Question 1

1 Create a WSN as 30

a. Insert entities and create connections to simulate a network with webcam, sound sensor, motion sensor, siren, LCD other required entities.

b. Program the network as follows

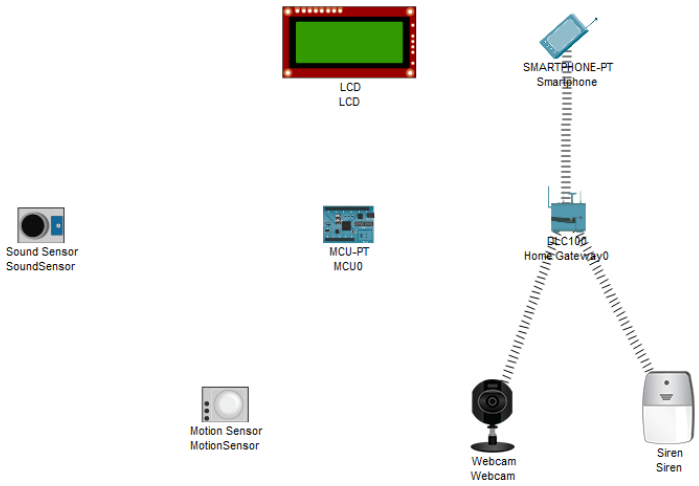
i. If only sound is detected set the text on LCD to "Welcome".

ii. If there is sound and motion detected at the same time, set the siren

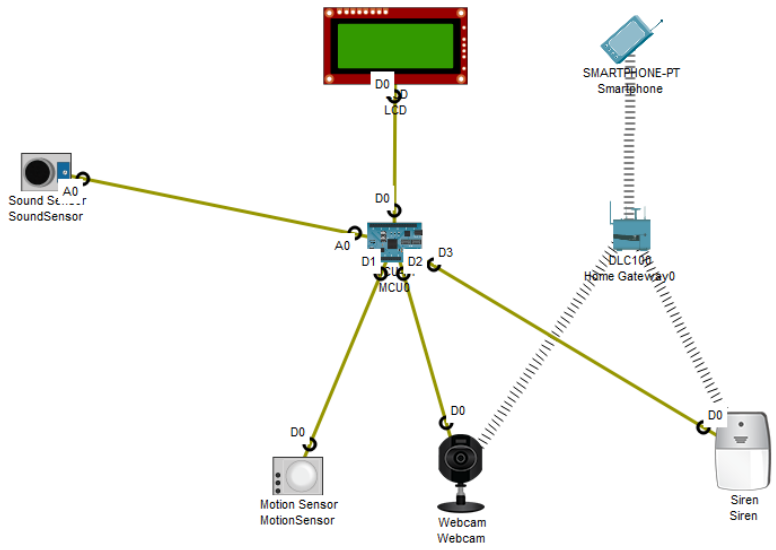
iii. Capture image whenever the siren rings and send the image to the mobile phone.

c. Simulate and demonstrate working of the above network. (Feed/program sample/fake inputs on some event wherever required. on some event.)

Place all devices as shown



Use IoT Custom Cable to make these connections

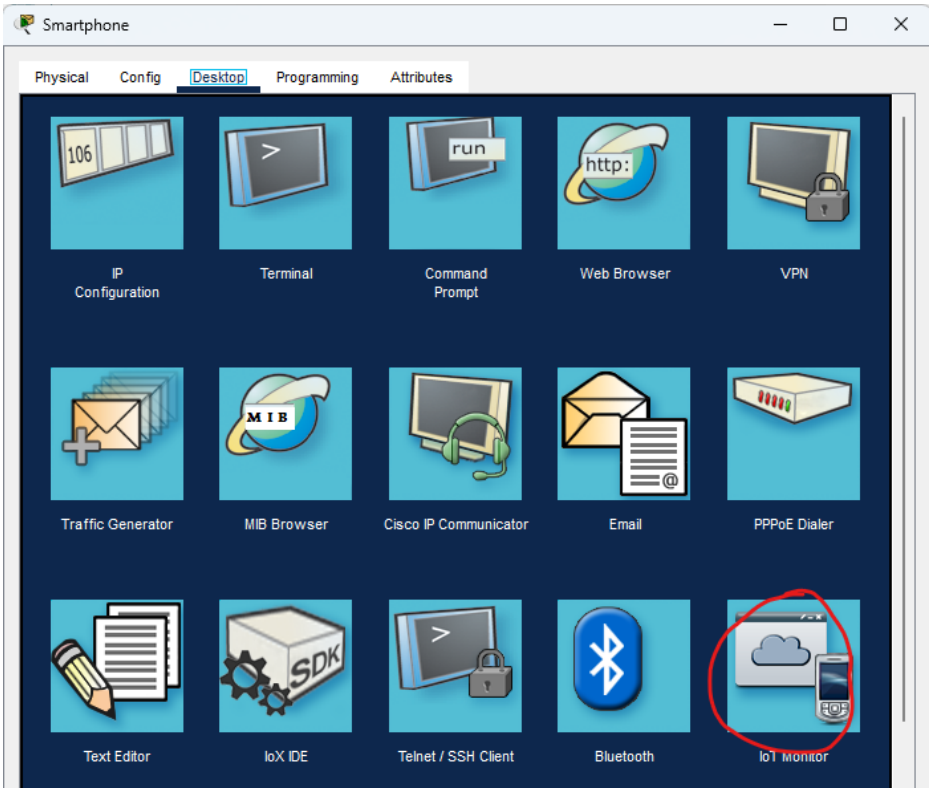


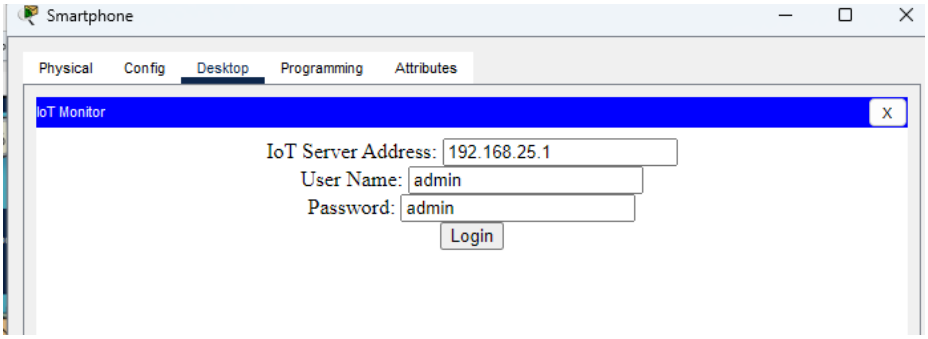
Write this code in MCU-PT

Reload | Copy | Paste | Undo | Redo | Find | Replace | Zoom: +

```
from gpio import *
from time import *

while True:
    delay(1000)
    sound = analogRead(A0)
    # subtract 12 from sound if using speaker for testing
    motion = digitalRead(1)
    if sound:
        customWrite(0, 'Welcome')
        customWrite(3, 1 if motion else 0)
    else:
        customWrite(0, '')
        customWrite(3, 0)
```

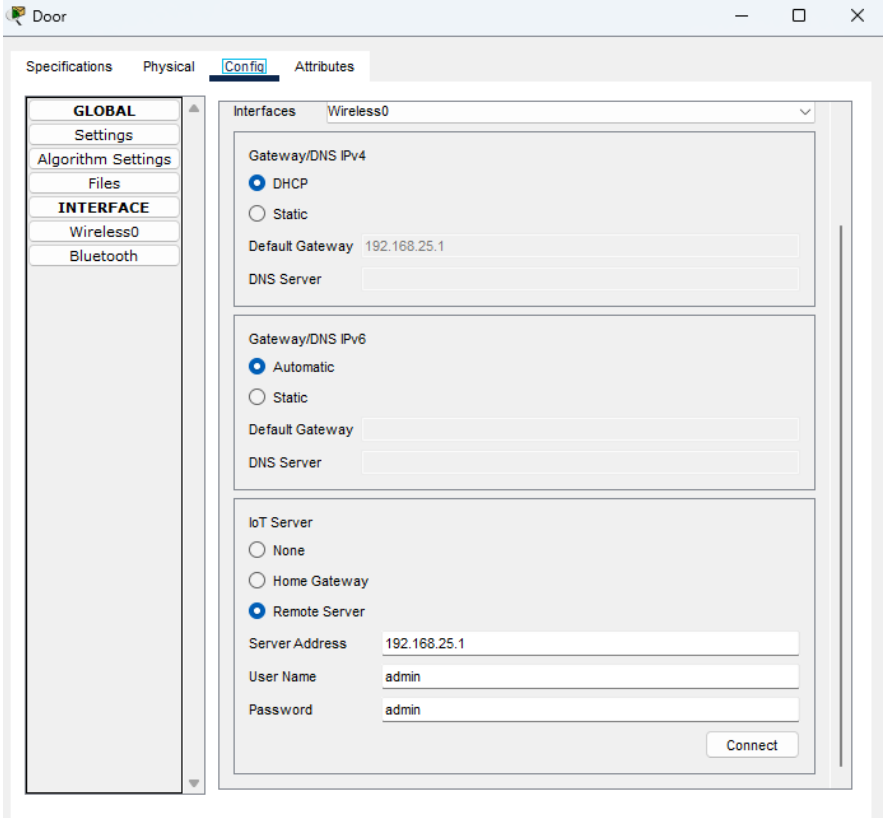
Go to **IoT Monitor** in Smartphone and login



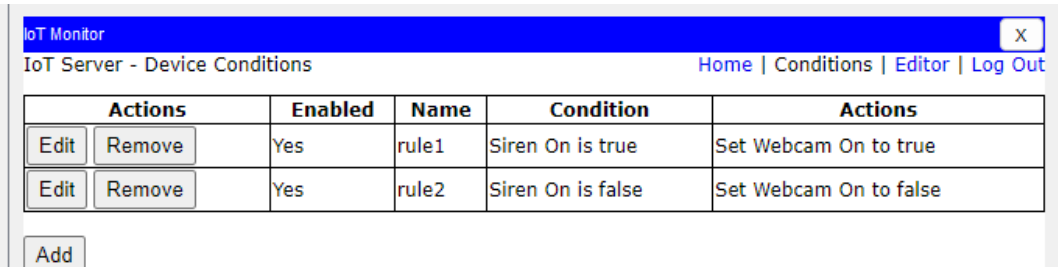


Use the same IP address, username and password and connect to the IoT Server

(only for Siren and Webcam)



Add these conditions in IoT Monitor



Question 2

1 Create a WSN as 30

a. Insert entities and create connections to simulate a network with fan, garage door, window, siren, humidity monitor, lamp and other required entities.

b. Program the network as follows

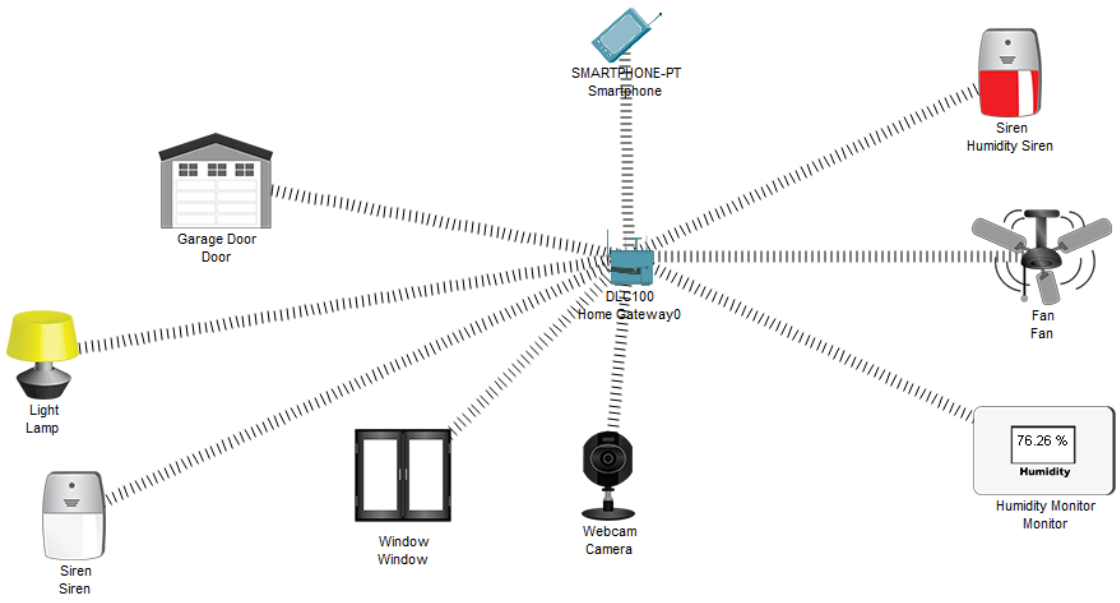
i. If the humidity level rises above 50% (or units), fan should be automatically on. If it falls below 25% (or units) the fan should be automatically off. If humidity goes above 75% (or units) the siren at the top should start ringing.

ii. When the garage door open at odd times the light should be on and off at even times. (Simulating entering and leaving of owners)

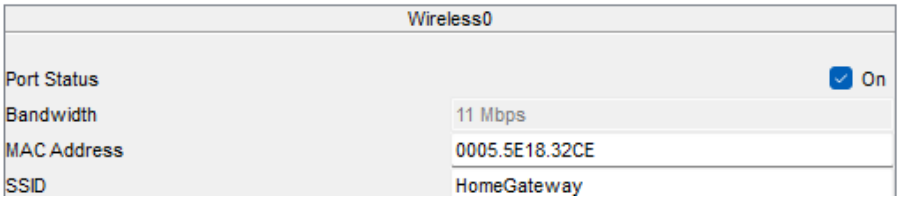
iii. If window also opens when at the even times of opening of the garage door, the other siren should start ringing. (Simulating setting of siren when the owners are not present). And image will also be captured and send to the mobile phone.

c. Simulate and demonstrate working of the above network. (Feed/program sample/fake inputs on some event wherever required.)

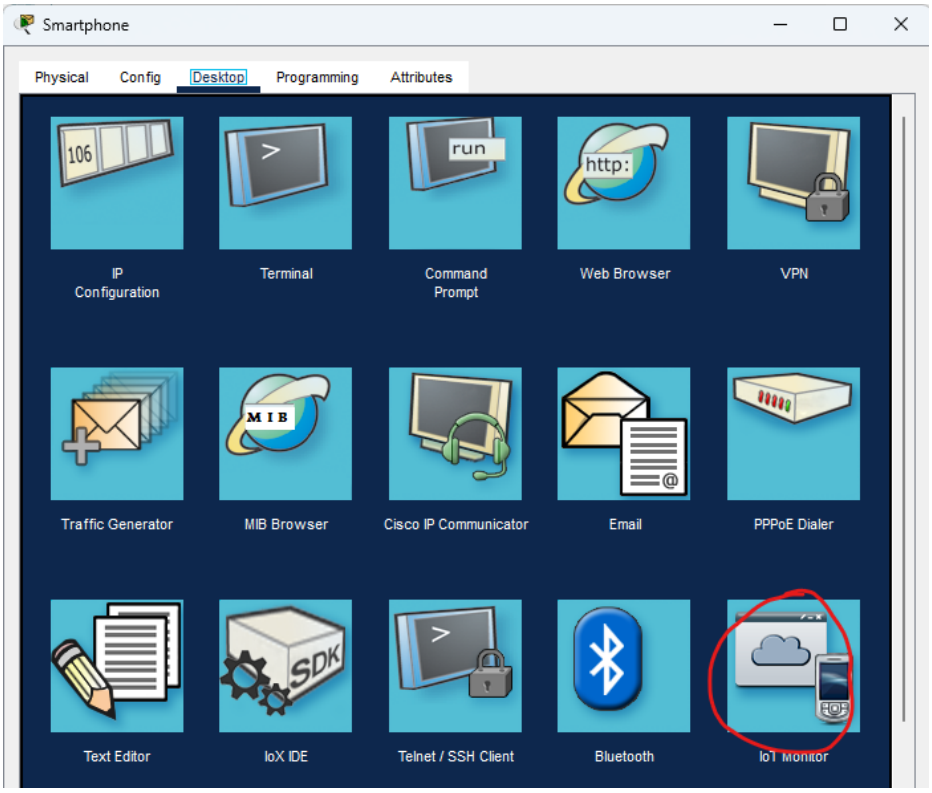
Place all devices as shown

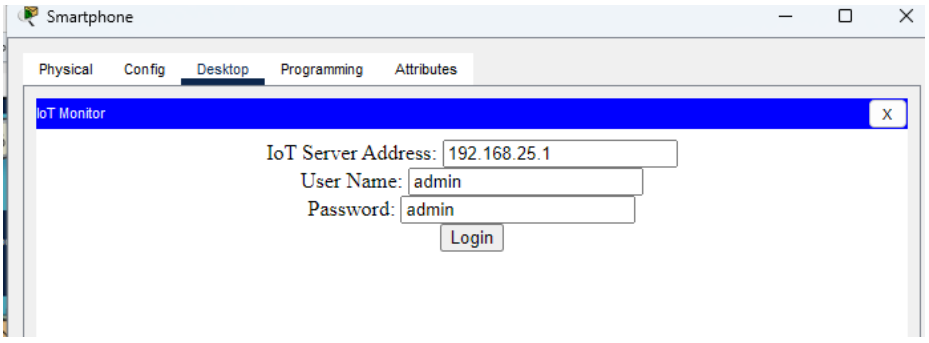


Change the SSID of all devices to **HomeGateway**



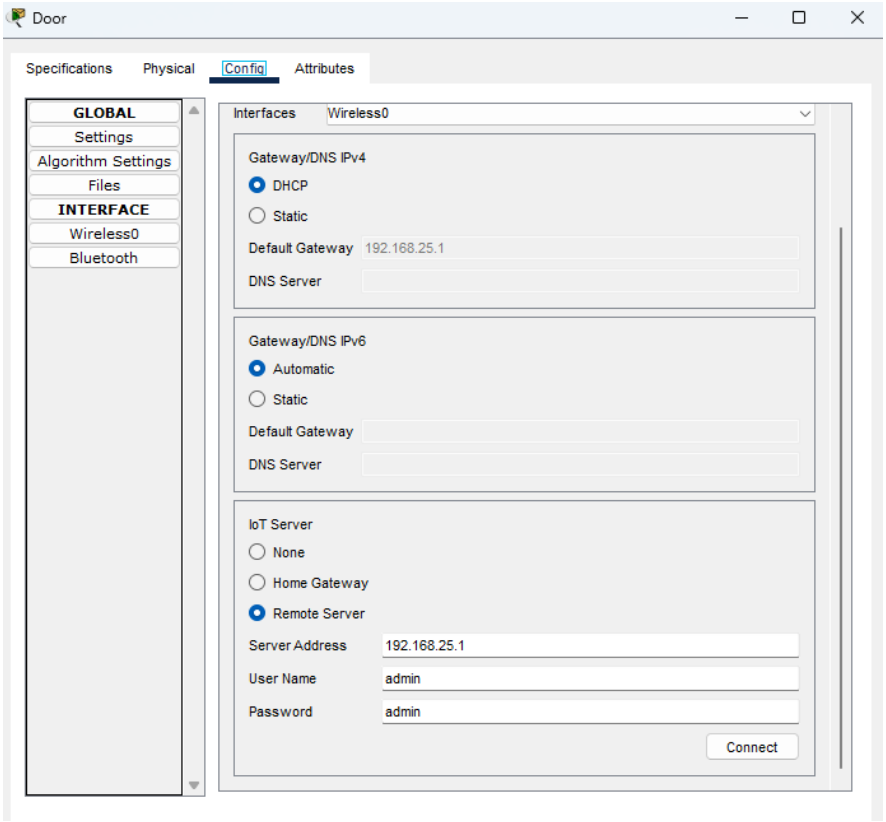
Go to **IoT Monitor** in Smartphone and login



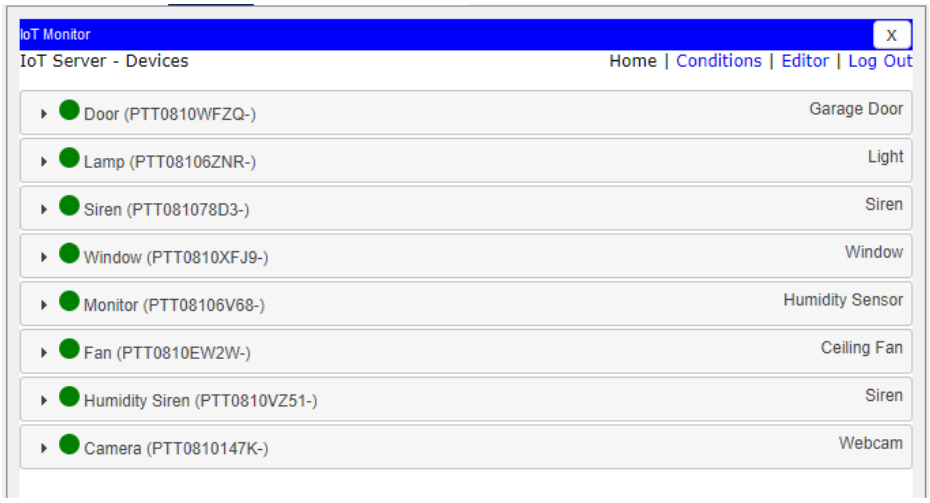


Use the same IP address, username and password and connect to the IoT Server

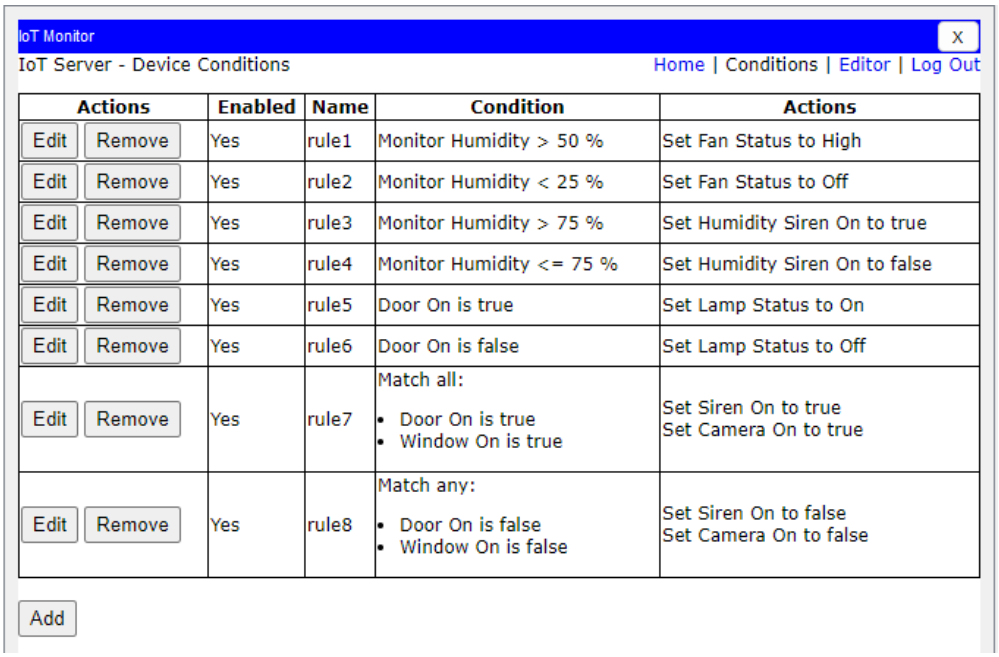
(for Garage Door, Lamp, Siren, Window, Humidity Monitor, Fan, Camera, and the other Siren)



Verify all connections in the **IoT Monitor**



Add these conditions in the **IoT Monitor**



IoT Monitor

IoT Server - Device Conditions

Home | Conditions | Editor | Log Out

Actions	Enabled	Name	Condition	Actions
Edit Remove	Yes	rule1	Monitor Humidity > 50 %	Set Fan Status to High
Edit Remove	Yes	rule2	Monitor Humidity < 25 %	Set Fan Status to Off
Edit Remove	Yes	rule3	Monitor Humidity > 75 %	Set Humidity Siren On to true
Edit Remove	Yes	rule4	Monitor Humidity <= 75 %	Set Humidity Siren On to false
Edit Remove	Yes	rule5	Door On is true	Set Lamp Status to On
Edit Remove	Yes	rule6	Door On is false	Set Lamp Status to Off
Edit Remove	Yes	rule7	Match all: • Door On is true • Window On is true	Set Siren On to true Set Camera On to true
Edit Remove	Yes	rule8	Match any: • Door On is false • Window On is false	Set Siren On to false Set Camera On to false

Add

Question 3

1 Create a WSN as 30

a. Insert entities and create connections to simulate a network with wind sensor, sound sensor, home speaker, potentiometer, motion sensor, web cam, alarm, siren, LCD and other required entities.

b. Program the network as follows

i. If change in value/status is detected by any sensor, the change should be displayed on the LCD.

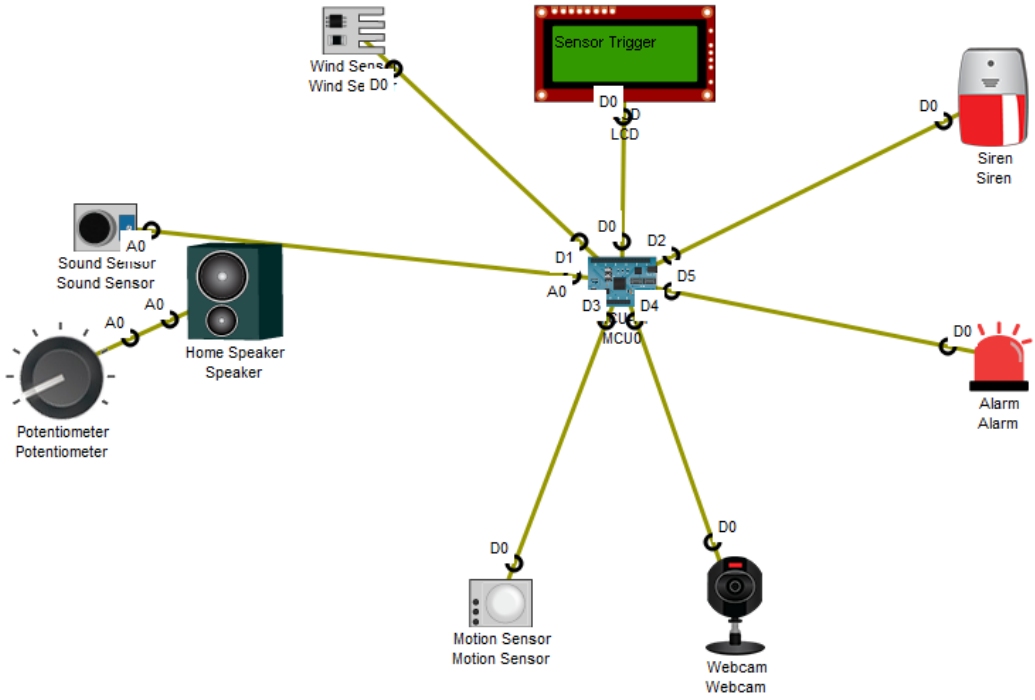
ii. If either wind sensor or sound sensor value crosses there 60% limit then siren should ring.

iii. If either wind sensor or sound sensor value crosses there 75% limit then the alarm should go on. And image will also be captured and send to the mobile phone.

c. Simulate and demonstrate working of the above network. (Feed/program sample/fake inputs on some event wherever required.)

Place all devices as shown

Use IoT Custom Cable and make these connections



Write this Python code in MCU-PT

```
from gpio import *
from time import *

def scaleSound(value):
    return ((value - 12.0) / (241 - 12)) * 100
    # since max reading is 241 and min reading is 12

while True:
    delay(1000)
    wind = digitalRead(1)
    sound = scaleSound(analogRead(A0))
    motion = digitalRead(3)

    if wind or sound or motion:
        customWrite(0, 'Sensor Trigger')
        if wind > 75 or sound > 75:
            customWrite(2, 0) # no siren
            customWrite(4, 1)
            digitalWrite(5, HIGH)
        elif wind > 60 or sound > 60:
            customWrite(2, 1)
        else:
            customWrite(2, 0)
            customWrite(4, 0)
            digitalWrite(5, LOW)
    else:
        customWrite(0, '')
        customWrite(2, 0)
        customWrite(4, 0)
        digitalWrite(5, LOW)
```

Question 4

1 Create a WSN as 30

a. Insert entities and create connections to simulate a network with CO detector, CO2 detector, fan, AC, alarm, old car, smoke detector, window, fire sprinkler, lamp and other required entities.

b. Program the network as follows

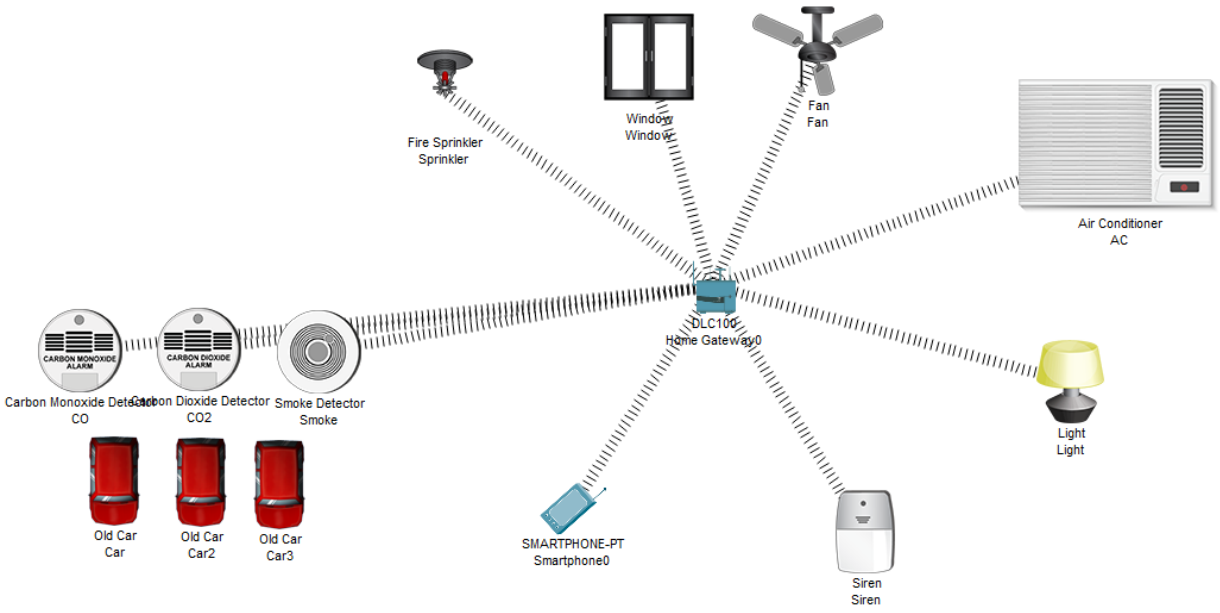
i. If smoke, CO or CO2 is detected from the old car fire sprinkler should be on and the windows should be open and alarm should be ring. Also the AC and the light, if on, should be off.

ii. The fire sprinkler should be off when a message is send from the PC

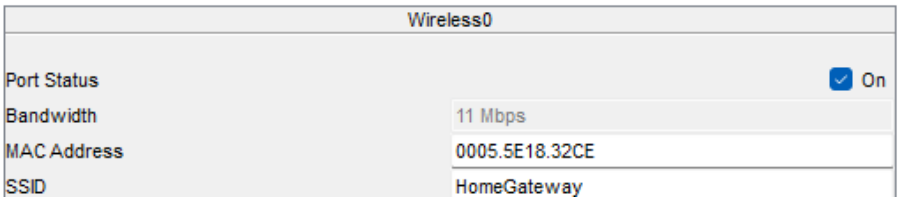
iii. If light is on, fan should be on. If the light is off then fan should be off and AC should be on.

c. Simulate and demonstrate working of the above network. (Feed/program sample/fake inputs on some event wherever required.)

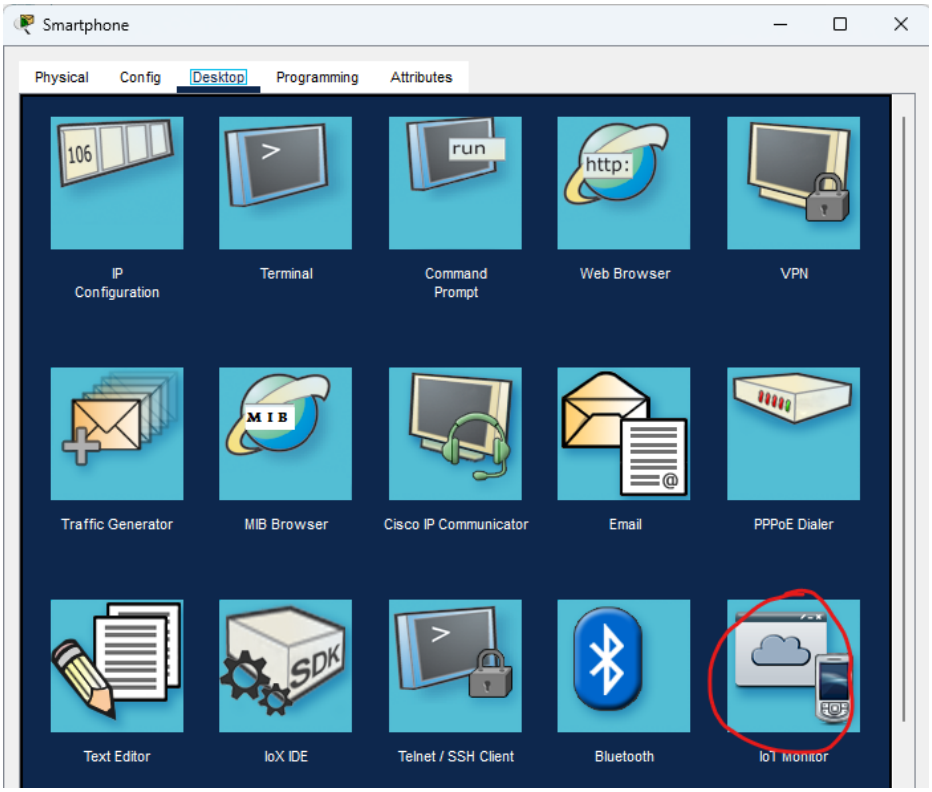
Place all devices as shown

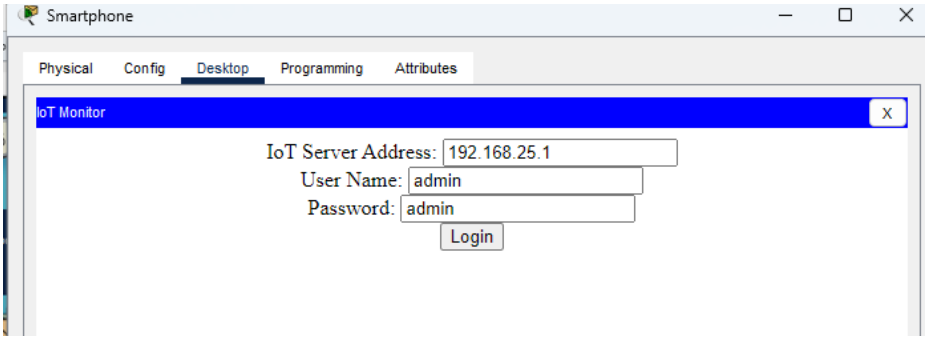


Change the SSID of all devices to **HomeGateway**



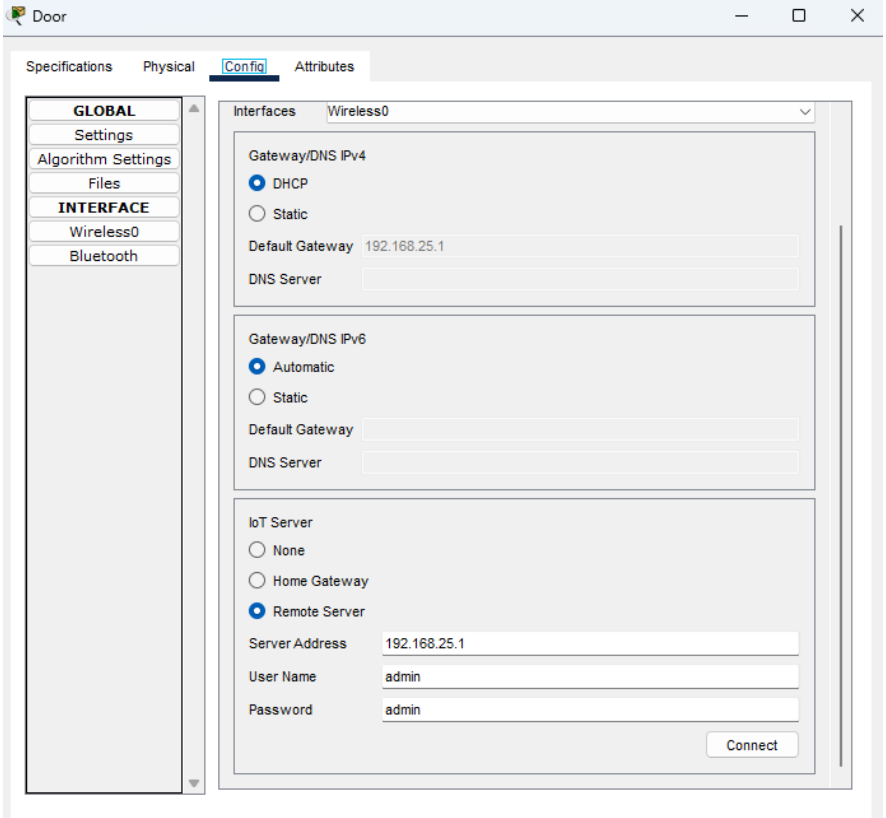
Go to **IoT Monitor** in Smartphone and login



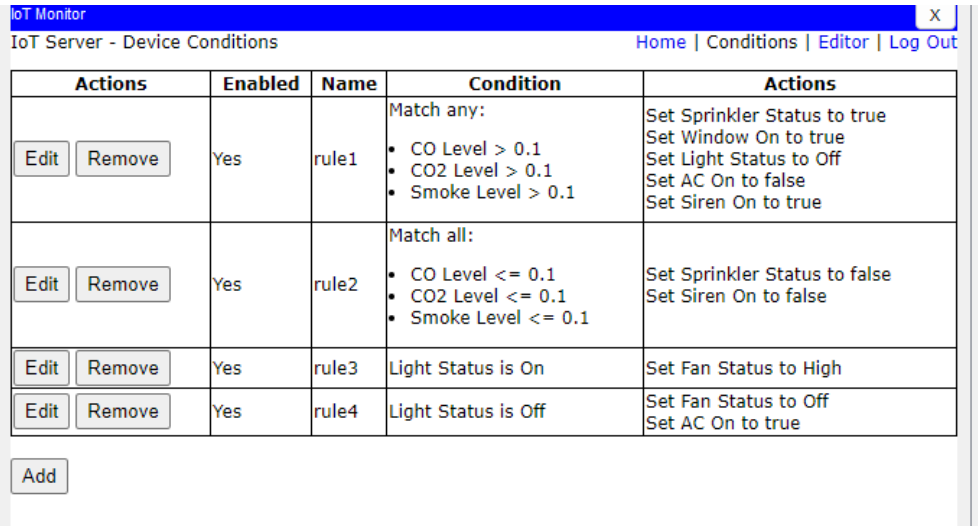


Use the same IP address, username and password and connect to the IoT Server

(for all devices)



Add these conditions in IoT Monitor



Question 5

1 Create a WSN as 30

a. Insert entities and create connections to simulate a network with temperature sensor, temperature monitor, fan, LCD, AC, heating element, alarm and other required entities.

b. Program the network as follows

i. There will be five levels of temperature measured
- Very Low: Below or equal to 10^0 C
- Low: Above 10^0 C and Below or equal to 25^0 C
- Normal: Above 25^0 C and Below or equal to 35^0 C
- High: Above 35^0 C and Below or equal to 50^0 C
- Very high: Above 50^0 C

ii. The LCD should display the level of temperature.

iii. If the temperature is very low then the heater should be on.

iv. If the temperature is low then the heater should be off

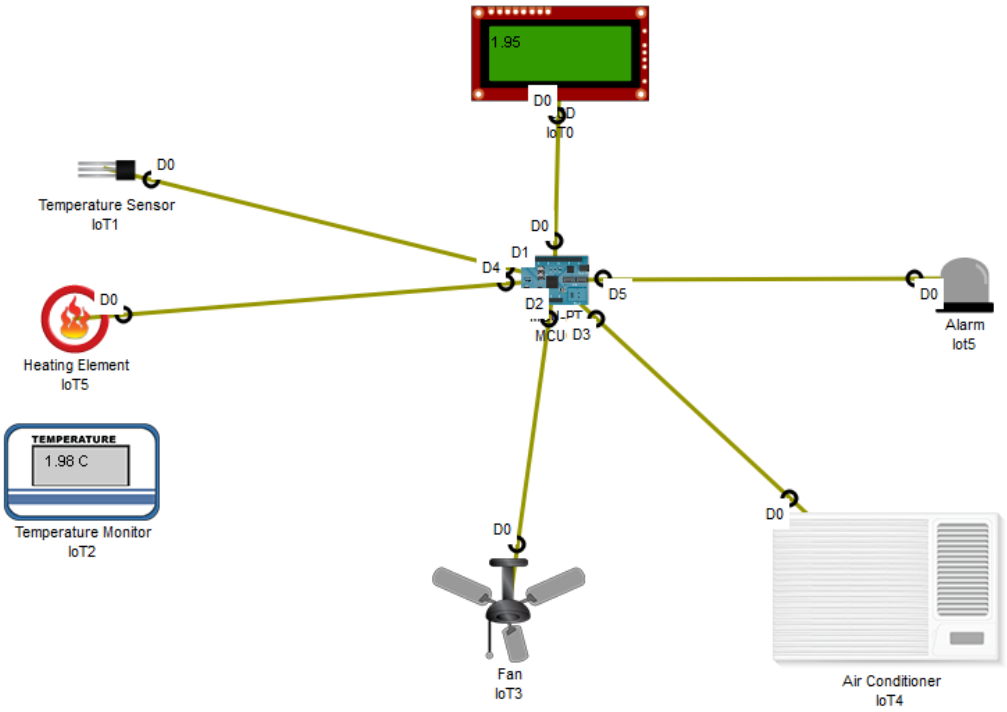
v. If the temperature is normal then the fan should be on.

vi. If the temperature is high, on the AC

vii. If the temperature is high, ring the alarm and send a message to the mobile

c. Simulate and demonstrate working of the above network. (Feed/program sample/fake inputs on some event wherever required.)

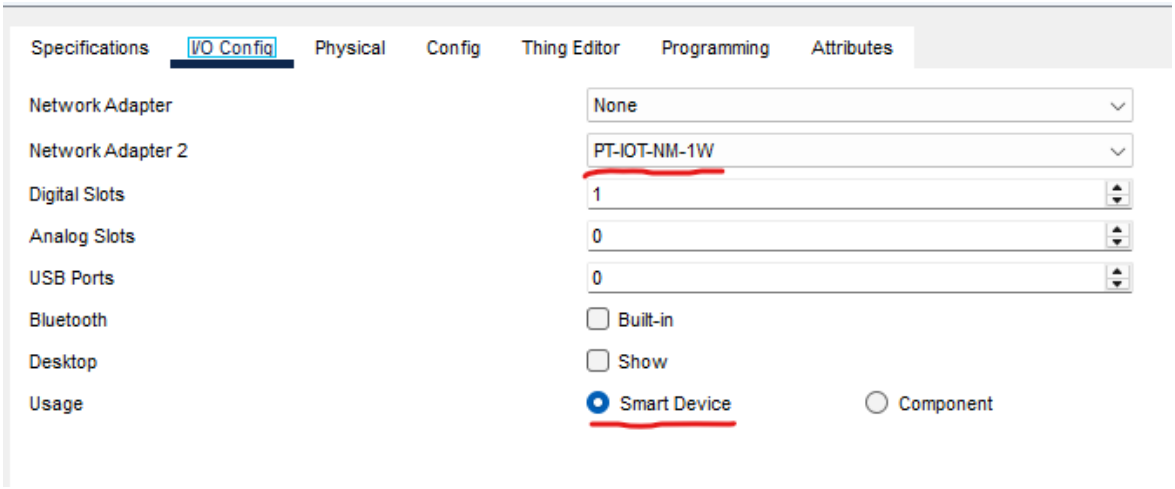
Place all devices as shown and make the connections using IoT Custom Cable



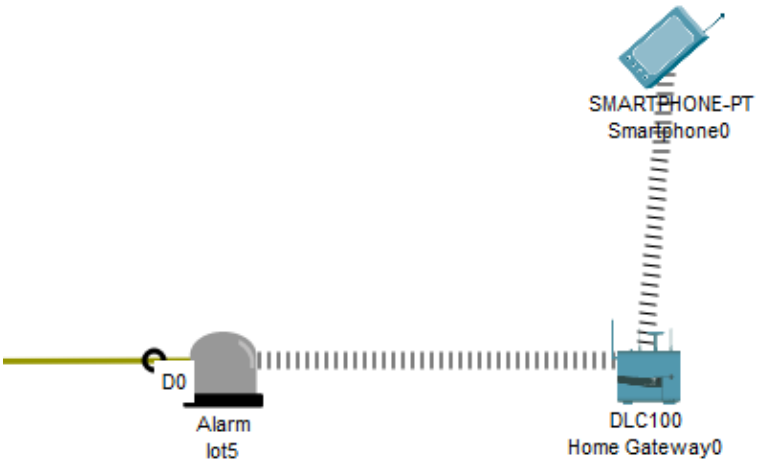
Write this code in MCU-PT

```
from gpio import *
from time import *

def scaleTemp(value):
    return round(((value / 1024.0) * 200) - 100, 2)

while True:
    delay(100)
    temp = scaleTemp(digitalRead(1))
    customWrite(0, temp)
    digitalWrite(3, HIGH)
    if temp <= 10: # very low
        customWrite(2, 0)
        digitalWrite(3, LOW)
        digitalWrite(4, HIGH)
    elif 10 < temp <= 25: # low
        digitalWrite(4, LOW)
    elif temp < 25 <= 35: # normal
        customWrite(2, 2)
    elif temp < 35 <= 50: # high
        digitalWrite(3, HIGH)
        digitalWrite(5, 1)
```

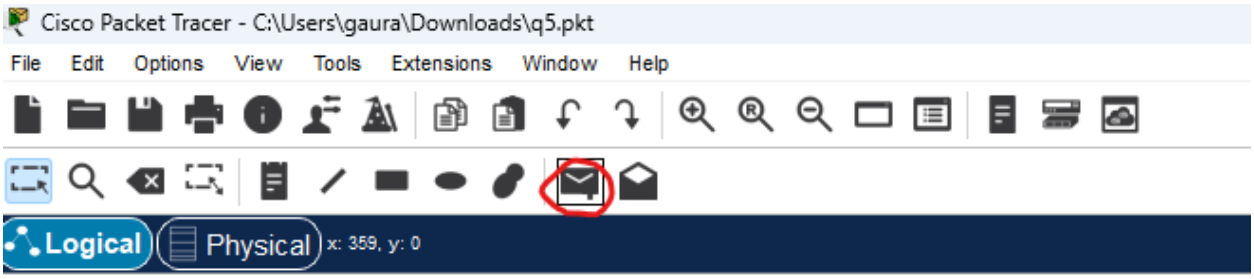
Go to Alarm, select Advanced from bottom-right and make these changes

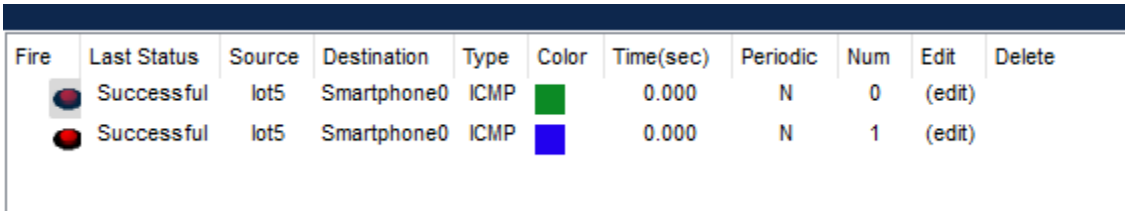


Add these devices and change SSID to HomeGateway (for Alarm and Smartphone)



Send a message from Alarm to Smartphone to verify connection





Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	Iot5	Smartphone0	ICMP		0.000	N	0	(edit)	
	Successful	Iot5	Smartphone0	ICMP		0.000	N	1	(edit)	