Task 12

a). Adding IoT devices to Smart Homes using Packet Tracer

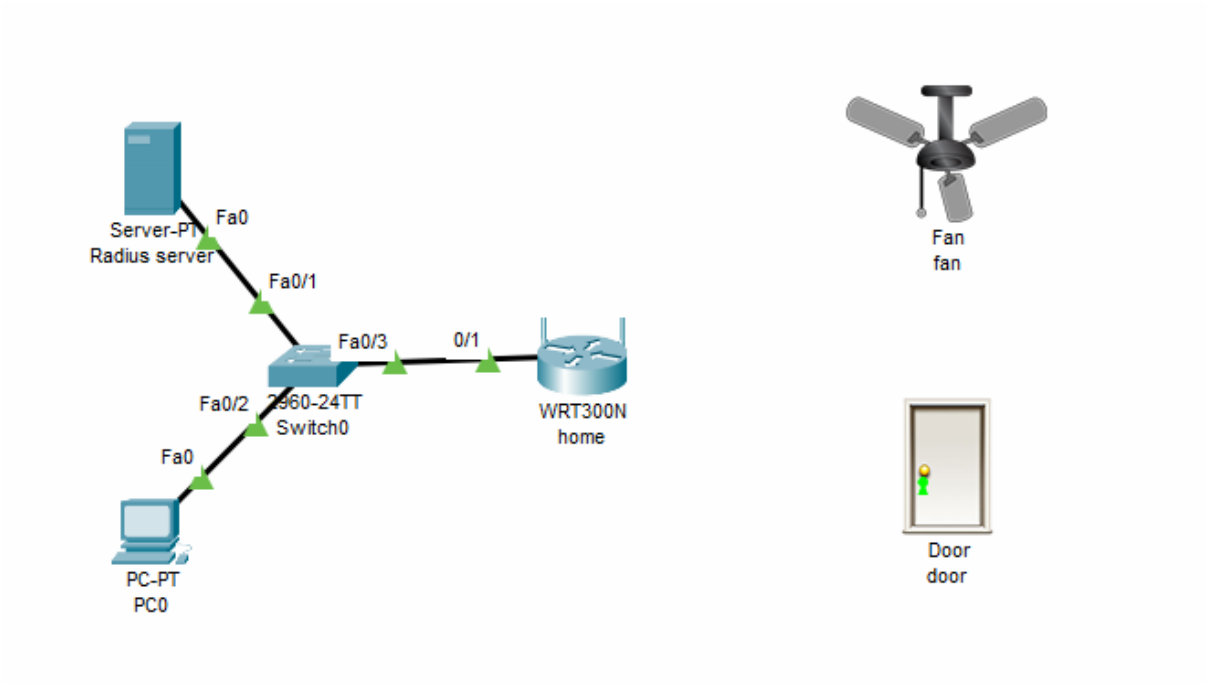
b). Connect and Monitor IoT Devices using Packet Tracer

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:

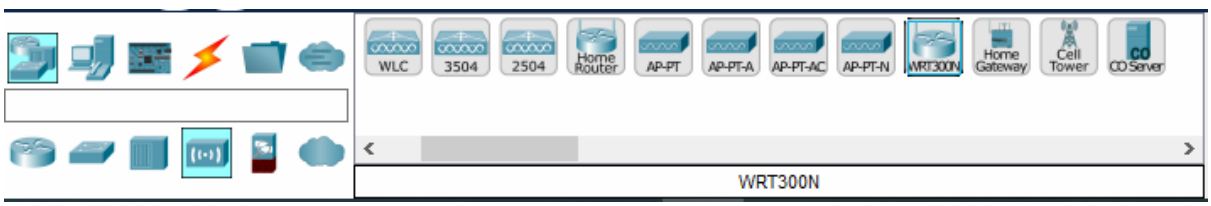
- **Connectivity**: Can connect to networks (Wi-Fi, Bluetooth, or wired).
- **Sensors/Actuators**: Collect data or perform actions (e.g., turning on a light, adjusting temperature).
- **Automation**: Operate automatically based on predefined conditions or commands.
- **Remote Control**: Can be controlled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

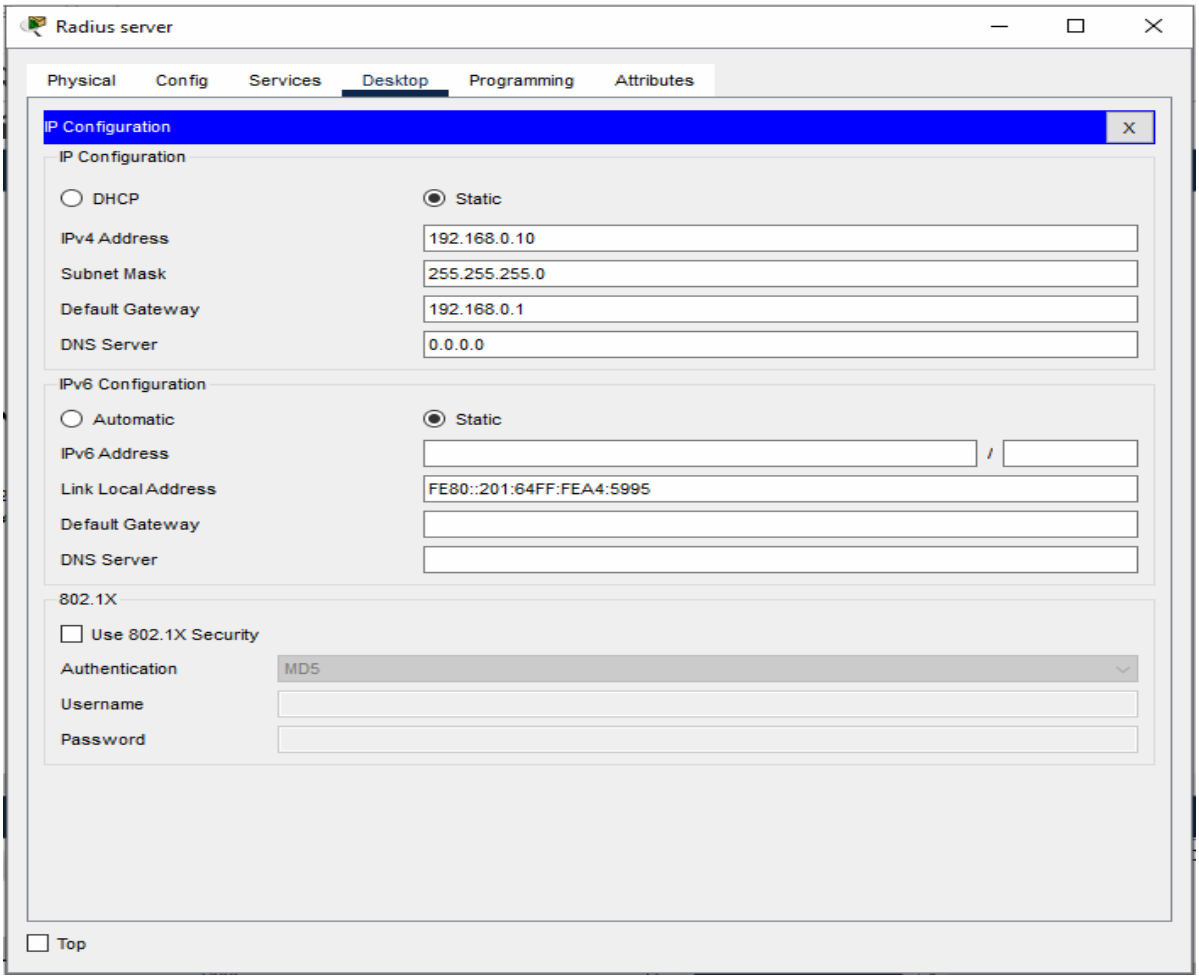
Configurations:

Configuring radius server

Under config->Give device name as radium server

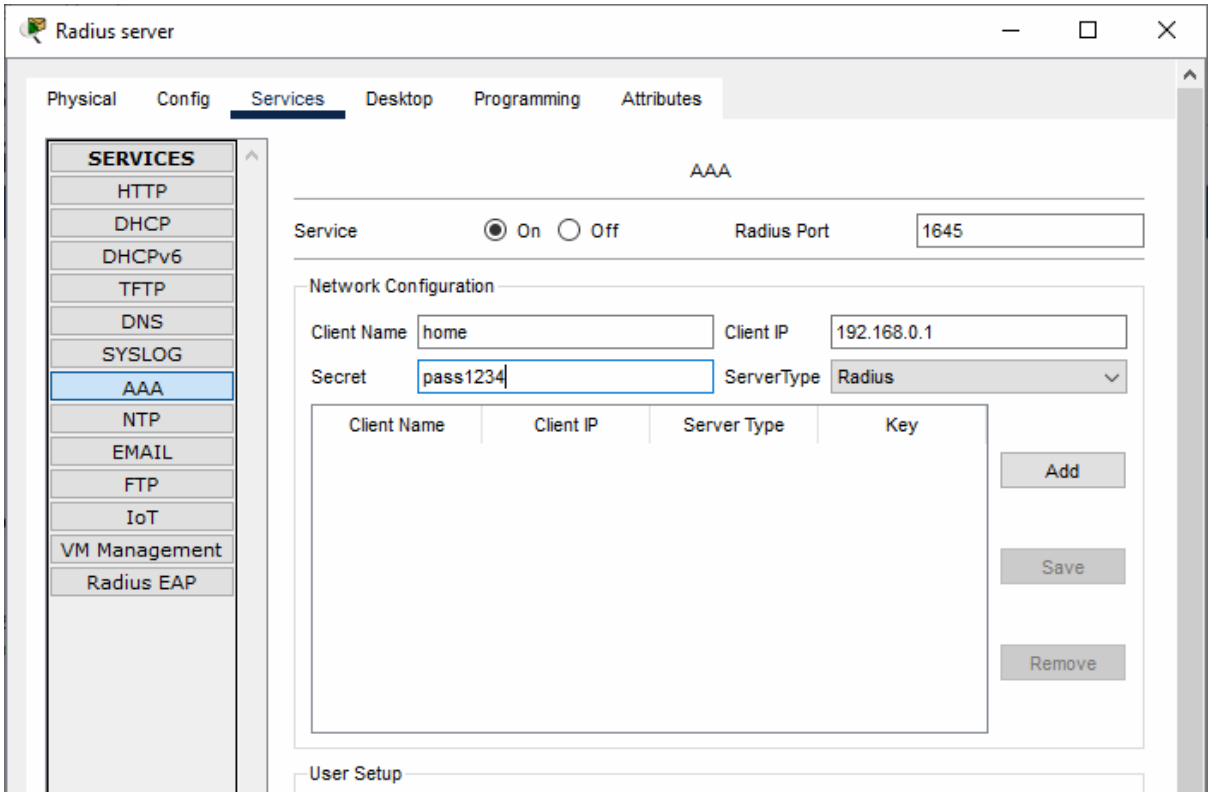
IP address:192.168.0.10 subnet mask:255.255.255.0

Default Gateway:192.168.0.1

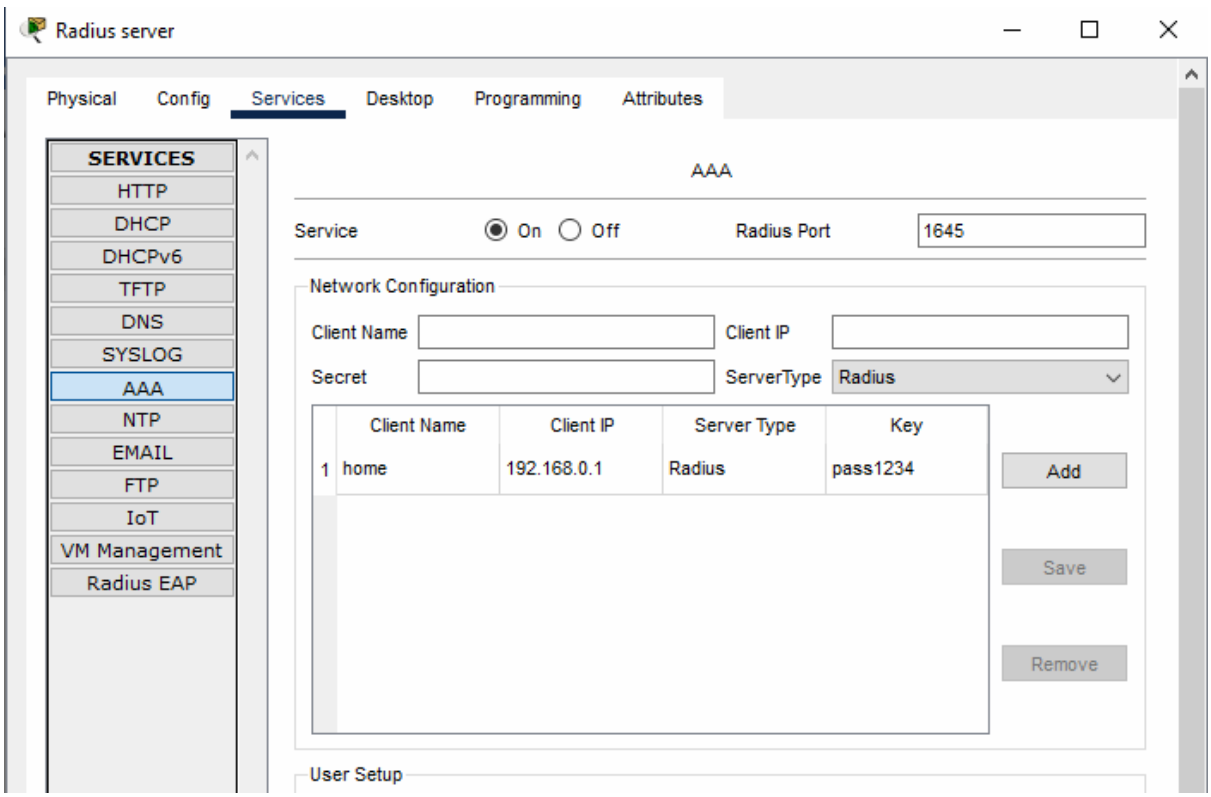


Under services click -> AAA ->click service=on radio button

Do the following as in the below screenshot



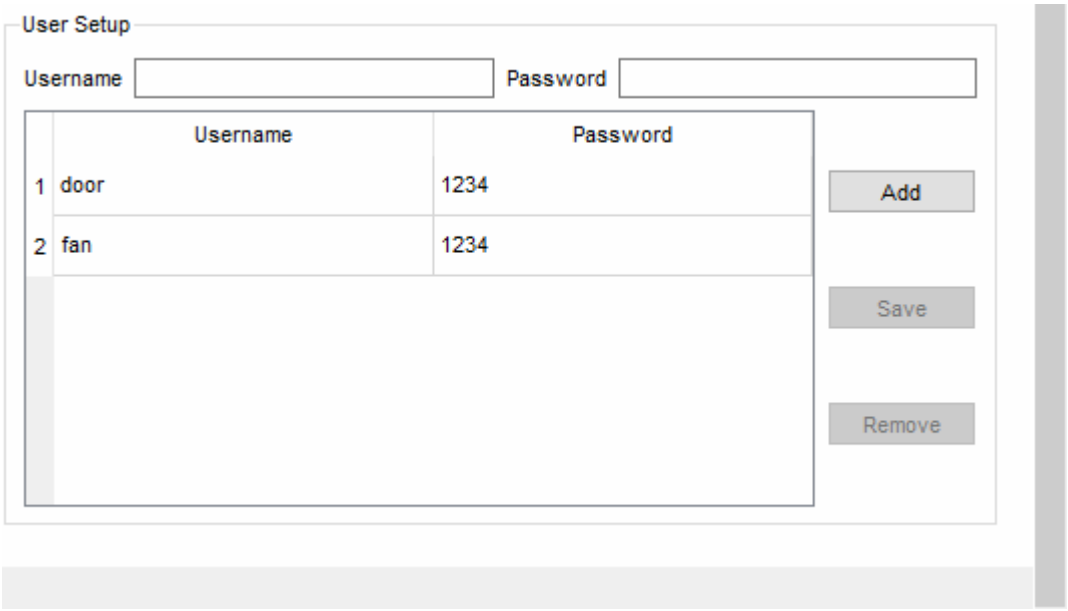
Click on add and configuration gets added



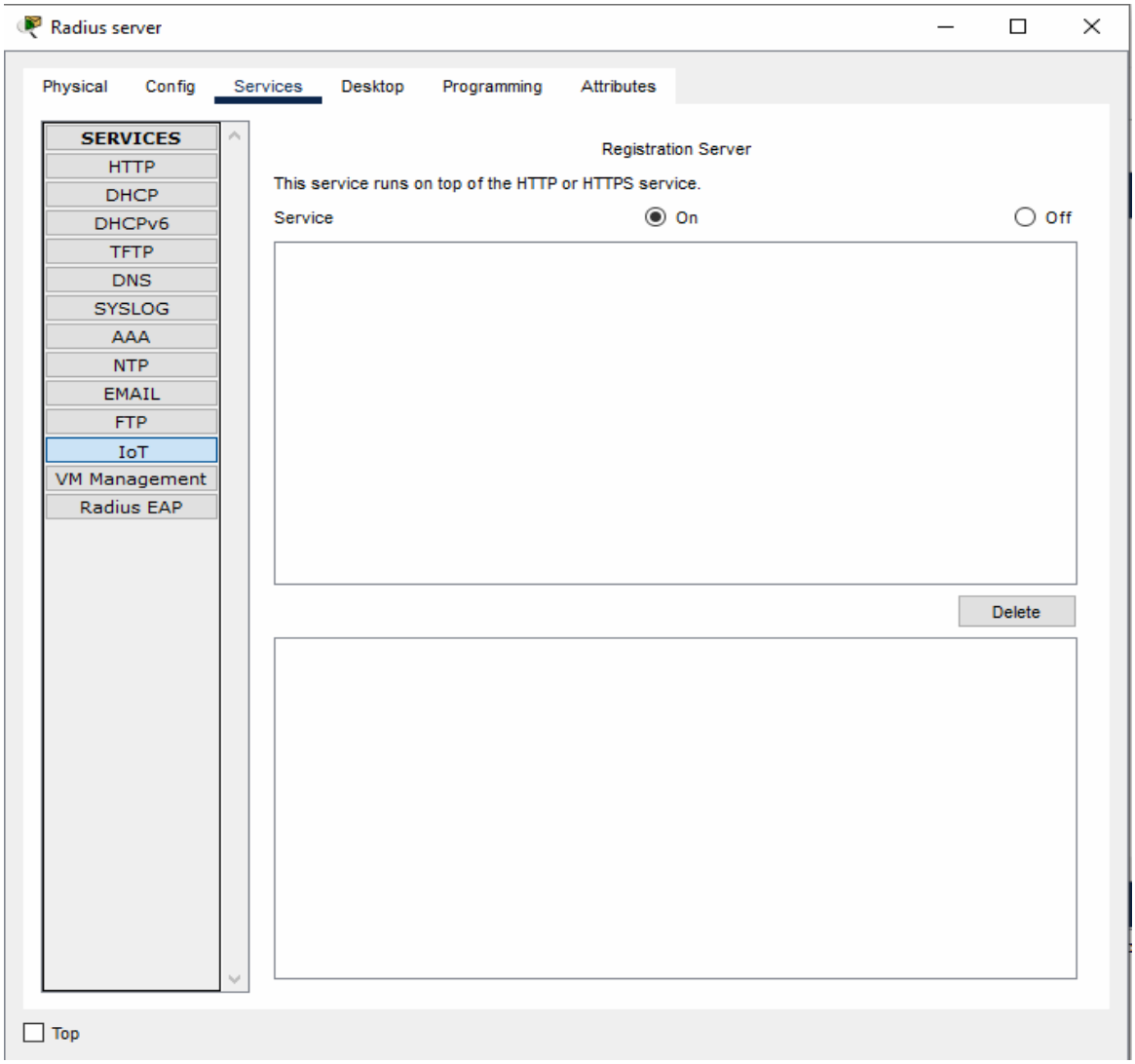
Now setup for user i.e user setup

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



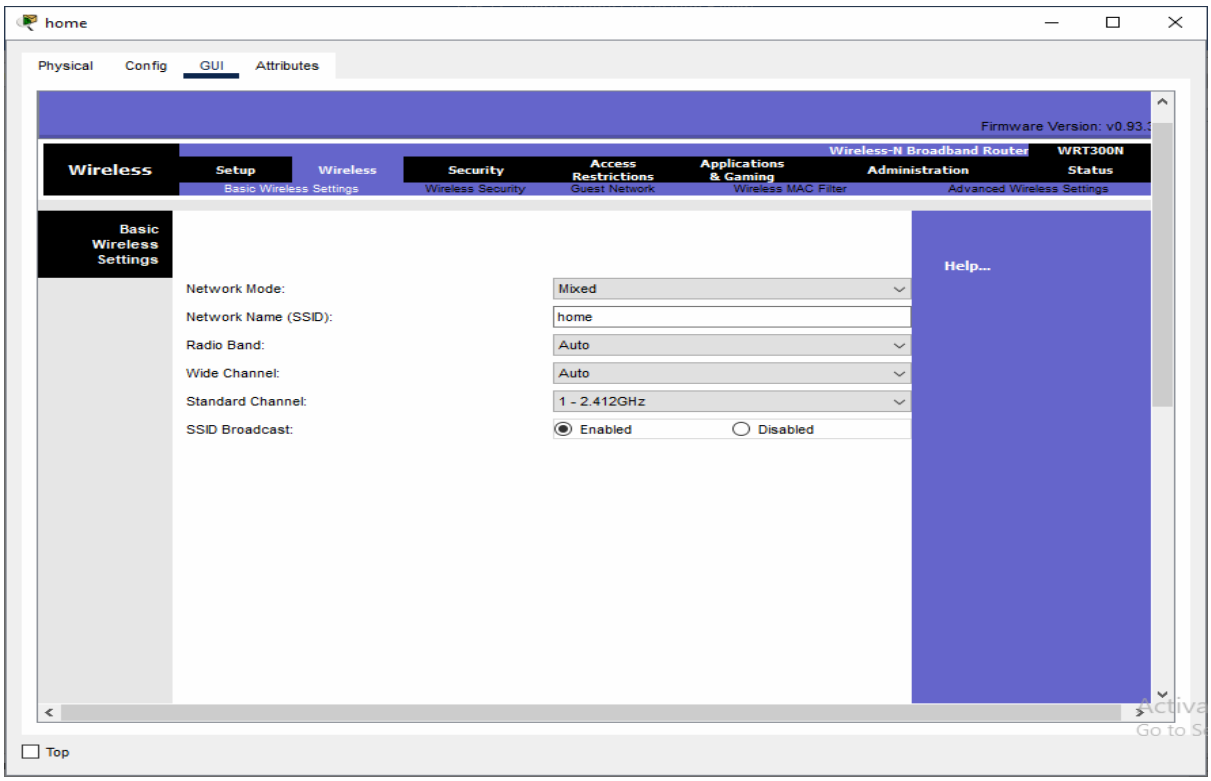
Under services click->IoT->service=on



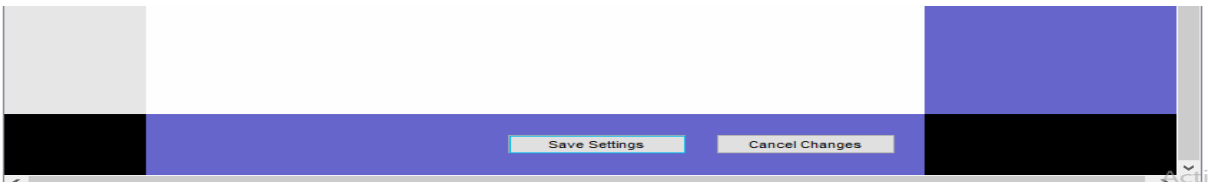
Configuration for Wireless router

Config->give display name as home

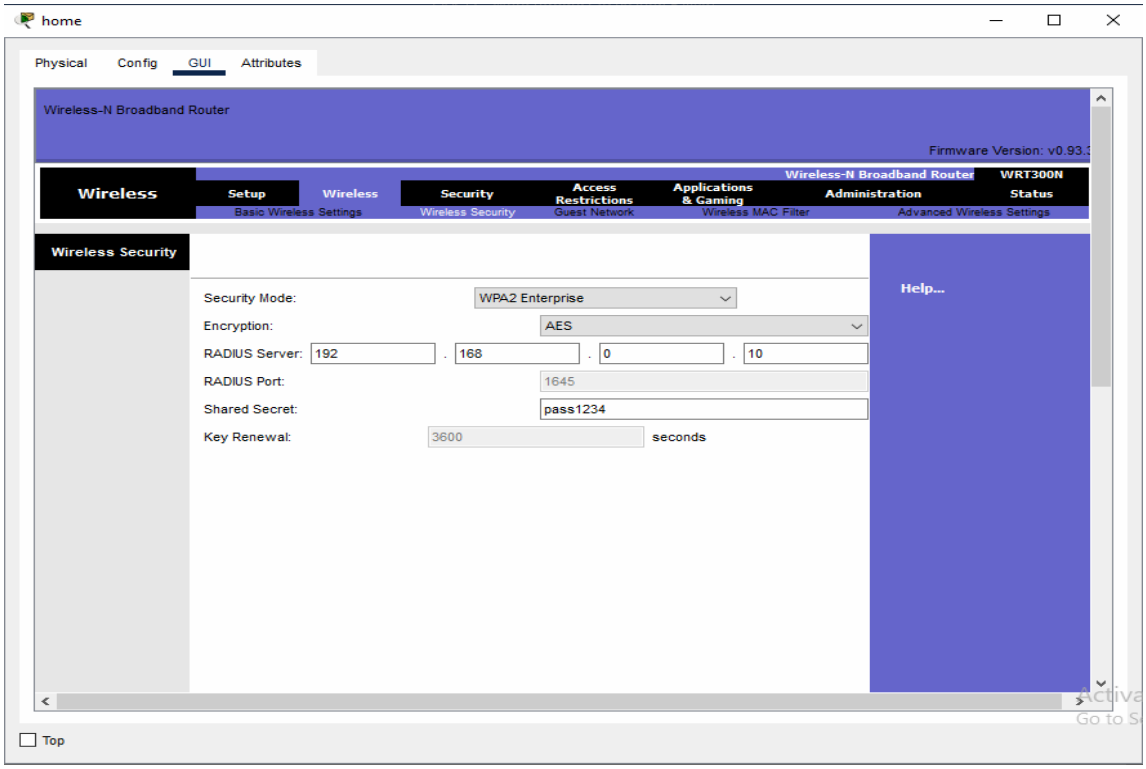
In GUI->click on wireless and enter the below shown configuration



And scroll down and click on save settings



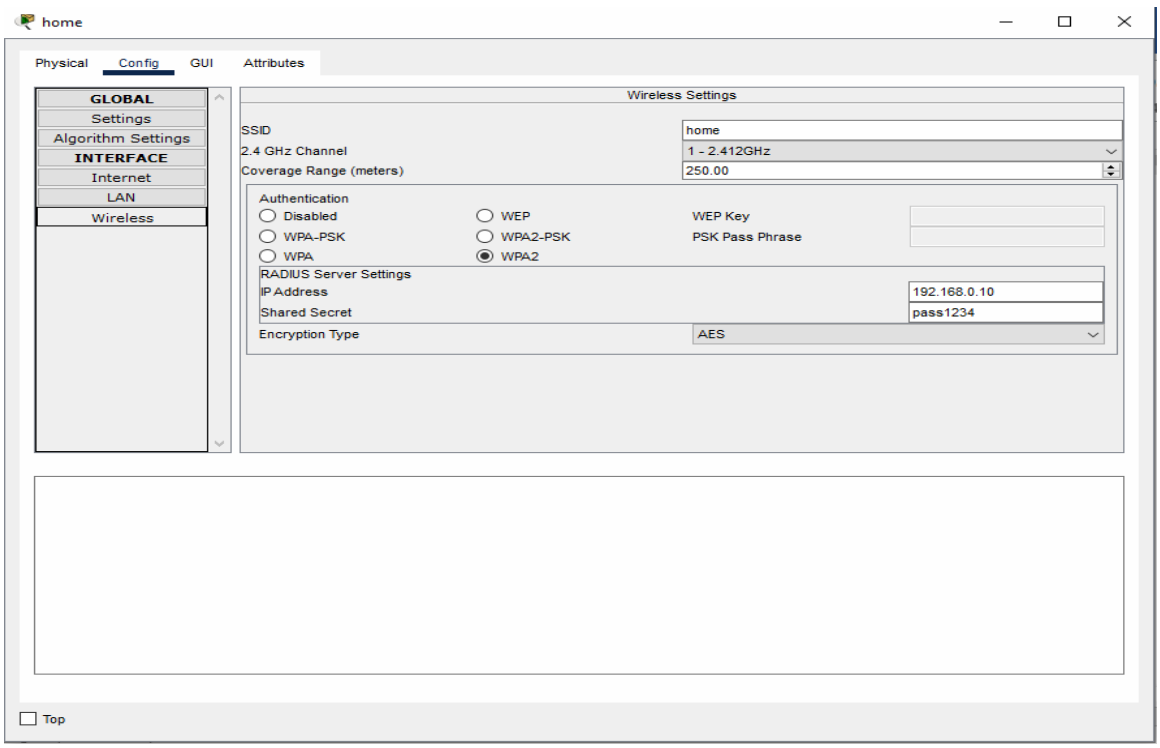
In GUI->under wireless->right side option click on security and add the below shown config



And scroll down and click on save settings

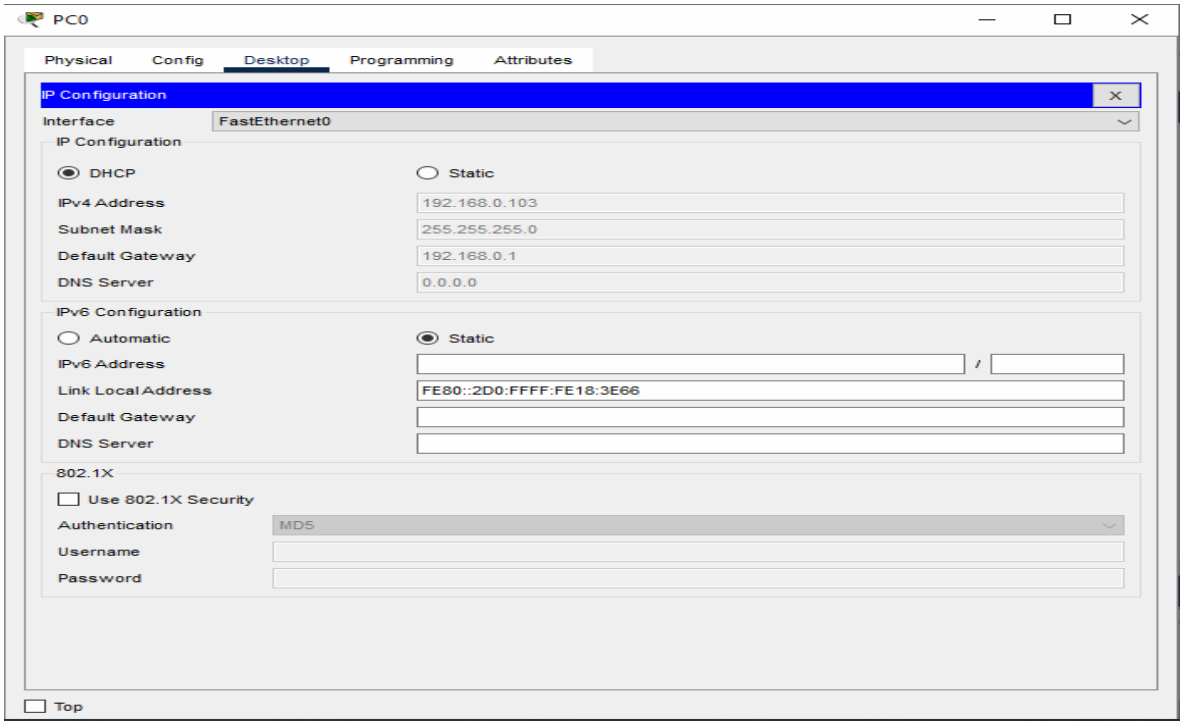
To check if all configurations which we gave are added

Goto->config in router->wireless



Configuration for PC

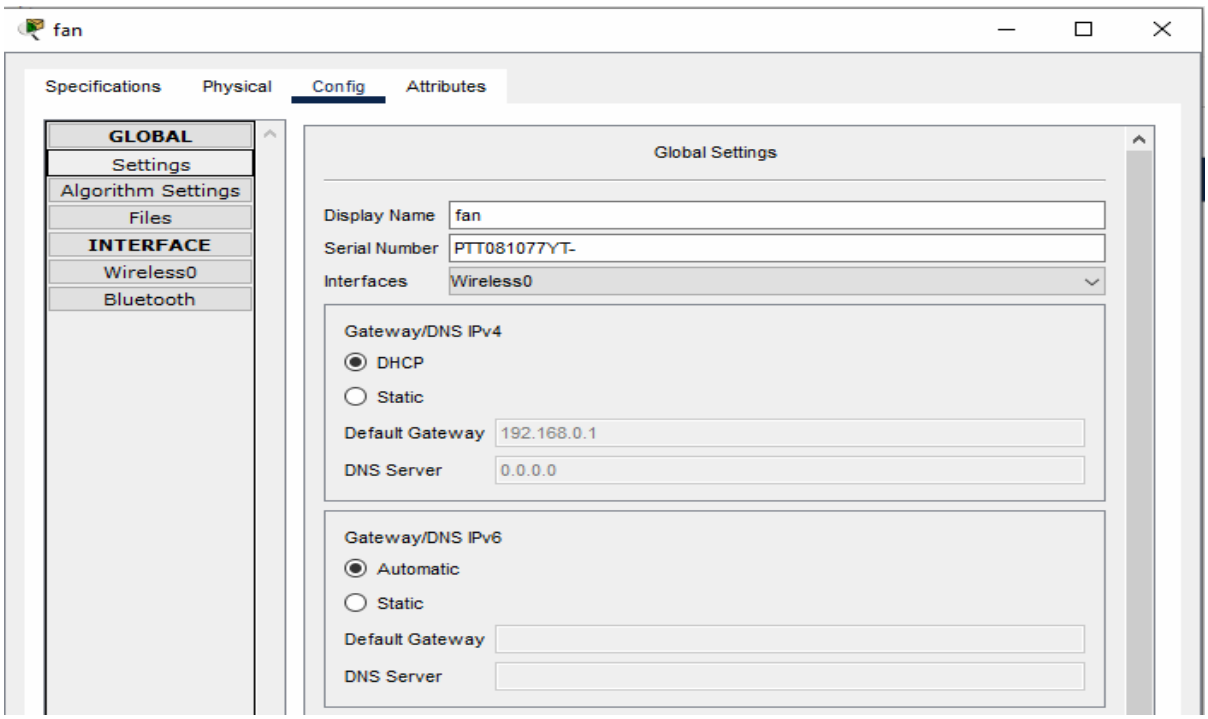
Select DHCP



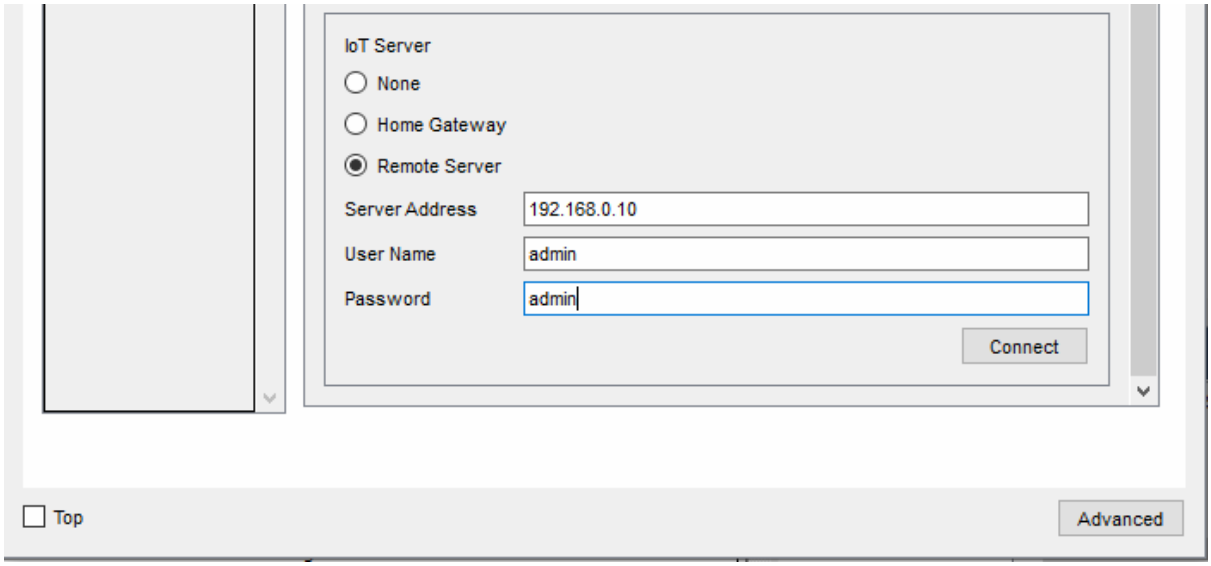
Configuration for fan

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

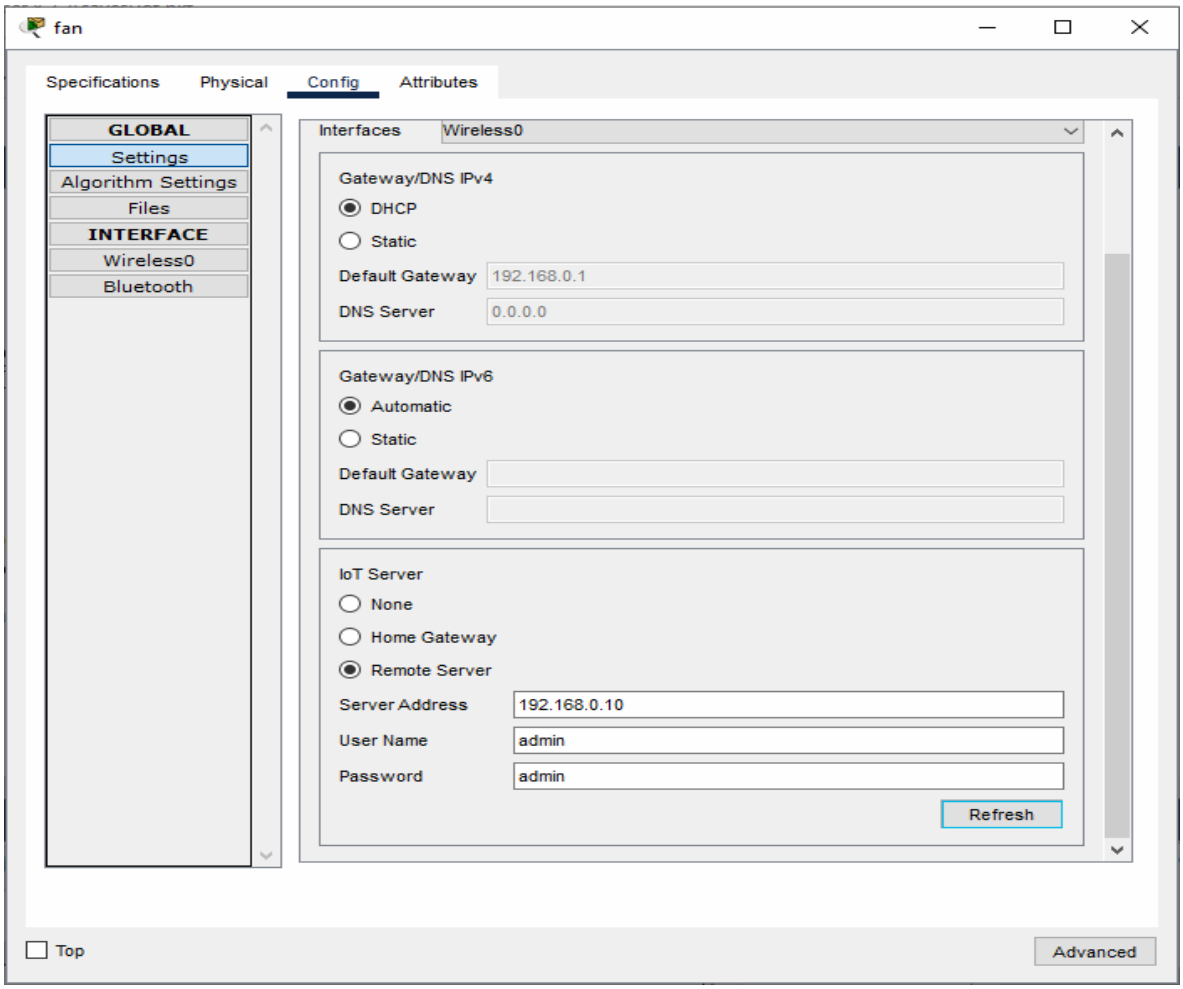
Goto->settings->follow the screenshot



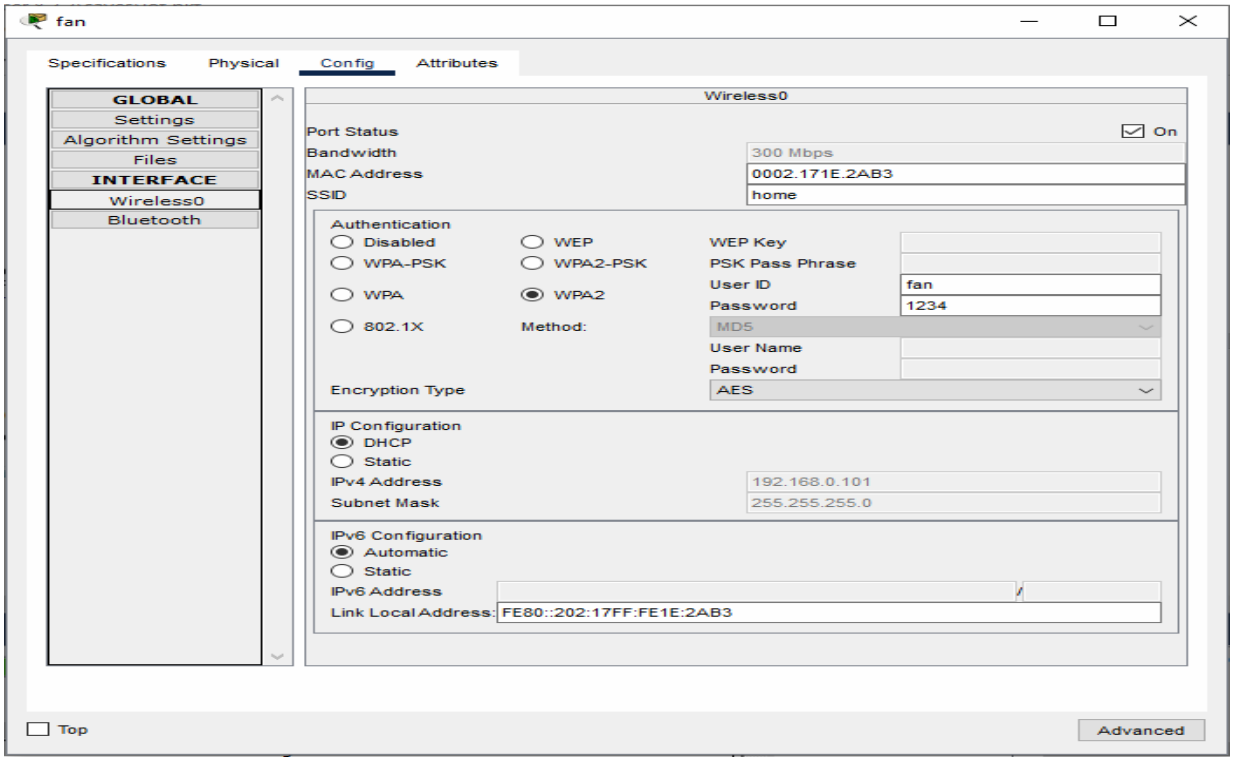
In settings->configure remoteserver as shown below



Below is the screenshot we get after connecting



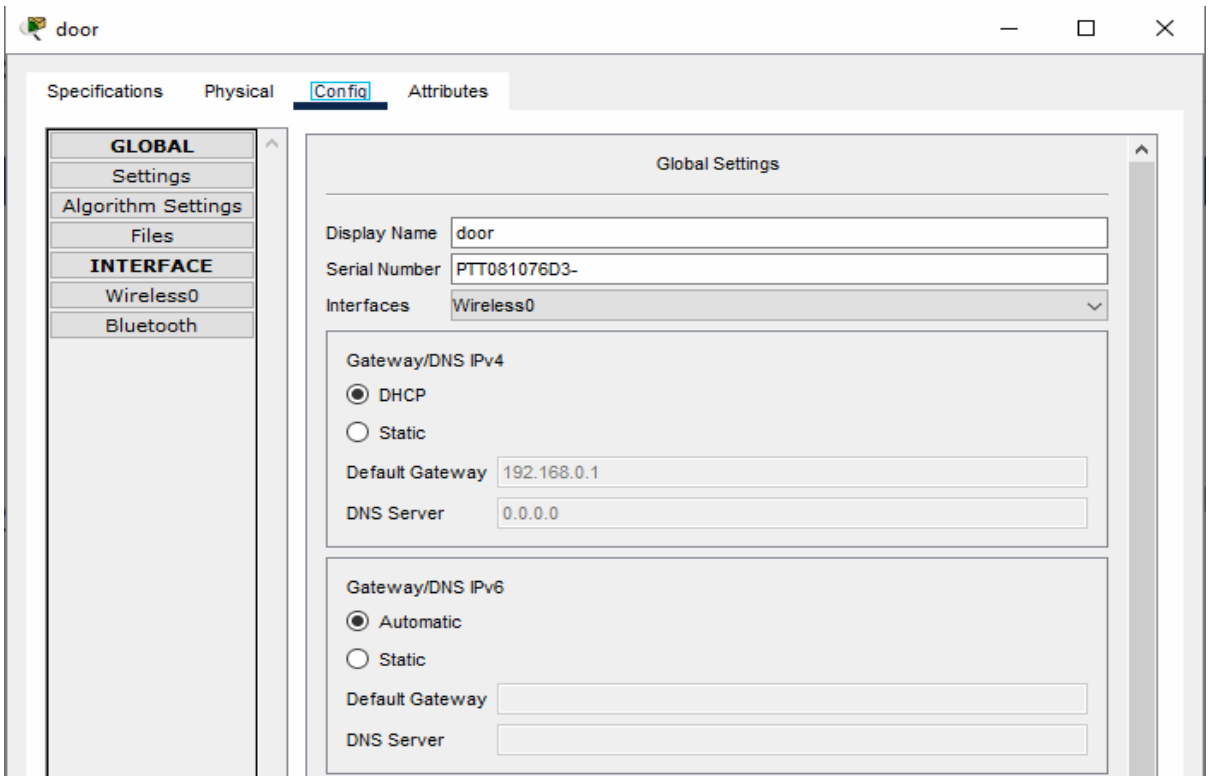
Under->config->wireless0->do the below config as shown in the screenshot



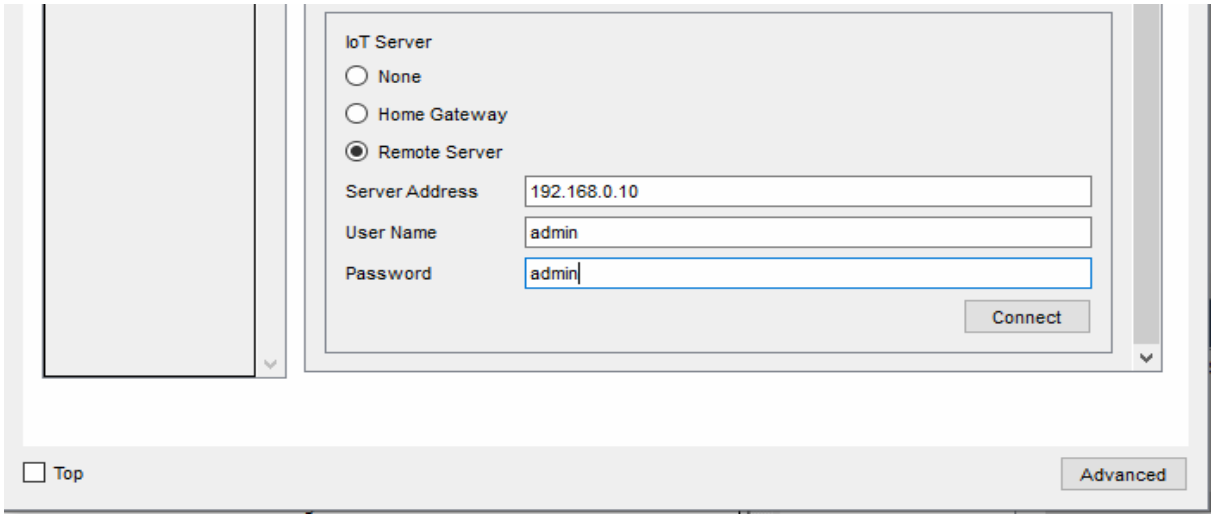
Configuration for Door

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

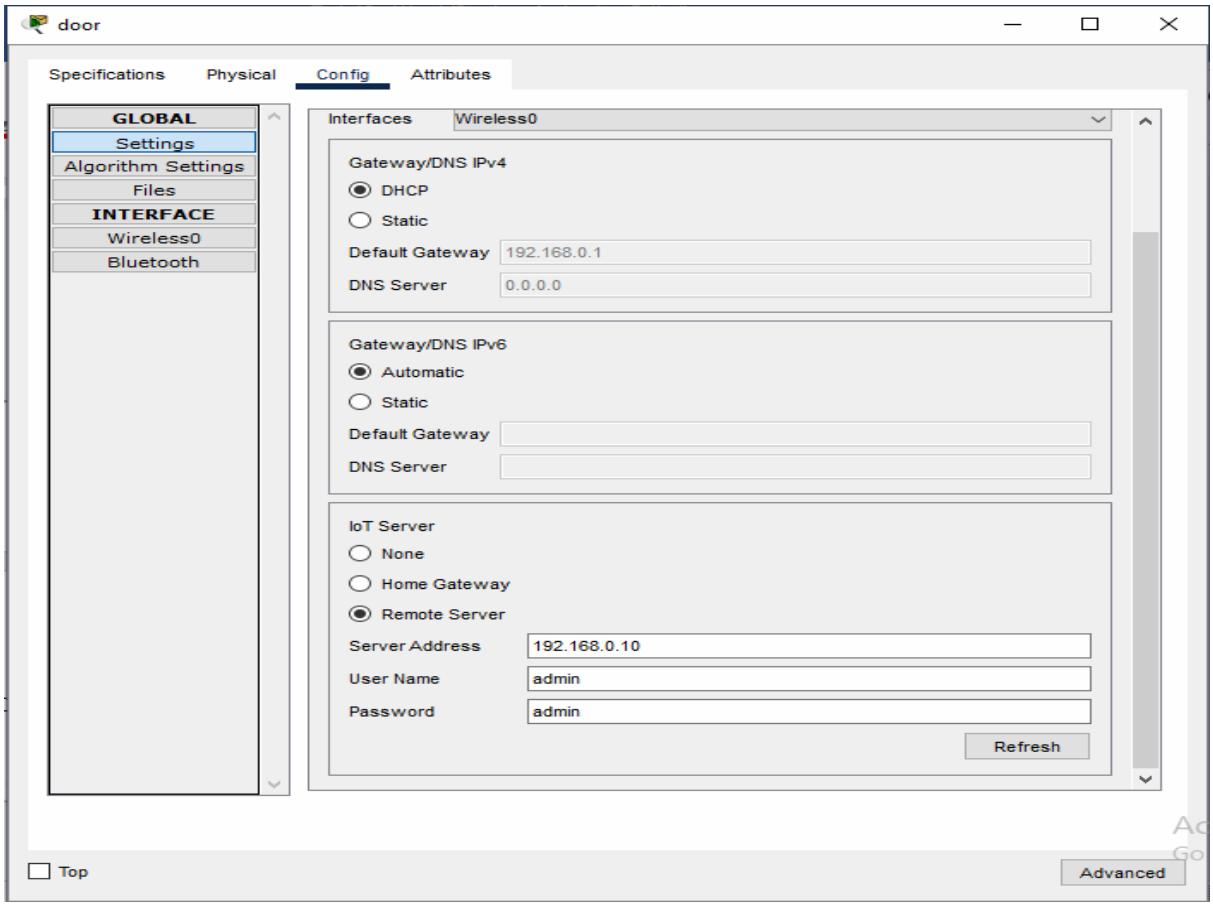
Goto->settings->follow the screenshot



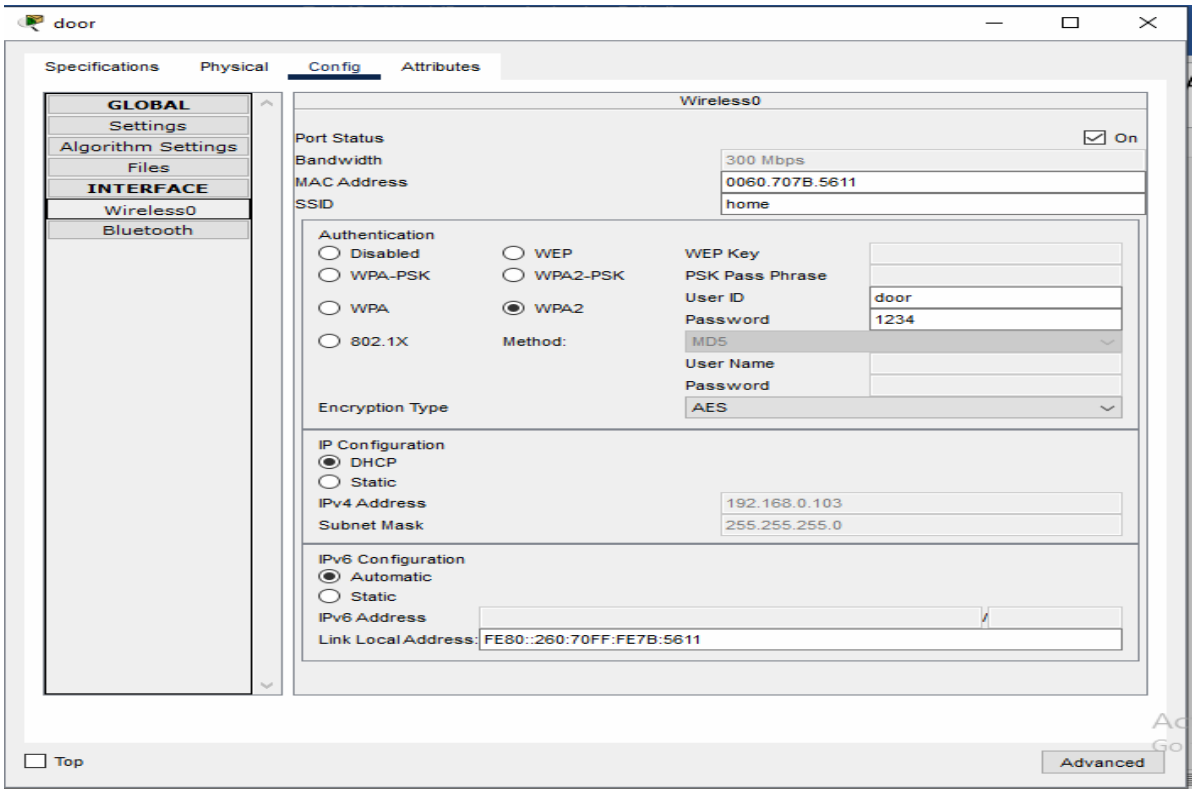
Click on connect



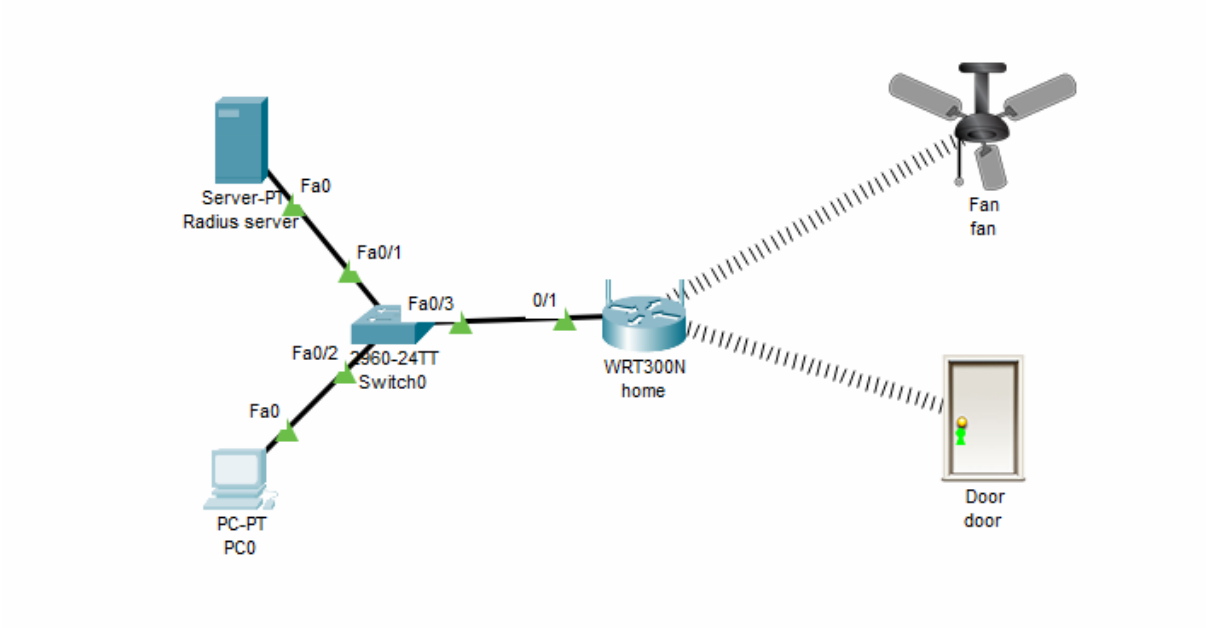
Below is the screenshot after connecting



In config->wireless0 do below configuration

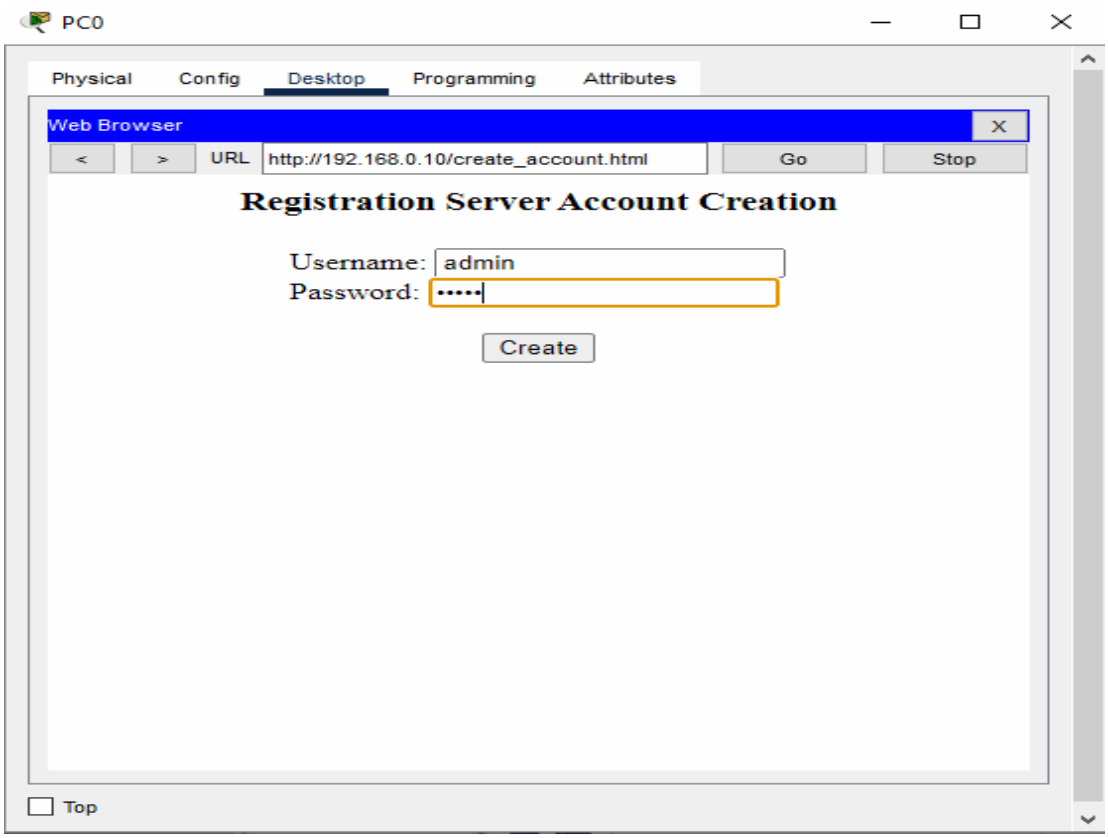


We will get link line between router and devices if both got connected successfully as shown in the below screenshot

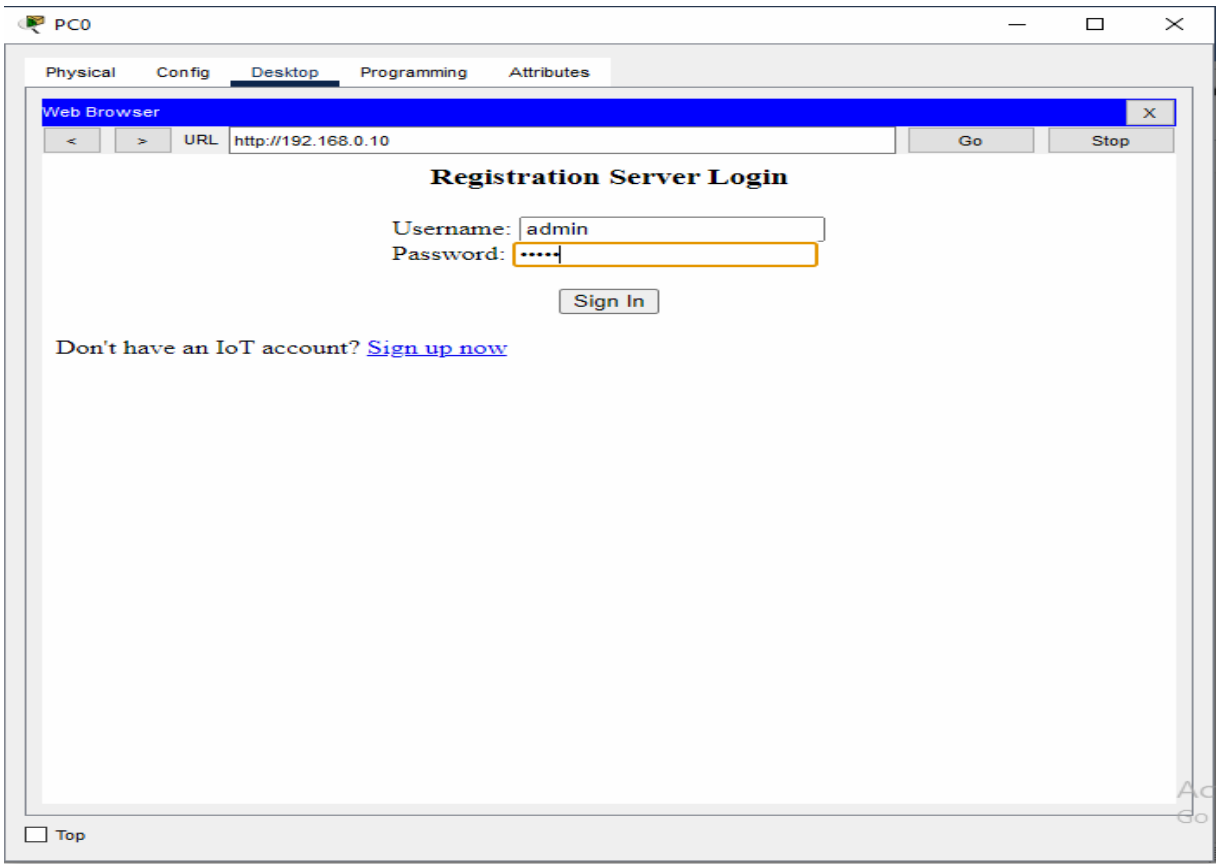


Testing

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



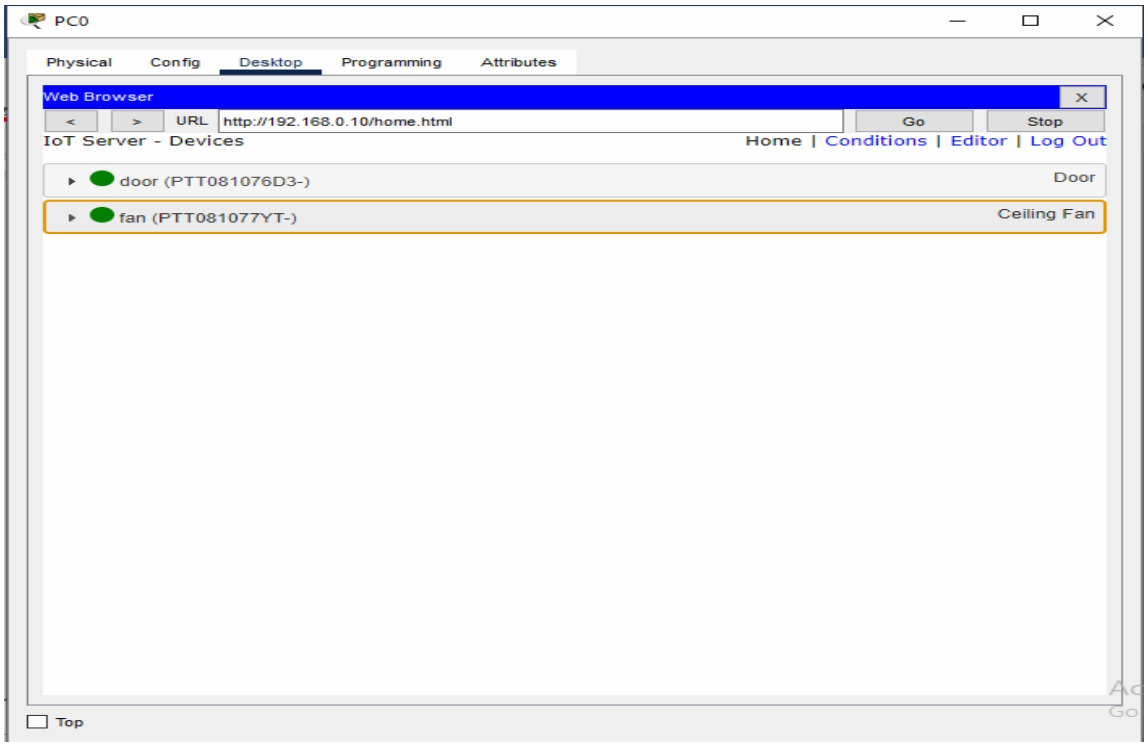
Then signin after registration



Once signin we will get below screen as it screenshot

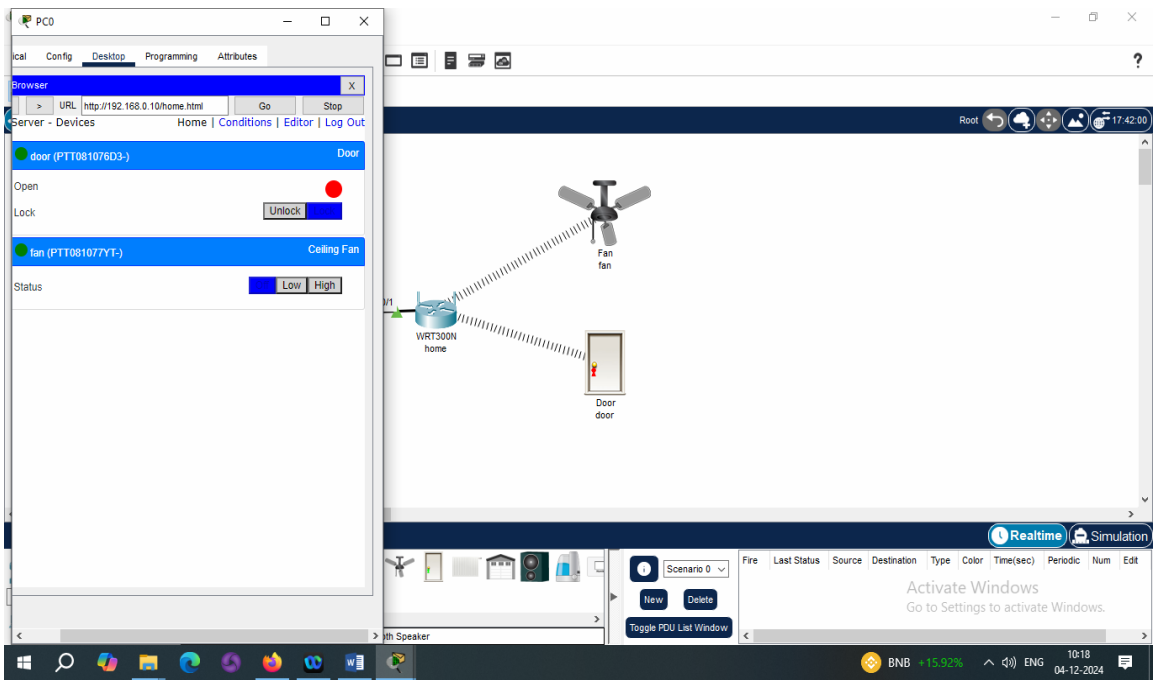
Iot devices gets added and we can operate

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