Name of the Student:	Roll No.	Date:

Experiment No. – 5(a)

**Title:** Interfacing of IR sensor for object detection using Arduino

**Hardware Requirements:** Arduino Board, IR Sensor.

Software Requirements: Arduino IDE

Theory:

IR sensor is an electronic device that emits the light in order to sense some object of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. Usually, in the infrared spectrum, all the objects radiate some form of thermal radiation. These types of radiations are invisible to our eyes, but infrared sensor can detect these radiations.
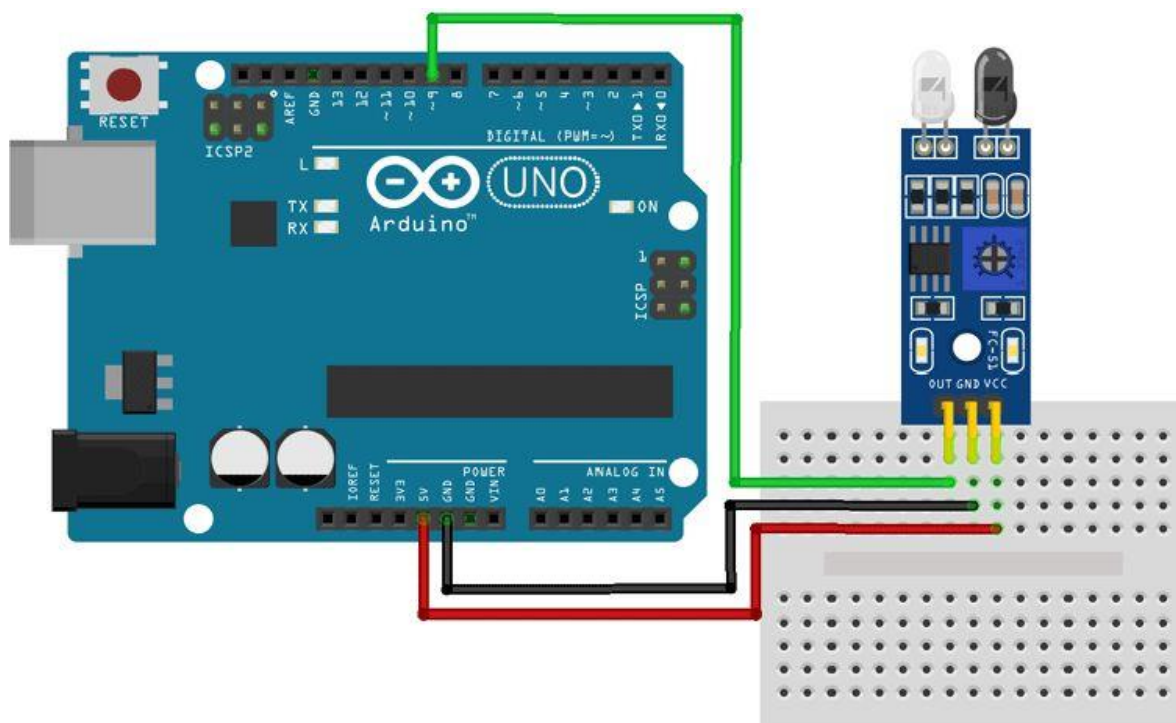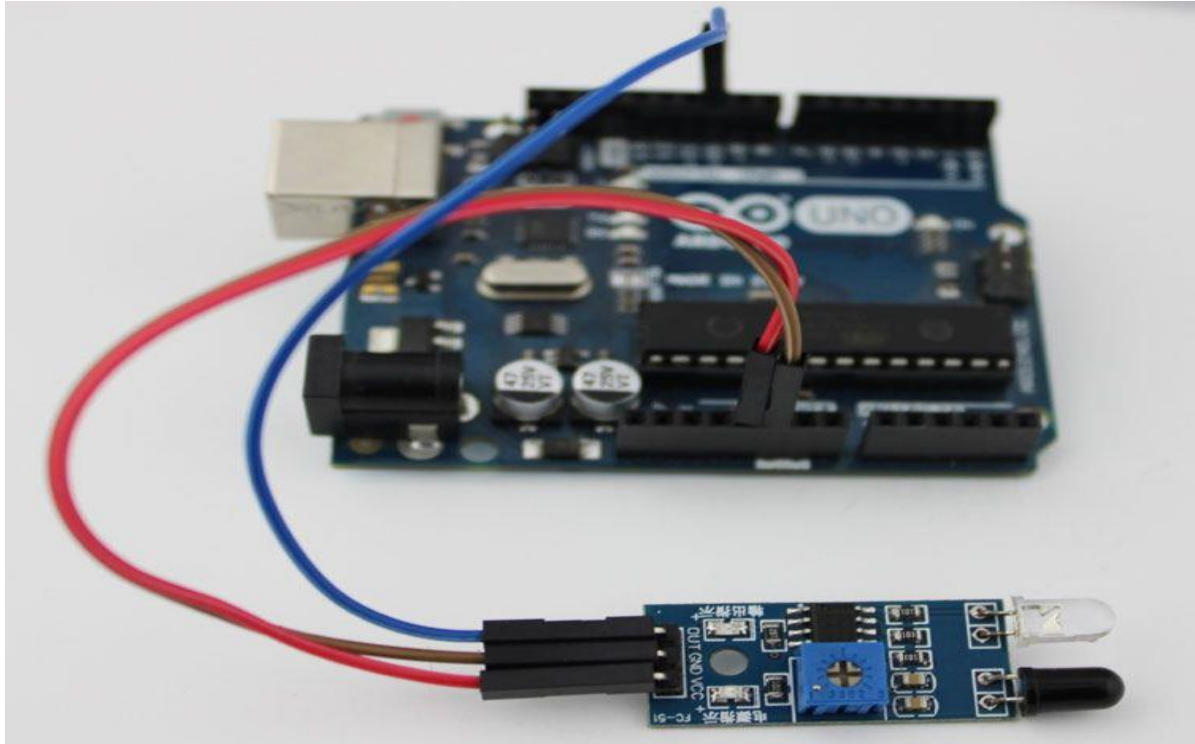
The working principle of an infrared sensor is similar to the object detection sensor. This sensor includes an IR LED & an IR Photodiode, so by combining these two can be formed as a photo-coupler otherwise optocoupler. The physics laws used in this sensor are planks radiation, Stephan Boltzmann & weins displacement.

IR LED is one kind of transmitter that emits IR radiations. This LED looks similar to a standard LED and the radiation which is generated by this is not visible to the human eye. Infrared receivers mainly detect the radiation using an infrared transmitter. These infrared receivers are available in photodiodes form. IR Photodiodes are dissimilar as compared with usual photodiodes because they detect simply IR radiation. Different kinds of infrared receivers mainly exist depending on the voltage, wavelength, package, etc.

Once it is used as the combination of an IR transmitter & receiver, then the receiver's wavelength must equal the transmitter. Here, the transmitter is IR LED whereas the receiver is IR photodiode. The infrared photodiode is responsive to the infrared light that is generated through an infrared LED. The resistance of photo-diode & the change in output voltage is in proportion to the infrared light obtained.

Procedure:

- Make the connection as per circuit diagram
- Open Arduino IDE
- Select the Arduino Board
- Select the Arduino Port
- Write code in Editor Window and save file
- Compile the code
- Upload the code

Conclusion:

_____

_____

_____

_____

Code:

```
// Arduino IR Sensor Code

int IRSensor = 9; // connect ir sensor module to Arduino pin 9
int LED = 13; // conect LED to Arduino pin 13

void setup()
{
 Serial.begin(115200); // Init Serila at 115200 Baud
 Serial.println("Serial Working"); // Test to check if serial is working or not
 pinMode(IRSensor, INPUT); // IR Sensor pin INPUT
 pinMode(LED, OUTPUT); // LED Pin Output
}

void loop()
{
 int sensorStatus = digitalRead(IRSensor); // Set the GPIO as Input
 if (sensorStatus == 1) // Check if the pin high or not
  {
   // if the pin is high turn off the onboard Led
   digitalWrite(LED, LOW); // LED LOW
   Serial.println("Motion Ended!"); // print Motion Detected! on the serial monitor window
  }
 else
  {
   //else turn on the onboard LED
   digitalWrite(LED, HIGH); // LED High
   Serial.println("Motion Detected!"); // print Motion Ended! on the serial monitor window
  }
}
```

Experiment No. – 5(b)

Title: Interfacing of Ultrasonic Sensor using Arduino Uno

Hardware Requirements: Arduino Board, Ultrasonic Sensor

Software Requirements: Arduino IDE

Theory:

Ultrasonic Sensor: