SPRINT-1

Team ID	PNT2022TMID34718
Project Name	Industry-Specific Intelligent Fire Management System

Simulation creation and code.

CODE

sketch.ino | diagram.json | libraries.txt | Library Manager

```
#include "DHTesp.h"
#include <cstdlib>
#include <time.h>

const int DHT_PIN = 15;

bool is_exhaust_fan_on = false;
bool is_sprinkler_on = false;

float temperature  = 0;

int gas_ppm = 0;
int flame = 0;
int flow = 0;

String flame_status = "";
String accident_status = "";
String sprinkler_status = "";

DHTesp dhtSensor;


void setup() {
  Serial.begin(99900);

  /**** sensor pin setups ****/
  dhtSensor.setup(DHT_PIN, DHTesp::DHT22);
  //if real gas sensor is used make sure the senor is heated up for acurate readings
  /*
    - Here random values for readings and stdout were used to show the
      working  of the devices as physical or simulated devices are not
      available.
  */
}

```

```
void loop() {

  TempAndHumidity  data = dhtSensor.getTempAndHumidity();

  //setting a random seed
  srand(time(0));

  //initial variable activities like declaring , assigning
  temperature  = data.temperature;
  gas_ppm = rand()%1000;
  int flamereading = rand()%1024;
  flame = map(flamereading,0,1024,0,1024);
  int flamerange = map(flamereading,0,1024,0,3);
  int flow = ((rand()%100)>50?1:0);

  //set a flame status based on how close it is.....
  switch (flamerange) {
  case 2:    // A fire closer than 1.5 feet away.
    flame_status = "Close Fire";
    break;
  case 1:    // A fire between 1-3 feet away.
    flame_status = "Distant Fire";
    break;
  case 0:    // No fire detected.
    flame_status = "No Fire";
    break;
  }

  //toggle the fan according to gas in ppm in the room
  if(gas_ppm > 100){
    is_exhaust_fan_on = true;
  }
  else{
```

```
    is_exhaust_fan_on = false;
  }

  //find the accident status 'cause fake alert may be caused by some mischief activities
  if(temperature < 40 && flamerange ==2){
    accident_status = "need auditing";
    is_sprinkler_on = false;
  }
  else if(temperature < 40 && flamerange ==0){
    accident_status = "not found";
    is_sprinkler_on = false;
  }
  else if(temperature > 50 && flamerange == 1){
    is_sprinkler_on = true;
    accident_status = "moderate";
  }
  else if(temperature > 55 && flamerange == 2){
    is_sprinkler_on = true;
    accident_status = "severe";
  }else{
      sprinkler_status = "not working";
    }
  }
  else if(is_sprinkler_on == false){
    sprinkler_status = "it should not!";
  }
  else{
    sprinkler_status = "Error!!";
  }

  //Obivously the output.It is like json format 'cause it will help us for future sprints
  String out = "{\n\t\"senor_values\":{";
  out+="\n\t\t\"gas_ppm\":"+String(gas_ppm)+",";
  out+="\n\t\t\"temperature\":"+String(temperature,2)+",";
  out+="\n\t\t\"flame\":"+String(flame)+",";
  out+="\n\t\t\"flow\":"+String(flow)+",\n\t}";
  out+="\n\t\"output\":{";
  out+="\n\t\t\"is_exhaust_fan_on\":"+String((is_exhaust_fan_on)?"true":"false")+",";
  out+="\n\t\t\"is_sprinkler_on\":"+String((is_sprinkler_on)?"true":"false")+",";
  out+="\n\t}";
  out+="\n\t\"messages\":{";
  out+="\n\t\t\"fire_status\":"+flame_status+",";
  out+="\n\t\t\"flow_status\":"+sprinkler_status+",";
  out+="\n\t\t\"accident_status\":"+accident_status+",";
  out+="\n\t}";
  out+="\n}";
  Serial.println(out);

  delay(2000);
}
```

DIAGRAM.JSON

sketch.ino | **diagram.json** | libraries.txt | Library Manager

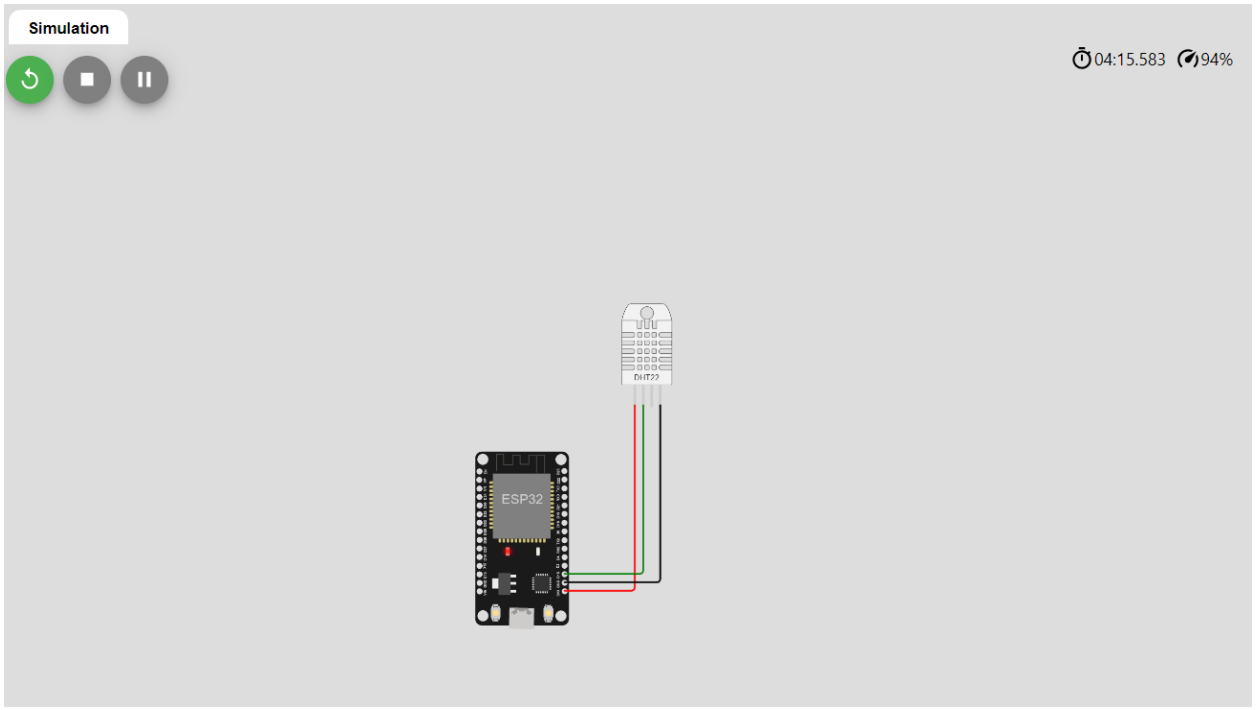
```
{
  "version": 1,
  "author": "PNT2022TMID34718",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 95.33, "left": -94.67, "attrs": {} },
    { "type": "wokwi-dht22", "id": "dht1", "top": -69.57, "left": 70.83, "attrs": {} }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
    [ "dht1:VCC", "esp:3V3", "red", [ "v0" ] ],
    [ "dht1:SDA", "esp:D15", "green", [ "v0" ] ],
    [ "dht1:GND", "esp:GND.1", "black", [ "v0" ] ]
  ]
}
```

LIBRARIES

sketch.ino | diagram.json | **libraries.txt** | Library Manager

```
# Wokwi Library List
# See https://docs.wokwi.com/guides/libraries
DHT sensor library for ESPx
ArduinoJson
```

OUTPUT




```
        "output":{
                "is_exhaust_fan_on":true,
                "is_sprinkler_on":false,
        }
        "messages":{
                "fire_status":Close Fire,
                "flow_status":it should not!,
                "accident_status":need auditing,
        }
}
{
        "senor_values":{
                "gas_ppm":681,
                "temperature":24.00,
                "flame":78,
                "flow":1,
        }
```

WOKWI LINK

https://wokwi.com/projects/348598990764245586