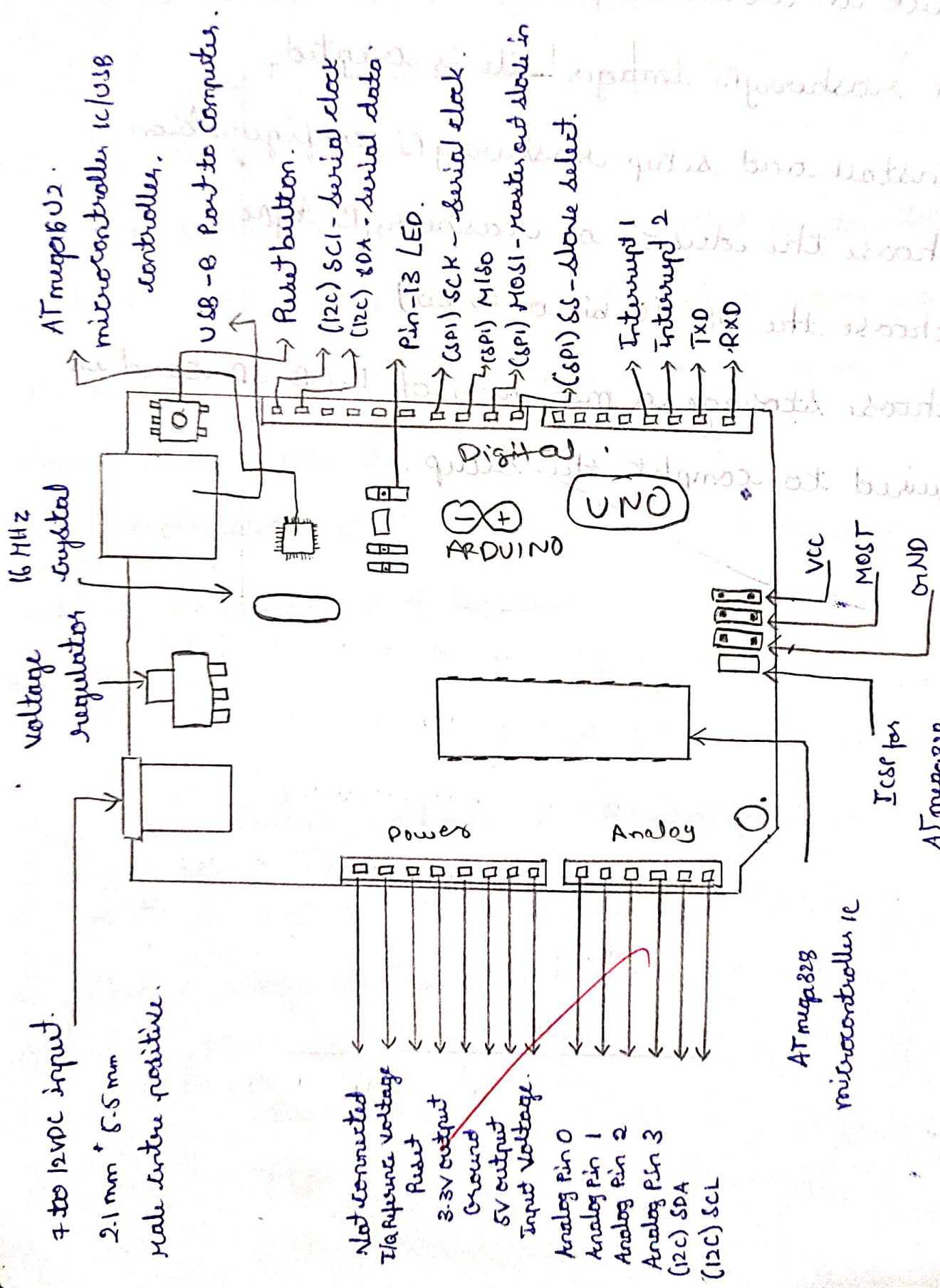
Week-2

Aim: Familiarization with Arduino and raspberry Pi board.



Rasberry Pi.

Ethernet Port.
USB Port.
3.5 mm Audio & composite o/p. JACK.
Ethernet Controller
GPIO Pins.
Broadcom BCM2835
CSI Camera Connector
4 Squarely placed mounting holes.
5V micro power
HDMI
Micro SD card.

10/2/24

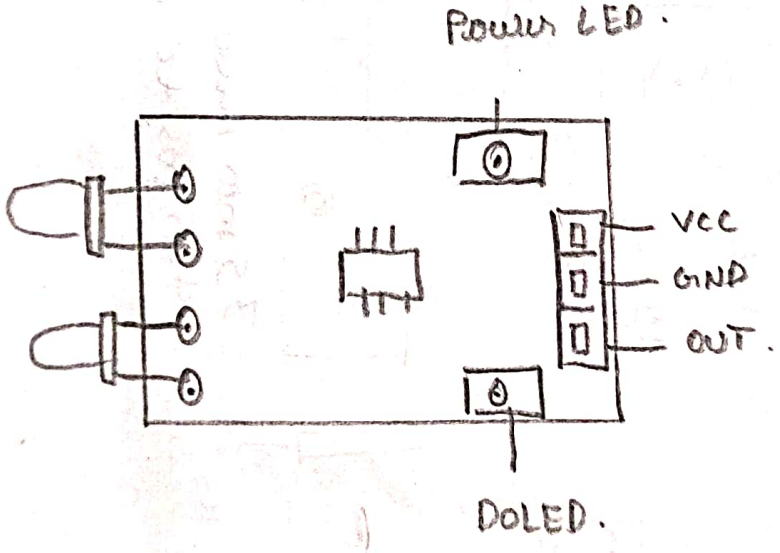
Write a Program to interface IR sensor using Arduino board.

IR Sensor → Infra red sensor / LDR sensor
(Light Dependent Resistor) sensor

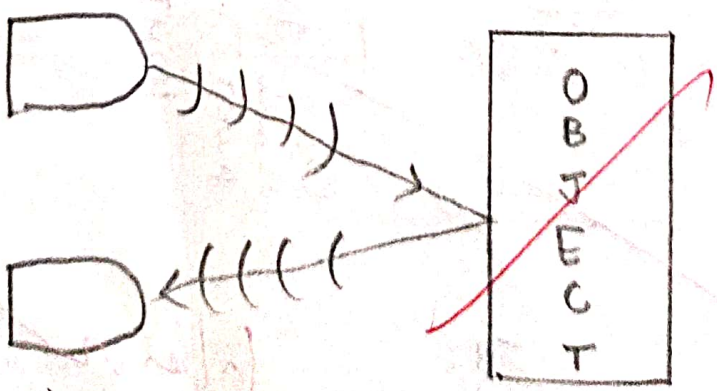
⇒ It is based on the Principle of optics.

⇒ IR radiation can be found with the wavelength of these waves range from 0.7 to 5

IR Sensor:



IR Transmitter



IR receiver.

Hardware Requirements.

1. Arduino Board
2. IR Sensor
3. Jumper wires.
4. Arduino Cable.

Procedure:

→ connect Arduino cable to the USB board to the END and another end arduino board.

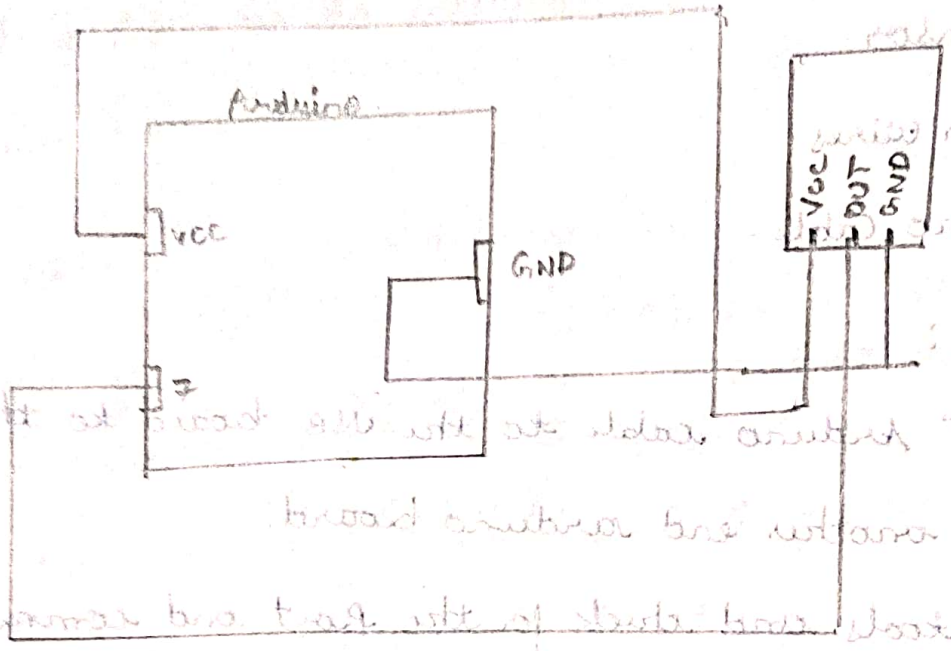
→ go to tools and check for the Port and connect to selected Arduino Port.

→ select the UNO board in the board manages.

→ Now connect IR Pin to Arduino board to Jumper wires.

IR	Arduino.
VCC	3.3V
GND	GND
OUT	Digital IPm 0-7.

Pin Diagrams :




```
int IRPin = 7;
int led = 13;
int Value;
Void setup () {
    PinMode (IRPin, INPUT);
    Serial .begin (9600);
    PinMode (led, OUTPUT);
}
Void loop () {
    Value = digitalRead (IRPin);
    Serial .Println (Value);
```

```
if (digitalRead (IRPin) == 0)
{
  digitalWrite (led, HIGH);
  Serial.Println ("Object detected");
}
else
{
  digitalWrite (led, LOW);
  Serial.Println ("object not detected");
}
```

Output:

Serial monitor.

```
object not detected.
0
Object not detected.
0
Object not detected.
0
Object detected.
1
object detected.
1
Object detected.
1
```

10/2/24.

write a Program to interface ultra sonic sensor using Arduino board.

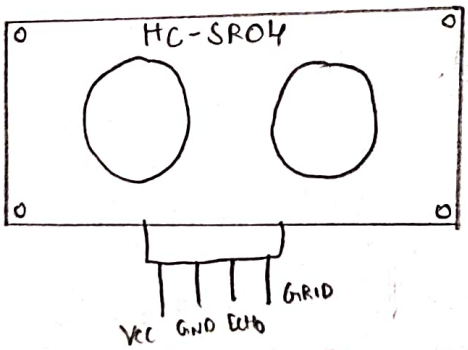
ultra sonic sensor:

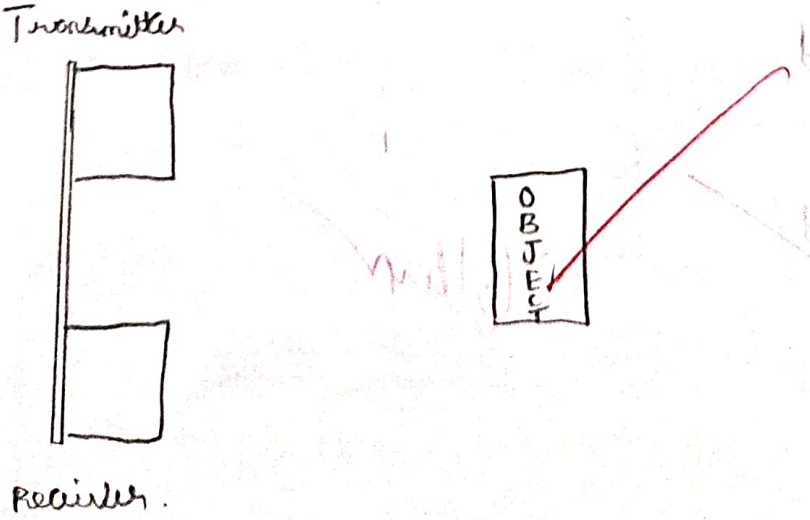
→ It is an instrument that measures the distance to an object using ultrasonic sound waves.

→ It uses a transducer to send and receive ultrasonic pulses that relay back the information about an object.

→ It converts a sound signal into electrical signal.

→ Principle of ultrasonic.

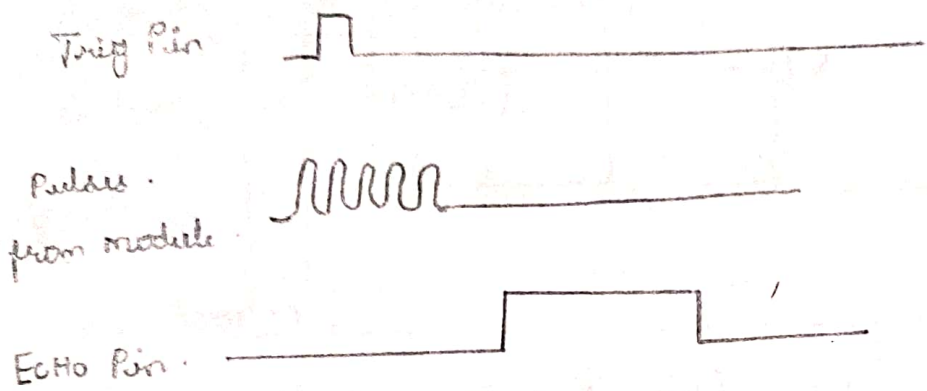




Distance = Time x Speed of sound/2.

Time can be calculated by Pushing.

ultrasonic HC-SR04 module Timing Diagram.

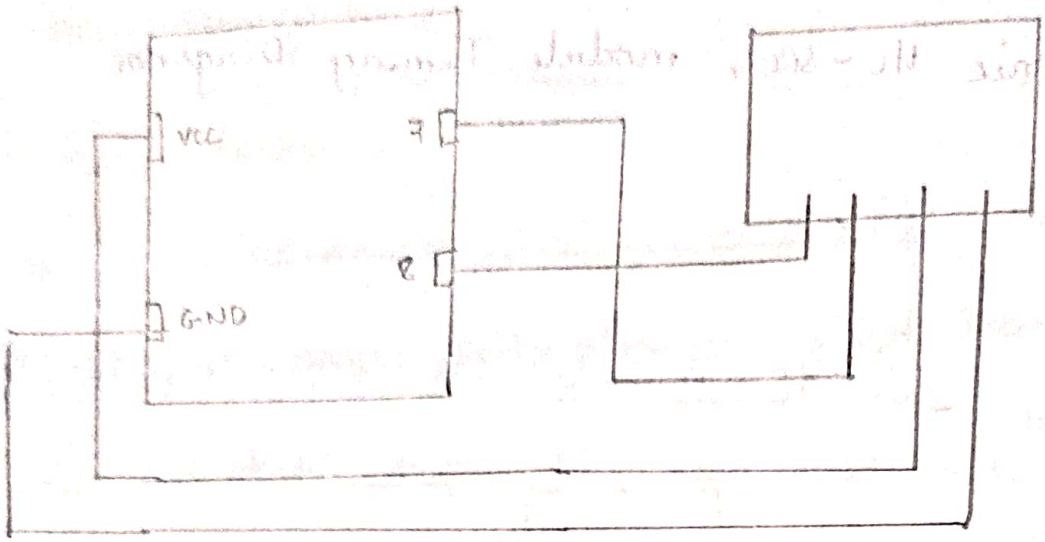


Hardware Requirements:

1. Arduino UNO
2. Arduino Cable.
3. ultra sonic Sensor HC-SR04
4. Jumper wires.
5. LED.

VCC	5V/3.3V
GND	GND
TRIG	7
ECHO	8.

Pin Diagram.



Procedure:

→ connect arduino cable to the USB board to the one End and another end arduino board

→ Go to tools select Port, and select communication board.

→ connect jumper wires to the Pins.

→ Verify and upload.

→ check the output in the Serial monitor.

Program:

```
# define ECHOPIN 7
# define TRIGPIN 8.
int led=12;
int a,b;
```

```
void setup()
{
  Serial.begin(9600);
  PinMode(ECHOPIN, INPUT);
  PinMode(TRIGPIN, OUTPUT);
  PinMode(led, OUTPUT);
}
void loop() {
  digitalWrite(TRIGPIN, LOW);
  delayMicroseconds(2000);
  digitalWrite(TRIGPIN, HIGH);
  delayMicroseconds(1000);
  float a = PulseIn(ECHOPIN, HIGH);
  digitalWrite(led, HIGH);
  b = a * 0.0344/2;
  Serial.Print(b);
  Serial.Println("Cm");
  delay(1000);
}.
```

Output: Serial Monitor.

0 cm
2067 cm
27 cm
14 cm
8 cm
5 cm
11 cm
110 cm
2323 cm.