Project Development Phase
Sprint-4

Date	12-November 2022
Team ID	PNT2022TMID35932
Project Name	Hazardous Area Monitoring for Industrial Plant powered by IoT

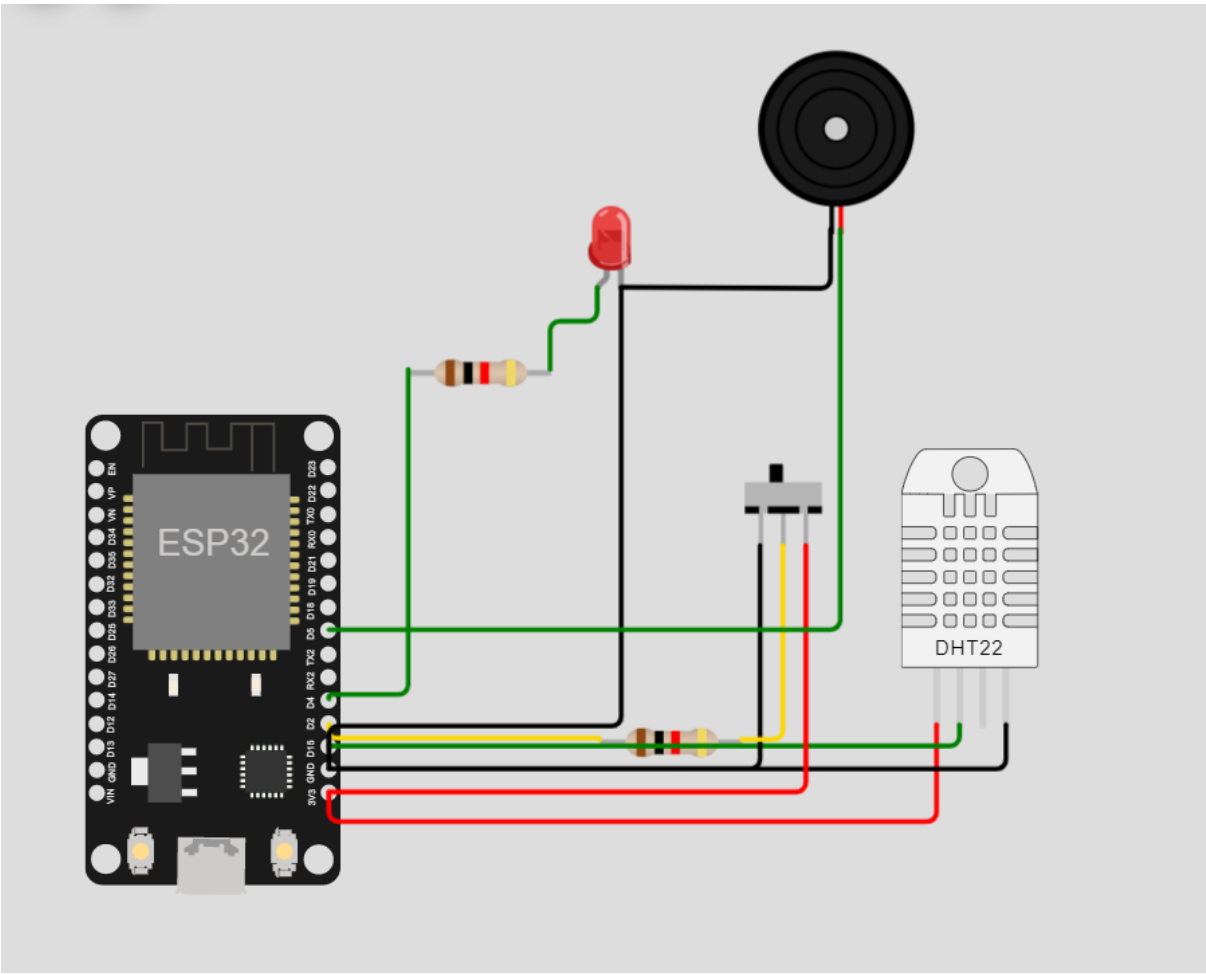
Updated IoT End device ESP32:

```
#include "DHT.h"// Library for dht22
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt
#include <HTTPClient.h>//library for HTTP requests


#define DHTPIN 15     // what pin we're connected to
#define DHTTYPE DHT22   // define type of sensor DHT 11
const int LED = 4;
//GAS SENSOR MQ-02
#define GAS_SENSOR 2
String alarmon = "{\"Alar\":1}";

//Your Domain name with URL path or IP address with path
String serverName = "http://169.51.205.238:32312/command";

unsigned long lastTime = 0;
unsigned long timerDelay = 1000;

DHT dht (DHTPIN, DHTTYPE);// creating the instance by passing pin and typr of dht connected

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);

//-------credentials of IBM Accounts------

#define ORG "bxddo9"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "Assign4"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "45625689713"     //Token
String data3;
float h, t;
int val;


//-------- Customise the above values --------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name
char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of event perform and
format in which data to be send
char subscribetopic[] = "iot-2/cmd/command/fmt/String";// cmd  REPRESENT command type AND
COMMAND IS TEST OF FORMAT STRING
char authMethod[] = "use-token-auth";// authentication method
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id


//-----------------------------------------
WiFiClient wifiClient; // creating the instance for wificlient
```

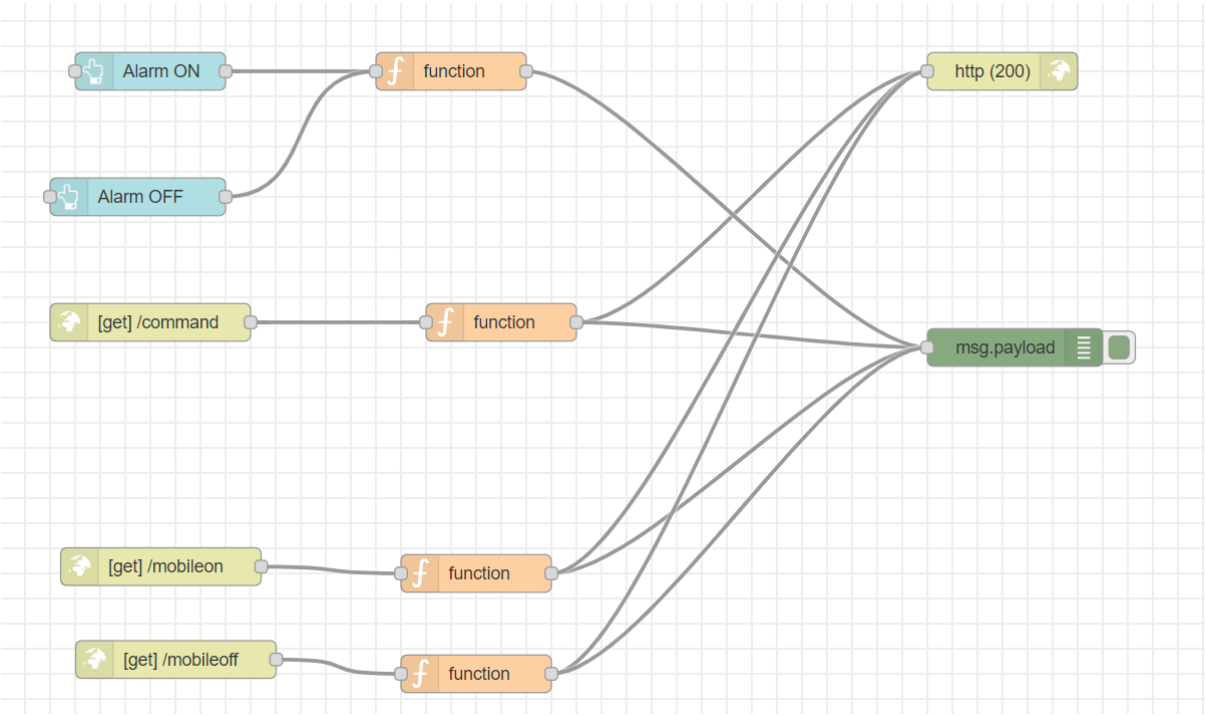
```
PubSubClient client(server, 1883, callback ,wifiClient); //calling the predefined client id by
passing parameter like server id,portand wificredential

const int DHT_PIN = 15;
bool al;

void setup() {
  Serial.begin(115200);
  Serial.println();
  pinMode(LED,OUTPUT);
  //digitalWrite(LED,HIGH);
  delay(10);
  wificonnect();
  mqttconnect();
}

void loop() {
  val = digitalRead(GAS_SENSOR);

  h = dht.readHumidity();
  t = dht.readTemperature();
  Serial.print("Temperature:");
  Serial.println(t);
  Serial.print("Humid:");
  Serial.println(h);
  Serial.print("Gas Sensor:");
  Serial.println(val);
  if(t > 45 || val == 1)
  {  al = 1;
  }
  else
  {  al = 0;
  }
  PublishData(t, h, val, al);
  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
  if ((millis() - lastTime) > timerDelay) {
    //Check WiFi connection status
    if(WiFi.status()== WL_CONNECTED){
      HTTPClient http;

      String serverPath = serverName + "?temperature=24.37";

      // Your Domain name with URL path or IP address with path
      http.begin(serverPath.c_str());

      // Send HTTP GET request
      int httpResponseCode = http.GET();

      if (httpResponseCode>0) {
       // Serial.print("HTTP Response code: ");
        //Serial.println(httpResponseCode);
        String payload = http.getString();
        //Serial.println(payload);

        if(payload == alarmon)
        {
          digitalWrite(LED,HIGH);
          tone(5,262,2000);
        }
        else
```

```
        {
          digitalWrite(LED,LOW);
          digitalWrite(5,LOW);
        }
      }
      else {
        Serial.print("Error code: ");
        Serial.println(httpResponseCode);
      }
      // Free resources
      http.end();
    }
    else {
      Serial.println("WiFi Disconnected");
    }
    lastTime = millis();
  }
}

/*.....................................retrieving to Cloud.............................*/

void PublishData(float temp, float humid, int vol,int alarm) {
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data to ibm cloud
  */
  String payload = "{\"Temperature\":";
  payload += temp;
  payload += "," "\"Humid\":";
  payload += humid;
  payload += ","\"Gas_Sensor\":";
  payload += val;
  payload += ","\"Alarm\":";
  payload += al;
  payload += "}";


  Serial.print("Sending payload: ");
  Serial.println(payload);


  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");// if it sucessfully upload data on the cloud then it will
print publish ok in Serial monitor or else it will print publish failed
    Serial.println("");
  } else {
    Serial.println("Publish failed");
  }

}


void mqttconnect() {
  if (!client.connected()) {
    Serial.print("Reconnecting client to ");
    Serial.println(server);
    while (!!!client.connect(clientId, authMethod, token)) {
      Serial.print(".");
      delay(500);
    }

     initManagedDevice();
     Serial.println();
```

```
  }
}
void wificonnect() //function defination for wificonnect
{
  Serial.println();
  Serial.print("Connecting to ");

  WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the connection
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
}

void initManagedDevice() {
  if (client.subscribe(subscribetopic)) {
    Serial.println((subscribetopic));
    Serial.println("subscribe to cmd OK");
  } else {
    Serial.println("subscribe to cmd FAILED");
  }
}

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
{

  Serial.print("callback invoked for topic: ");
  Serial.println(subscribetopic);
  for (int i = 0; i < payloadLength; i++) {
    Serial.print((char)payload[i]);
    data3 += (char)payload[i];
  }
  Serial.println("data: "+ data3);
  if(data3=="lighton")
  {
Serial.println(data3);
digitalWrite(LED,HIGH);
  }
  else
  {
Serial.println(data3);
digitalWrite(LED,LOW);
}
data3="";
}
```



Node Red flow-2:



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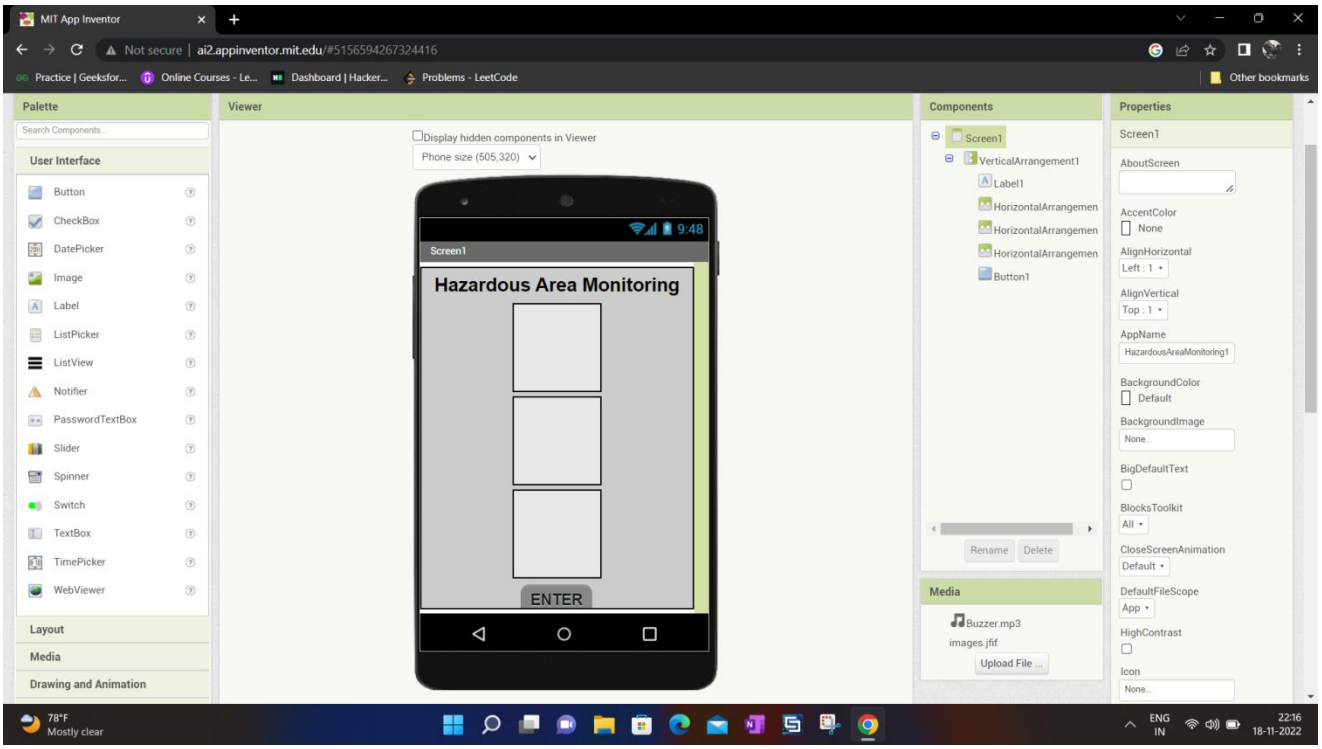
Mobile App: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Components
Properties
Screen1
Hazardous Area Monitoring
ENTER
Media
Buzzer.mp3
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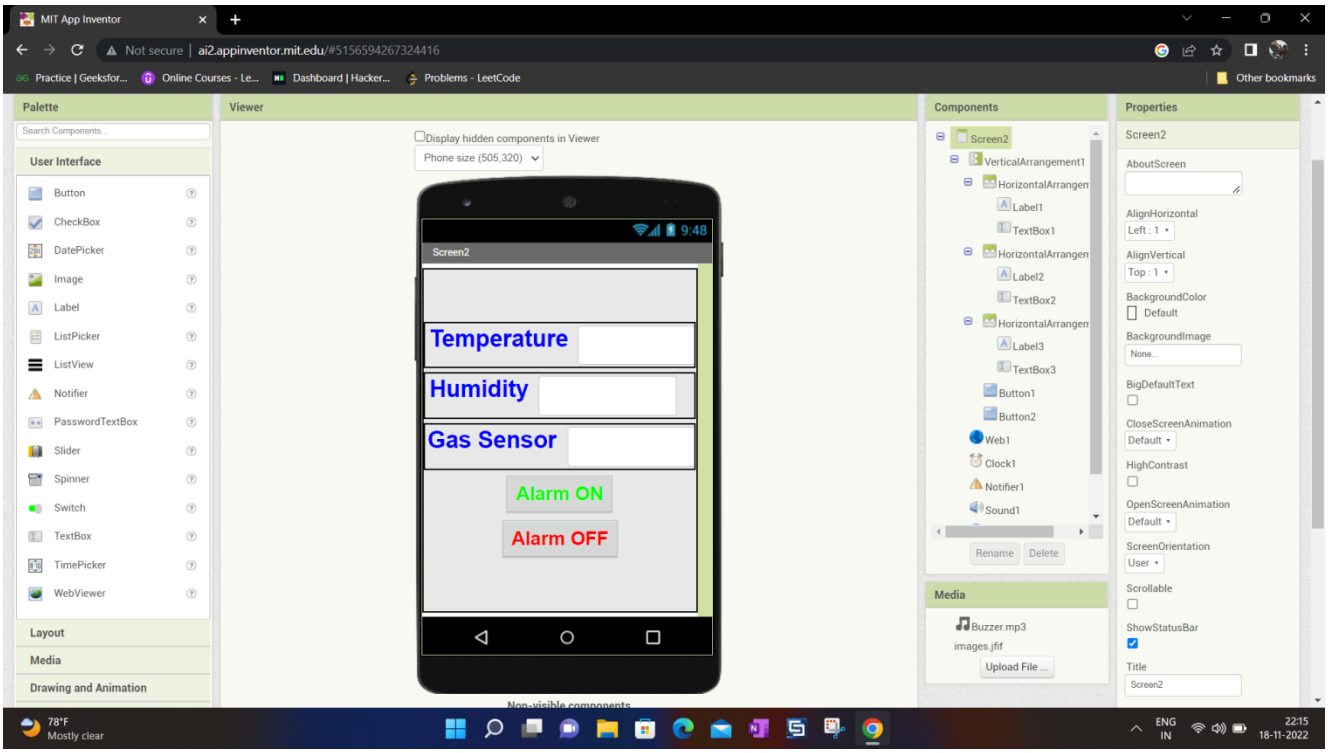
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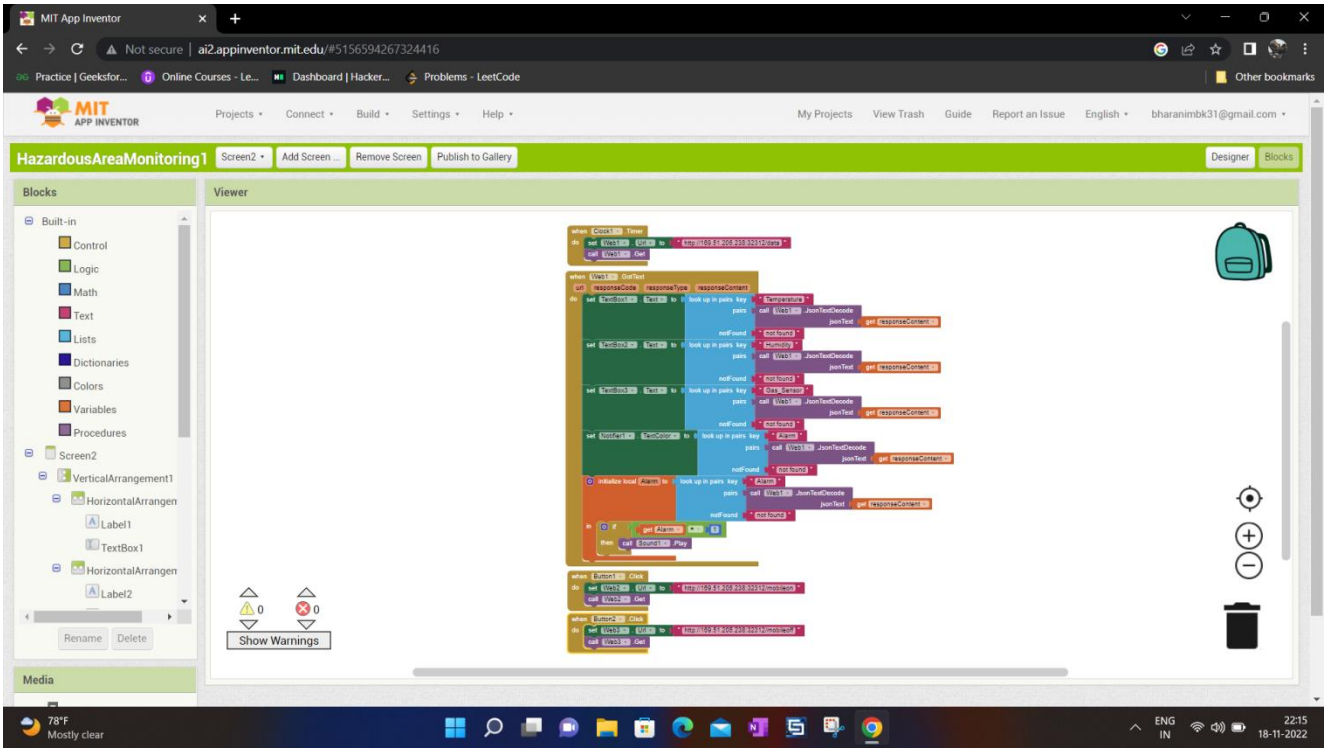
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Screen2
Add Screen ...
Remove Screen
Publish to Gallery
Designer
Blocks
Blocks
Built-in
Control
Logic
Math
Text
Lists
Dictionaries
Colors
Variables
Procedures
Screen2
VerticalArrangement1
HorizontalArrangen
Label1
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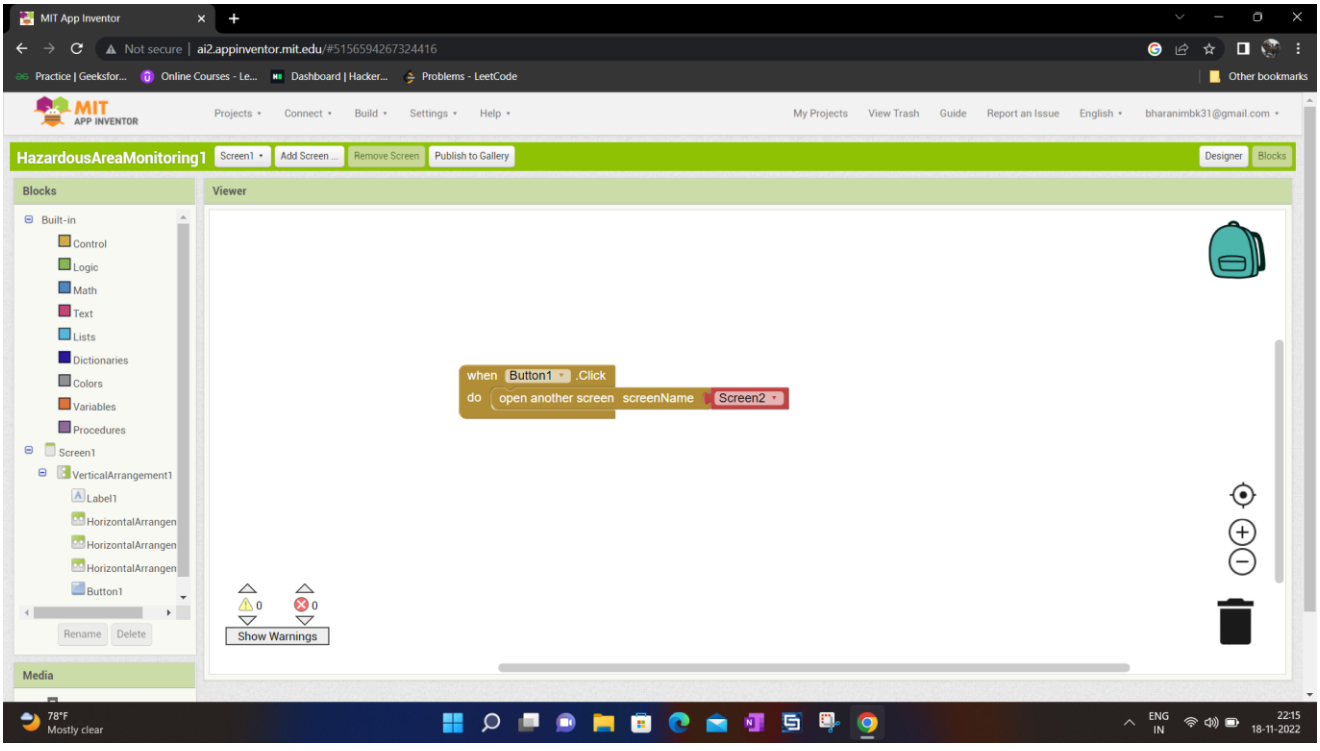
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Screen1
Add Screen ...
Remove Screen
Publish to Gallery
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Colors
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Screen1
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Label1
HorizontalArrangen
HorizontalArrangen
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