1.IOT PROTOCOLS

(THEORY)

2. TEMPERATURE SENSOR (cloud storage)

CODING:

Arduino software

```
#include <ESP8266WiFi.h>
#include <ESP8266HTTPClient.h>
#include "DHT.h"
#define DHTPIN D1
#define DHTTYPE DHT11
DHT dht(DHTPIN, DHTTYPE);
const char* ssid = "aruna";  //phn hotspot name
const char* password = "arunashankar";   //phn hotspot password
const char* apiKey = "1IAJKX4DE5D6A99T";   //it is taken from thingspeak app
const char* serverAddress = "http://api.thingspeak.com/update";
//https://api.thingspeak.com/update?api_key=H02UFYAJGTK5D0E9&field1=0
//https://api.thingspeak.com/channels/700867/feeds.json?results=2
void setup() {
 dht.begin();
 Serial.begin(115200);
WiFi.begin(ssid, password);
 while (WiFi.status() != WL_CONNECTED) {
```

```
   delay(1000);
   Serial.println("Connecting to WiFi...");
  }
}void loop() {
float humidity = 0;
  float temperature = 0;
{
   Serial.print("Humidity: ");
   Serial.print(humidity);
   Serial.print("%\tTemperature: ");
   Serial.print(temperature);
   Serial.println("°C");
  }
  WiFiClient client;
  HTTPClient http;
http.begin(client, serverAddress);
 http.addHeader("Content-Type", "application/x-www-form-urlencoded");
String postData = "api_key=" + String(apiKey) + "&field1=" +
String(temperature) + "&field2=" + String(humidity);
 int httpCode = http.POST(postData);
if (httpCode > 0) {
   Serial.print("HTTP Response Code: ");
```

```
  Serial.println(httpCode);
 } else {
  Serial.println("HTTP POST failed.");
 }
 http.end();
delay(3000);
 temperature++;
 humidity++;
}
```

3. LED BLINKING APPLICATION

Ardiuno software:

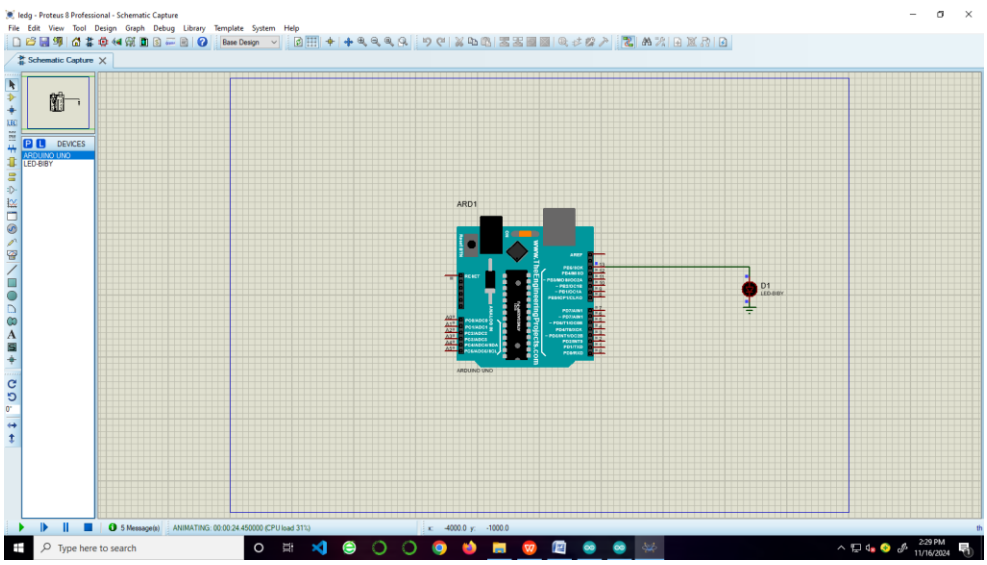
Coding:

```
int led=13;
void setup(){
 pinMode(led,OUTPUT);
 }
void loop(){
for(int led=0;led<=5;led++){
 digitalWrite(led,HIGH);
 delay(1000);
 digitalWrite(led,LOW);
 delay(1000);
```

}

}

Proteus stimulation:



5.Room temperature refer 3 experiment

6. MEASURING SOIL MOISTURE SENSOR

```
#include "DHT.h"

#define DHTPIN D1

#define DHTTYPE DHT11

#include <Arduino.h>

#if defined(ESP32)

  #include <WiFi.h>

#elif defined(ESP8266)
```

```
  #include <ESP8266WiFi.h>
#endif
#include <Firebase_ESP_Client.h>
DHT dht(DHTPIN, DHTTYPE);
//Provide the token generation process info.
#include "addons/TokenHelper.h"
//Provide the RTDB payload printing info and other helper functions.
#include "addons/RTDBHelper.h"
// Insert your network credentials
#define WIFI_SSID "aruna"
#define WIFI_PASSWORD "arunashankar"
// Insert Firebase project API Key
#define API_KEY "AIzaSyAIW_LxE8GFiihvn6tQ5ChOuYucSb5SqPI"
// Insert RTDB URLefine the RTDB URL */
#define DATABASE_URL "soilmoisture-a5e62-default-
rtdb.firebaseio.com/"
//Define Firebase Data object
FirebaseData fbdo;
FirebaseAuth auth;
FirebaseConfig config;
```

```
//unsigned long sendDataPrevMillis = 0;
//int count = 0;
bool signupOK = false;
void setup(){
  pinMode(DHTPIN, INPUT);
  dht.begin();
  Serial.begin(115200);
  WiFi.begin(WIFI_SSID, WIFI_PASSWORD);
  Serial.print("Connecting to Wi-Fi");
  while (WiFi.status() != WL_CONNECTED){
    Serial.print(".");
    delay(300);
  }
  Serial.println();
  Serial.print("Connected with IP: ");
  Serial.println(WiFi.localIP());
  Serial.println();
/* Assign the api key (required) */
  config.api_key = API_KEY;
```

```
  /* Assign the RTDB URL (required) */
  config.database_url = DATABASE_URL;

  /* Sign up */
  if (Firebase.signUp(&config, &auth, "", "")){
    Serial.println("ok");
    signupOK = true;
  }
  else{
    Serial.printf("%s\n", config.signer.signupError.message.c_str());
  }

  /* Assign the callback function for the long running token generation task */
  config.token_status_callback = tokenStatusCallback; //see addons/TokenHelper.h

  Firebase.begin(&config, &auth);
  Firebase.reconnectWiFi(true);
}
```

```
void loop(){
  int data=analogRead(A0);
  data=1024-data;
 delay(1000);

  if (Firebase.ready() && signupOK ) {

    if (Firebase.RTDB.setFloat(&fbdo, "soilmoisture",data)){
//      Serial.println("PASSED");
       Serial.print("soilmoisture");
       Serial.println(data);

    }
    else {
      Serial.println("FAILED");
      Serial.println("REASON: " + fbdo.errorReason());
    }
```

```
    // Write an Float number on the database path test/float


  }
  Serial.println("_____________________________________");
}
```

7.ultrasonic sensor

```
int tig=7,echo=5;
int dist,Time;
void setup(){
  pinMode(tig,OUTPUT);
  pinMode(echo,INPUT);
  Serial.begin(9600);


}
void loop(){
  digitalWrite(tig,LOW);
  delayMicroseconds(2);
  digitalWrite(tig,HIGH);
  delayMicroseconds(10);
  digitalWrite(tig,LOW);
```

```
  Time=pulseIn(echo,HIGH);

  dist=Time/29/2;

  Serial.println(dist);

  delay(1000);

}
```

8.DEVELOP A SIMPLE APPLICATION BASED ON SENSORS

Refer a any prg about sensor eg: ultrasonic sensor prg ,soil moisture sensor

9.DEVELOP A COMMERCIAL IOT APPLICATION (AUTOMATED HAND SANITIZING)

```
#include<Servo.h>
 #define echoPin 4
#define trigPin 5Servo
Myservo:
int long duration;
int distance: void setup()
{
Myservo.attach(3):
 pinMode(echoPin,INPUT);
 pinMode(trigPin, OUTPUT);
void loop()
digitalWrite(trigPin,LOW);
delayMicroseconds(2);
digitalWrite(trigPin,HIGH);
delayMicroseconds(10):
duration=pulseIn(echoPin,HIGH);
distance (duration 0.034/2):
if(distance<=5)
{
Myservo.write(180):
else { Myservo.write(0);
}
delay(500);
}
```

10.refer 9th prg