Project Development Phase
Sprint – 3 (SMS Alert Service & App Front – end Development)

Date	24 November 2022
Team ID	PNT2022TMID18250
Project Name	Project – Gas leakage monitoring and alerting system for industries

Software:

- Arduino IDE
- MIT App Inventor

Installed Libraries – Arduino IDE:

- ESP8266WiFi
- LiquidCrystal_I2C
- PubSubClient

Source Code:

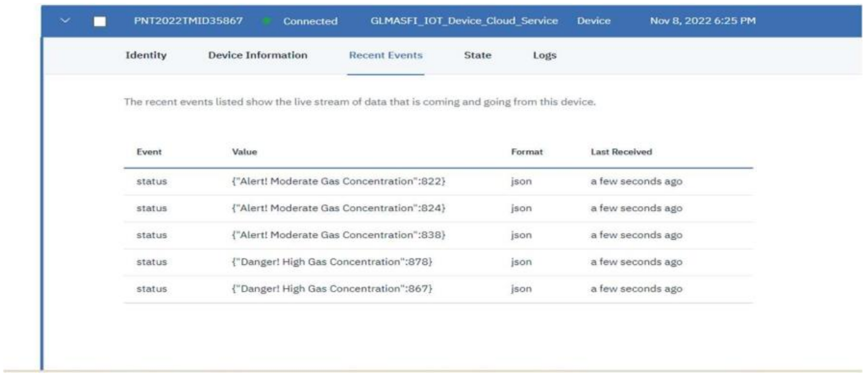
```
#include <ESP8266WiFi.h>
#include <LiquidCrystal_I2C.h>
#include <PubSubClient.h>

#define Buzzer D5
#define Green D6
#define Sensor A0
#define ORG "wf2kmp"
#define DEVICE_TYPE "GLMASFI_IOT_Device_Cloud_Service"
#define DEVICE_ID "PNT2022TMID35867"
#define TOKEN "PNT2022TMID35867"

const char* ssid = "Airtel-Hotspot-958A";
const char* password = "9889i1bb";
const char* host = "maker.ifttt.com";
const int httpsPort = 80;
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char topic[] = "iot-2/evt/status/fmt/json";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;

void PublishData(float);
void callback(char*, byte*, unsigned int);


LiquidCrystal_I2C lcd(0x27, 16, 2);
WiFiClient client1;
WiFiClient client2;
PubSubClient client(server, 1883, callback, client2);

void setup() {
  lcd.backlight();
  lcd.init();
  pinMode(Green, OUTPUT);
  pinMode(Buzzer, OUTPUT);
  pinMode(Sensor, INPUT);
  Serial.begin(115200);
  Serial.println();

  Serial.print("Connecting to ");
  Serial.print(ssid);
  WiFi.begin(ssid, password);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.print("WiFi connected, IP address: ");
  Serial.println(WiFi.localIP());
  Serial.print("connecting to ");
  Serial.println(host);
  if (!client1.connect(host, httpsPort)) {
    Serial.println("connection failed");
    return;
  }
  if (!client2.connect(host, httpsPort)) {
    Serial.println("connection failed");
    return;
  }

}

int msgSent = 0;
void loop() {
  Serial.print("Reconnecting client to ");
  Serial.println(server);
  while (!client.connect(clientId, authMethod, token)) {
    Serial.print(".");
    delay(500);
  }
  Serial.println();

  int sensor = analogRead(Sensor);
  Serial.println(String(sensor));
  PublishData(sensor);
  if (sensor >= 840 && !msgSent) {
    digitalWrite(Green, HIGH);
    digitalWrite(Buzzer, HIGH);
    String url = "/trigger/gasle/json/with/key/ktkqqpO7-nkuFo1Dc-jMZX4tNAKchaWS4E6SzY7btPA";
    Serial.print("Requesting URL: ");
    Serial.println(url);
    client1.print(String("GET ") + url + " HTTP/1.1\r\n" + "Host: " + host + "\r\n" + "Connection:
close\r\n\r\n");
    msgSent = 1;
    lcd.setCursor(0, 1);
    Serial.println("Gas Concentration Level: High");
  }
  else if (sensor >= 840 && msgSent) {
    digitalWrite(Green, HIGH);
    digitalWrite(Buzzer, HIGH);
    lcd.setCursor(0, 1);
    Serial.println("Gas Concentration Level: High");
  }
  else if (sensor>=820){
    digitalWrite(Buzzer, HIGH);
    digitalWrite(Green, HIGH);
    delay(750);
    digitalWrite(Buzzer,LOW);
    digitalWrite(Green, LOW);
    delay(1000);
    lcd.setCursor(0, 1);
    Serial.println("Gas Concentration Level: Moderate");
  }
  else{
    digitalWrite(Green, LOW);
    digitalWrite(Buzzer, LOW);
    lcd.setCursor(0, 1);
    Serial.println("Gas Concentration Level: Normal");
  }
  lcd.setCursor(0, 0);
  lcd.print("Value: ");
  lcd.print(sensor);
  delay(1000);
}

void callback(char* topic, byte* payload, unsigned int length) {
 Serial.println("callback invoked");
}

void PublishData(float senso){
  String payload;
  if(senso >= 840) {
    payload= "{\"Danger! High Gas Concentration\":";
  }
  else if(senso >= 820) {
    payload= "{\"Alert! Moderate Gas Concentration\":";
  }
  else {
    payload = "{\"Normal Gas Concentration\":";
  }
  payload += senso;
  payload+="}";

  Serial.print("Sending payload: ");
  Serial.println(payload);
  if (client.publish(topic, (char*) payload.c_str())) {
     Serial.println("Publish ok");
  }
  else {
    Serial.println("Publish failed");
  }
}
```

Verification:

Concentration (ppm)	**Level**	**IOT device Indication**	**Cloud Service Update**	**SMS Alert**
> 840	High	Buzzer & LED - High	Danger! High Gas Concentration	Danger! Close gas Valve immediately – **(Only for Technician)** – Once
820 - 840	Moderate	Buzzer (with delay) & Blinking LED	Alert! Moderate Gas Concentration	NA
< 820	Normal	Buzzer & LED - Low	Normal Gas Concentration	NA

Output:

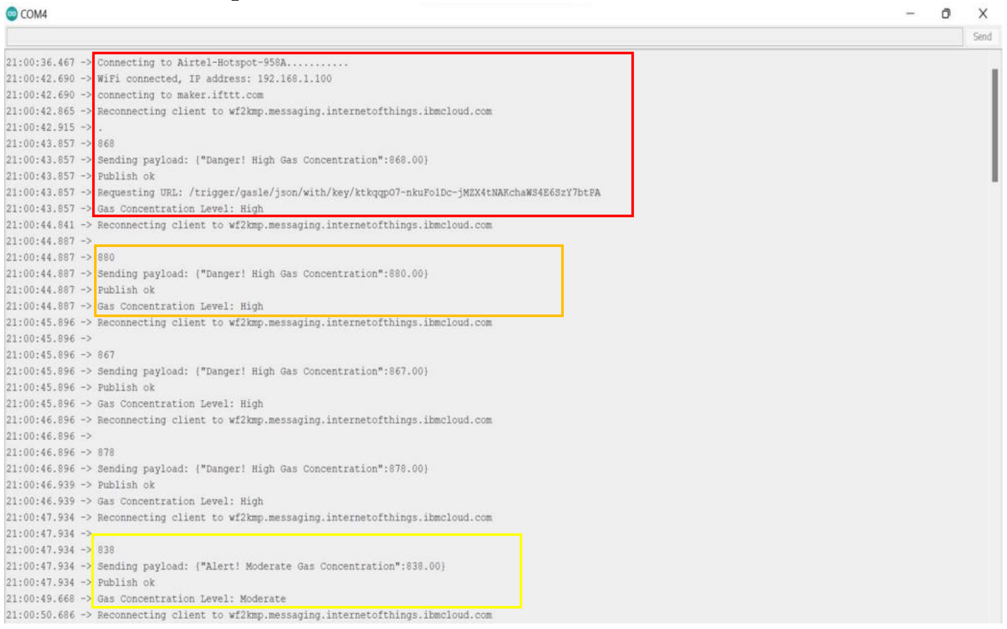
1. **Cloud Service:**



The recent events listed show the live stream of data that is coming and going from this device.

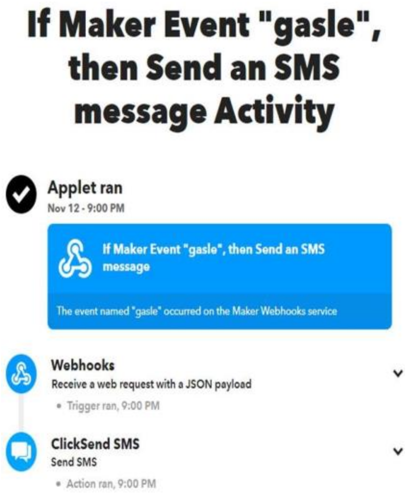
Event	Value	Format	Last Received
status	{"Alert! Moderate Gas Concentration":822}	json	a few seconds ago
status	{"Alert! Moderate Gas Concentration":824}	json	a few seconds ago
status	{"Alert! Moderate Gas Concentration":838}	json	a few seconds ago
status	{"Danger! High Gas Concentration":878}	json	a few seconds ago
status	{"Danger! High Gas Concentration":867}	json	a few seconds ago

2. **Serial Monitor Output:**



```
21:00:36.467 -> Connecting to Airtel-Hotspot-958A...........
21:00:42.690 -> WiFi connected, IP address: 192.168.1.100
21:00:42.690 -> connecting to maker.ifttt.com
21:00:42.865 -> Reconnecting client to wf2kmp.messaging.internetofthings.ibmcloud.com
21:00:42.915 -> .
21:00:43.857 -> 868
21:00:43.857 -> Sending payload: {"Danger! High Gas Concentration":868.00}
21:00:43.857 -> Publish ok
21:00:43.857 -> Requesting URL: /trigger/gasle/json/with/key/ktkqqpO7-nkuFo1Dc-jMZX4tNAKchaWS4E6SzY7btPA
21:00:43.857 -> Gas Concentration Level: High
21:00:44.841 -> Reconnecting client to wf2kmp.messaging.internetofthings.ibmcloud.com
21:00:44.887 ->
21:00:44.887 -> 880
21:00:44.887 -> Sending payload: {"Danger! High Gas Concentration":880.00}
21:00:44.887 -> Publish ok
21:00:44.887 -> Gas Concentration Level: High
21:00:45.896 -> Reconnecting client to wf2kmp.messaging.internetofthings.ibmcloud.com
21:00:45.896 ->
21:00:45.896 -> 867
21:00:45.896 -> Sending payload: {"Danger! High Gas Concentration":867.00}
21:00:45.896 -> Publish ok
21:00:45.896 -> Gas Concentration Level: High
21:00:46.896 -> Reconnecting client to wf2kmp.messaging.internetofthings.ibmcloud.com
21:00:46.896 ->
21:00:46.896 -> 878
21:00:46.896 -> Sending payload: {"Danger! High Gas Concentration":878.00}
21:00:46.939 -> Publish ok
21:00:46.939 -> Gas Concentration Level: High
21:00:47.934 -> Reconnecting client to wf2kmp.messaging.internetofthings.ibmcloud.com
21:00:47.934 ->
21:00:47.934 -> 838
21:00:47.934 -> Sending payload: {"Alert! Moderate Gas Concentration":838.00}
21:00:47.934 -> Publish ok
21:00:49.668 -> Gas Concentration Level: Moderate
21:00:50.686 -> Reconnecting client to wf2kmp.messaging.internetofthings.ibmcloud.com
```

3. **IFTTT Configuration & Request:**


If Maker Event "gasle", then Send an SMS message Activity

Applet ran
Nov 12 - 9:00 PM

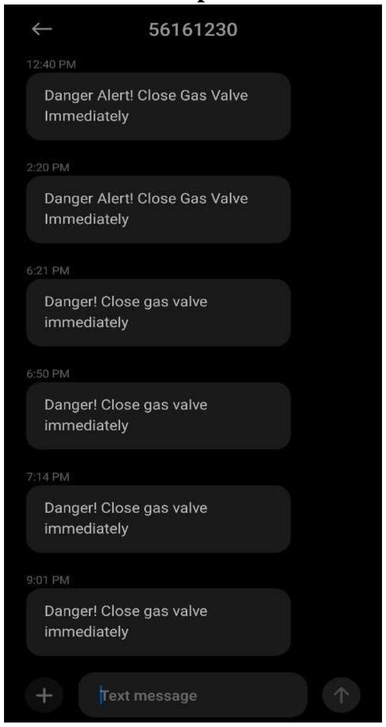
If Maker Event "gasle", then Send an SMS message

The event named "gasle" occurred on the Maker Webhooks service

Webhooks
Receive a web request with a JSON payload
• Trigger ran, 9:00 PM

ClickSend SMS
Send SMS
• Action ran, 9:00 PM

4. **SMS Alert - Output:**


56161230

12:40 PM
Danger Alert! Close Gas Valve Immediately

2:20 PM
Danger Alert! Close Gas Valve Immediately

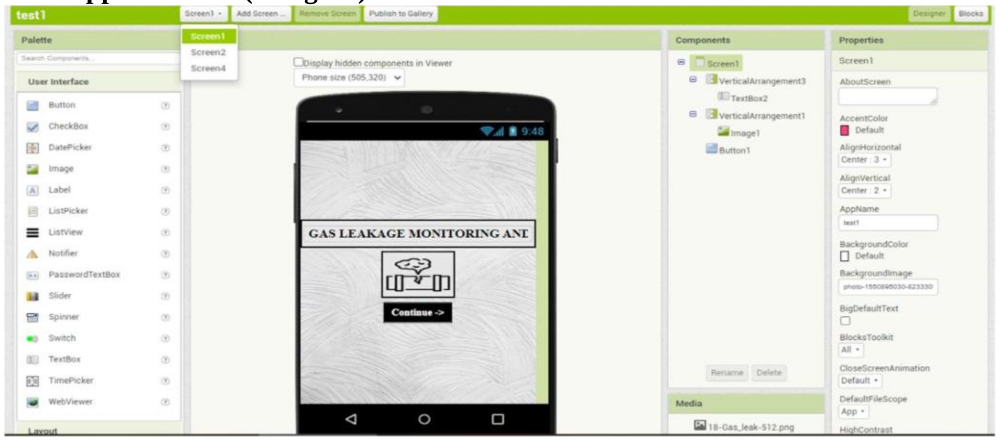
6:21 PM
Danger! Close gas valve immediately

6:50 PM
Danger! Close gas valve immediately

7:14 PM
Danger! Close gas valve immediately

9:01 PM
Danger! Close gas valve immediately

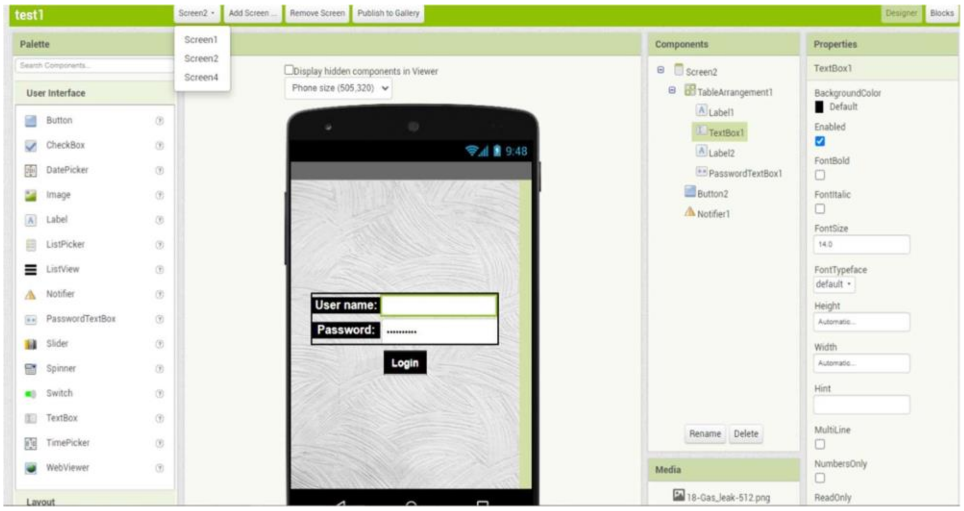
MIT App-Inventor: (Designer)

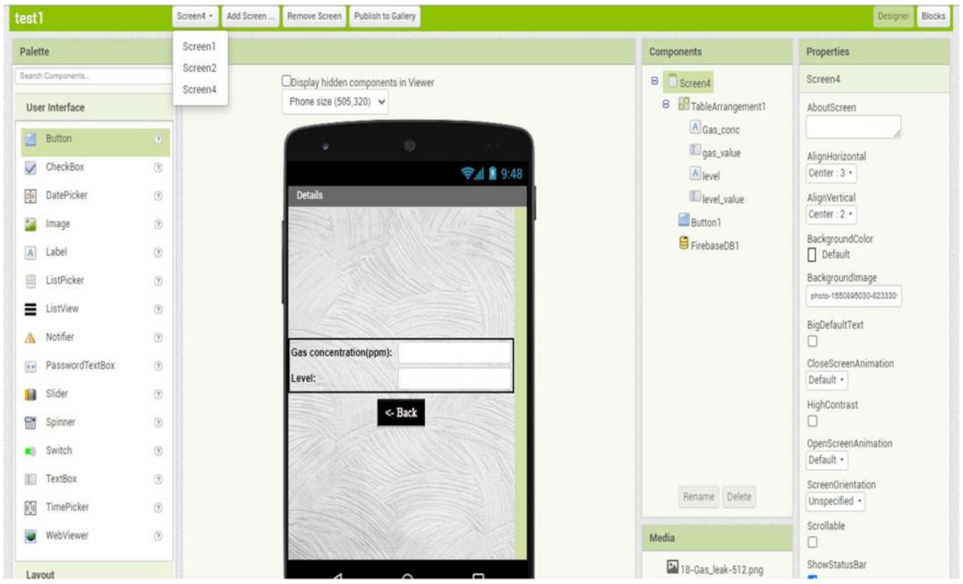


Components:
Screen1
VerticalArrangement3
TextBox2
VerticalArrangement1
Image1
Button1

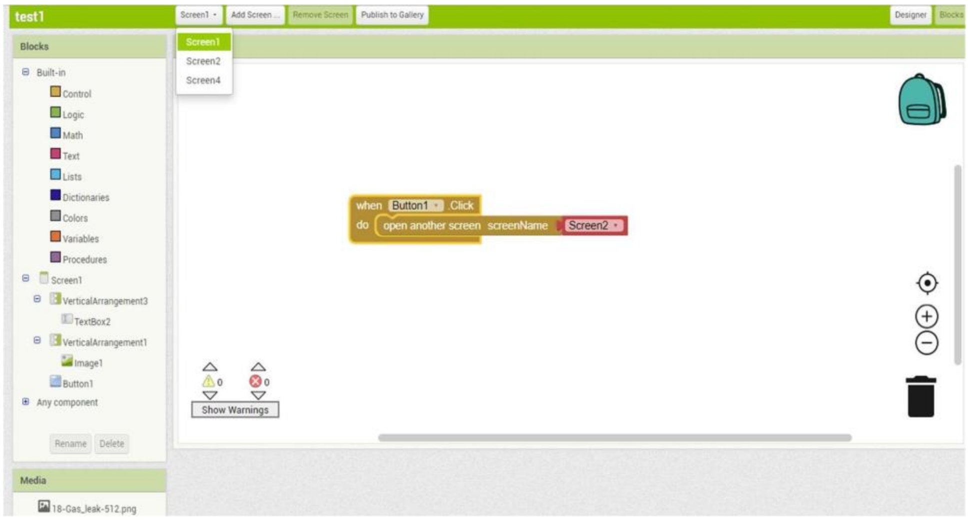
Media: 18-Gas_leak-512.png

Properties: Screen1
AboutScreen
AccentColor: Default
AlignHorizontal: Center : 3
AlignVertical: Center : 2
AppName: test1
BackgroundColor: Default
BackgroundImage: photo-1550895030-823330
BigDefaultText
BlocksToolkit: All
CloseScreenAnimation: Default
DefaultFileScope: App
HighContrast

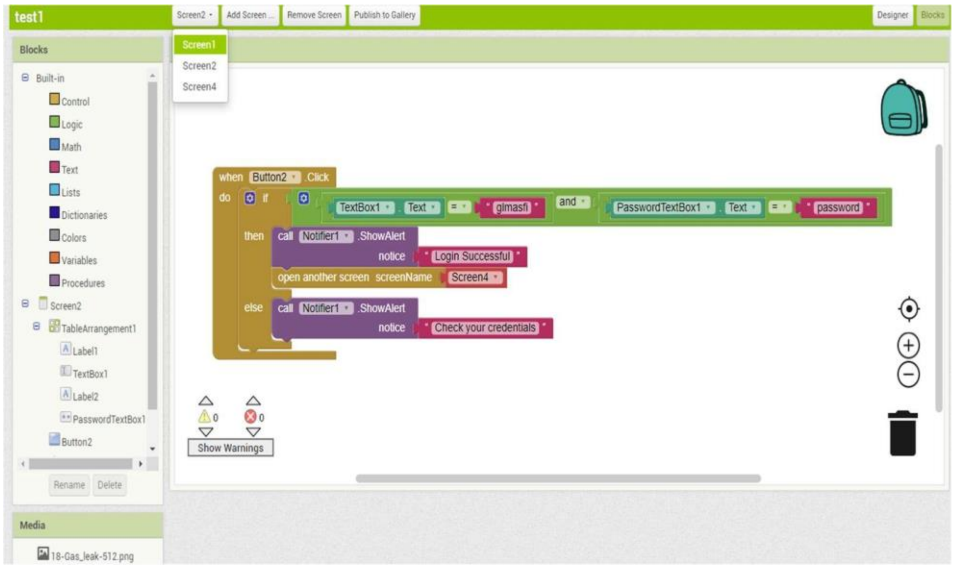




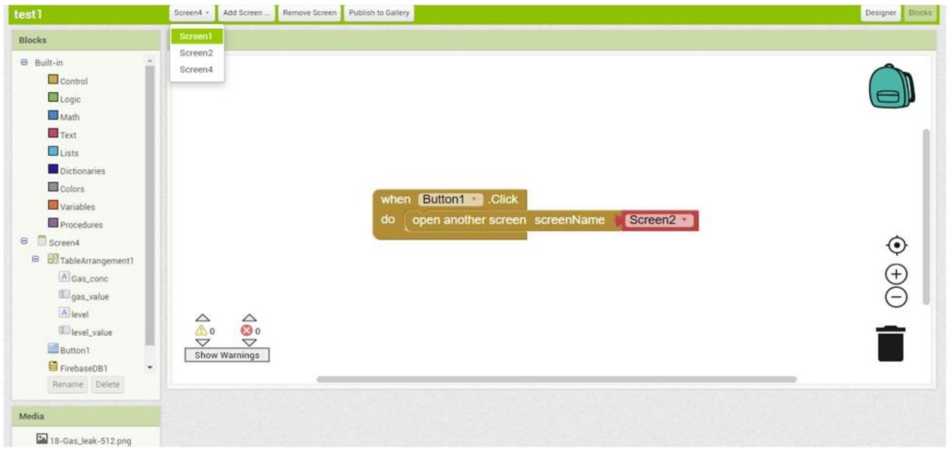
MIT App Inventor: (Blocks)



```
when Button1 .Click
do  open another screen  screenName  Screen2
```

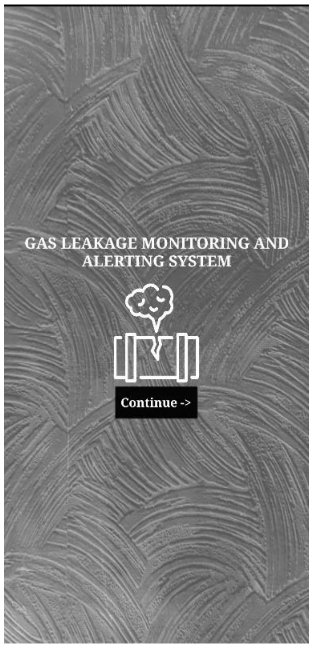


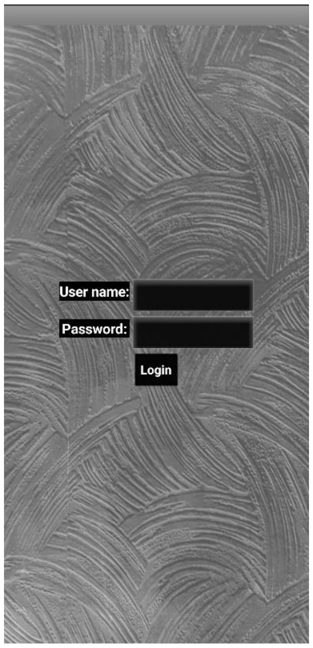
```
when Button2 .Click
do  if  TextBox1 . Text = "gimasfi"  and  PasswordTextBox1 . Text = "password"
    then  call Notifier1 .ShowAlert
                          notice  "Login Successful"
          open another screen  screenName  "Screen4"
    else  call Notifier1 .ShowAlert
                          notice  "Check your credentials"
```

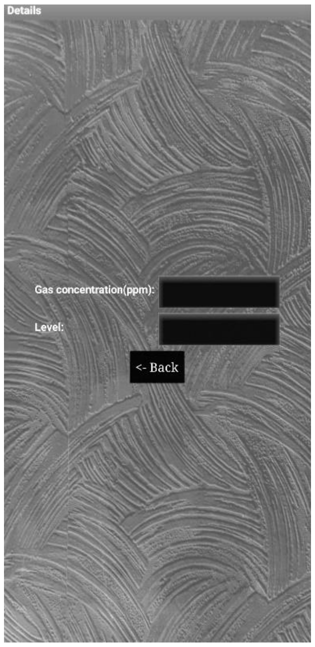


```
when Button1 .Click
do  open another screen  screenName  "Screen2"
```

Mobile App Output:


GAS LEAKAGE MONITORING AND ALERTING SYSTEM
Continue ->


User name:
Password:
Login


Details
Gas concentration(ppm):
Level:
<- Back