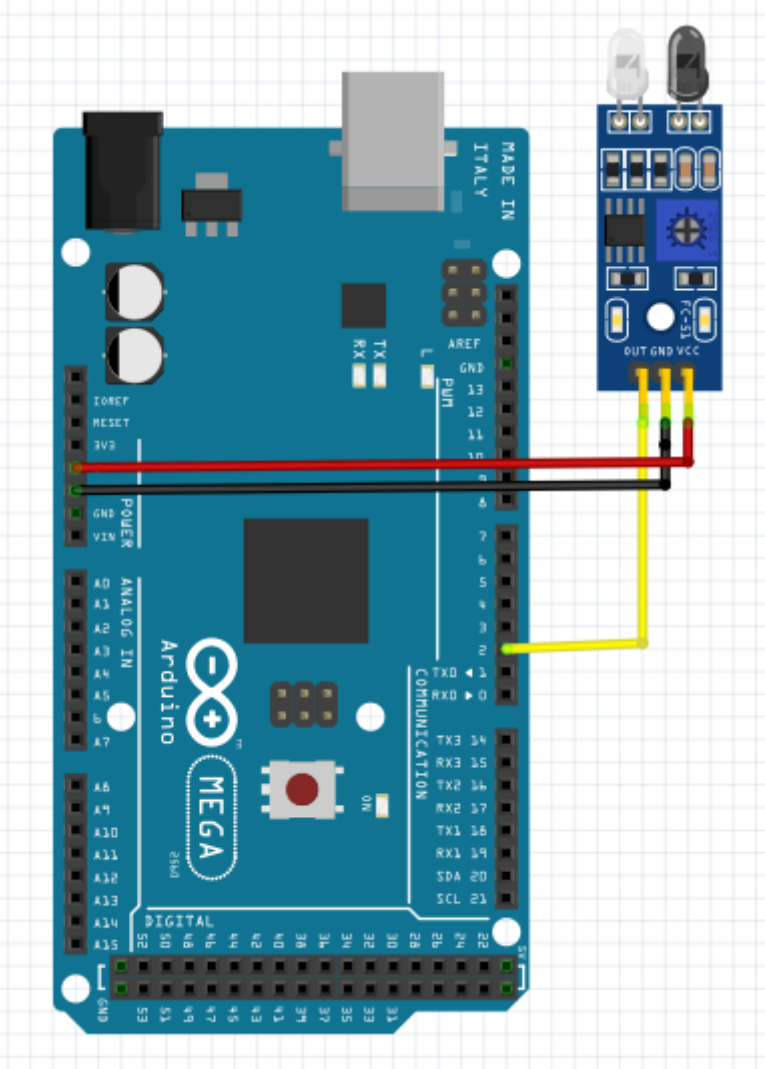
Interfacing with Arduino

The module is operated like a switch and uses 3 wires. One for ground, one for 5V and one for the signal. The signal is a logic LOW or 0V when it senses an object in front and a logic HIGH/5V when it there are no obstructions. This makes it easy for us to interface it with Arduino by using the readpin() statement. There is also an indicated LED on the board to indicate the state of the output

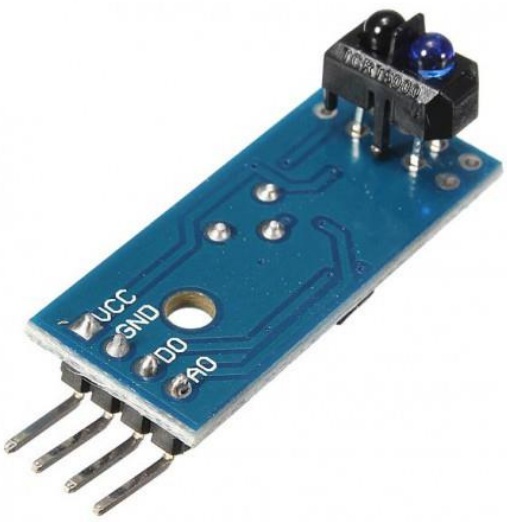
Notice that there is a blue trimmer resistor on the circuitboard. This is to adjust the sensitivity of the sensor

By this time, we won't do a demo for creating the code with Arduino as the application is pretty straightforward. This will be left as an exercise for your team.

SHOW



You can try this sample wiring and figure out how to do the code from there.
In your kits, there is also another type of IR sensor that is provided



The difference between this sensor and the other one is this one is packaged in a single piece. The theory of operation is still the same and you also have the same trimmer resistor on board.

However, this sensor includes an ANALOG output that you can use to approximate distance. Do still note that environmental conditions still affect this sensor's sensitivity.

The A0 pin of the module can be connected directly to your Arduino's pins. The voltage output is proportional to the distance of the object from the sensor. This type of sensor is particularly useful for detecting closer objects as other sensors like ultrasonic ones fail at close ranges.

Another use for this sensor is for line tracing. On black surfaces, the sensor is detecting less reflected IR while on lighter surfaces, it can detect the proximity of the object. The trimmer needs to be adjusted so that it is not triggering on dark surfaces at a given constant distance.

We won't go deeper on how to connect this to Arduino's analog input as it is fairly straightforward.