Index

Aim.

In this assignment, I need you to design IoT for a research building. In this building there are four rooms, in which one room is smart cafeteria, one room is library where automatic lights on, one room is surveillance room where intruders are not allowed and detected, one room should have low temperature and low humidity in it.

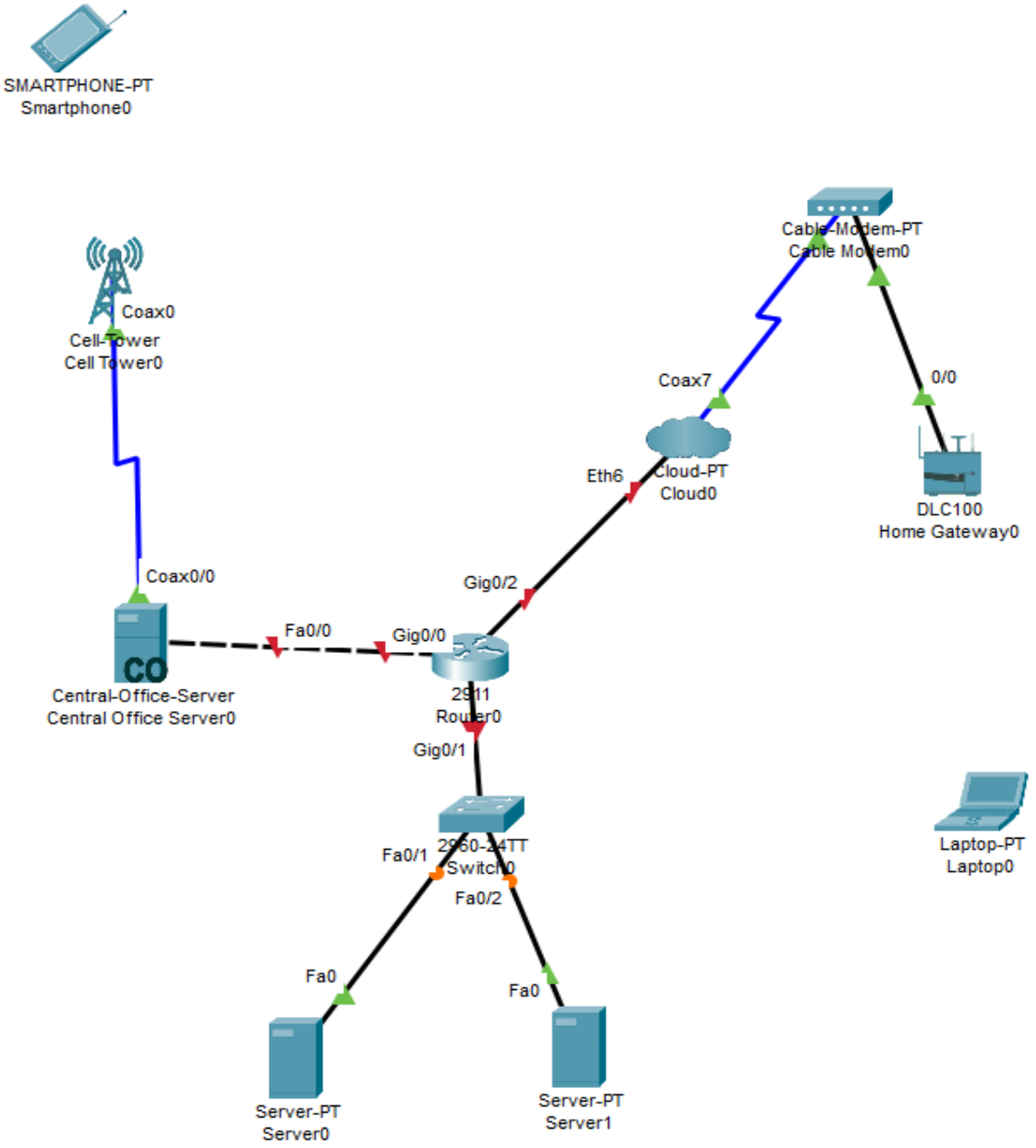
Solution.

Required Devices.

1. Smart Phone 2.
2. Cell Tower.
3. Central Office Server.
4. 2911 Router
5. 2960-24 TT Switch
6. Server PT 2.
7. Cloud PT.
8. Cable Modem.
9. Home Gateway.
10. Laptop PT 3.
11. Door 4.
12. AC 2.
13. Light.
14. Coffee
15. Fan.
16. Bluetooth Speaker
17. Thermostat.
18. Temperature Monitor.
19. Humidity Monitor.
20. Humiture Monitor.
21. Webcam.
22. RFID Reader.
23. MCU-PT.
24. RFID CARD.

Setup Network.

- First of all, place the network device to configure the network backbone.
- Connect the Cell tower with Central Office Server with the help of Coaxial cable.
- Connect the Router with Central Office Server with the help of Copper Cross-Over cable.
- Connect the DNS-Server and IoT-Server with Switch with the help of Copper Straight-Through cable.
- Connect Switch with Router with the help of Copper Straight-Through cable.
- Connect Cloud (WAN) with Router with the help of Copper Straight-Through cable.
- Connect Cable Modem with Cloud with the help of Coaxial cable.
- Connect Home Gateway with Modem with the help of Copper Straight-Through cable.

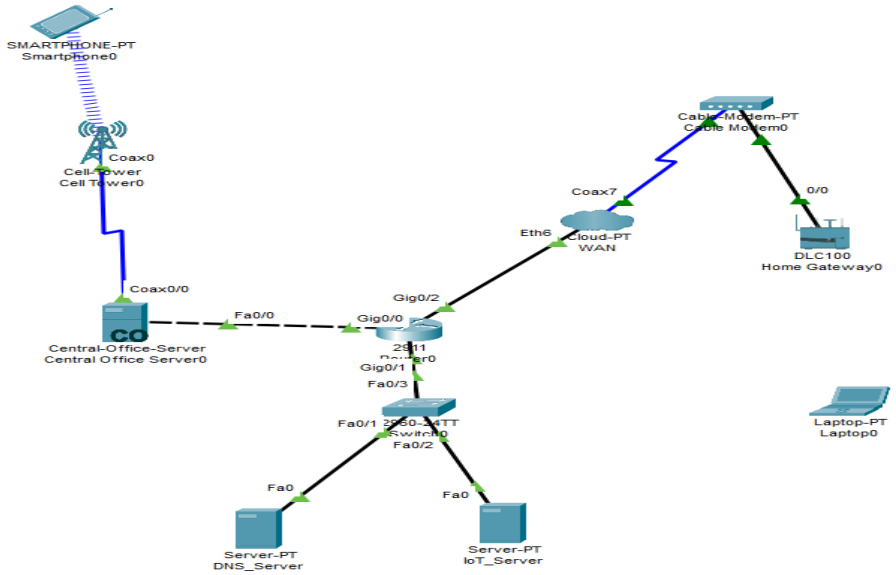


Router Configuration.

- Open the CLI tab of the Router. 200.165.13.225 255.255.255.224
- And apply the following command in the IOS command. 10.20.30.1 255.255.255.0
    - Command 200.165.14.225 255.255.255.224

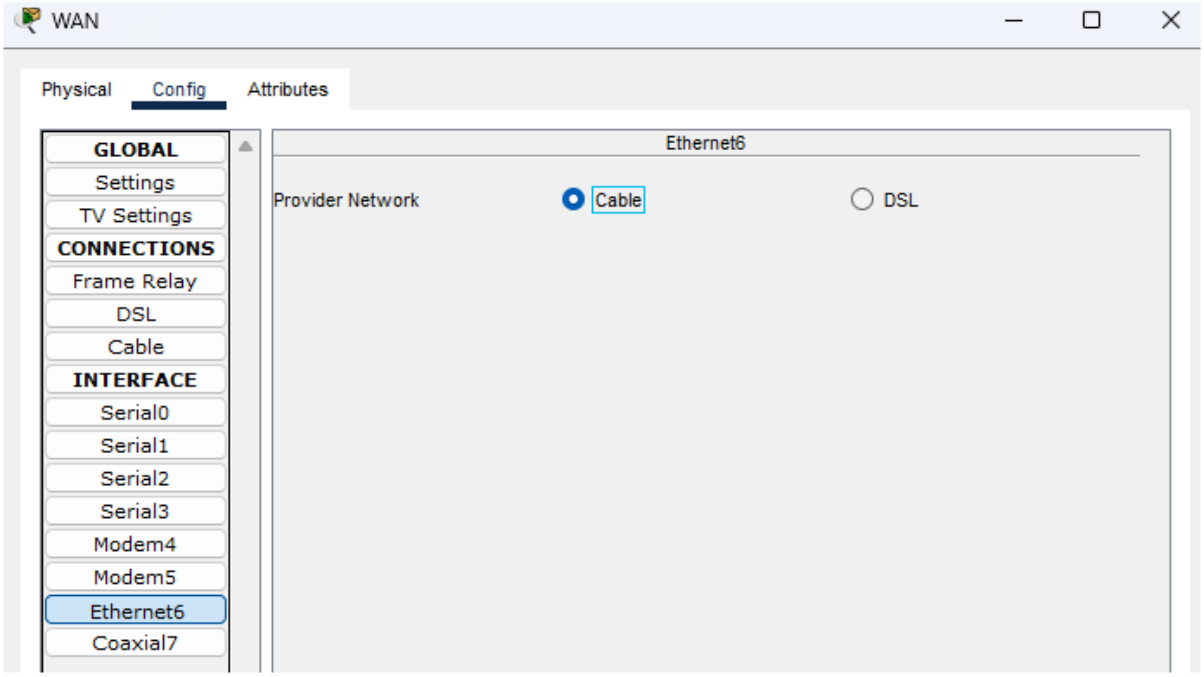
```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int g0/0
Router(config-if)#ip add 100.165.13.225 255.255.255.224
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0,
changed state to up
Router(config-if)#int g0/1
Router(config-if)#ip add 10.20.30.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1,
changed state to up
Router(config-if)#int g0/2
Router(config-if)#ip add 200.165.14.225 255.255.255.224
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2,
changed state to up
Router(config-if)#
```

- It will look like as follow.

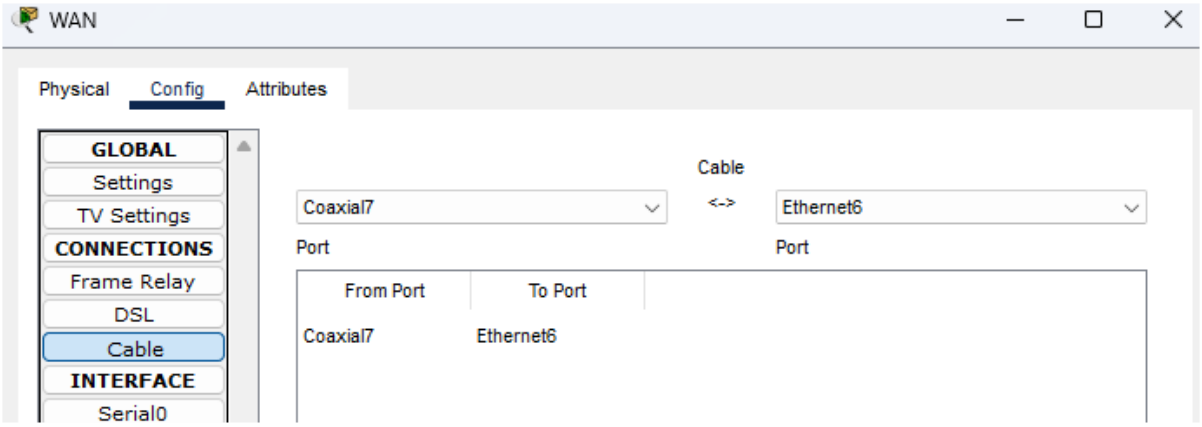


Clod Setup.

- Open the config tab.
- Now select the Ethernet 6 under the Interface setting.
- Select the Network Provide to Cable, because we had used the coaxial cable.



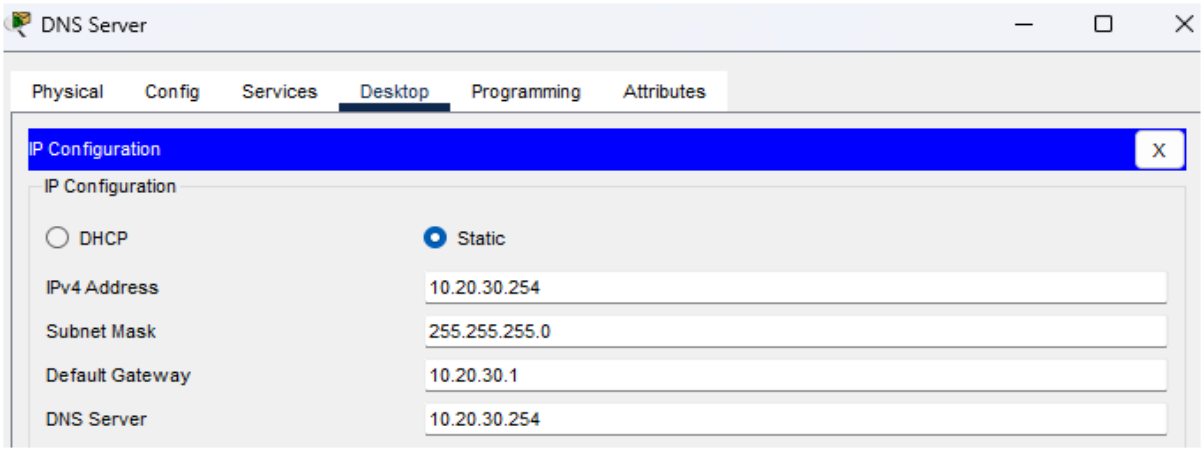
- Now select the Cable under the Connection setting.
- Add the cable and Port.



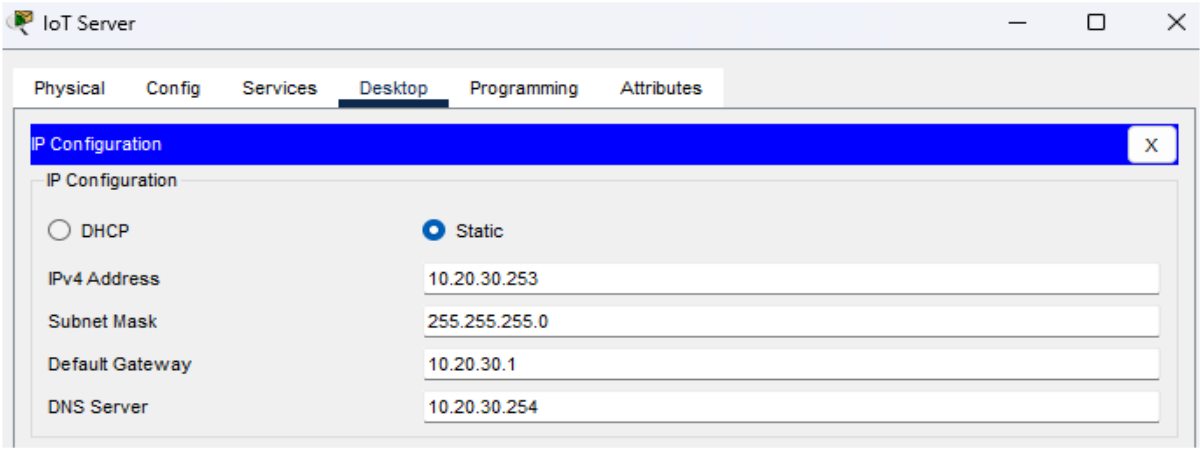
DNS-Server and IoT Server Configuration.

- Open the IP Configuration from the Desktop tab of the server.
- Add the manual IP in the Server.

DNS -Server.

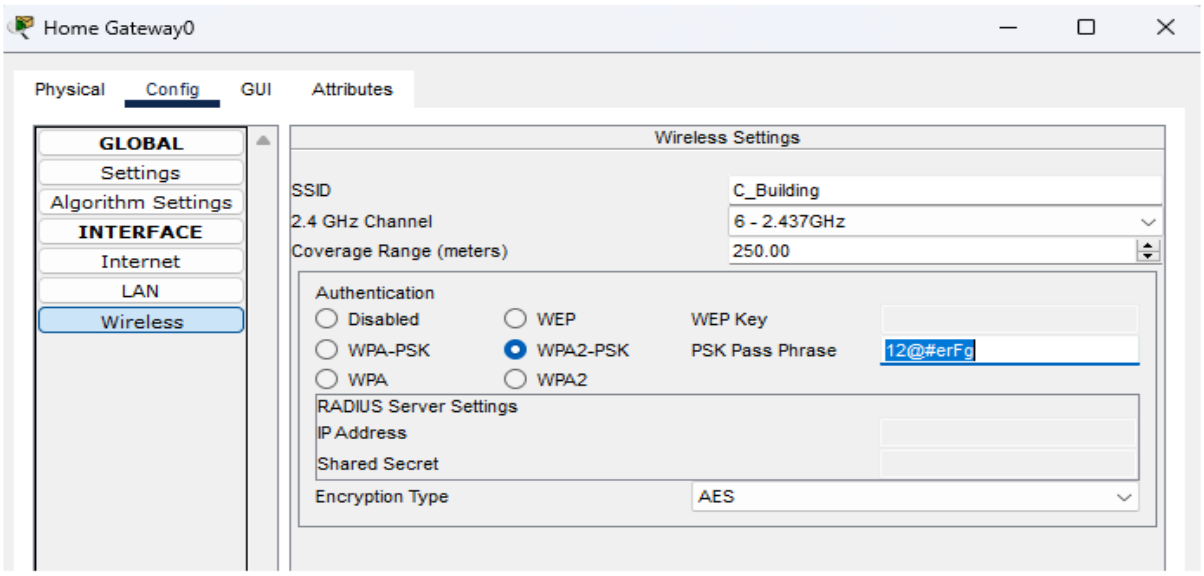


IoT Server.



Home Gateway Configuration.

- Set the Login Credential for the IoT device to connect with the secure Gateway.
- Open the Config tab of home gateway.
- Select the wireless interface.
- Change the SSID name from HomeGateway to C_building.
- Add the WPA2-PSK Authentication and PSK pass Pharse 12@#erFg.



DHCP Ip Configuration.

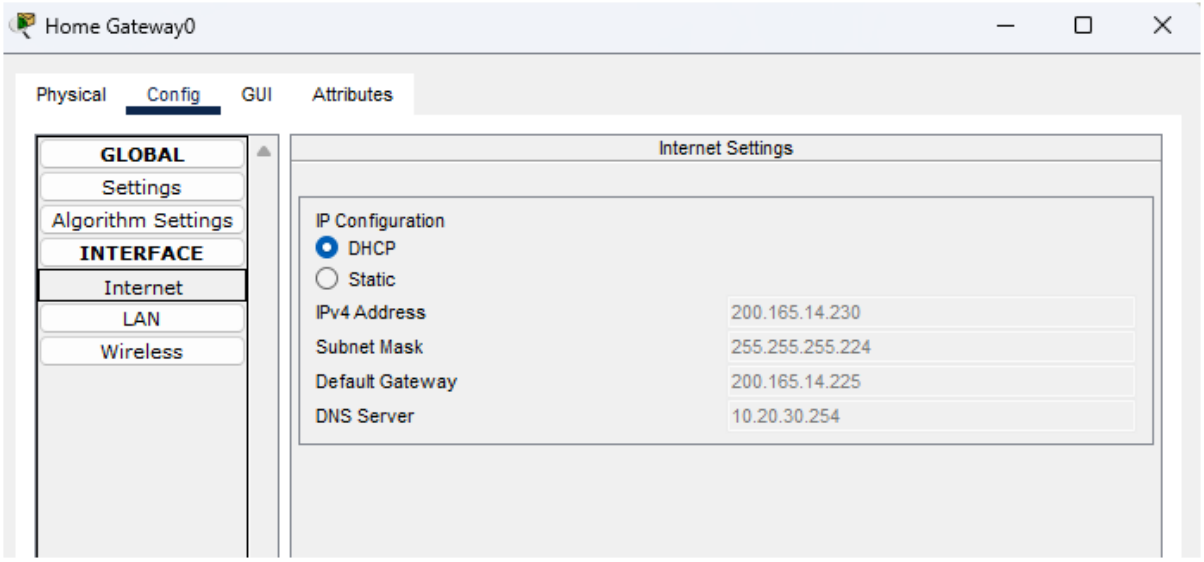
- We want to provide the DHCP ip to all the IoT Device so we need to add the particular network range in the router.
- Apply the following command in the router.
    - Command for cell tower

```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip dhcp exc
Router(config)#ip dhcp excluded-address 200.165.13.225 200.165.13.229
Router(config)#ip dhcp pool CELL
Router(dhcp-config)#network 200.165.13.224 255.255.255.224
Router(dhcp-config)#default
Router(dhcp-config)#default-router 200.165.13.225
Router(dhcp-config)#dns-server 10.20.30.254
Router(dhcp-config)#exit
```

    - Command for WAN

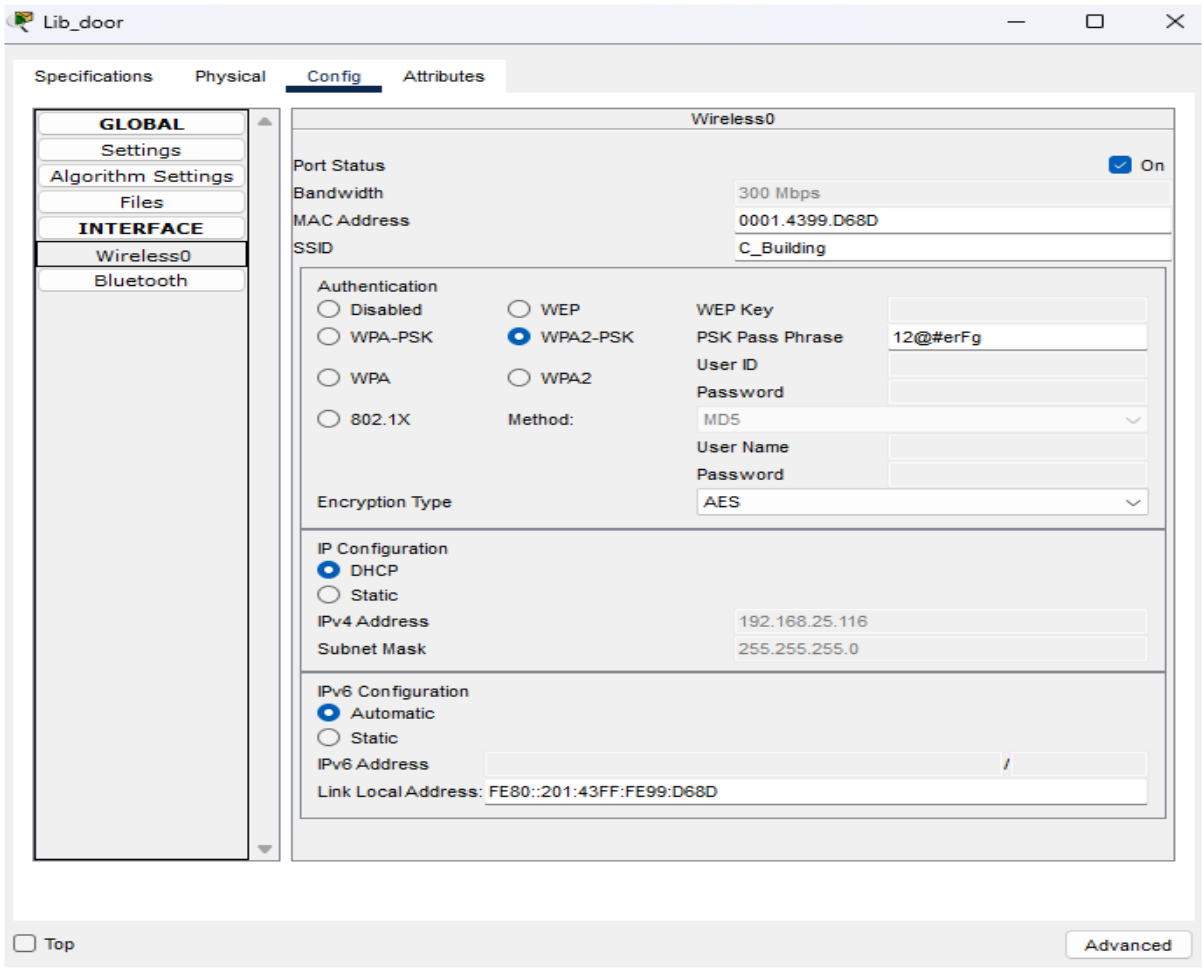
```
Router(config)#ip dhcp excluded-address 200.165.14.225 200.165.14.229
Router(config)#ip dhcp pool WAN
Router(dhcp-config)#network 200.165.14.224 255.255.255.224
Router(dhcp-config)#default-router 200.165.14.225
Router(dhcp-config)#dns-server 10.20.30.254
Router(dhcp-config)#exit
Router(config)#
```

WAN DHCP IP Pool.

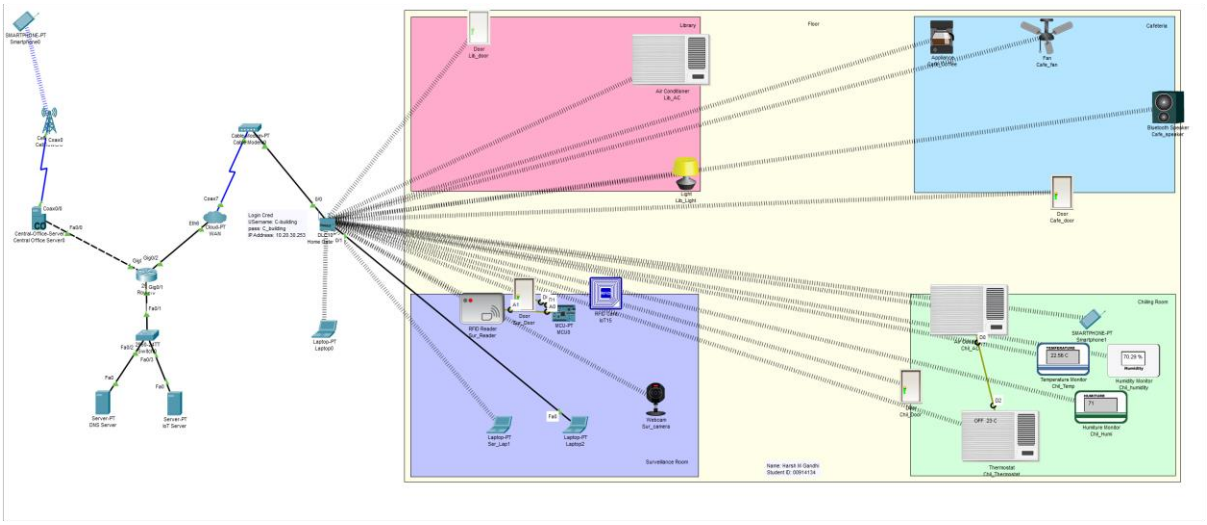


IoT Device placement and Connection.

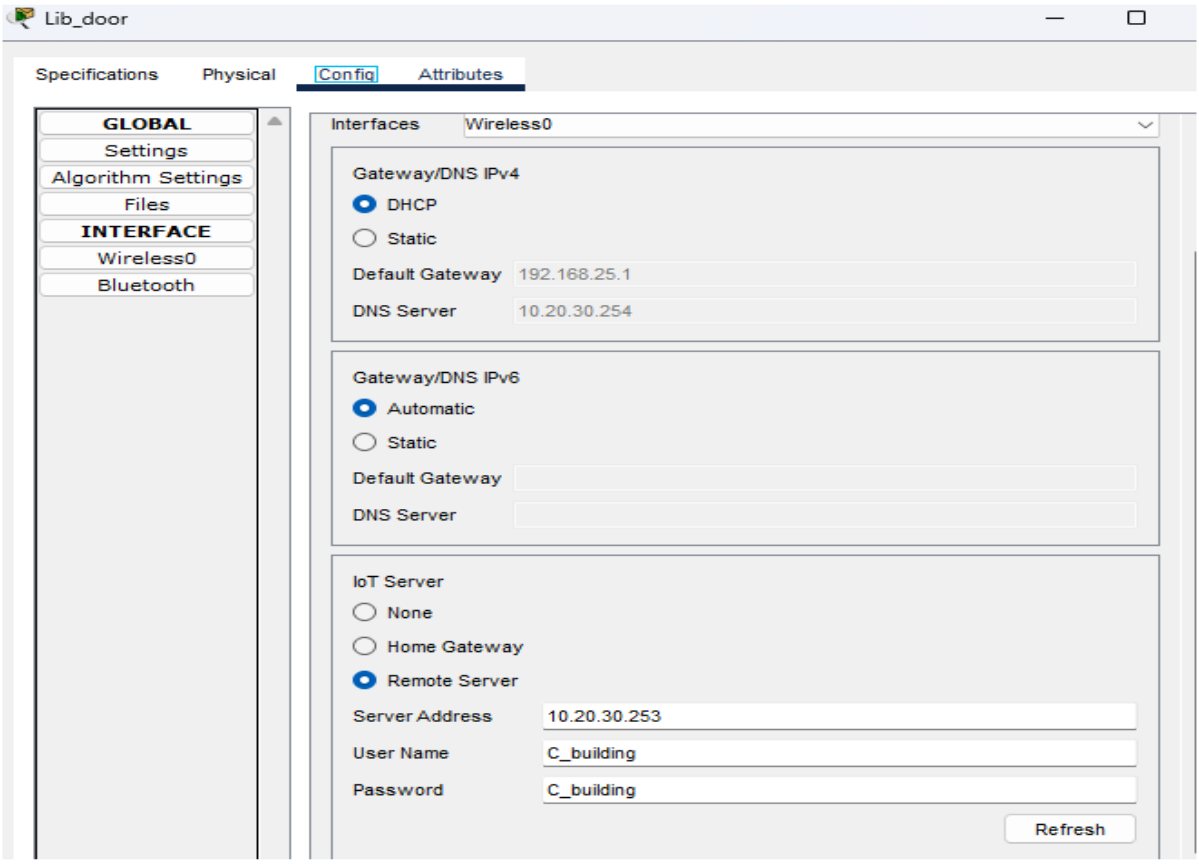
- Select the given IoT Device and place it accordingly to the usage.
- For connect the IoT Device with the Home gateway. Click on the device and open the Config tab and select the Wirless Interface and Write the SSID and PSK pass Pharse in it.



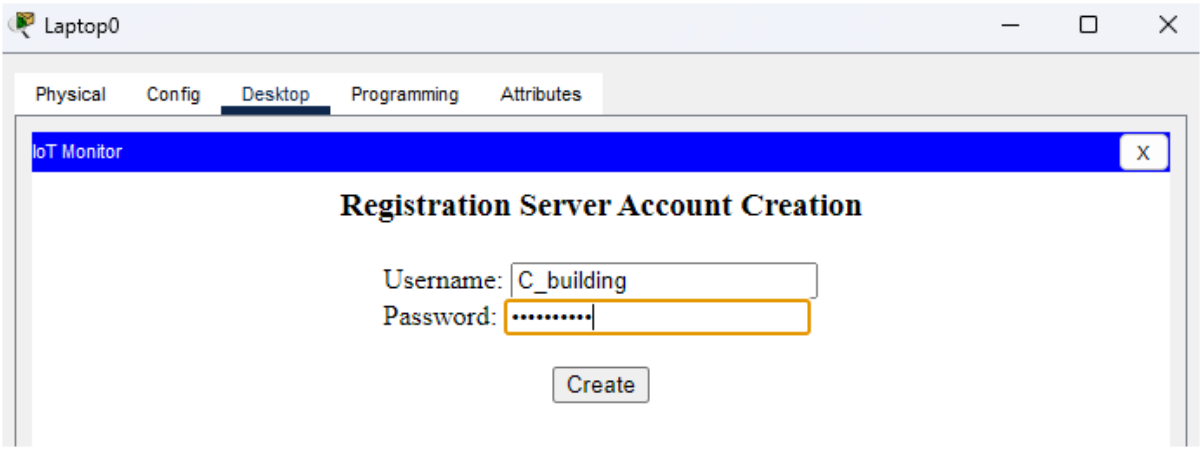
- There you see the Connection line from Home Gateway to IoT devices.



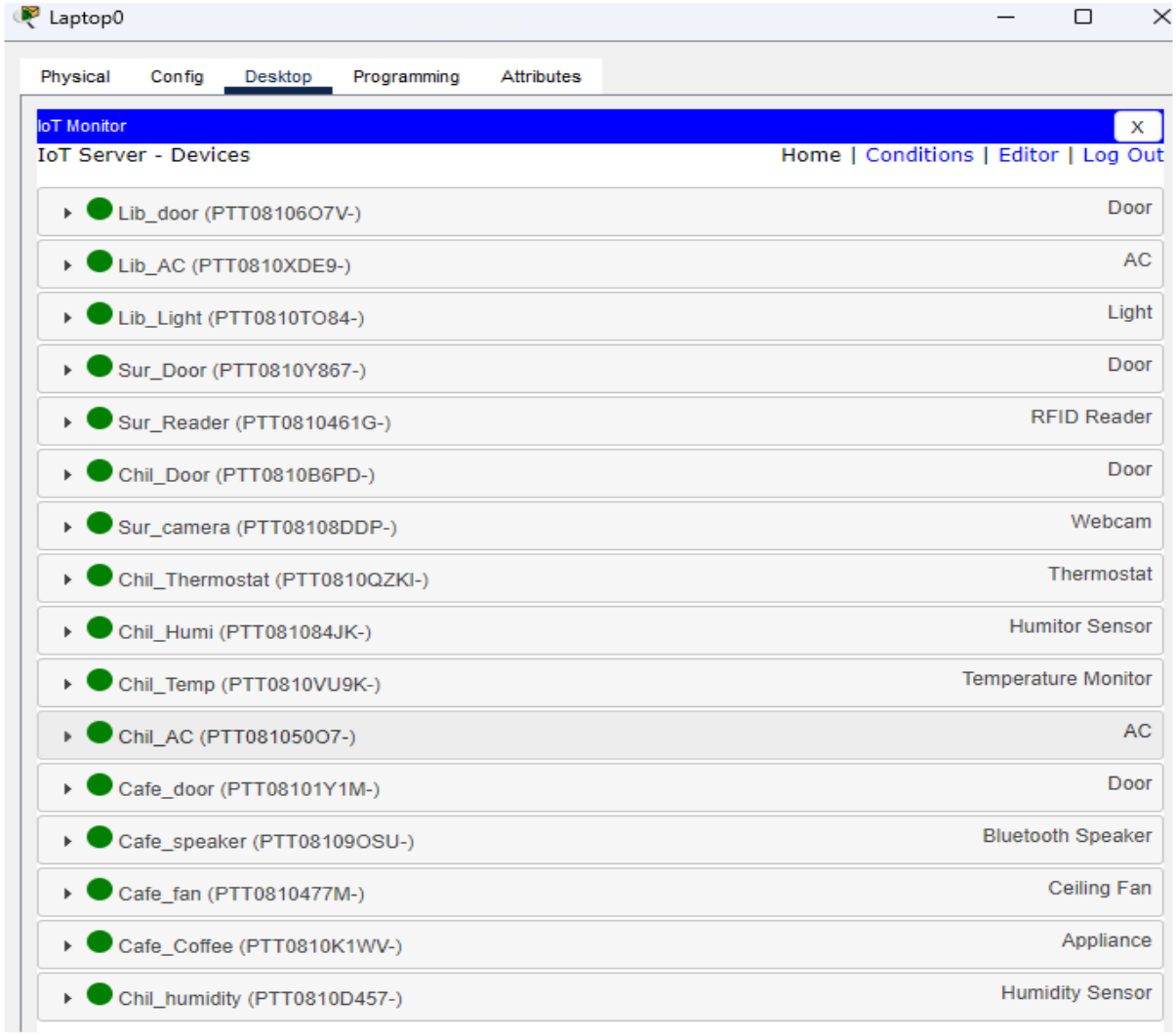
- We have to change the AC IoT adapter to connect it wirelessly. Click on the AC device and open the advance option. Then select the I/O Configuration and change the Network adapter to PT-IOT-NM-1W.
- And then follow the same step to connect it wirelessly.
- Update the IoT Server setting for that select the IoT Device and Open the config tab and change the IoT server from None to Remote Server. Add the Server address and User name and Pass word.



- Repeat these steps for all the IoT Device.
- Then open the Laptop and Open the Desktop Tab , Select the IoT Monitor open it.
- Click on the Sign Up Now.
- Add the User name and password then hit create button.

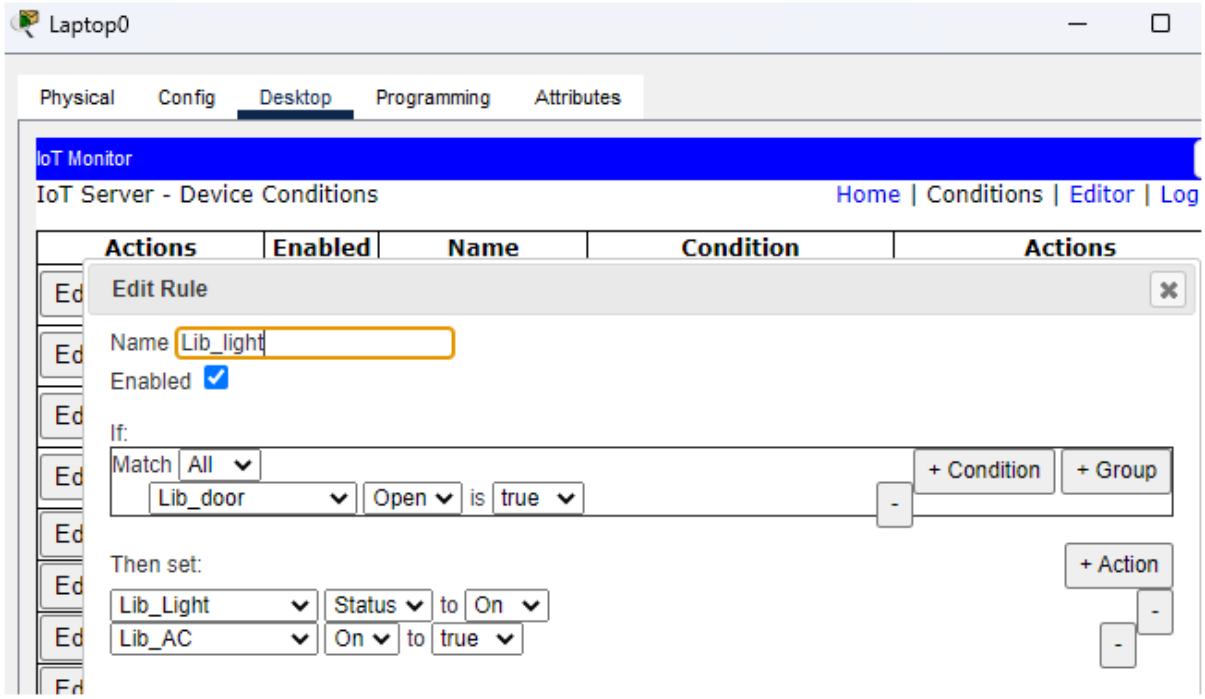


- After Successful creating account, log out and Log in again with the Server address, username and password.
- There you see all the register IoT Devices.



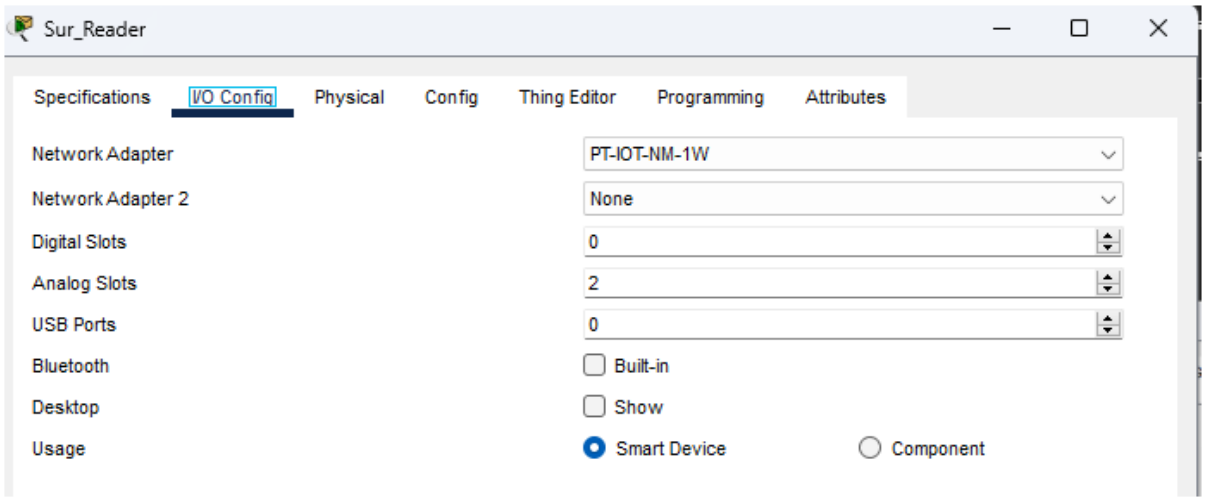
Library Room Configuration.

- For Library we had given instruction that when the Lib Door is open at that time the Lib_light get blow.
- To fulfil this condition, we have to apply the condition in the IoT Monitor.
- Login to the IoT Monitor and open the Condition page and set the condition as given in below figure.



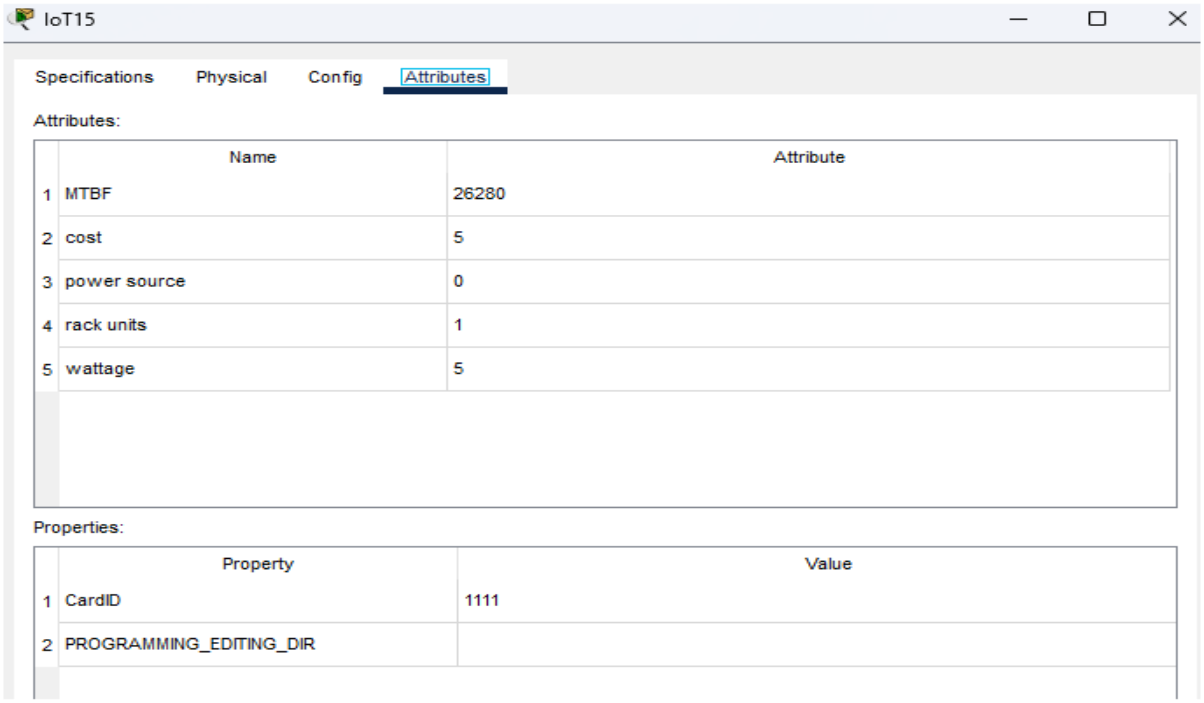
Surveillance Room Configuration.

- Open the advance setting of RFID Reader and select the I/O Configuration and update the Analog Slots from 0 to 2.
- From these we are able to set the instruction for protect it from the intruder to enter in the Room.



- Now connect D0 of Door to D1 of MCU-PT. for setup the instructions.
- A1 of RFID Reader to A0 of MCU-PT chip.

- Click on the RFID card and open the Attribute tab.
- Update the RFID card Number from 1001 to 1111.



- Click on the RFID Reader and open the Programming Tab.
- Open the main.js from the Java Script, and update the code for a unique action of the door.
- Apply the following code.

```
        if (!found) {
                cardID = lastCardID = 0;
                setState(2);
        }
        else {
                if (lastCardID != cardID){
                        lastCardID = cardID;
                        sendReport();
                }
        }

        if(cardID == 1111){
                setState(0);
        }
        else{
                setState(1);
        }
        delay(DELAY_TIME);
}
```

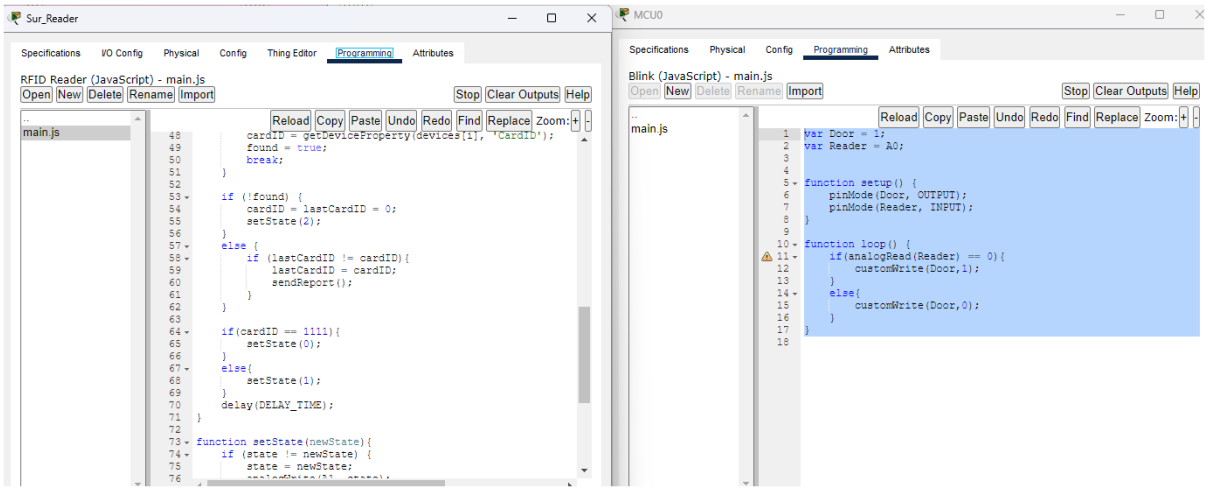
- Condition is set.
- Click on the MCU-Chip and open the Programming Tab.
- Open the main.js and set the Action for the IoT device.

- Apply the following code.

```
var Door = 1;
var Reader = A0;


function setup() {
        pinMode(Door, OUTPUT);
        pinMode(Reader, INPUT);
}

function loop() {
        if(analogRead(Reader) == 0){
                customWrite(Door,1);
        }
        else{
                customWrite(Door,0);
        }
}
```



- In these code we are setting the condition by which the door is accessible to only particular person.
- If card id match with the code than door will open other wise not.

Chilling Room Configuration.

- Update the Thermostat Digital Slot connection by 3 instead of 0.
- Then connect the AC to Thermostat with IoT Custom Cable with D0 to D1 port.
- Now open the Thing Editor tab, and select the Component to AC.
- Slot 0 for AC in OFF Condition, Slot 1 for AC in ON condition, Slot 2 for High Speed of Blower condition, Slot 3 for Blower in OFF condition.