

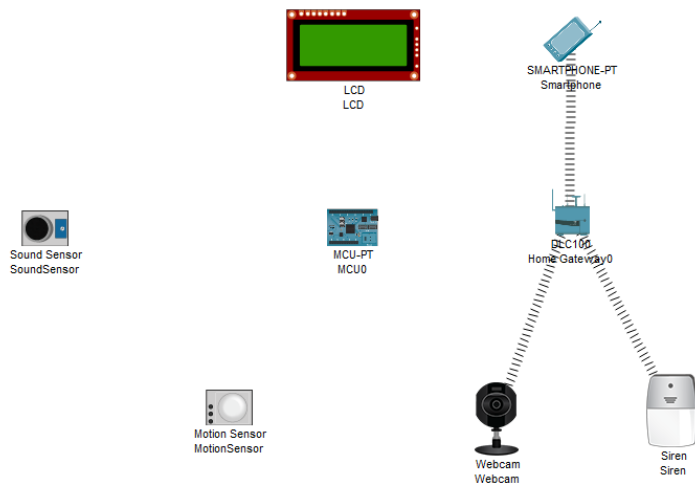
Question 1

1 Create a WSN as

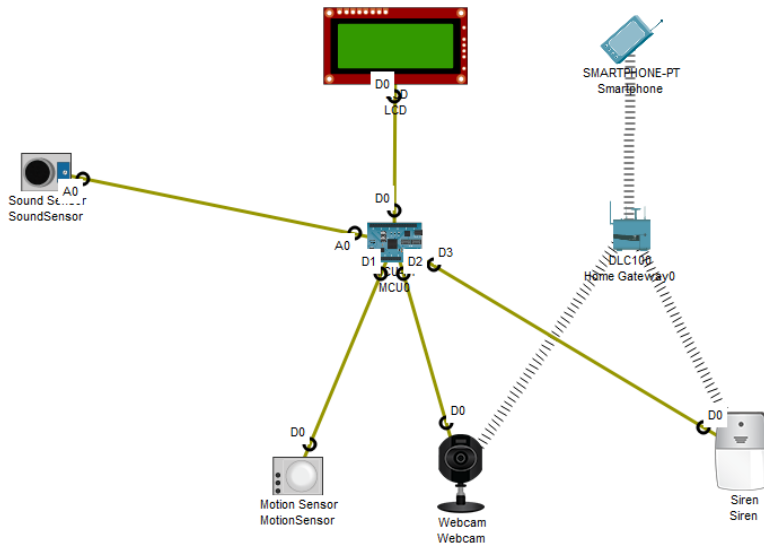
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- a. Insert entities and create connections to simulate a network with webcam, sound sensor, motion sensor, siren, LCD other required entities.
- b. Program the network as follows
 - i. If only sound is detected set the text on LCD to "Welcome".
 - 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

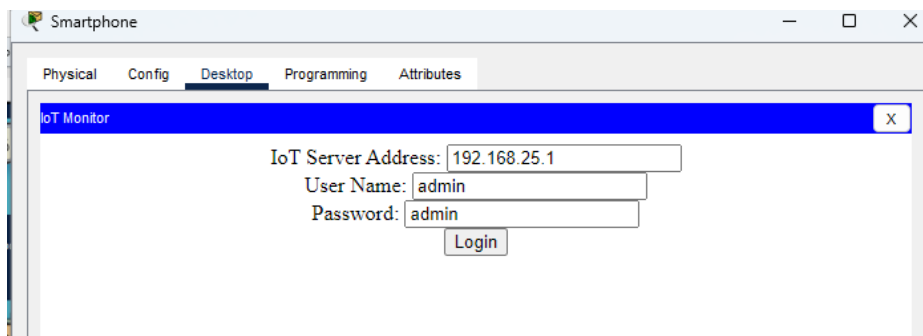
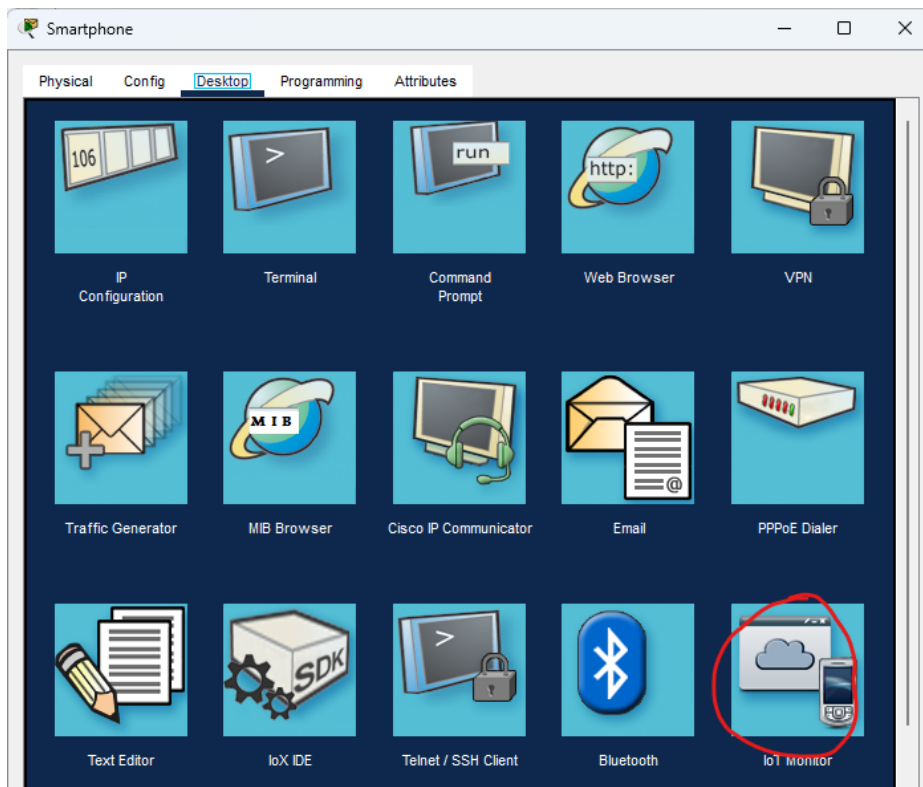


Write this code in MCU-PT

```
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)

The screenshot shows a web-based configuration interface for a device named "Door". The "Config" tab is active, displaying settings for the "Wireless0" interface. The left sidebar contains a tree view with "GLOBAL" (Settings, Algorithm Settings, Files) and "INTERFACE" (Wireless0, Bluetooth) sections. The main content area is divided into three sections: "Gateway/DNS IPv4" with "DHCP" selected and "Default Gateway" set to "192.168.25.1"; "Gateway/DNS IPv6" with "Automatic" selected; and "IoT Server" with "Remote Server" selected, "Server Address" set to "192.168.25.1", "User Name" set to "admin", and "Password" set to "admin". A "Connect" button is located at the bottom right of the IoT Server section.

Add these conditions in IoT Monitor

IoT Monitor					
IoT Server - Device Conditions					
Actions		Enabled	Name	Condition	Actions
Edit	Remove	Yes	rule1	Siren On is true	Set Webcam On to true
Edit	Remove	Yes	rule2	Siren On is false	Set Webcam On to false
Add					

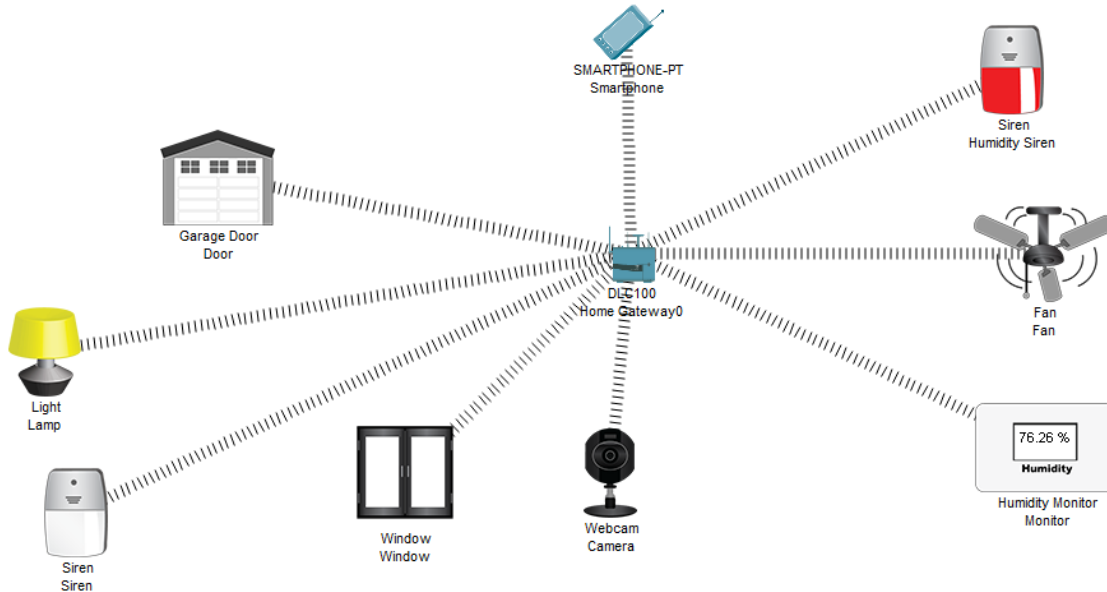
Question 2

1 Create a WSN as

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- 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.)

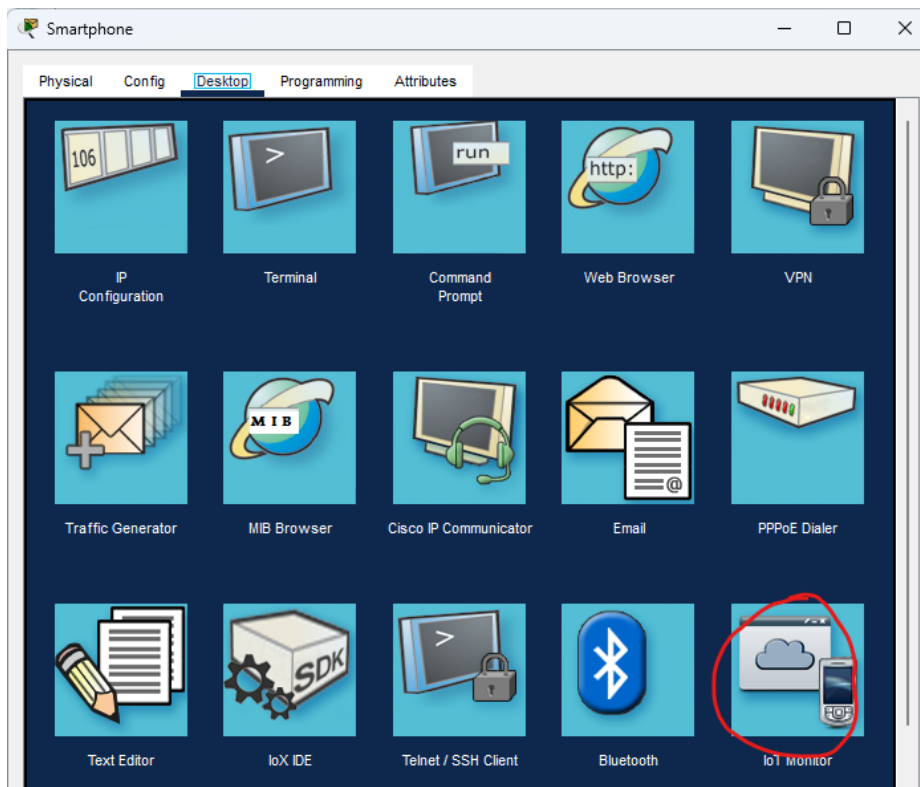
Place all devices as shown



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

Wireless0	
Port Status	<input checked="" type="checkbox"/> On
Bandwidth	11 Mbps
MAC Address	0005.5E18.32CE
SSID	HomeGateway

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



The image shows the 'IoT Monitor' login window. It has a title bar 'IoT Monitor' and a close button. The window contains the following fields and controls:

- IoT Server Address: 192.168.25.1
- User Name: admin
- Password: admin
- Login button

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)

The screenshot shows a web-based configuration window titled "Door". It has four tabs: "Specifications", "Physical", "Config" (selected), and "Attributes". On the left, there is a sidebar with a tree view containing "GLOBAL" (with sub-items "Settings", "Algorithm Settings", "Files") and "INTERFACE" (with sub-items "Wireless0" and "Bluetooth"). The main area displays the configuration for the "Wireless0" interface. It is divided into three sections: "Gateway/DNS IPv4" with radio buttons for "DHCP" (selected) and "Static", and fields for "Default Gateway" (192.168.25.1) and "DNS Server"; "Gateway/DNS IPv6" with radio buttons for "Automatic" (selected) and "Static", and fields for "Default Gateway" and "DNS Server"; and "IoT Server" with radio buttons for "None", "Home Gateway", and "Remote Server" (selected). Below these are fields for "Server Address" (192.168.25.1), "User Name" (admin), and "Password" (admin), followed by a "Connect" button.

Verify all connections in the **IoT Monitor**

The screenshot shows the "IoT Monitor" web application. At the top, there is a blue header bar with the title "IoT Monitor" and a close button (X). Below the header, there is a navigation bar with the text "IoT Server - Devices" and links for "Home", "Conditions", "Editor", and "Log Out". The main content area displays a list of connected devices, each with a green status indicator, a name in parentheses, and a description.

Device Name	Description
Door (PTT0810WFZQ-)	Garage Door
Lamp (PTT08106ZNR-)	Light
Siren (PTT081078D3-)	Siren
Window (PTT0810XFJ9-)	Window
Monitor (PTT08106V68-)	Humidity Sensor
Fan (PTT0810EW2W-)	Ceiling Fan
Humidity Siren (PTT0810VZ51-)	Siren
Camera (PTT0810147K-)	Webcam

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: <ul style="list-style-type: none">Door On is trueWindow On is true	Set Siren On to true Set Camera On to true
Edit	Remove	Yes	rule8	Match any: <ul style="list-style-type: none">Door On is falseWindow On is false	Set Siren On to false Set Camera On to false
Add					

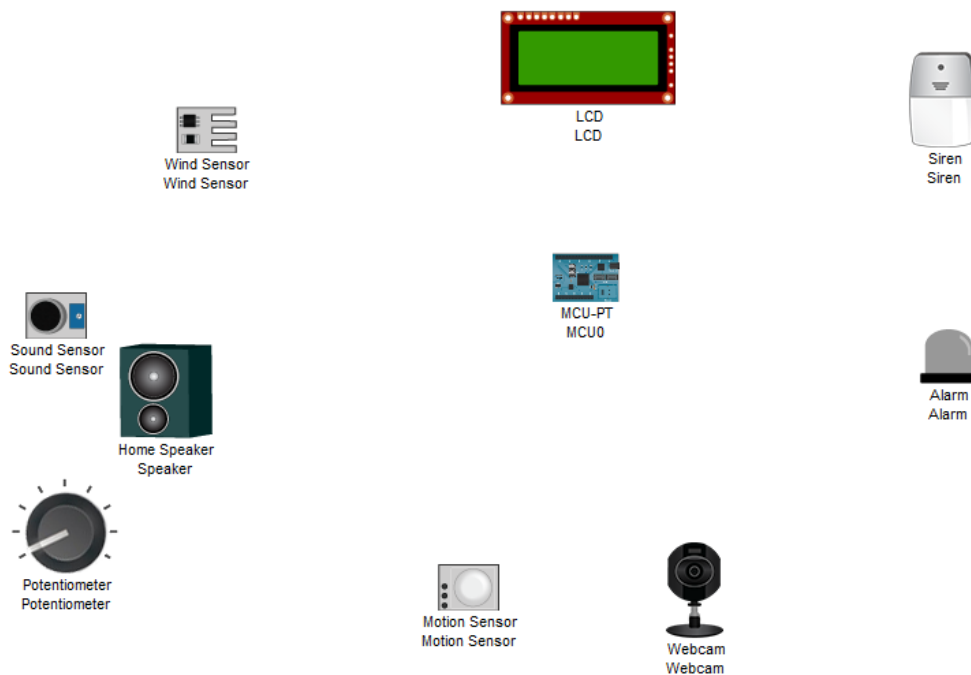
Question 3

1 Create a WSN as

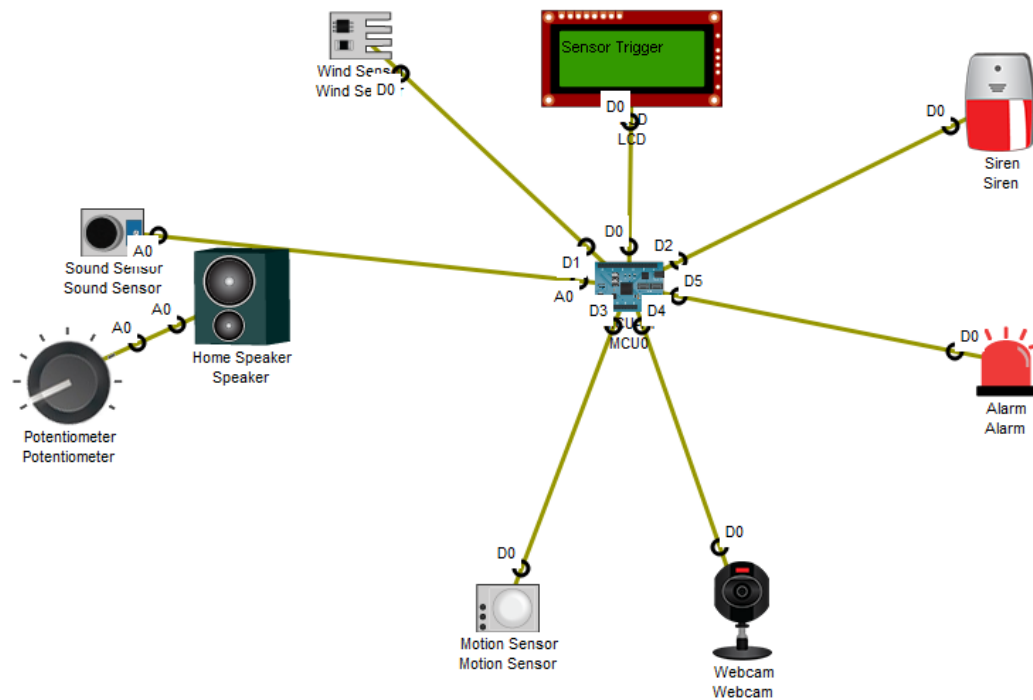
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- a. Insert entities and create connections to simulate a network with wind sensor, sound sensor, home speaker, potentiometer, motion sensor, web cam, alarm, siren, LCD and other required entities.
- b. Program the network as follows
 - i. If change 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)
```

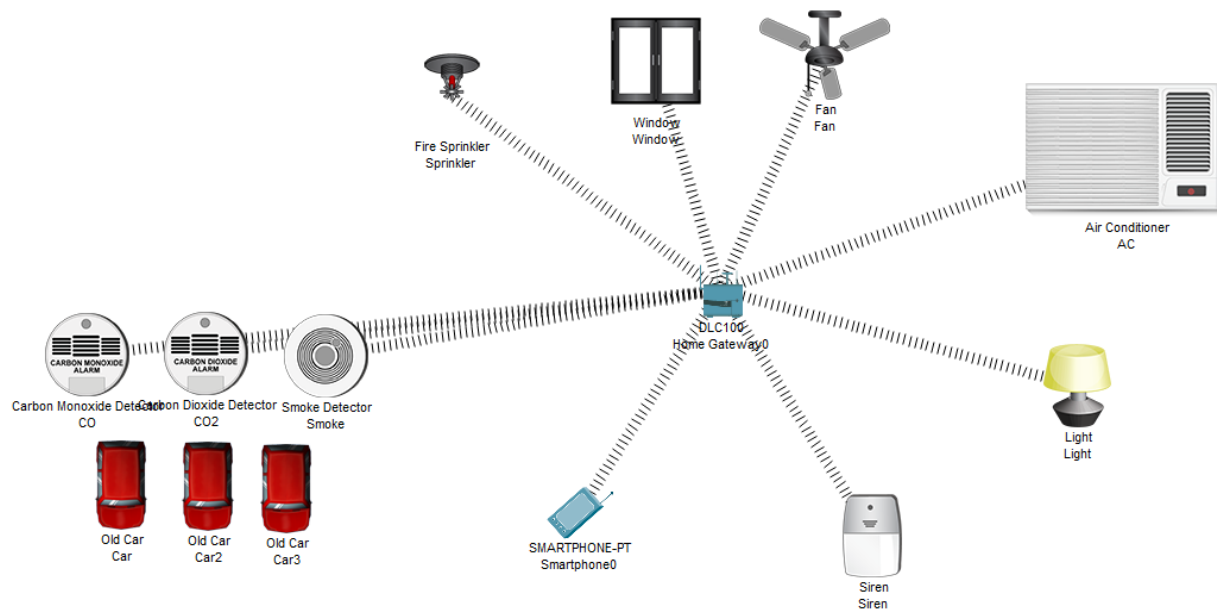
Question 4

1 Create a WSN as

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- 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.)

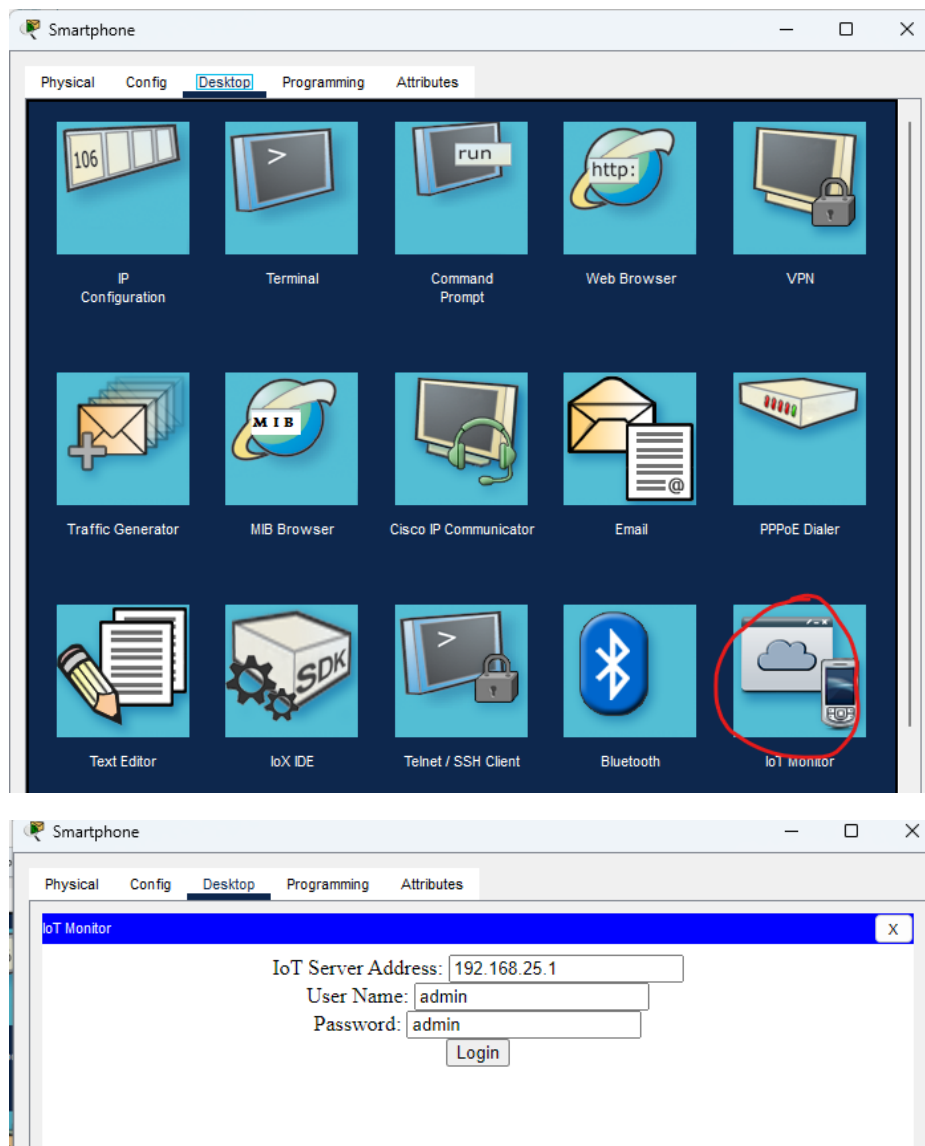
Place all devices as shown



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

Wireless0	
Port Status	<input checked="" type="checkbox"/> On
Bandwidth	11 Mbps
MAC Address	0005.5E18.32CE
SSID	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)

The screenshot shows the 'Door' application window with the 'Config' tab selected. The left sidebar has a tree view with 'GLOBAL' (Settings, Algorithm Settings, Files) and 'INTERFACE' (Wireless0, Bluetooth). The main area shows the 'Wireless0' interface configuration. Under 'Gateway/DNS IPv4', 'DHCP' is selected, and the 'Default Gateway' is 192.168.25.1. Under 'Gateway/DNS IPv6', 'Automatic' is selected. Under 'IoT Server', 'Remote Server' is selected, with 'Server Address' 192.168.25.1, 'User Name' 'admin', and 'Password' 'admin'. A 'Connect' button is at the bottom right.

Add these conditions in IoT Monitor

IoT Monitor				
IoT Server - Device Conditions				
Actions	Enabled	Name	Condition	Actions
<div>Edit</div> <div>Remove</div>	Yes	rule1	Match any: <ul style="list-style-type: none"> CO Level > 0.1 CO2 Level > 0.1 Smoke Level > 0.1 	Set Sprinkler Status to true Set Window On to true Set Light Status to Off Set AC On to false Set Siren On to true
<div>Edit</div> <div>Remove</div>	Yes	rule2	Match all: <ul style="list-style-type: none"> CO Level <= 0.1 CO2 Level <= 0.1 Smoke Level <= 0.1 	Set Sprinkler Status to false Set Siren On to false
<div>Edit</div> <div>Remove</div>	Yes	rule3	Light Status is On	Set Fan Status to High
<div>Edit</div> <div>Remove</div>	Yes	rule4	Light Status is Off	Set Fan Status to Off Set AC On to true
<div>Add</div>				

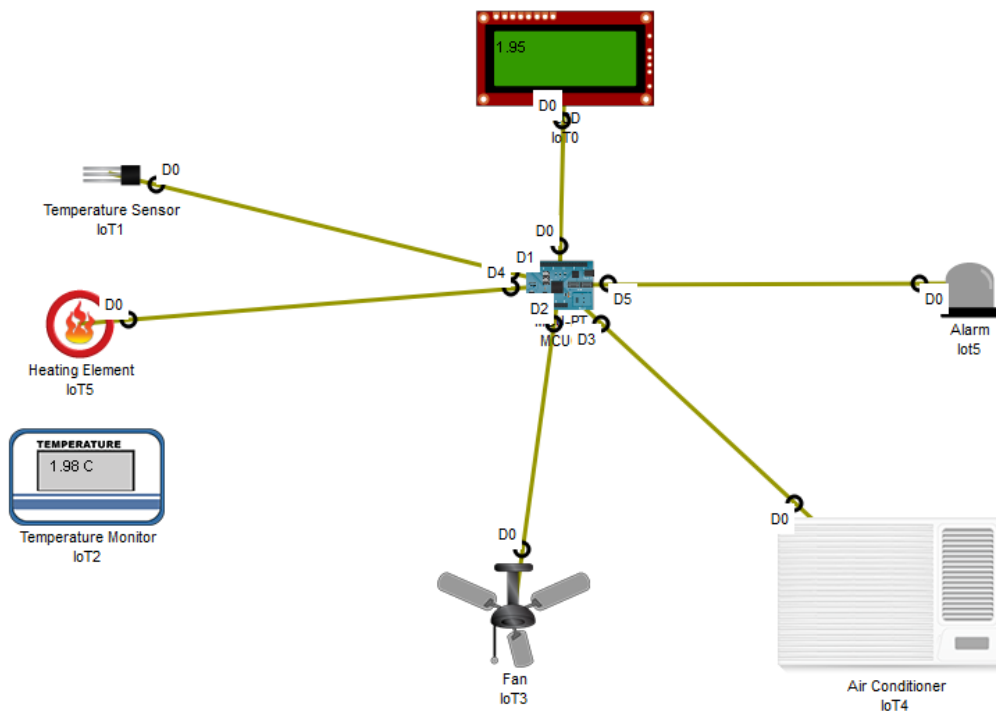
Question 5

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

```
Reload Copy Paste Undo Redo Find Replace
from gpio import *
from time import *

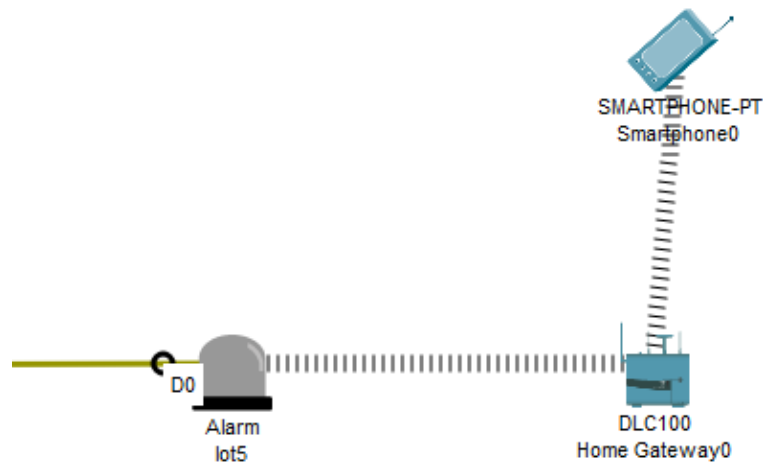
def scaleTemp(value):
    return round((value / 1024.0) * 200) - 100, 2)

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)
```

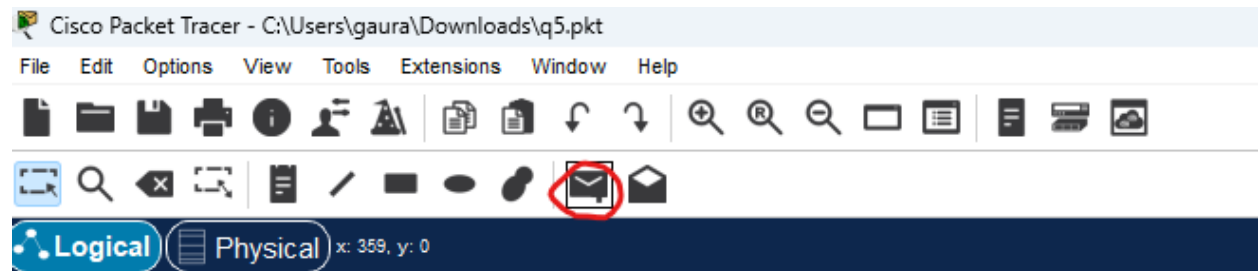
Go to Alarm, select Advanced from bottom-right and make these changes

Specifications	IO Config	Physical	Config	Thing Editor	Programming	Attributes
Network Adapter	None					
Network Adapter 2	PT-IOT-NM-1W					
Digital Slots	1					
Analog Slots	0					
USB Ports	0					
Bluetooth	<input type="checkbox"/> Built-in					
Desktop	<input type="checkbox"/> Show					
Usage	<input checked="" type="radio"/> Smart Device <input type="radio"/> Component					

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	lot5	Smartphone0	ICMP	Green	0.000	N	0	(edit)	
	Successful	lot5	Smartphone0	ICMP	Blue	0.000	N	1	(edit)	