

Task 12

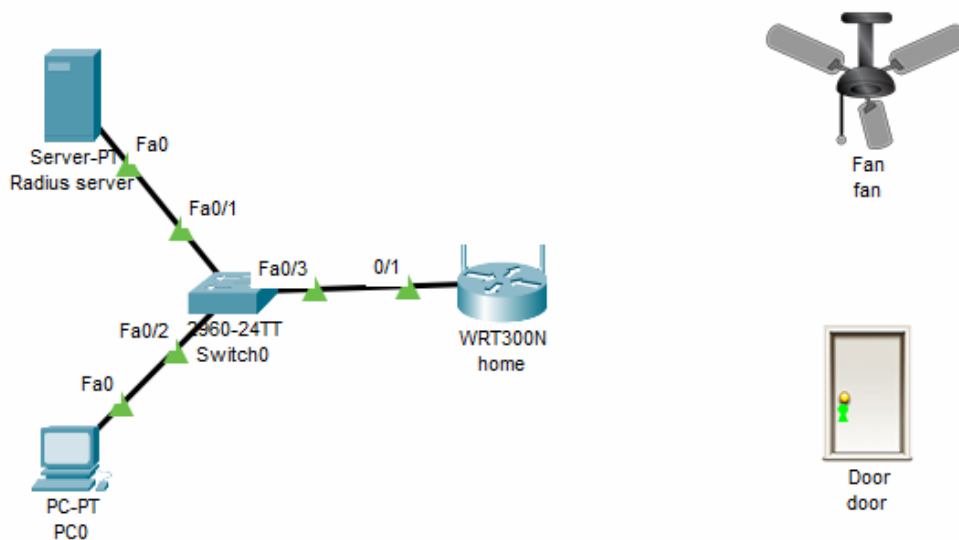
- Adding IoT devices to Smart Homes using Packet Tracer
- Connect and Monitor IoT Devices using Packet Tracer

IoT Devices are physical objects embedded with sensors, software, and other technologies that enable them to connect to the internet and exchange data with other devices, systems, or users. They are part of the **Internet of Things (IoT)** ecosystem, designed to automate processes, enhance efficiency, and provide real-time data insights.

Key Features:

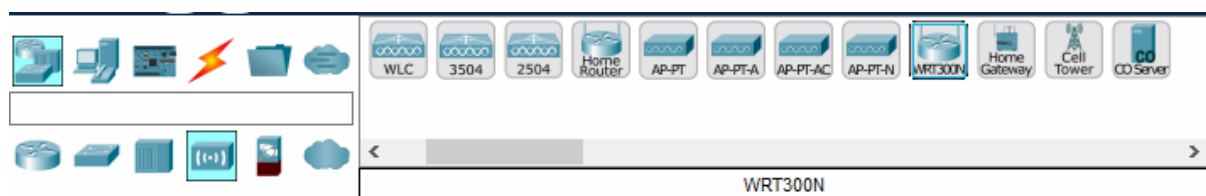
- **Connectivity:** Can connect to networks (Wi-Fi, Bluetooth, or wired).
- **Sensors/Actuators:** Collect data or perform actions (e.g., turning on a light, adjusting temperature).
- **Automation:** Operate automatically based on predefined conditions or commands.
- **Remote Control:** Can be controlled or monitored from anywhere via the internet.

Examples: fan, light, door, security cameras



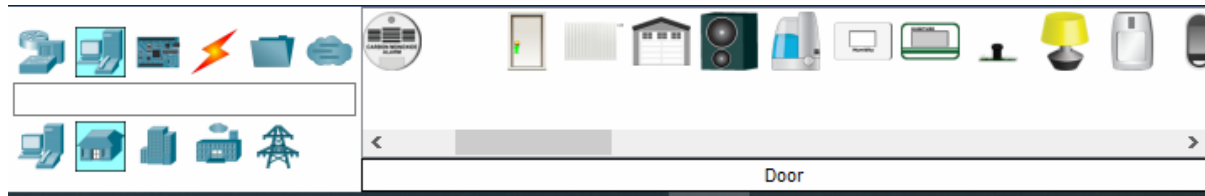
WRT300N home router -> Under network devices->sub category 4th option (wireless devices)

Click on wireless devices->WRT300N (from last 4th option)



IoT devices (like fan, door) -> Under End devices -> sub category 2nd option (home)

Click on home -> drag and drop fan and door



Description of the network

Radius server:

RADIUS server (Remote Authentication Dial-In User Service) can control access to IoT devices by implementing centralized **authentication, authorization, and accounting (AAA)** mechanisms

When a user or device (e.g., PC or smartphone) attempts to control or access an IoT device (e.g., fan, door, or lamp), the access request is sent to the RADIUS server via the router.

The RADIUS server verifies the credentials (e.g., username and password, token, or certificates) provided by the user/device.

If the credentials are valid, the RADIUS server grants access to the network resources; otherwise, it denies the request.

WRT300N router

WRT300N is a wireless router commonly used in networking simulations (like in Cisco Packet Tracer) and real-world scenarios to provide network connectivity.

Its primary purpose is to act as a gateway between connected devices and the wider network (e.g., the internet or a local network).

PC:

The PC hosts the IoT server or monitoring software, enabling centralized control and management of connected IoT devices.

It acts as the interface for users to monitor the status or control devices (e.g., turning a lamp on/off or unlocking the door).

IoT Devices:

Fan:

- A smart device that allows remote control of its operations, such as turning on/off and adjusting speed.

Door (Smart Lock):

- Allows secure, remote locking/unlocking of doors.
- Monitors door status (open/closed) for enhanced security.

Configurations:

Configuring radius server

Under config->Give device name as radius server

IP address:192.168.0.10 subnet mask:255.255.255.0

Default Gateway:192.168.0.1

The screenshot shows a window titled "Radius server" with a tabbed interface. The "Desktop" tab is selected, and a sub-tab "IP Configuration" is active. The "IP Configuration" section has two radio buttons: "DHCP" (unselected) and "Static" (selected). Below these are four text input fields: "IPv4 Address" (192.168.0.10), "Subnet Mask" (255.255.255.0), "Default Gateway" (192.168.0.1), and "DNS Server" (0.0.0.0). The "IPv6 Configuration" section also has two radio buttons: "Automatic" (unselected) and "Static" (selected). Below these are four text input fields: "IPv6 Address" (empty), "Link Local Address" (FE80::201:64FF:FEA4:5995), "Default Gateway" (empty), and "DNS Server" (empty). The "802.1X" section has a checkbox "Use 802.1X Security" (unchecked). Below it is a dropdown menu for "Authentication" set to "MD5", and two text input fields for "Username" and "Password". A "Top" button is at the bottom left.

Under services click -> AAA ->click service=on radio button

Do the following as in the below screenshot

Radius server

Physical Config **Services** Desktop Programming Attributes

SERVICES

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA**
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

AAA

Service ☒ On ☐ Off Radius Port

Network Configuration

Client Name Client IP

Secret ServerType

Client Name	Client IP	Server Type	Key

Add

Save

Remove

User Setup

Click on add and configuration gets added

Radius server

Physical Config **Services** Desktop Programming Attributes

SERVICES

- HTTP
- DHCP
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AAA

Service ☒ On ☐ Off Radius Port

Network Configuration

Client Name Client IP

Secret ServerType

	Client Name	Client IP	Server Type	Key
1	home	192.168.0.1	Radius	pass1234

Add

Save

Remove

User Setup

Now setup for user i.e user setup

Need to add username and password for iot devices

In username tab enter fan and in password 1234 and click add. same way do for all devices

User Setup

Username Password

	Username	Password
1	door	1234
2	fan	1234
<div></div>		

Add

Save

Remove

Under services click->IoT->service=on

Radius server

Physical Config **Services** Desktop Programming Attributes

SERVICES

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT**
- VM Management
- Radius EAP

Registration Server

This service runs on top of the HTTP or HTTPS service.

Service ☒ On ☐ Off

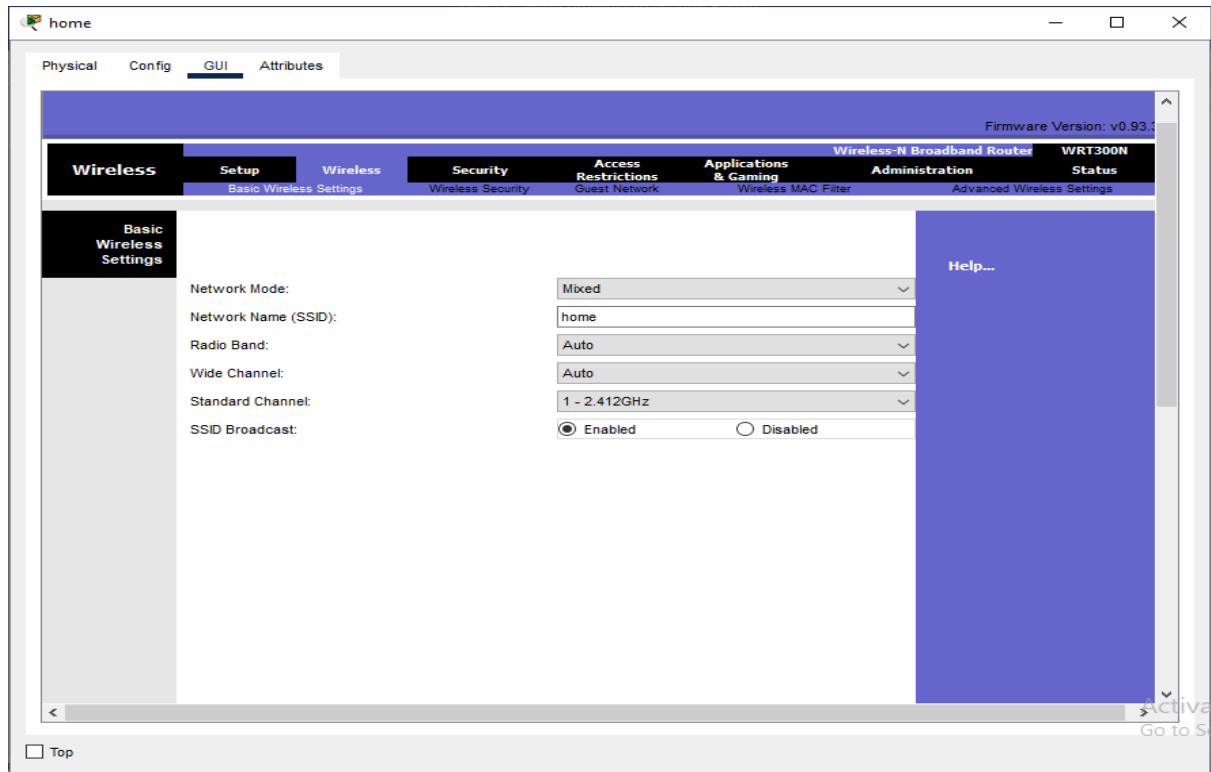
Delete

☐ Top

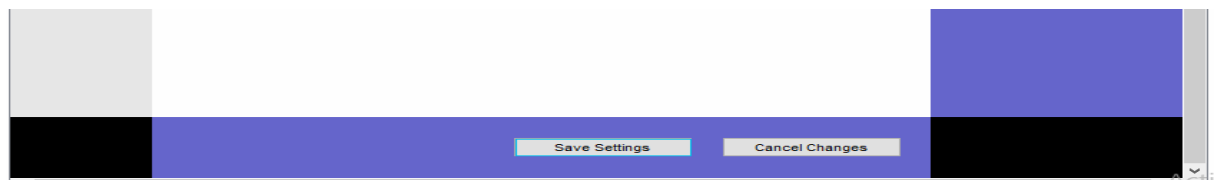
Configuration for Wireless router

Config->give display name as home

In GUI->click on wireless and enter the below shown configuration

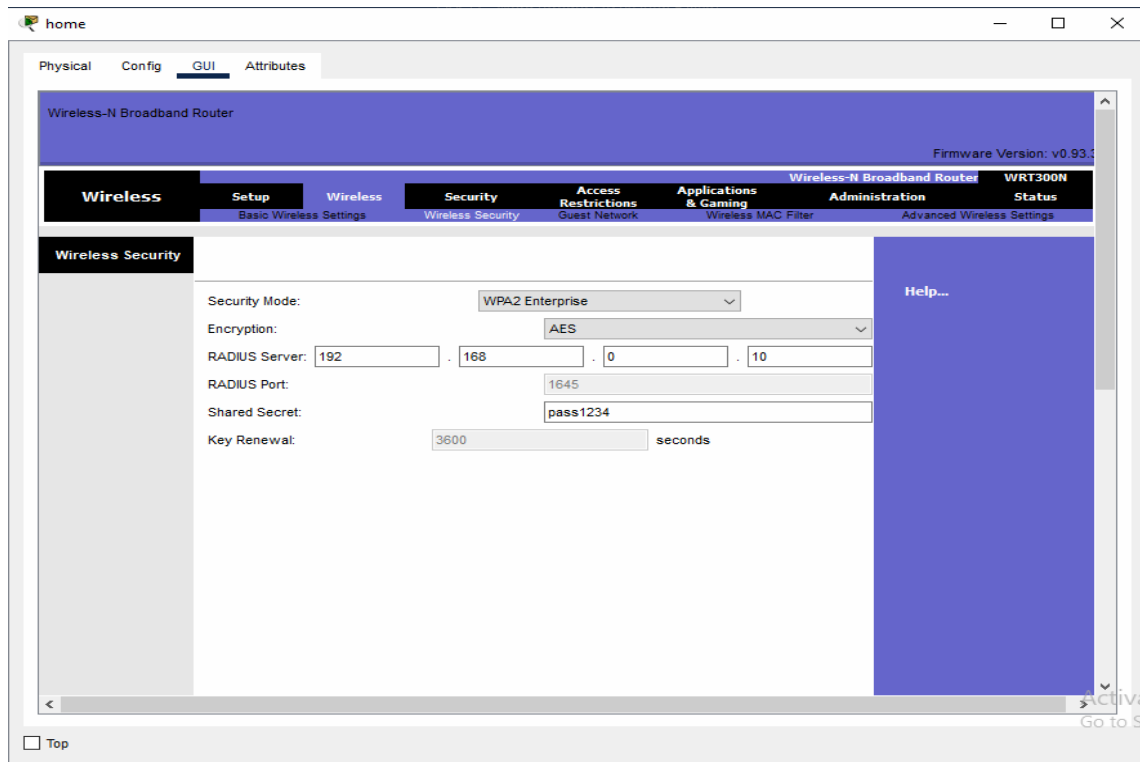


And scroll down and click on save settings



In GUI->under wireless->right side option click on security and add the below shown config

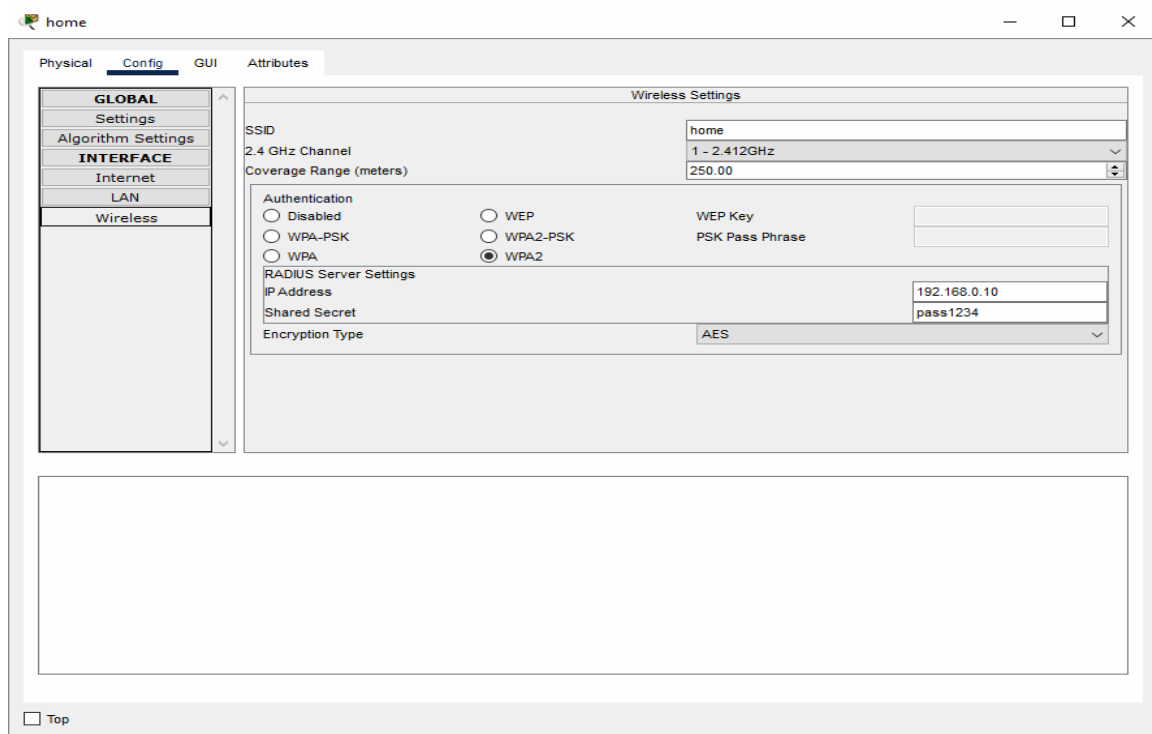




And scroll down and click on save settings

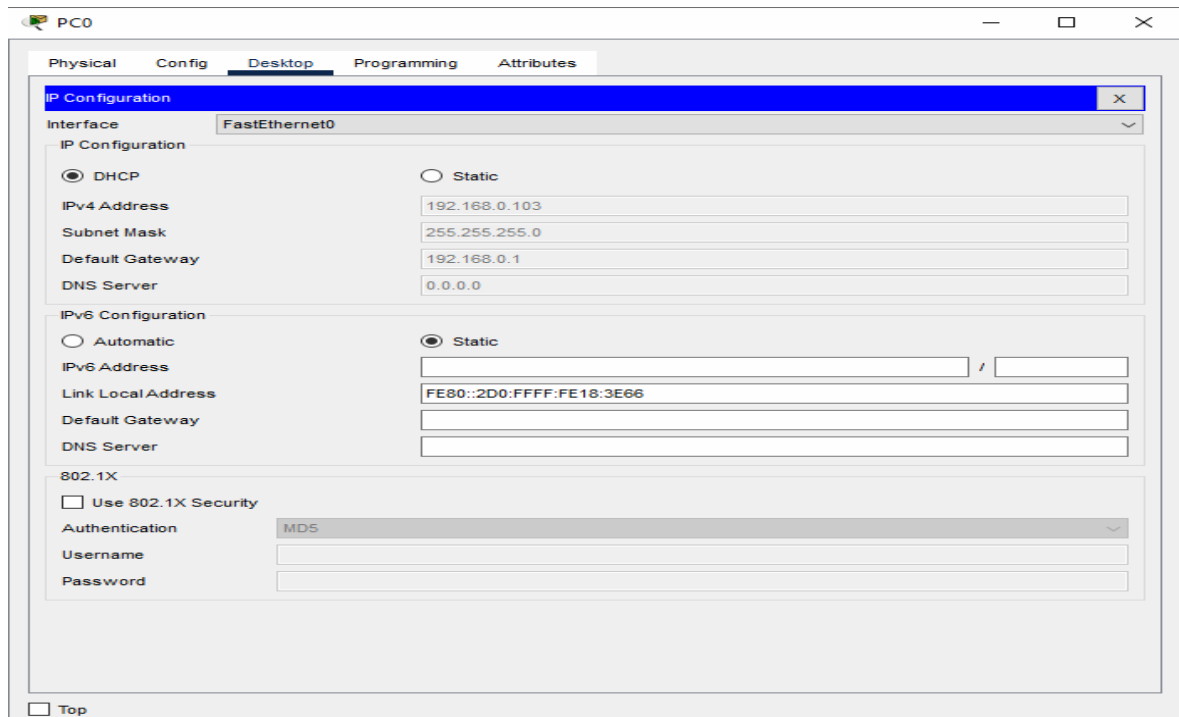
To check if all configurations which we gave are added

Goto->config in router->>wireless



Configuration for PC

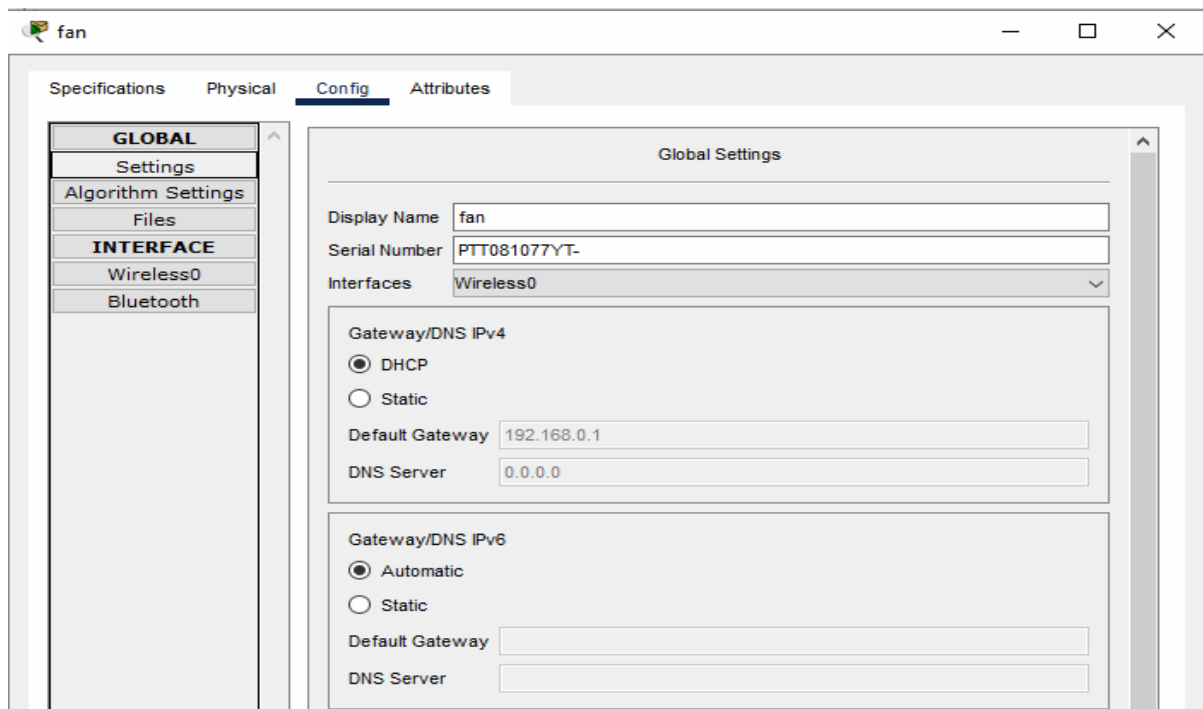
Select DHCP



Configuration for fan

Goto->config->change the display name as fan

Goto->settings->follow the screenshot



In settings->configure remoteserver as shown below

IoT Server

☐ None
☐ Home Gateway
☒ Remote Server

Server Address: 192.168.0.10
 User Name: admin
 Password: admin

Connect

☐ Top
 Advanced

Below is the screenshot we get after connecting

fan

Specifications Physical **Config** Attributes

GLOBAL
 Settings
 Algorithm Settings
 Files
INTERFACE
 Wireless0
 Bluetooth

Interfaces: Wireless0

Gateway/DNS IPv4
☒ DHCP
☐ Static
 Default Gateway: 192.168.0.1
 DNS Server: 0.0.0.0

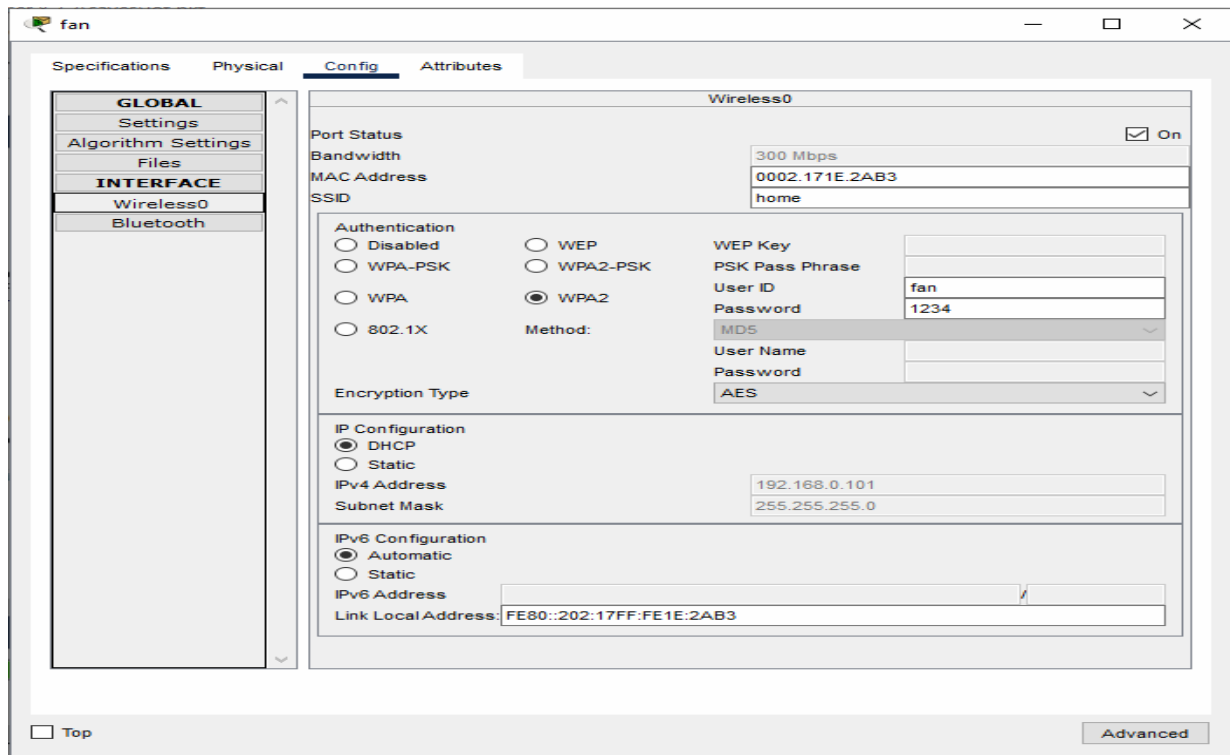
Gateway/DNS IPv6
☒ Automatic
☐ Static
 Default Gateway:
 DNS Server:

IoT Server
☐ None
☐ Home Gateway
☒ Remote Server
 Server Address: 192.168.0.10
 User Name: admin
 Password: admin

Refresh

☐ Top
 Advanced

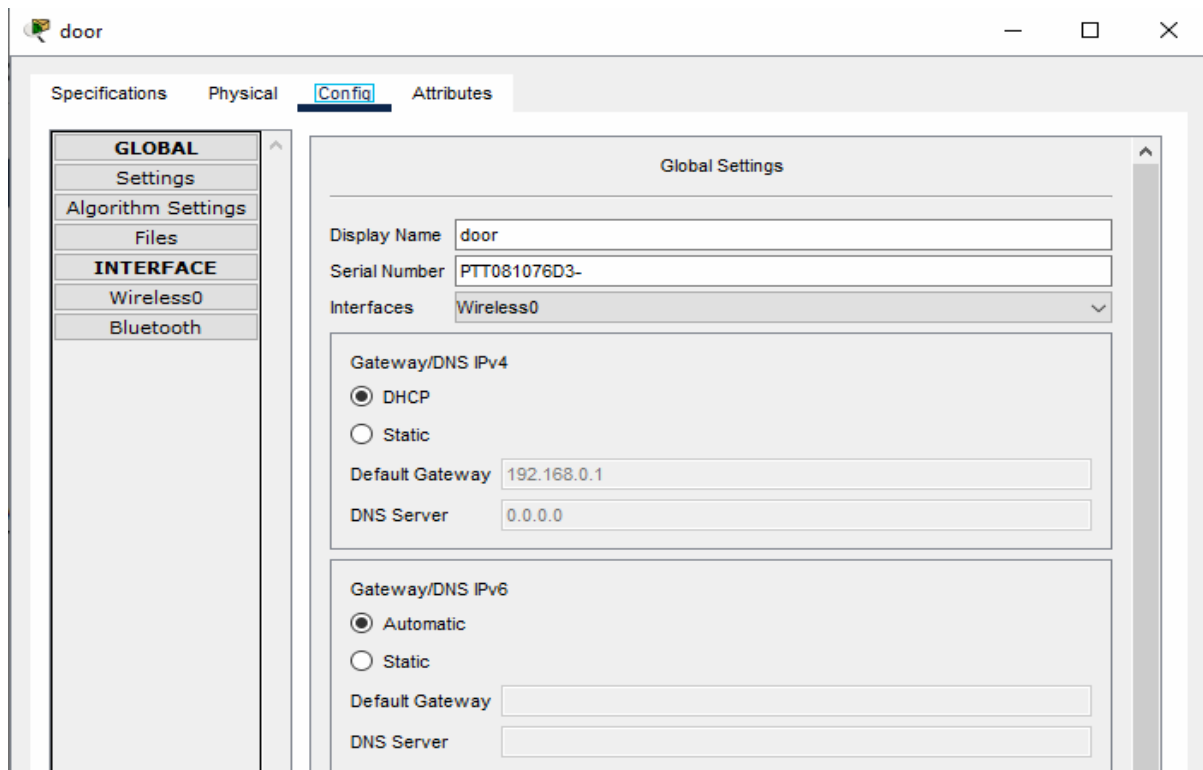
Under->config->wireless0->do the below config as shown in the screenshot



Configuration for Door

Goto->config->change the display name as door

Goto->settings->follow the screenshot



Click on connect

IoT Server

☐ None

☐ Home Gateway

☒ Remote Server

Server Address

User Name

Password

Connect

☐ Top

Advanced

Below is the screenshot after connecting

door

Specifications Physical **Config** Attributes

GLOBAL

Settings

Algorithm Settings

Files

INTERFACE

Wireless0

Bluetooth

Interfaces Wireless0

Gateway/DNS IPv4

☒ DHCP

☐ Static

Default Gateway

DNS Server

Gateway/DNS IPv6

☒ Automatic

☐ Static

Default Gateway

DNS Server

IoT Server

☐ None

☐ Home Gateway

☒ Remote Server

Server Address

User Name

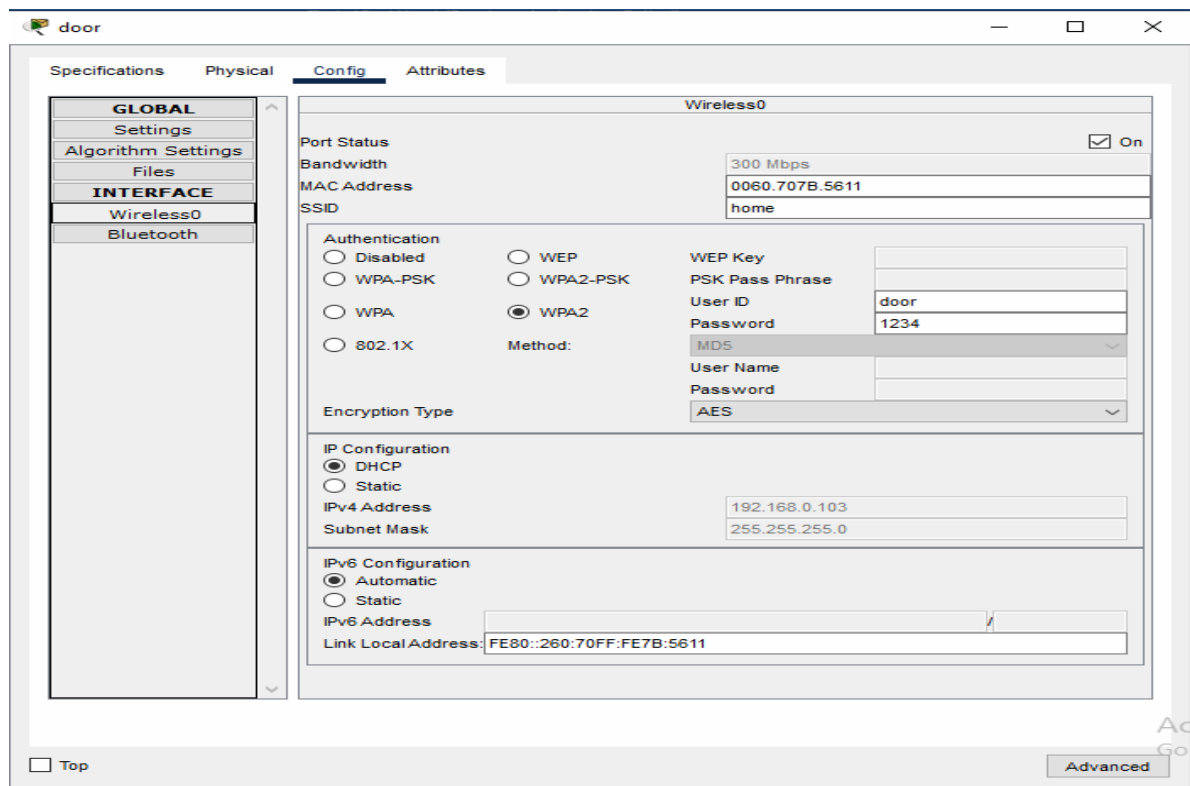
Password

Refresh

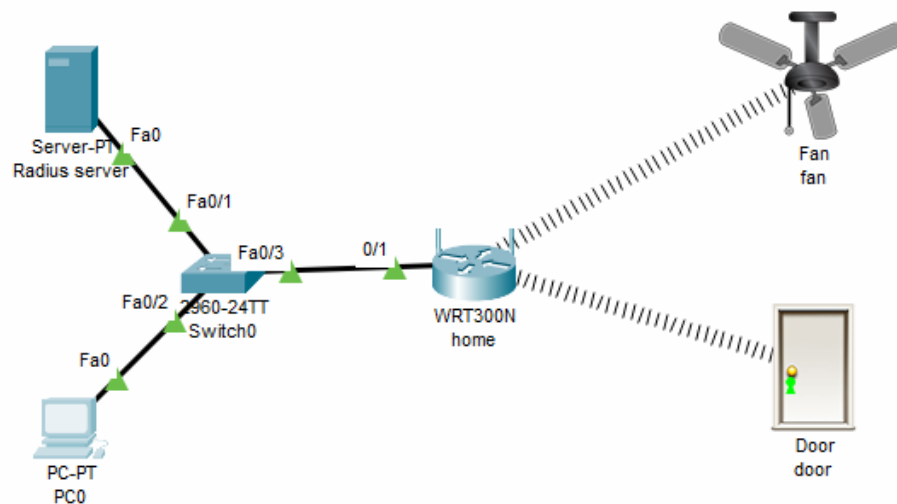
☐ Top

Advanced

In config->wireless0 do below configuration



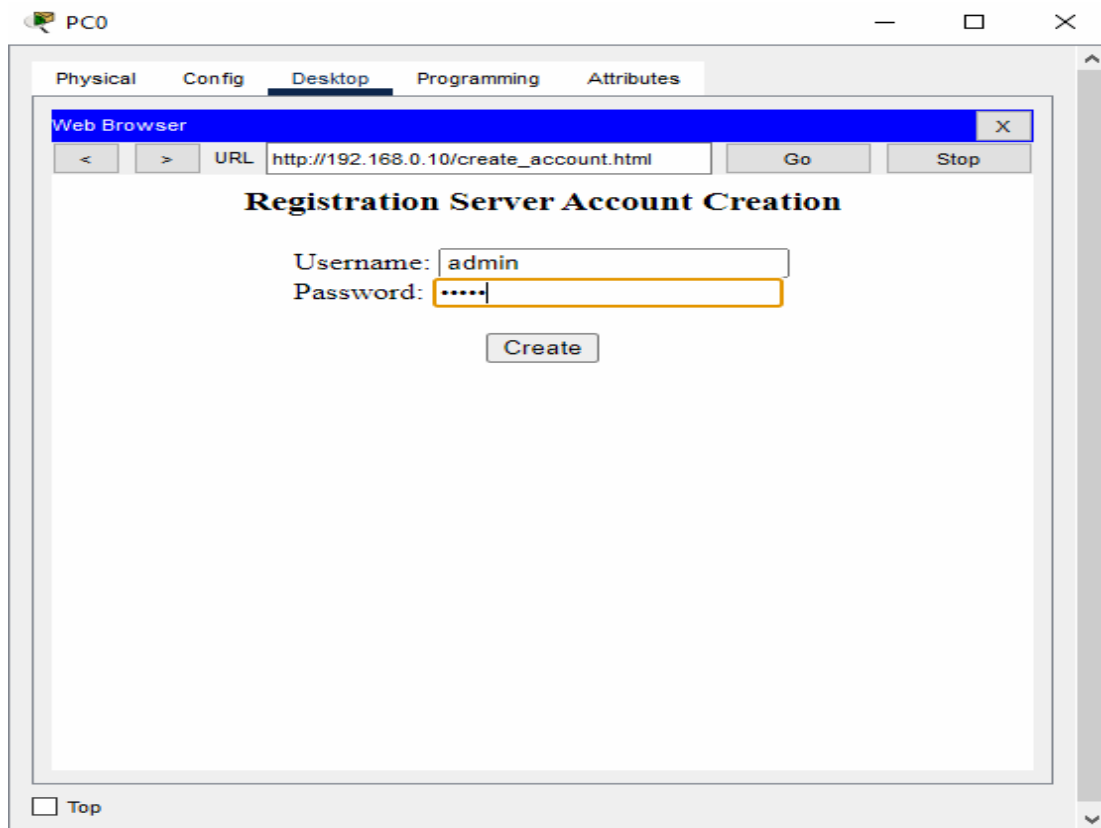
We will get link line between router and devices if both got connected successfully as shown in the below screenshot



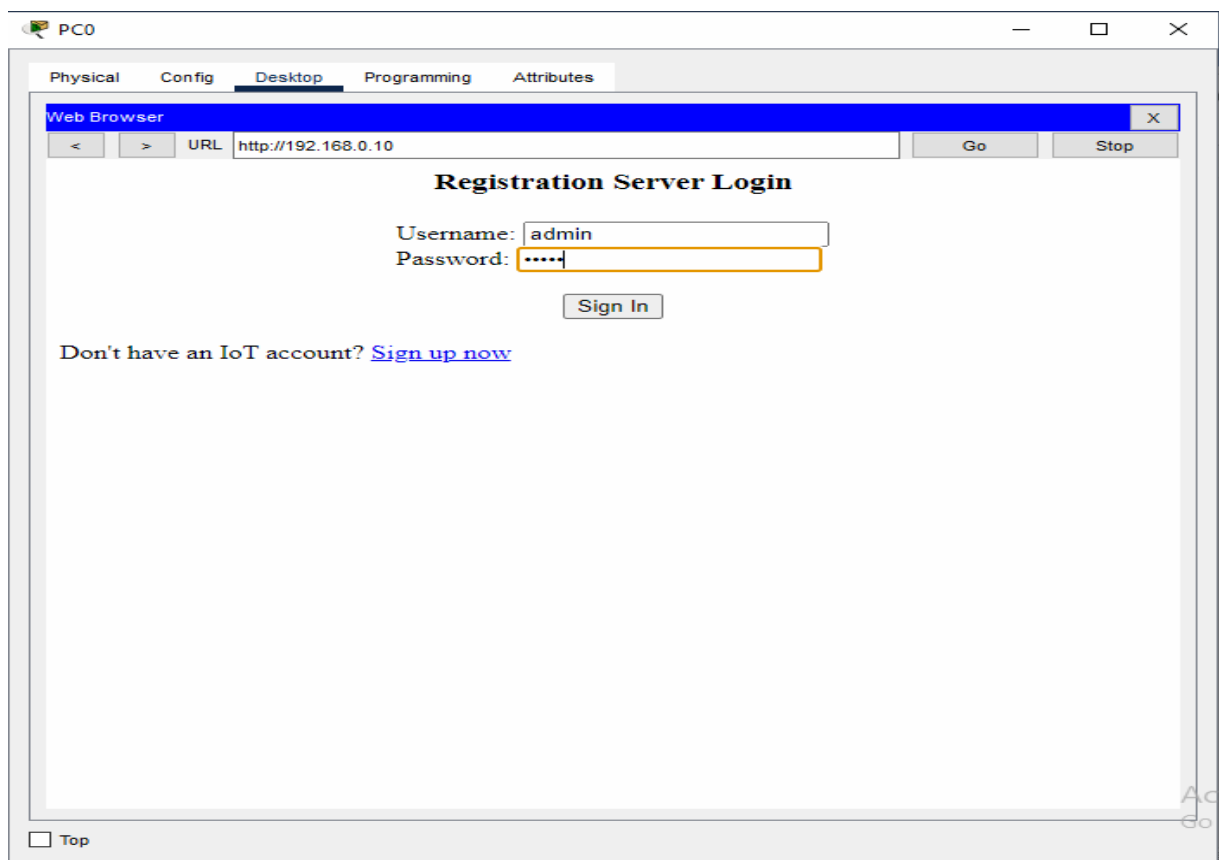
Testing

We on/off the fan and door from the PC

Goto PC->Desktop->webbrowser->give <https://192.168.0.10> and register as shown below



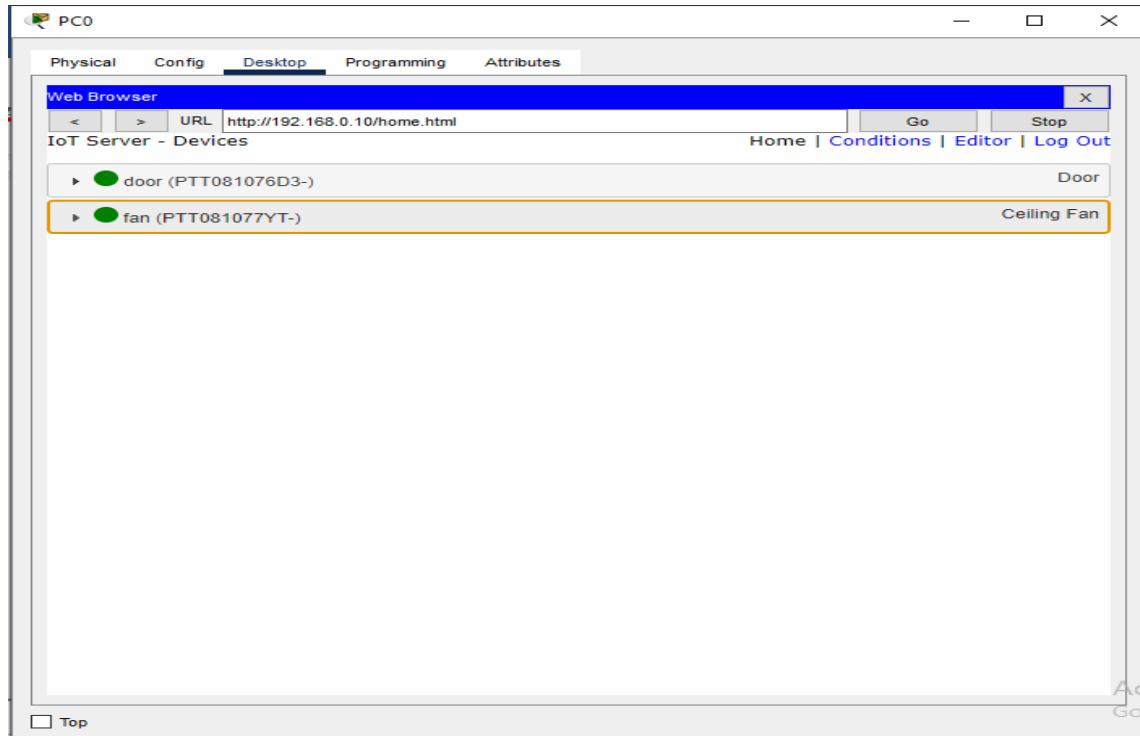
Then signin after registration



Once signin we will get below screen as it screenshot

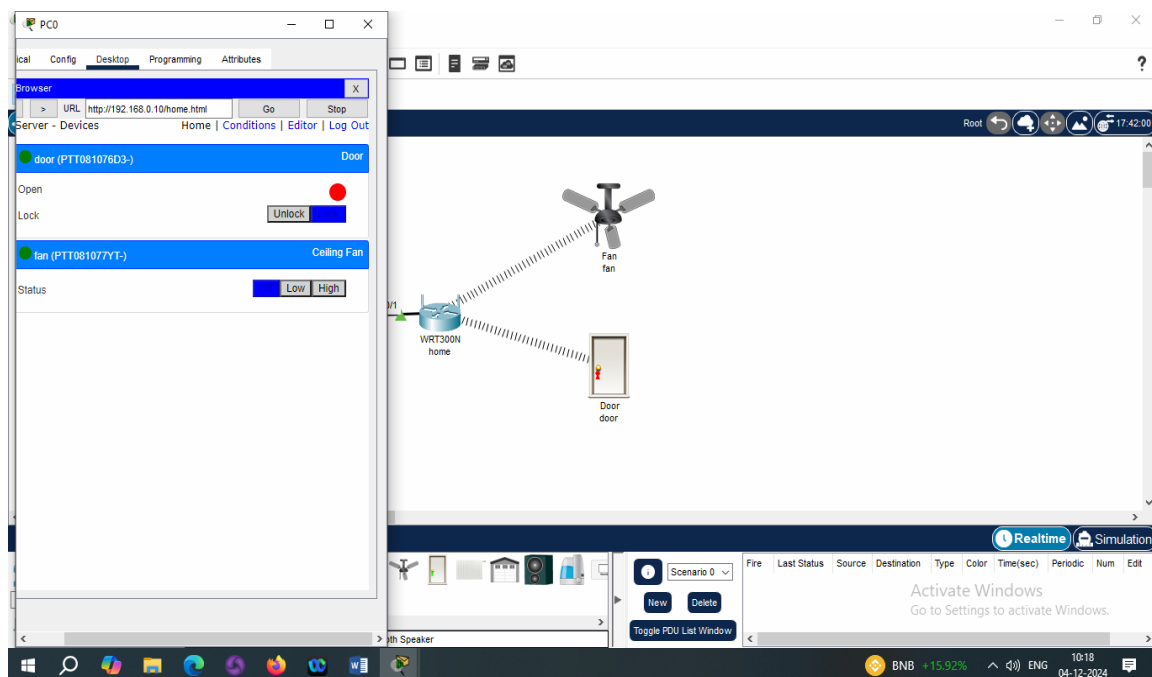
Iot devices gets added and we can operate

Note: If ur not able to see devices added check if DHCP is enabled in PC->config



Click on small arrow left of fan and we can see controls for on/off and for door lock/unlock

Door turns red if we click on lock and turns green if we click unlock



For fan if we click on low, vibration is less and if we click on high, vibration will be more as shown in below screenshot

