Ex No : 08 Date:	IMPLEMENT LED BLINK AND LED PATTERN WITH ARDUINO

Aim:
To Implement LED Blink and LED Pattern With Arduino

Procedure:
STEP 1: Open Arduino Software.
STEP 2: Click Tools -> Board -> Arduino Nano.
STEP 3: In Tools Menu Select Port –> COM.
STEP 4: Click File-> New and Start Write the Code.
STEP 5: And Click tick Icon Button of the file Menu to compile.
STEP 6: Click Upload Icon After Verify.

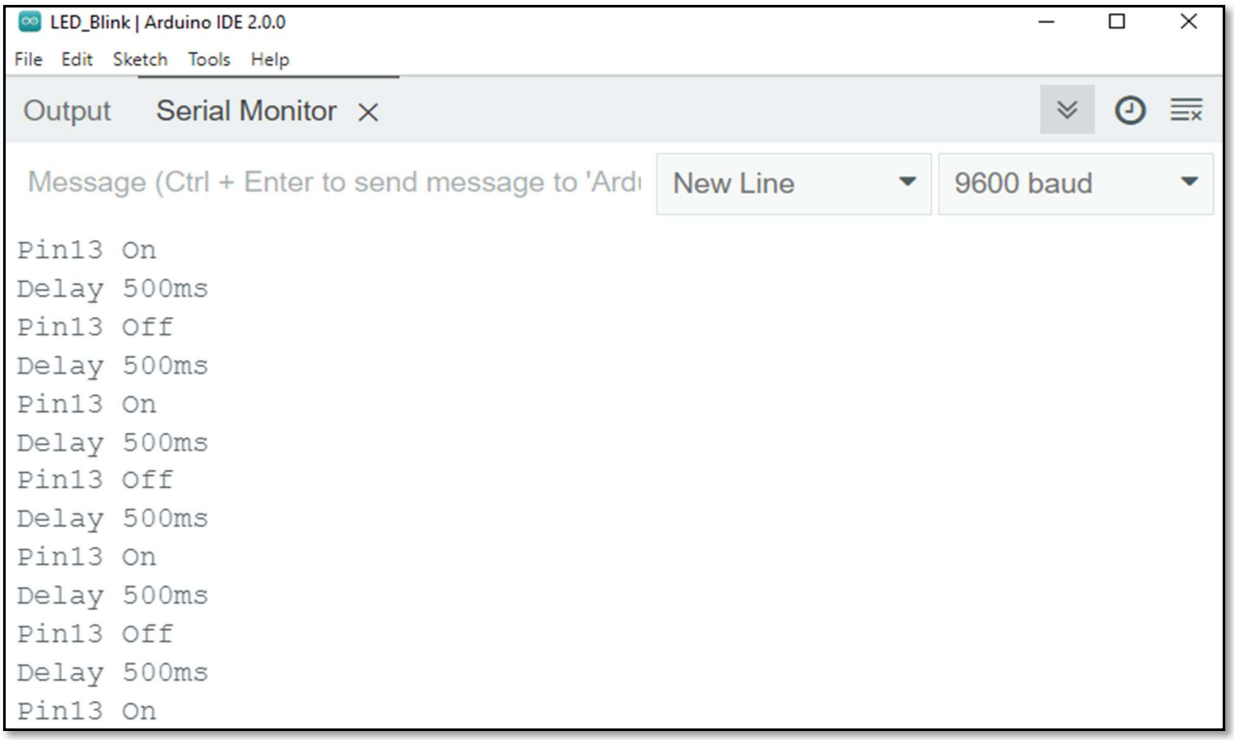
Program: LED Blink

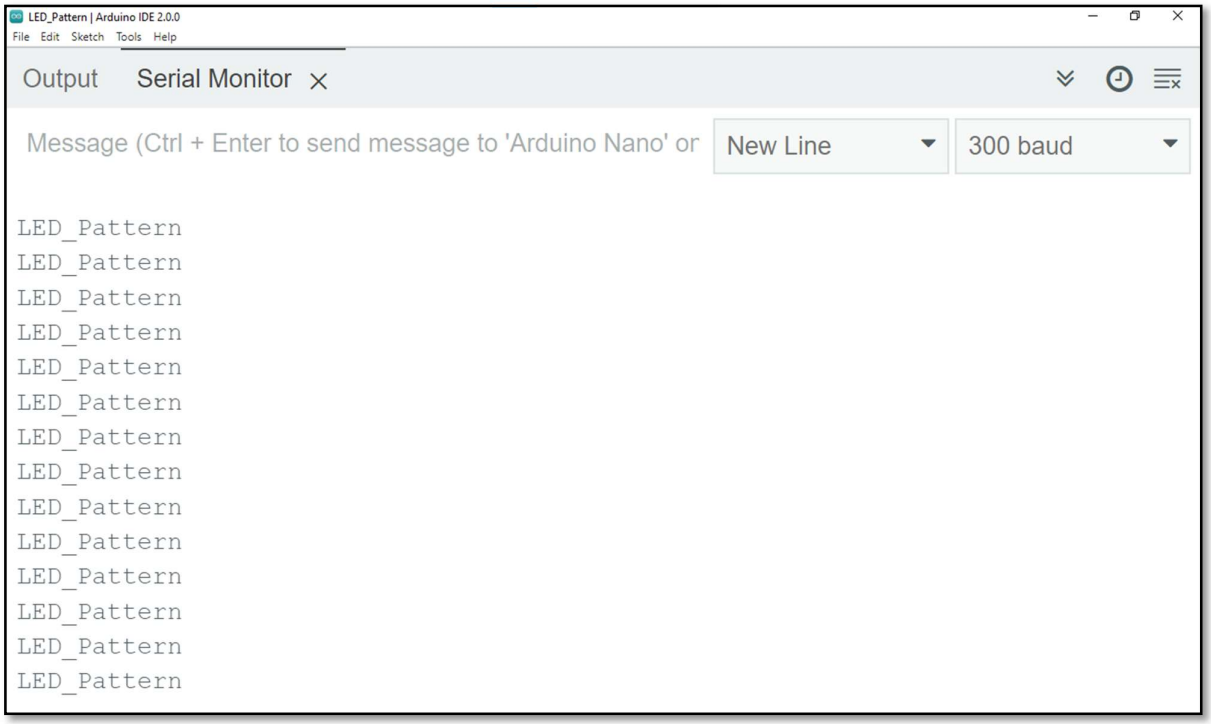
```
#include <LiquidCrystal.h>
LiquidCrystal lcd(A5,A4,A3,A2,A1,A0);
int i;
void setup() {
  // set up the LCD's number of columns and rows:
  lcd.begin(16, 2);
  lcd.print("LED BLINK");
  lcd.setCursor(0,1);
  lcd.print("EXPERIMENT");
  delay(3000);
}
void led_blink()
{
  lcd.clear();
  lcd.print("LED Blinking");
  pinMode(5,OUTPUT);

  for(int i=0;i<10;i++)
  {
    digitalWrite(1,HIGH);
    delay(50);
  }
}
void loop() {
    led_blink();
    delay(100);
}
```

Program: LED Pattern

```
#include <LiquidCrystal.h>
LiquidCrystal lcd(A5,A4,A3,A2,A1,A0);
int i;
void setup() {
  lcd.begin(16, 2);
  lcd.print("LED PATTERN ");
  lcd.setCursor(0,1);
  lcd.print("Experimenter");
  delay(3000);
  lcd.clear();
}
void ledPattern()
{
  lcd.clear();
  lcd.print("LED Pattern");
  for (i =2;i<=7;i++)
{
pinMode(i, OUTPUT);  // turn the LED on (HIGH is the voltage level)
digitalWrite(i, HIGH);
}
 for(int j=0;j<5;j++)
 {
    for (i =2;i<=7;i++)
      {
      digitalWrite(i, LOW);
      delay(100);
      }
    for (i =7;i>=2;i--)
      {
      digitalWrite(i, HIGH);
      delay(100);
      }
 }
  for (i =2;i<=7;i++)
  digitalWrite(i, HIGH);

  for (i =2;i<=7;i++)
  pinMode(i, INPUT);
}
void loop() {
    ledPattern();
    delay(1000);

}
```

Output:





Result:

Thus the above LED Blink and LED Pattern with Arduino program was executed and verified successfully

Ex No : 09 Date:	IMPLEMENT LED PATTERN WITH PUSH BUTTON CONTROL WITH ARDUINO

Aim:
Implement LED Pattern with Push Button Control with Arduino

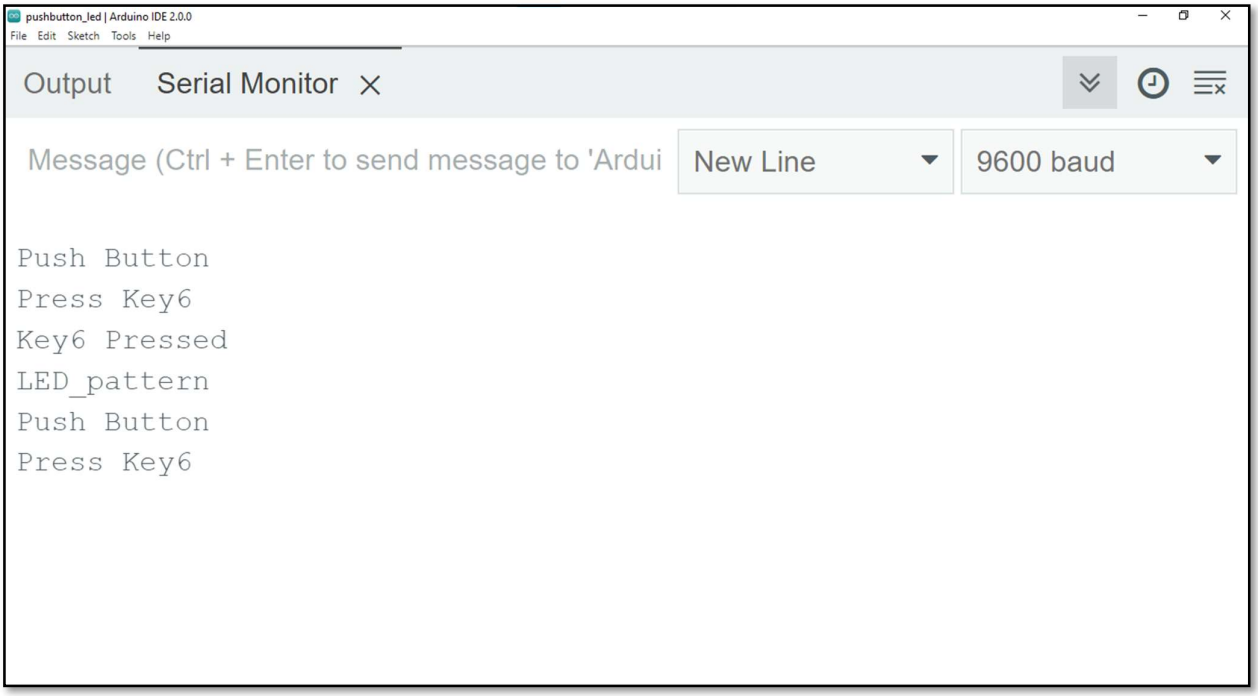
Procedure:
STEP 1: Open Arduino Software.
STEP 2: Click Tools -> Board -> Arduino Nano.
STEP 3: In Tools Menu Select Port –> COM.
STEP 4: Click File-> New and Start Write the Code.
STEP 5: And Click tick Icon Button of the file Menu to compile.
STEP 6: Click Upload Icon After Verify.

Program:

```
#include <LiquidCrystal.h>
LiquidCrystal lcd(A5,A4,A3,A2,A1,A0);
int i;
void setup() {

  lcd.begin(16, 2);
  lcd.print("LED Pattern");
  lcd.setCursor(0,1);
  lcd.print("Experimenter");
  delay(3000);
  lcd.clear();
}

void pushbutton_led()

{

lcd.clear();
lcd.print("Push Button");
lcd.setCursor(0,1);
lcd.print("Press Key6");

pinMode(7, INPUT);  // turn the LED on (HIGH is the voltage level)
digitalWrite(7, HIGH);

for (i =2;i<=6;i++)
{
pinMode(i, OUTPUT);  // turn the LED on (HIGH is the voltage level)
digitalWrite(i, HIGH);
}

while(digitalRead(7));

if(!digitalRead(7))
{
```

```
lcd.clear();
lcd.print("Key6 Pressed");
for (i =2;i<=6;i++)
  {
  digitalWrite(i, LOW);
  delay(100);
  }
for (i =6;i>=2;i--)
  {
  digitalWrite(i, HIGH);
  delay(100);
  }
  for (i =2;i<=6;i++)
  digitalWrite(i, HIGH);
}

}
void loop() {

   pushbutton_led();
   delay(1000);
}
```

Output:



Result:

Thus the above LED Pattern with Push Button Control with Arduino program was executed and verified successfully

Ex No : 10 Date:	DISPLAY "HELLO WORLD" IN LCD 16X2 DISPLAY WITH ARDUINO

Aim:
To Display "Hello World" in LCD 16X2 Display with Arduino

Procedure:
STEP 1: Open Arduino Software.
STEP 2: Click Tools -> Board -> Arduino Nano.
STEP 3: In Tools Menu Select Port –> COM.
STEP 4: Click File-> New and Start Write the Code.
STEP 5: And Click tick Icon Button of the file Menu to compile.
STEP 6: Click Upload Icon After Verify.

Program:
```
#include <LiquidCrystal.h>
LiquidCrystal lcd(A5,A4,A3,A2,A1,A0);
int i;
void setup() {
  lcd.begin(16, 2);
  lcd.print("TEXT DISPLAY");
  lcd.setCursor(0,1);
  lcd.print("Experimenter");
  delay(3000);
  lcd.clear();
  lcd.print("HELLO WORLD");
}
void loop() {
}
```

Output:

Result:
Thus the above Display "Hello World" in LCD 16X2 with Arduino program was executed and verified successfully

Ex No : 11 Date:	IMPLEMENT THE SERVO MOTOR CONTROL WITH ARDUINO

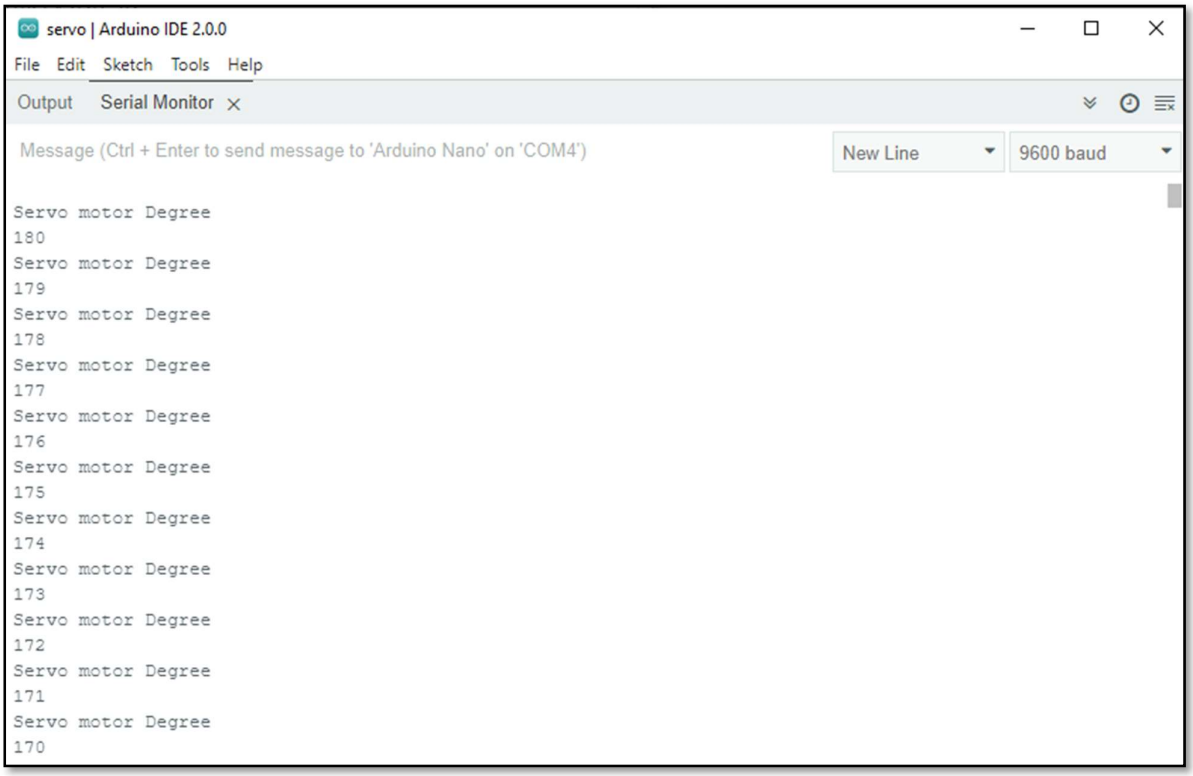
Aim:
To Implement the Servo Motor Control with Arduino

Procedure:
STEP 1: Open Arduino Software.
STEP 2: Click Tools -> Board -> Arduino Nano.
STEP 3: In Tools Menu Select Port –> COM.
STEP 4: Click File-> New and Start Write the Code.
STEP 5: And Click tick Icon Button of the file Menu to compile.
STEP 6: Click Upload Icon After Verify.

Program:
```
#include <LiquidCrystal.h>
#include <Servo.h>
Servo myservo;
LiquidCrystal lcd(A5,A4,A3,A2,A1,A0);
int i;
void setup() {
  lcd.begin(16, 2);
  lcd.print("ROTATE SERVO");
  lcd.setCursor(0,1);
  lcd.print("Experimenter");
  delay(3000);
  lcd.clear();
  lcd.print("START ROTATING");
  delay(1000);
  lcd.clear();
}
void servoSweep()
{
  lcd.clear();
  lcd.print("MOTER DEGREE");
   myservo.attach(11);
   int pos;
for(int i=0; i<2;i++)
{
  for (pos = 0; pos <= 90; pos += 1) {          // goes from 0 degrees to 180 degrees
                                                // in steps of 1 degree
    myservo.write(pos);                         // tell servo to go to position in variable 'pos'
    delay(15);                                  // waits 15ms for the servo to reach the position
    lcd.setCursor(0,1);
    lcd.print("   ");
    lcd.setCursor(0,1);
    lcd.print(pos);
  }
  for (pos = 130; pos >= 0; pos -= 1) {         // goes from 180 degrees to 0 degrees
    myservo.write(pos);                         // tell servo to go to position in variable 'pos'
```

```
   delay(15);                                    // waits 15ms for the servo to reach the
position
   lcd.setCursor(0,1);
   lcd.print("   ");
   lcd.setCursor(0,1);
   lcd.print(pos);
 }
}
}
void loop() {
   servoSweep();
   delay(1000);
}
```

Output:



Result:

Thus the above Implement the Servo Motor Control with Arduino program was executed and verified successfully

Ex No : 12 Date:	IMPLEMENT AND MONITOR THE LM35 TEMPERATURE SENSOR AND ULTRASONIC DISTANCE MEASUREMENT WITH ARDUINO

Aim:

To Implement and Monitor the LM35 Temperature Sensor and Ultrasonic Distance Measurement With Arduino

Procedure:

STEP 1: Open Arduino Software.
STEP 2: Click Tools -> Board -> Arduino Nano.
STEP 3: In Tools Menu Select Port –> COM.
STEP 4: Click File-> New and Start Write the Code.
STEP 5: And Click tick Icon Button of the file Menu to compile.
STEP 6: Click Upload Icon After Verify.

Program for LM35:

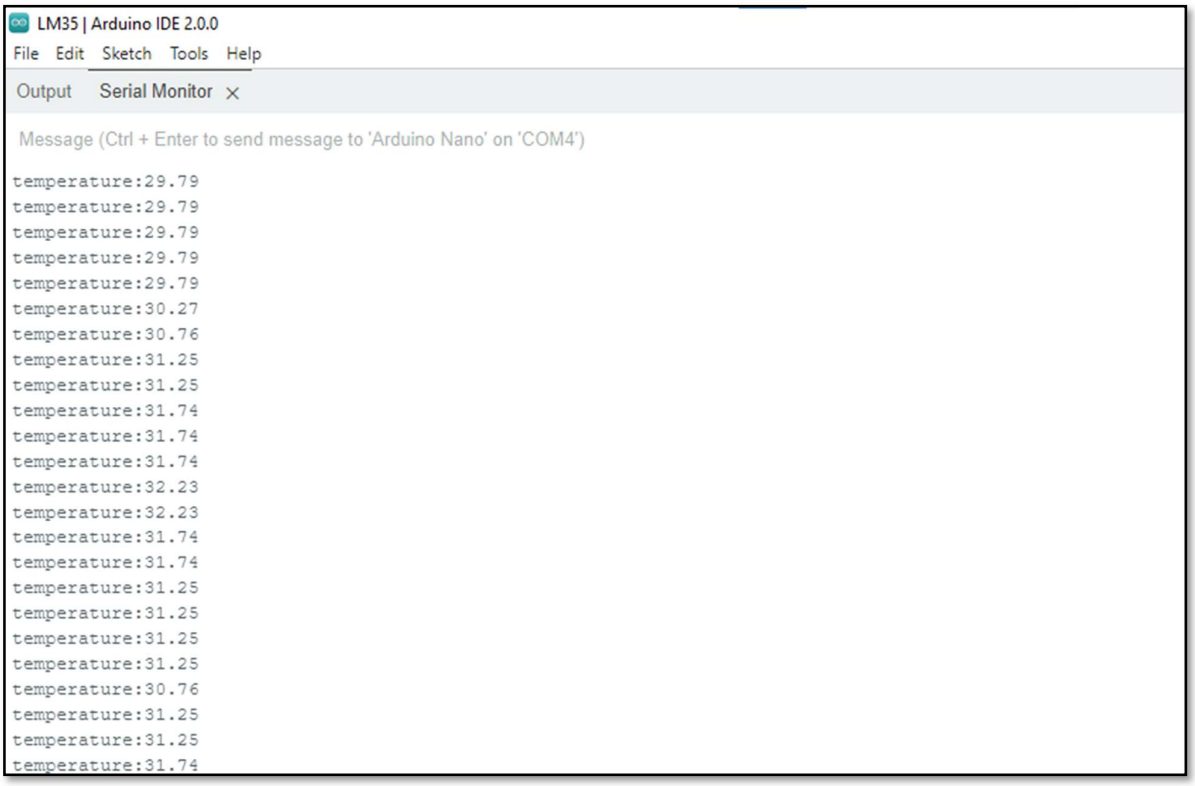
```
#include <LiquidCrystal.h>
LiquidCrystal lcd(A5,A4,A3,A2,A1,A0);
int i;

void setup() {
  lcd.begin(16, 2);
  lcd.print("Find Temperature");
  lcd.setCursor(0,1);
  lcd.print("Experimenter");
  delay(3000);
  lcd.clear();
}

void temperature()
{
  int val;
  float mv;
  float cel;
  float farh;

  for(int i=0;i<20;i++)
  {
  lcd.clear();
  lcd.print("Temperature");
  val = analogRead(A6);
  mv = ( val/1024.0)*5000;
  cel = mv/10;
  farh = (cel*9)/5 + 32;
  lcd.setCursor(0,1);
  lcd.print(cel);
  lcd.print("*C");
  delay(1000);
  }
```

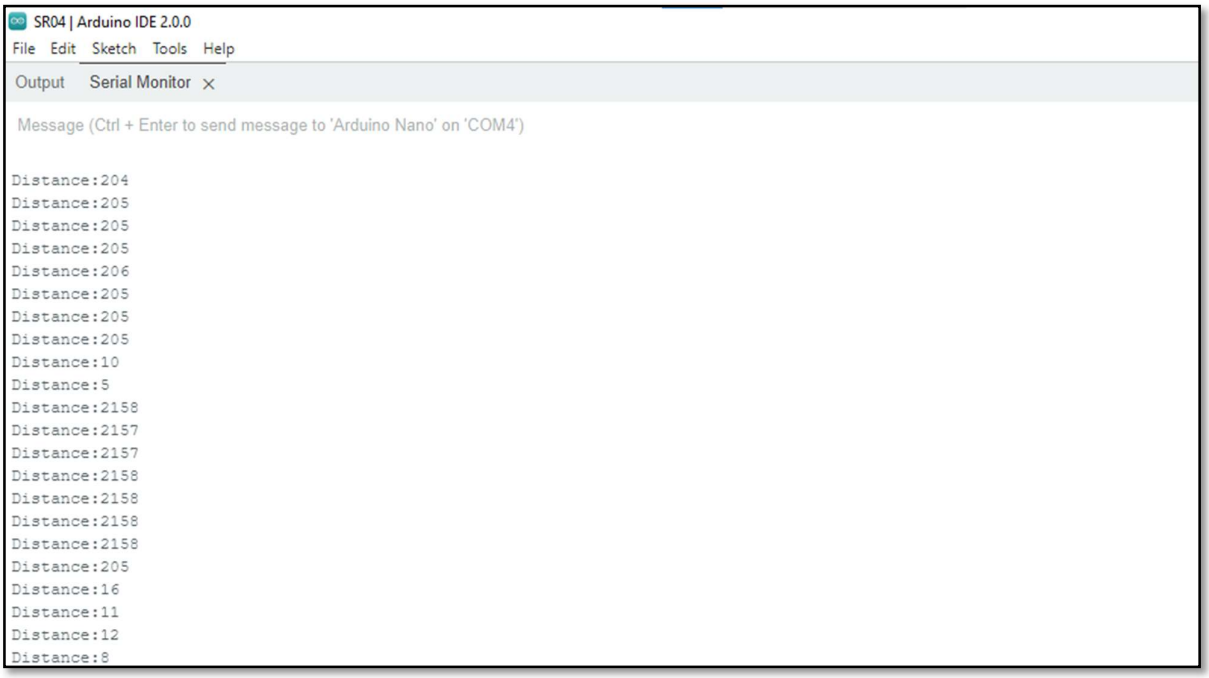
```
}
void loop() {
   temperature();
   delay(1000);
 }
```

Program for Ultrasonic (SR04):

```
#include <LiquidCrystal.h>
LiquidCrystal lcd(A5,A4,A3,A2,A1,A0);
int i;

void setup() {
  lcd.begin(16, 2);
  lcd.print("Finding Distance");
  lcd.setCursor(0,1);
  lcd.print("Experimenter");
  delay(3000);
  lcd.clear();
}

void sr04()
{
  pinMode(13, OUTPUT);
  pinMode(12, INPUT);
  for(int i=0;i<100;i++)
  {
  lcd.clear();
  lcd.print("UltraSonic");
  lcd.setCursor(0,1);
  digitalWrite(13, LOW);
  delayMicroseconds(2);
  digitalWrite(13, HIGH);
  delayMicroseconds(10);
  digitalWrite(13, LOW);
  long duration = pulseIn(12, HIGH);
  int distance = duration * 0.034 / 2; // Speed of sound wave divided by 2 (go and back)
  lcd.print("Distance:");
  lcd.print(distance);
  lcd.print("cm");
  delay(100);
  }
}
void loop() {
   sr04();
   delay(1000);
}
```

Output:





Result:

Thus the above Implement and Monitor the LM35 Temperature Sensor and Ultrasonic Distance Measurement with Arduino Program was executed and verified successfully

Ex No : 13 Date:	IMPLEMENT THE IR SENSOR ANALOG INPUT WITH ARDUINO

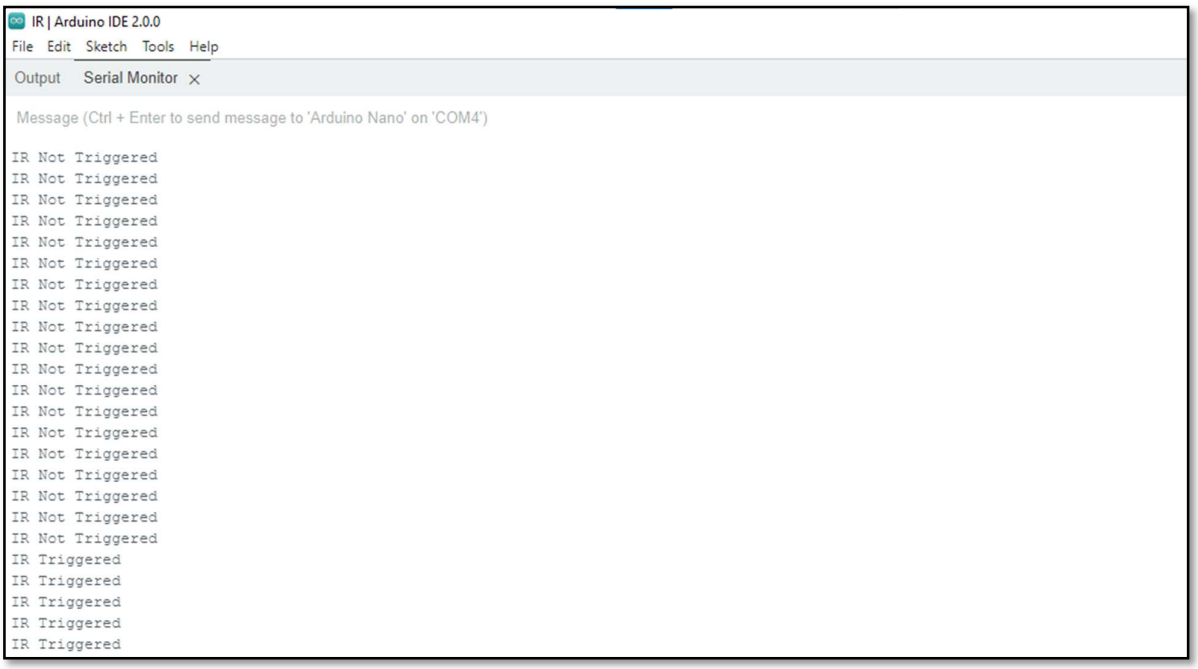
Aim:
To Implement the IR Sensor Analog Input with Arduino

Procedure:
STEP 1: Open Arduino Software.
STEP 2: Click Tools -> Board -> Arduino Nano.
STEP 3: In Tools Menu Select Port –> COM.
STEP 4: Click File-> New and Start Write the Code.
STEP 5: And Click tick Icon Button of the file Menu to compile.
STEP 6: Click Upload Icon After Verify.

Program:
```
#include <LiquidCrystal.h>
LiquidCrystal lcd(A5,A4,A3,A2,A1,A0);
int i;

void setup() {
  lcd.begin(16, 2);
  lcd.print("IR INPUT");
  lcd.setCursor(0,1);
  lcd.print("Experimenter");
  delay(3000);
  lcd.clear();
}
void ir_sensor()
{
  pinMode(10,INPUT);
  pinMode(2,OUTPUT);
  digitalWrite(2,HIGH);

  for(int i=0;i<100;i++)
  {
    if(!digitalRead(10))
    {
      lcd.clear();
      lcd.print("IR Triggered");
      digitalWrite(2,LOW);
    }
    else
    {
     lcd.clear();
      lcd.print("IR Not Triggered");
      digitalWrite(2,HIGH);
    }
    delay(100);
  }
}
void loop() {
```

```
  ir_sensor();
  delay(1000);
}
```

Output:



Result:

Thus the above Implement the IR Sensor Analog Input with Arduino program was executed and verified successfully

Ex No : 14 Date:	USING THINKSPEAK CLOUD READING TEMPERATURE SENSOR MONITORING WITH NODEMCU

Aim:
To Using ThinkSpeak Cloud Reading Temperature Sensor Monitoring with NodeMCU

Procedure:

STEP 1: Open Arduino Software.
STEP 2: Click Tools -> Board -> NodeMcu.
STEP 3: In Tools Menu Select Port –> COM.
STEP 4: Click File-> New and Start Write the Code.
STEP 5: Login Your Think speak Cloud and check API key and Channel Number.
STEP 6: Open secrets.h Header file.
STEP 7: Edit SSID &Password of the WIFI and add Your API key and Channel Number of Think speak cloud
STEP 8: And Click tick Icon Button of the file Menu to compile.
STEP 9: Click Upload Icon After Verify.
STEP 10: Now, Check you think speak cloud temperature will sense as Graph

Program:

Secrets.h

```
#define SECRET_SSID "MySSID"                // replace MySSID with your WiFi network name
#define SECRET_PASS "MyPassword"            // replace MyPassword with your WiFi password
#define SECRET_CH_ID 0000000                // replace 0000000 with your channel number
#define SECRET_WRITE_APIKEY "XYZ"           // replace XYZ with your channel write API Key
```

NodeMcu.ino

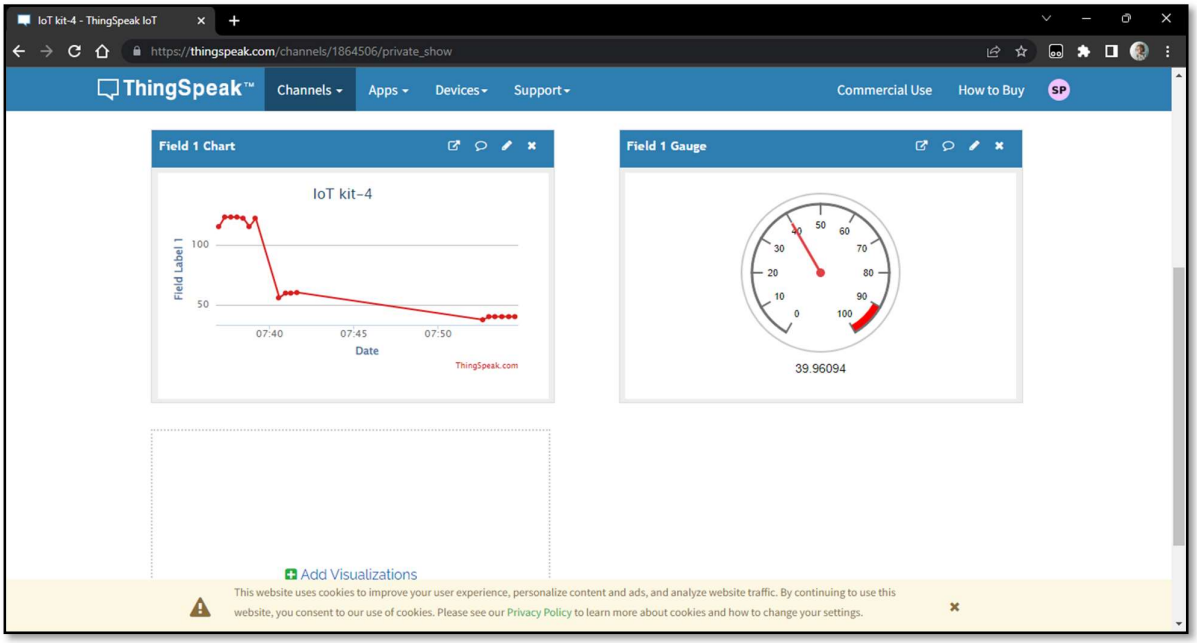
```
#include <ESP8266WiFi.h>
#include "secrets.h"
#include "ThingSpeak.h" // always include thingspeak header file after other header files and custom macros
#include <SoftwareSerial.h>
SoftwareSerial swSer(D6, D7);
char ssid[] = SECRET_SSID;   // your network SSID (name)
char pass[] = SECRET_PASS;   // your network password
int keyIndex = 0;            // your network key Index number (needed only for WEP)
WiFiClient  client;

unsigned long myChannelNumber = SECRET_CH_ID;
const char * myWriteAPIKey = SECRET_WRITE_APIKEY;

// Initialize our values
float number1 = 0;
float number2 = 0;
float number3 = 0;
float number4 = 0;
```

```
float number5 = 0;
float number6 = 0;
float number7 = 0;
float number8 = 0;
String myStatus = "";
String response;
int ESPwait(String stopstr, int timeout_secs)
{
  bool found = false;
  char c;
  long timer_init;
  long timer;
  response="";
  timer_init = millis();
  while (!found) {
    timer = millis();
    if (((timer - timer_init) / 1000) > timeout_secs) { // Timeout?
      Serial.println("!Timeout!");
      return 0;  // timeout
    }
    if (swSer.available()) {
      c = swSer.read();
      //Serial.print(c);
      response += c;
      if (response.endsWith(stopstr)) {
        found = true;
        delay(10);
        swSer.flush();
        Serial.flush();
        Serial.println();
      }
    } // end Serial1_available()
  } // end while (!found)
  return 1;
}
int ESPwait1(String stopstr, int timeout_secs)
{
  bool found = false;
  char c;
  long timer_init;
  long timer;
  response="";
  timer_init = millis();
  while (!found) {
    timer = millis();
    if (((timer - timer_init) / 1000) > timeout_secs) { // Timeout?
      Serial.println("!Timeout!");
      return 0;  // timeout
    }
    if (Serial.available()) {
      c = Serial.read();
      Serial.print(c);
      response += c;
```

```
      if (response.endsWith(stopstr)) {
        found = true;
        delay(10);
        Serial.flush();
        Serial.println();
      }
    } // end Serial1_available()
  } // end while (!found)
  return 1;
}
void setup() {
  Serial.begin(9600);  // Initialize serial
  swSer.begin(9600);
  pinMode(LED_BUILTIN,OUTPUT);

  while (!Serial) {
    ; // wait for serial port to connect. Needed for Leonardo native USB port only
  }
  WiFi.mode(WIFI_STA);
  ThingSpeak.begin(client);  // Initialize ThingSpeak
}
void loop() {
  char c;
      // Connect or reconnect to WiFi
  if(WiFi.status() != WL_CONNECTED){
    Serial.print("Attempting to connect to SSID: ");
    Serial.println(SECRET_SSID);
    while(WiFi.status() != WL_CONNECTED){
      WiFi.begin(ssid, pass);  // Connect to WPA/WPA2 network. Change this line if using open or
WEP network
      Serial.print(".");
      delay(5000);
    }
    Serial.println("\nConnected.");

    for(int i=0;i<5;i++)
    {
    digitalWrite(LED_BUILTIN,LOW);
    delay(100);
    digitalWrite(LED_BUILTIN,HIGH);
    delay(100);
    }
  }
if(swSer.available())
  {
  c=swSer.read();
  swSer.println(c);
  if(c=='*')
    {
      if(ESPwait("#",3))
      {
      char * strtokIndx;
      response.remove(response.length()-1);
```

```
    strtokIndx = strtok(const_cast<char*>(response.c_str()),",");     // get the first part - the string
    number1 = atof(strtokIndx);
    Serial.println(response);
     response="";

    ThingSpeak.setField(1, number1);
   int x = ThingSpeak.writeField(myChannelNumber, 1, number1, myWriteAPIKey);
   if(x == 200)
{
   Serial.println("Channel update successful.");
   digitalWrite(LED_BUILTIN,LOW);
  }

  else{
   Serial.println("Problem updating channel. HTTP error code " + String(x));
   digitalWrite(LED_BUILTIN,HIGH);
  }
  Serial.println("Sent");

     }
   }
  }
}
```

Output:



Result:

Thus the above ThinkSpeak Cloud Reading Temperature Sensor Monitoring with NodeMCU was executed successfully