

## HOME AUTOMATION /SMART IRRIGATION SYSTEM



### What is our GOAL for this MODULE?

In this class, we learned about the concept of IoT (Internet of Things) and created a smart home and irrigation system on a Cisco packet tracer. We also learned how to set the **Home Gateway** and how to configure end devices on the internet to make them smart devices.

### What did we ACHIEVE in the class TODAY?

- Learned to set Home Gateway on network
- Learned to set IoT Server for controlling end devices like fan, lamp, and door
- Learned to set up an IoT Server for an automated irrigation system

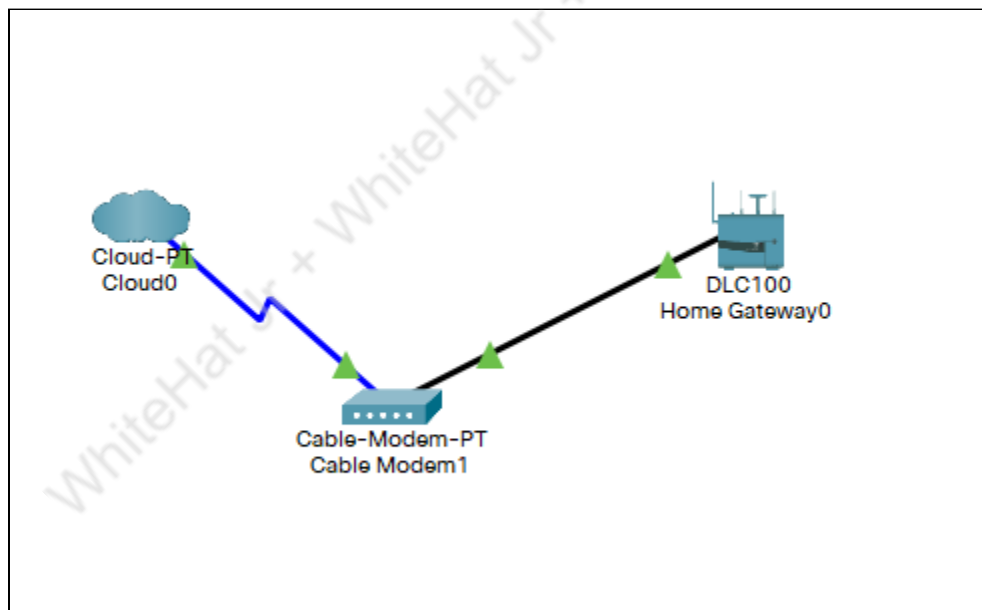
### Which CONCEPTS/ CODING BLOCKS did we cover today?

- Home Gateway
- IoT Server
- Set conditions for end devices

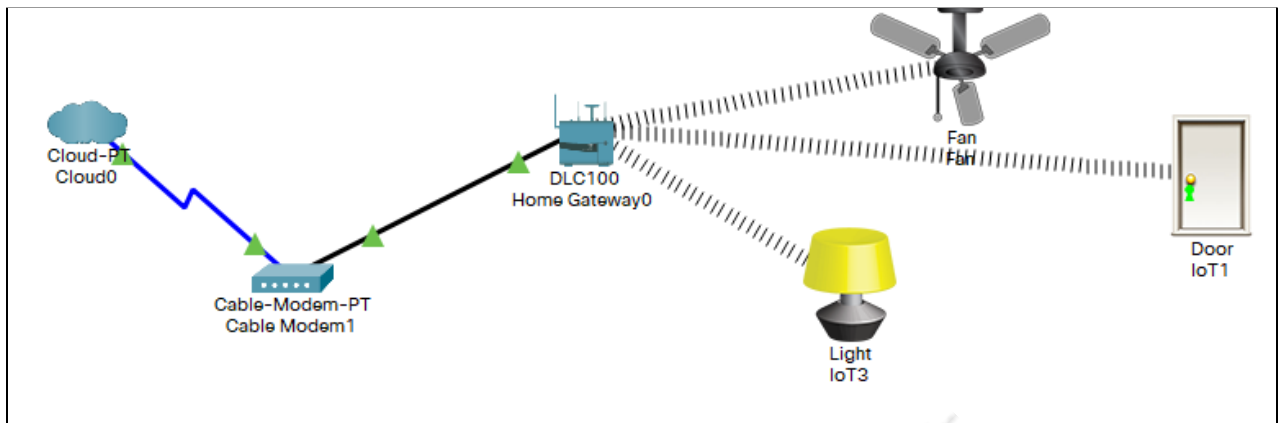
## How did we DO the activities?

### SMART HOME SYSTEM

1. Start by preparing the network.
  - Go to **Network** devices.
  - Click on the **Cloud** symbol.
  - Select **Cloud-PT** first and then select **Cable-Modem-PT** in the same row.
  - Click on **Connections**, then, click on **Co-axial** (blue) and select **coaxial Port 0** for Modem. Then, drag it to **Cloud** and select **Co-axial**. After this, both will share connections.
  - Click on **network devices** and then click on **Wireless devices** and select **Home Gateway**. **Home Gateway** will provide wireless access or ethernet ports to facilitate smart devices.
  - Click on connections, select **Copper-Straight-Through** and then click on home gateway. Then, select internet and drag it to **Cable-Modem-PT**. On clicking **Cable-Modem-PT**, select **Port 1**.

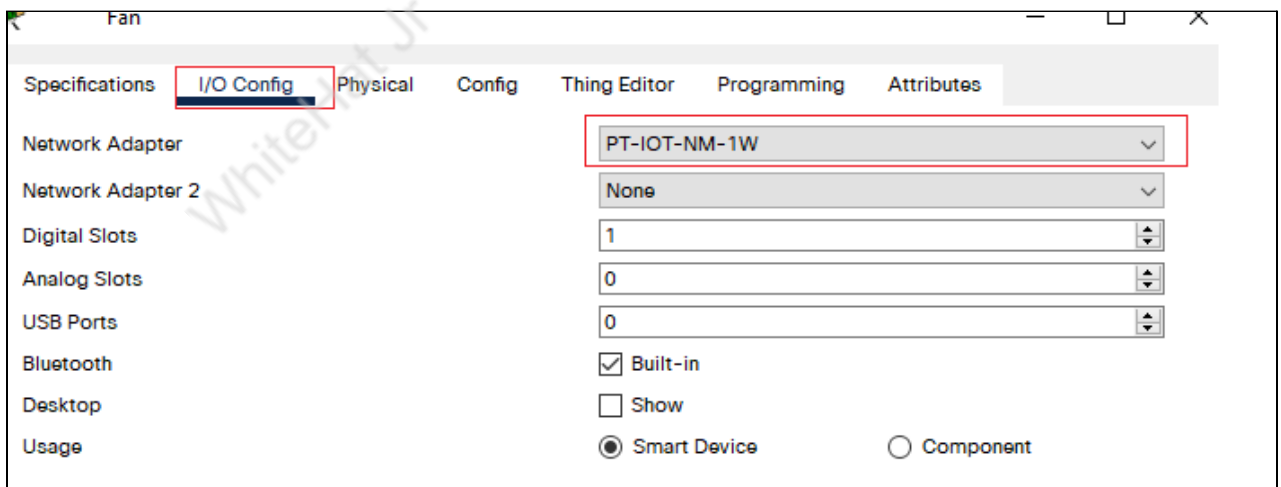


2. Connect end devices with the network. In this case, end devices refers to our home appliances, like the fan, AC and lamp.
  - Click on **end-devices**.
  - Click on **Home**.
  - Select devices like **Fan**, **Door** and **Light** one by one.
  - You will notice that it will automatically connect to **Home Gateway**.



3. **Smart Devices:** The end devices are visible, but we need to change some settings to make them smart devices and make them available on remote servers or local servers.

- Let's change the settings for the fan first.
  - Click on **Fan**.
  - Click on **advance** at the right bottom corner.
  - Click on **I/O Config**.
  - Select **PT-IOT-NM-1W**.
  - Click on **Config**.
  - Change the **Display Name**.
  - Click on the **DHCP** setting.

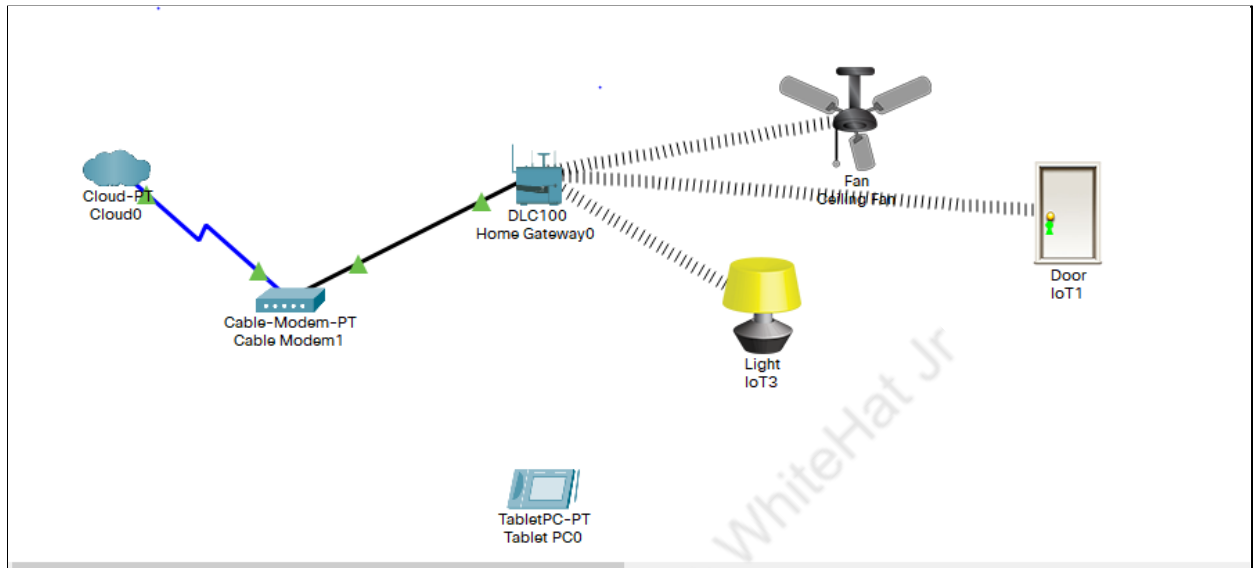


4. Repeat the same steps for the door and the lamp.

5. To control the smart devices remotely, we need a device, like a laptop, phone, or a tablet.

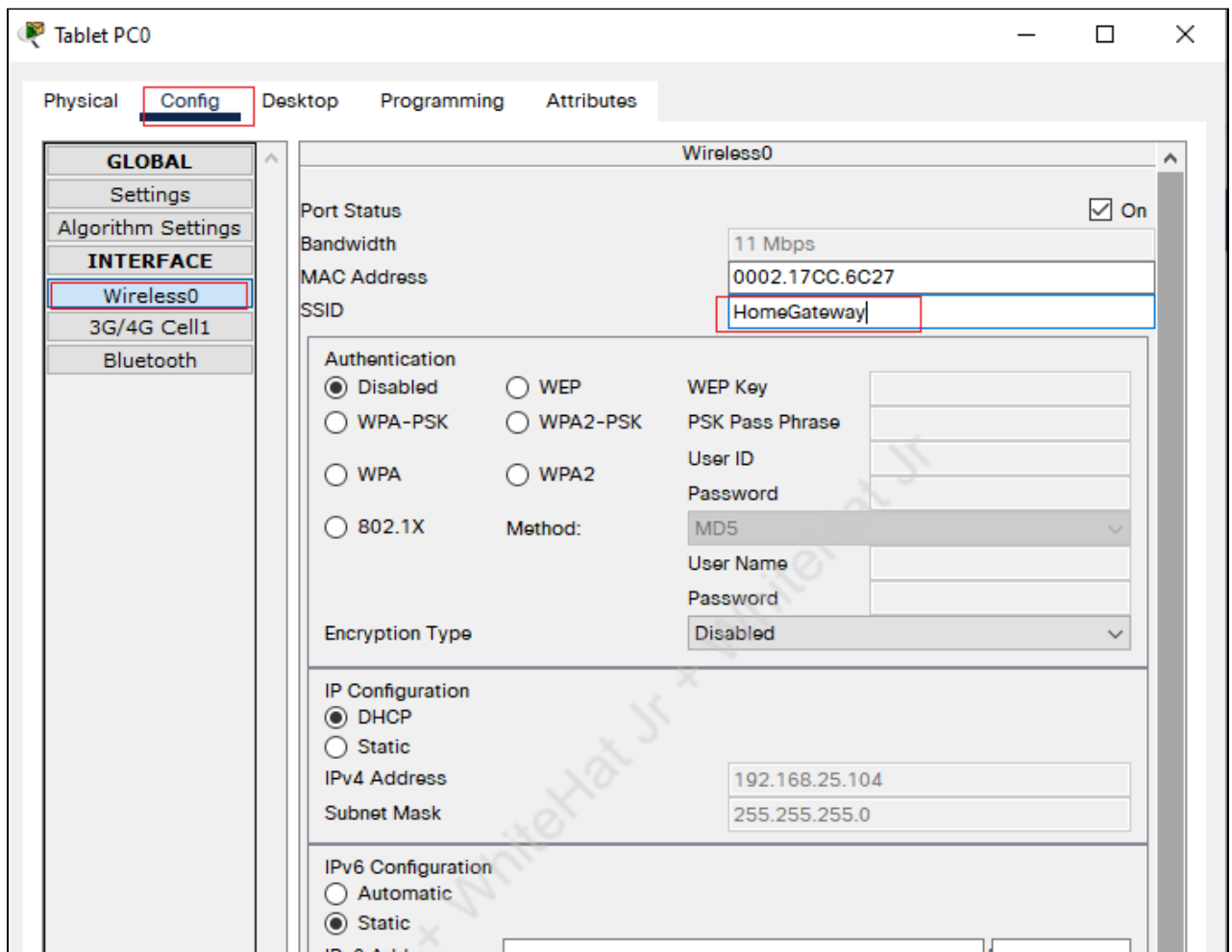
- Go to End devices at the bottom.

- Select **end devices** at the bottom.
- Select **Tablet**.

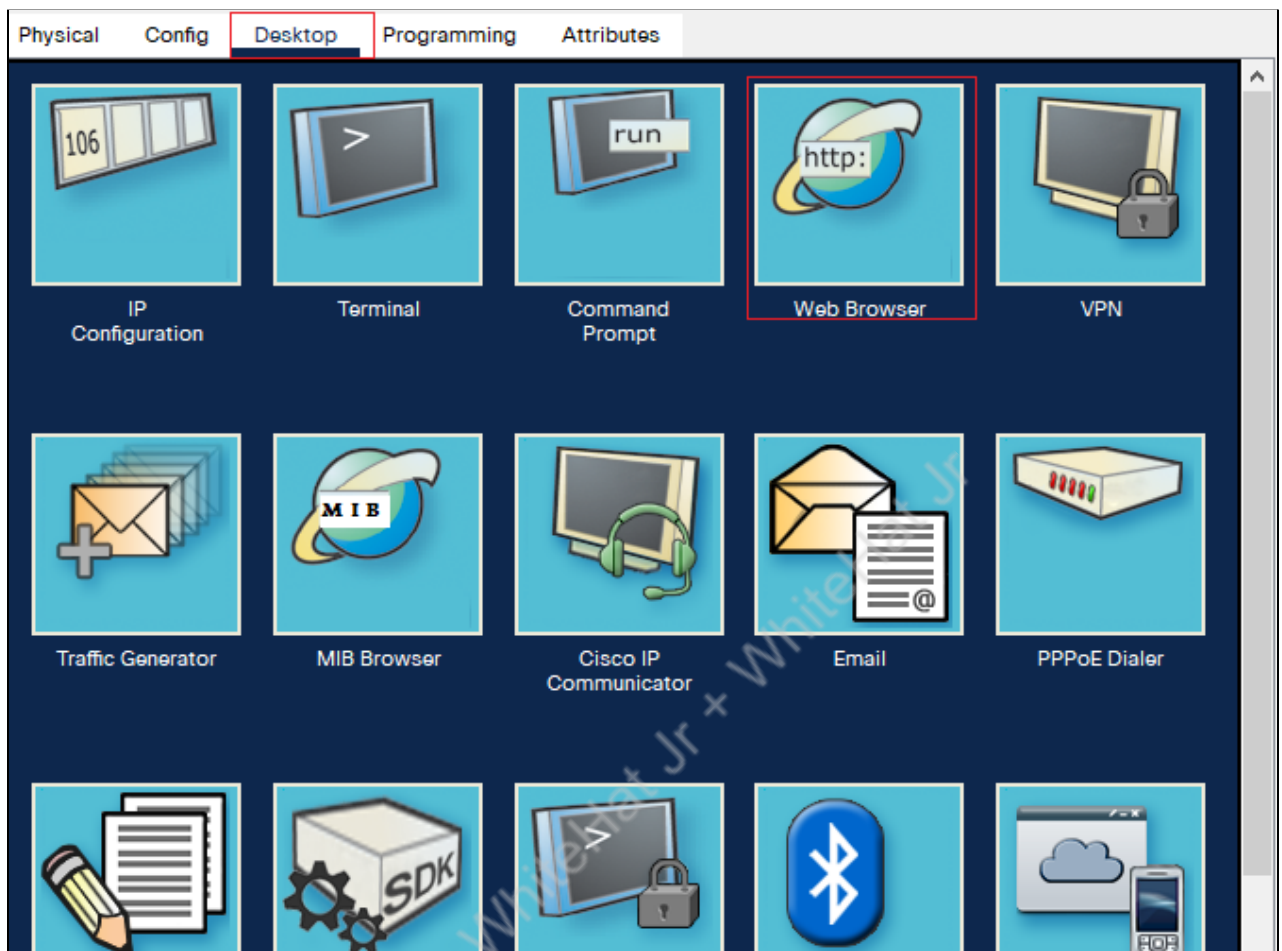


6. Connect the **Tablet** with **Home Gateway**.

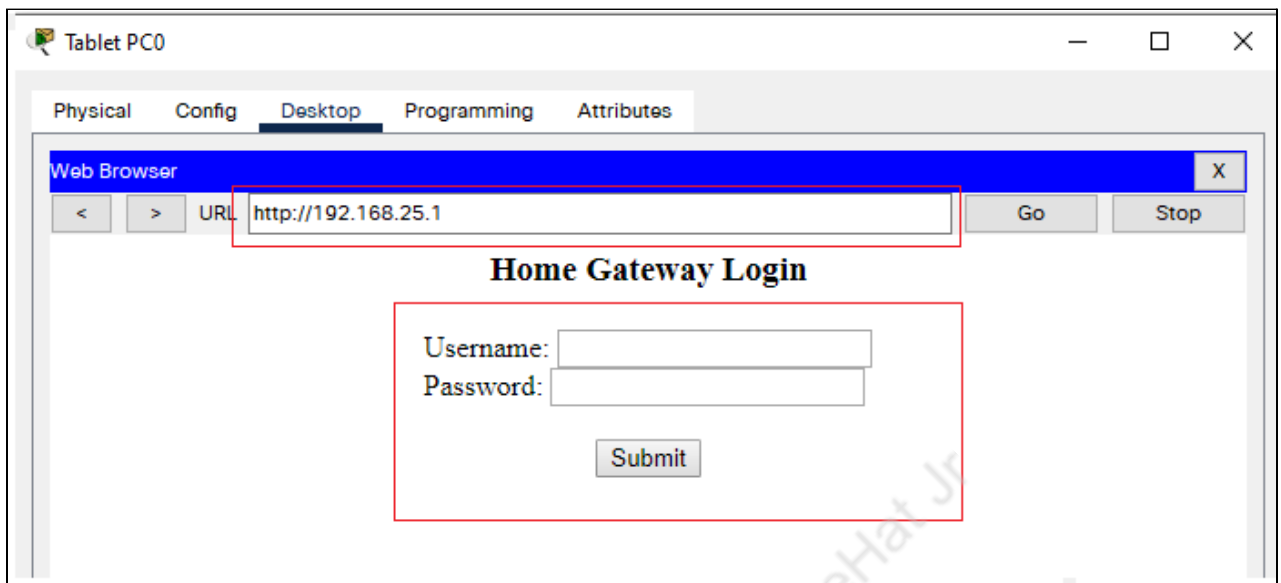
- Click on **Config**.
- Click on **wireless**.
- Go to **SSID** and write **HomeGateway**.



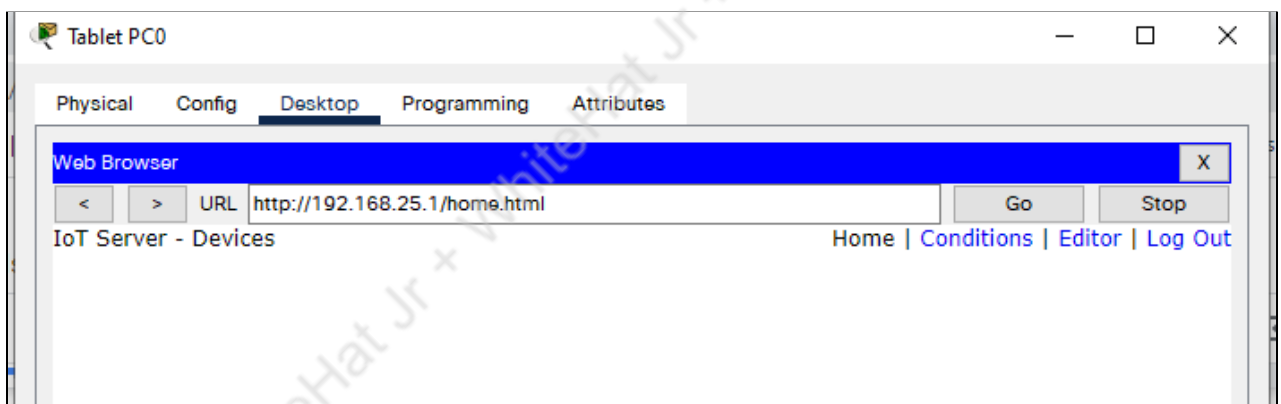
7. Currently, our tablet is connected with **Home Gateway** but we can't see any smart home interface on it. To make them visible, make an interface for **IoT Products**.
- Click on **Tablet**.
  - Click on **Desktop**.
  - Click on **Web Browser**.



8. **WebBrowser** Settings: Set the IP address for **Web-Browser** settings.
- Write down the **192.168.25.1** in the URL field. This is the IP of the Gateway.
  - The **Home Gateway Login** window will appear.
  - Write down the username and password as follows:
    - **Username = admin**
    - **Password = admin**
  - Click on **Submit**.



The following window will appear:



9. But still, our home devices (**Fan, Lamp, Door**) are not visible. For that, we need to adjust the settings as follows:
- Click on **Fan**.
  - Click on **Advance**.
  - Click on **Config**.
  - Go to **IoT Server** and select **Home Gateway**.

Specifications I/O Config Physical **Config** Thing Editor Programming Attributes

**GLOBAL**

Settings

Algorithm Settings

Files

**INTERFACE**

Wireless0

Bluetooth

Interfaces Wireless0

Gateway/DNS IPv4

☒ DHCP

☐ Static

Default Gateway 192.168.25.1

DNS Server

Gateway/DNS IPv6

☐ Automatic

☒ Static

Default Gateway

DNS Server

IoT Server

☐ None

☒ Home Gateway

☐ Remote Server

Server Address

User Name

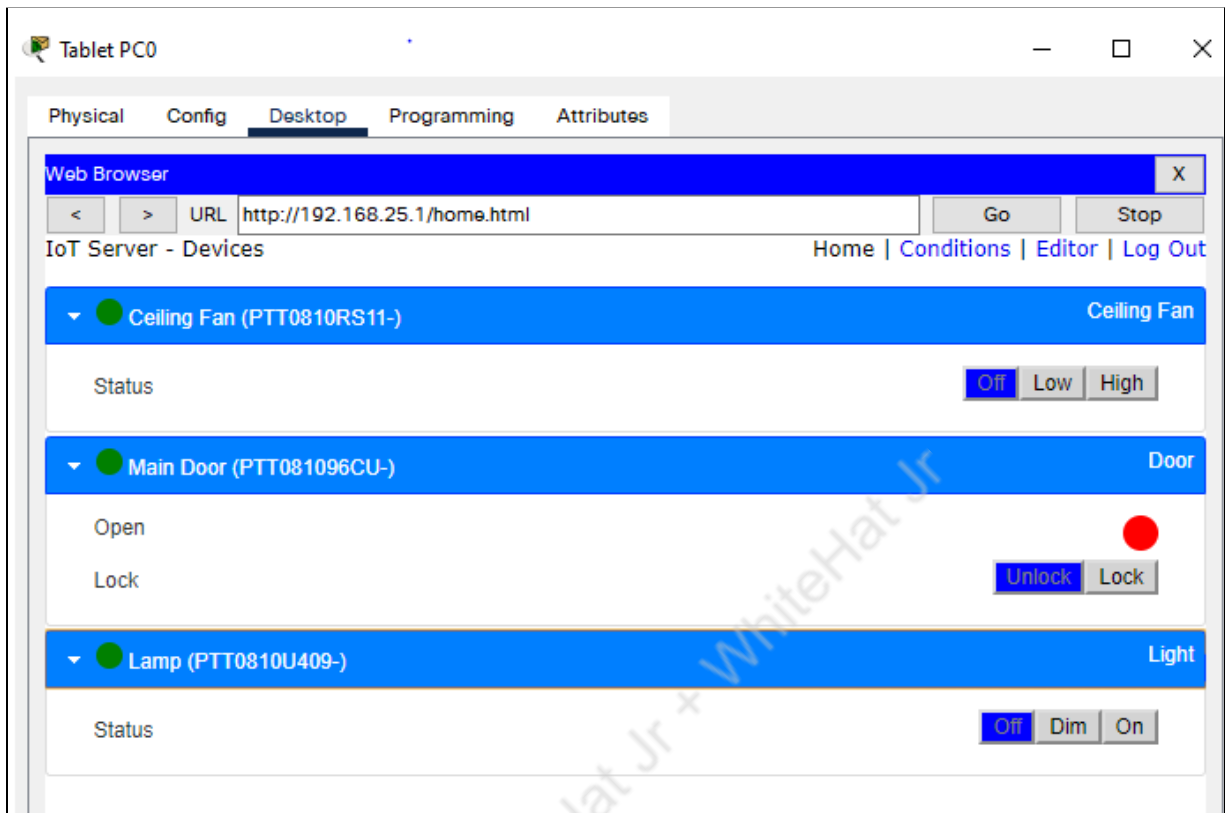
Password

Refresh

10. Make a smart home interface on the tablet.

- Go to **Tablet**.
- Enter the **IP Address (192.168.0.1)**, and then write **admin** as the **Username** and **Password**.

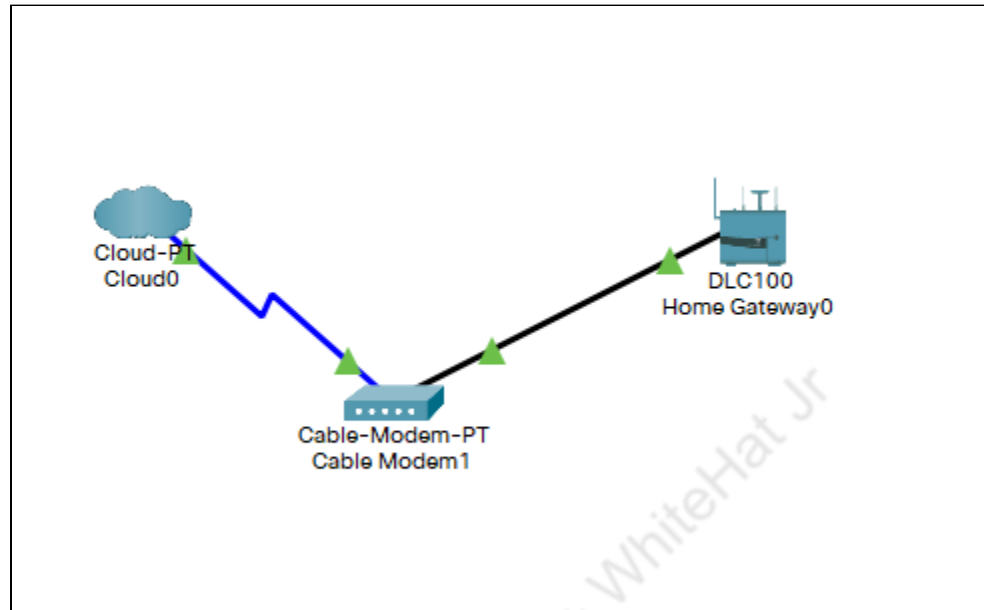




11. Operate the switches to turn the smart devices on or off as required.

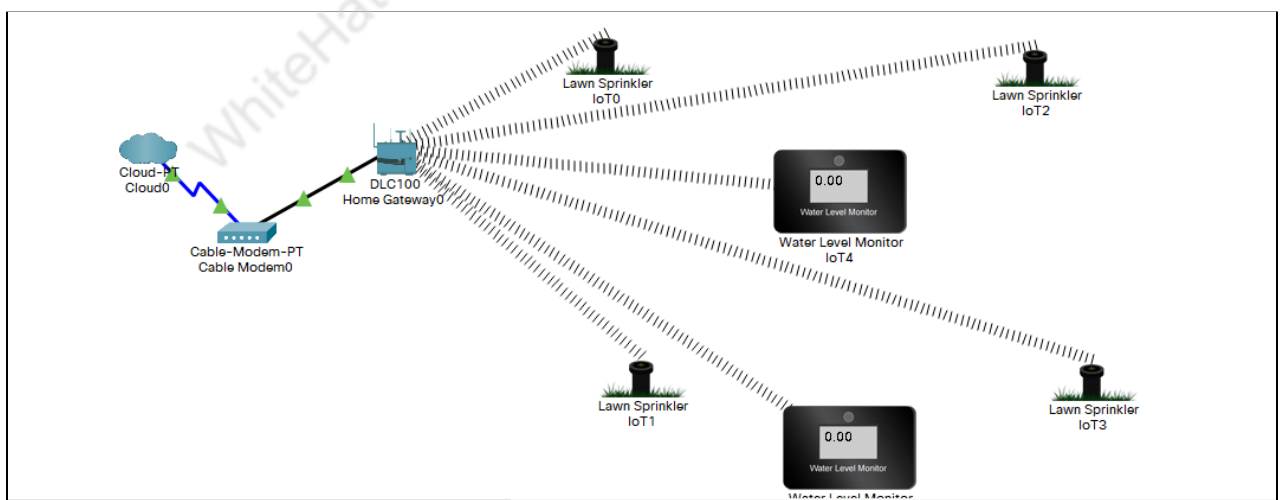
### SMART IRRIGATION SYSTEM

1. Start by preparing a network,
  - Go to **network** devices.
  - Click on the **Cloud** symbol
  - Select "**Cloud-PT**" first and then select **Cable-Modem-PT** in the same row
  - Click on **Connections**, Click on **Co-axial** (blue) and select **coaxial Port 0** for Modem and then drag it to **Cloud** and select **Co-axial**. After this, both will share connections.
  - Click on **network devices** and then click on **Wireless devices** and select **Home Gateway**.
  - Home Gateway will provide wireless access or ethernet ports to facilitate smart devices.
  - Click on connections, select **Copper-Straight-Through** and then click on home gateway. On clicking **Home Gateway** select internet and drag it to **Cable-Modem-PT**. On clicking **Cable-Modem-PT** select **Port 1**



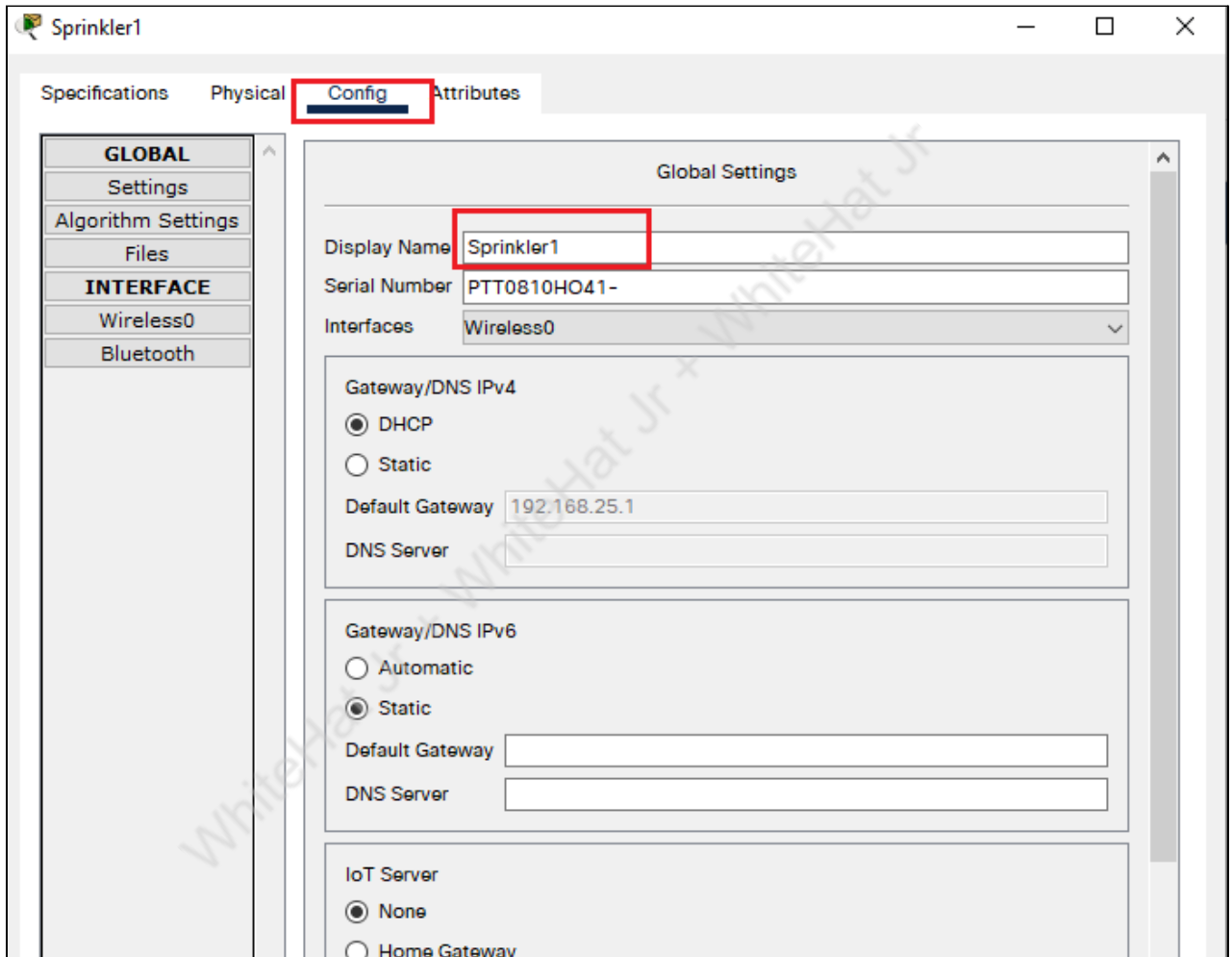
12. Connect the end devices with network.

- Click on **end-devices**.
- Click on **Industrial**.
- Select devices like sprinklers and water level monitors. Select 4 lawn sprinklers and 2 water level monitors. You will notice that they will automatically be connected to **Home Gateway**.



13. Now, the end devices are connected, but we need to adjust some settings to make them smart devices and make them available on remote servers or local servers.

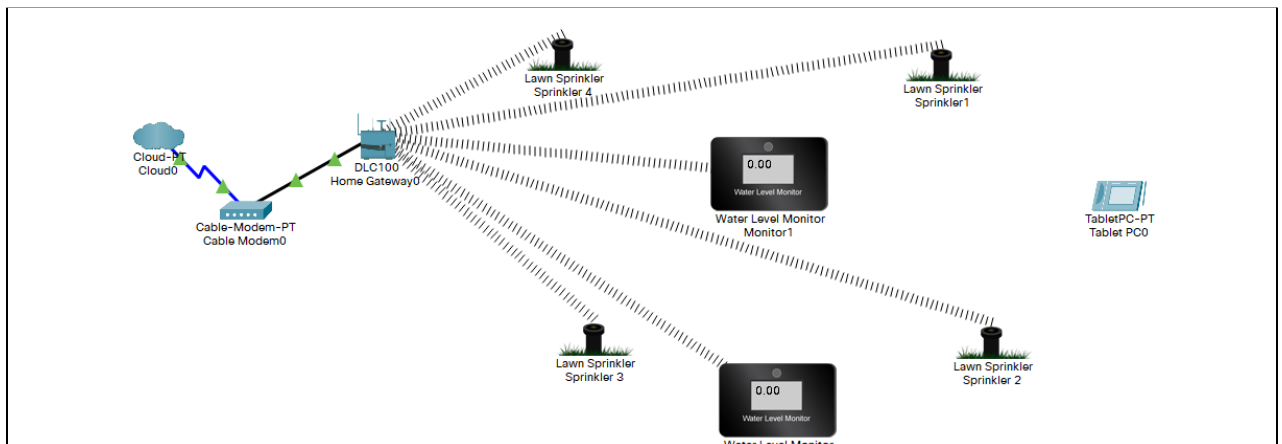
- Click on **Sprinkler**.
- Click on **Advanced** at the right bottom corner.
- Click on **I/O Config**.
- Select **PT-IOT-NM-1W**.
- Click on **Config**.
- Change the **Display Name**.
- Click on the **DHCP** setting.



14. Do the same settings for water sprinklers too.

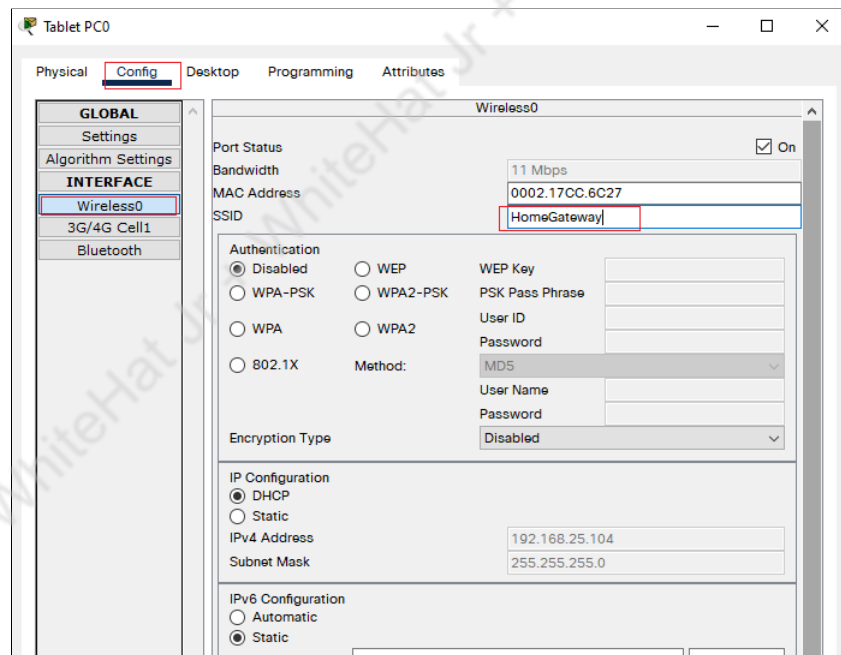
15. To control devices remotely we must need devices such as a laptop, phone, or tablet.

- Go to End devices at the bottom
  - Select **end devices** at the bottom
  - Select **Tablet**



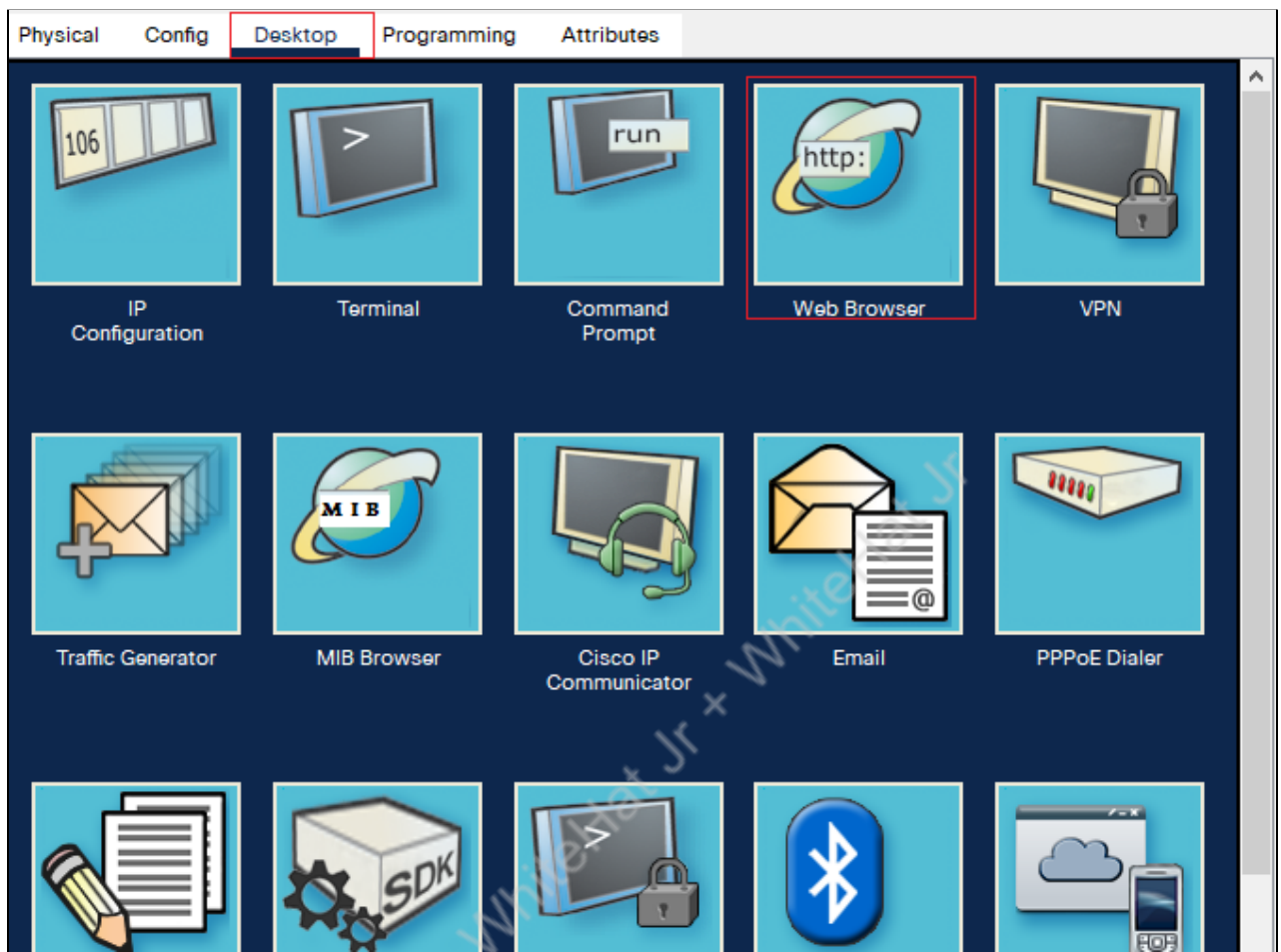
#### 16. Connect the Tablet with HomeGateway

- Click on **config**.
- Click on **wireless**.
- Go to **SSID** and write down **HomeGateway**.



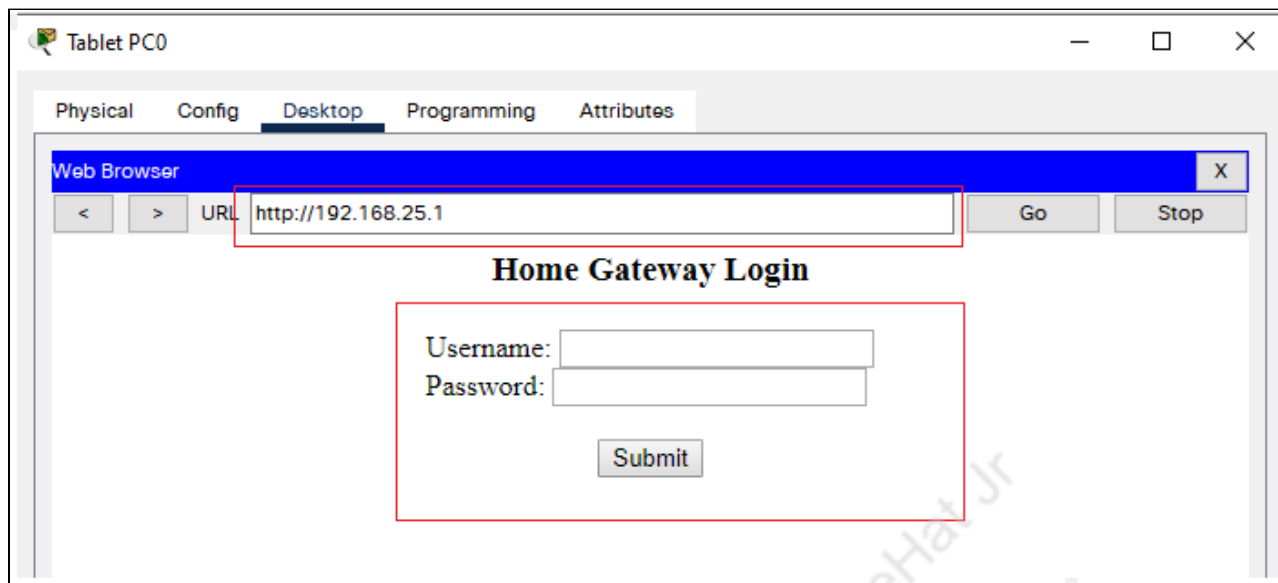
#### 17. Currently, our tablet is connected with **HomeGateway** but we can't see any smart home interface on it. Make an interface for IoT Products.

- Click on **Tablet**.
- Click on **Desktop**.
- Click on **Web Browser**.

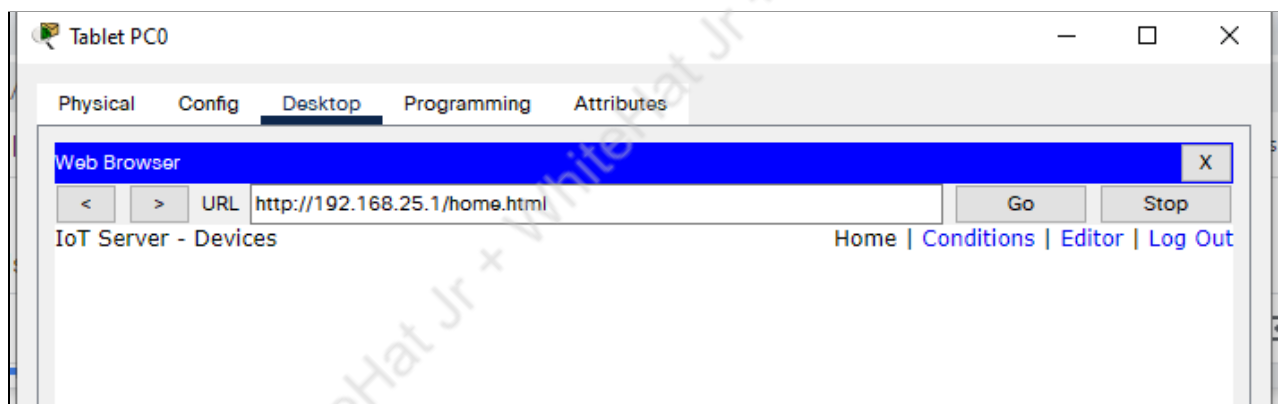


18. WebBrowser Settings: Set the IP address for **Web-Browser settings**:

- Write down the **192.168.25.1** in the **URL** field. This is the IP of the Gateway.
- The **Home Gateway Login** window will appear.
- Write down the username and password as follows:
  - **Username= admin**
  - **Password = admin**
- Click on **Submit**.

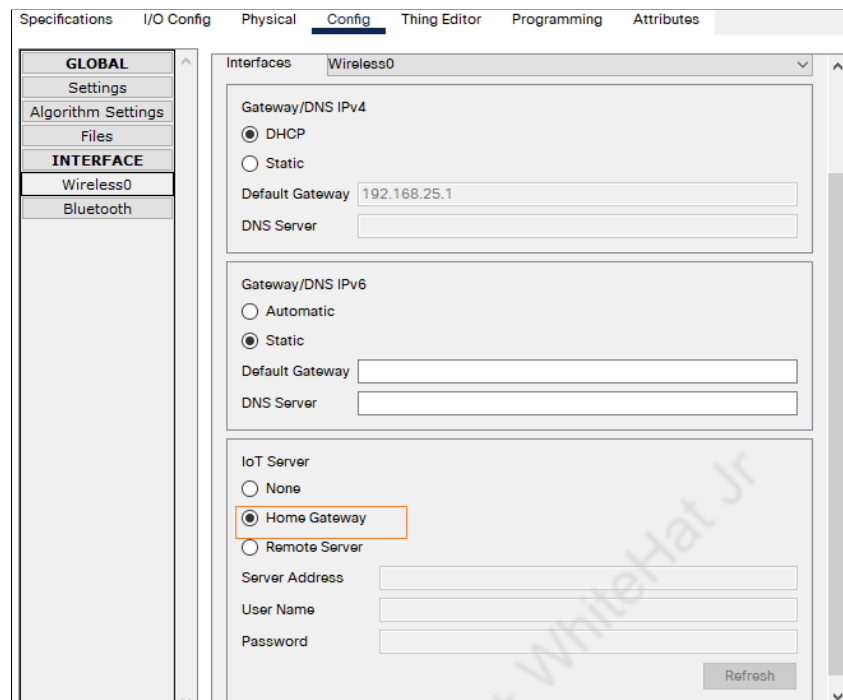


The following window will appear:



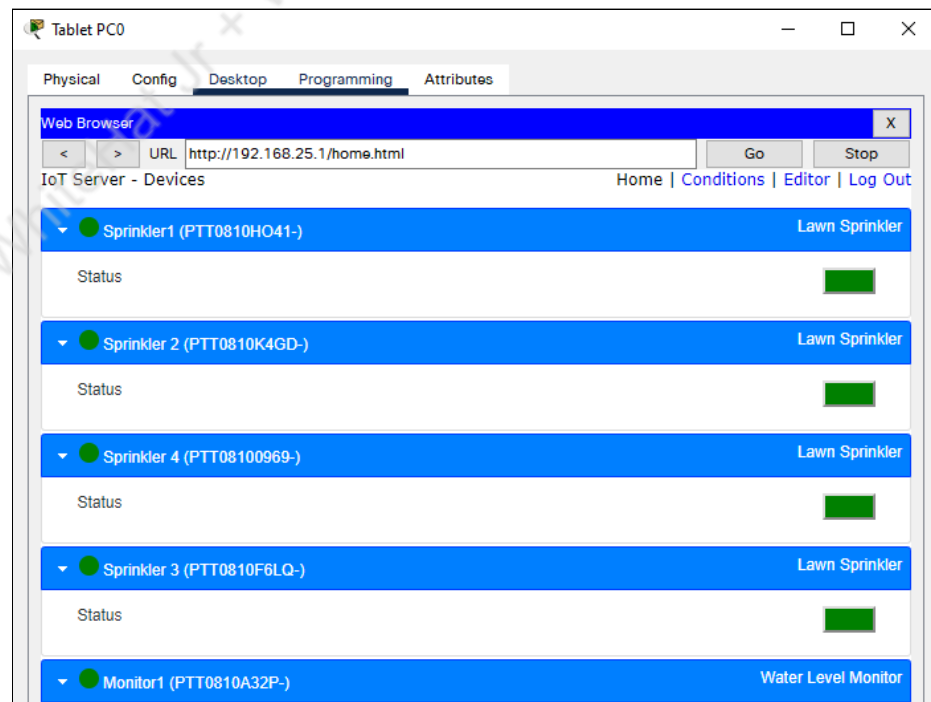
19. You will see that the smart devices, namely the sprinklers and the water level monitor, are not visible on the web server. To make them visible, perform the following steps:

- Click on **Advanced**.
- Click on **Config**.
- Go to **Settings**.
- Go to **IoT Server** and select **Home Gateway**.

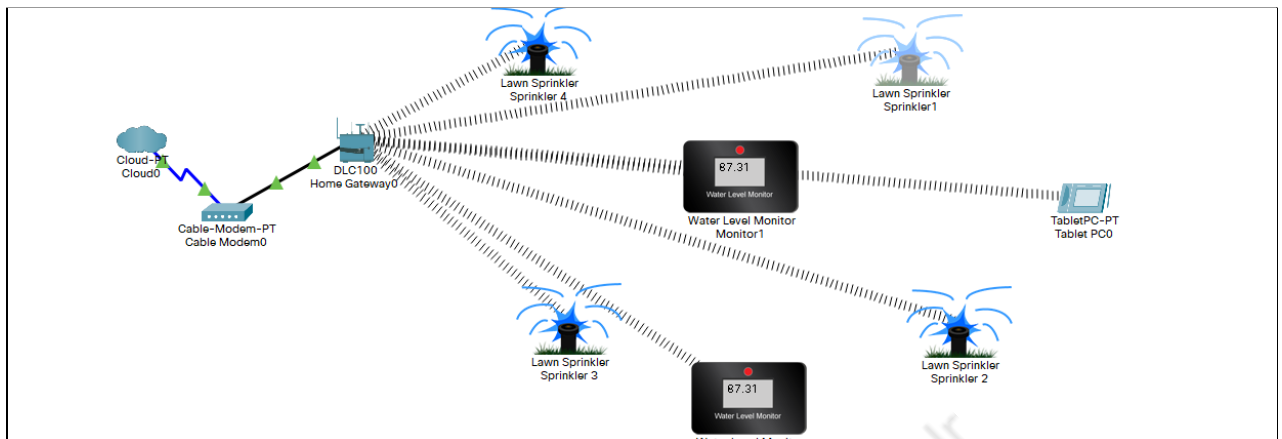


20. Make the smart irrigation interface on tablet as follows.

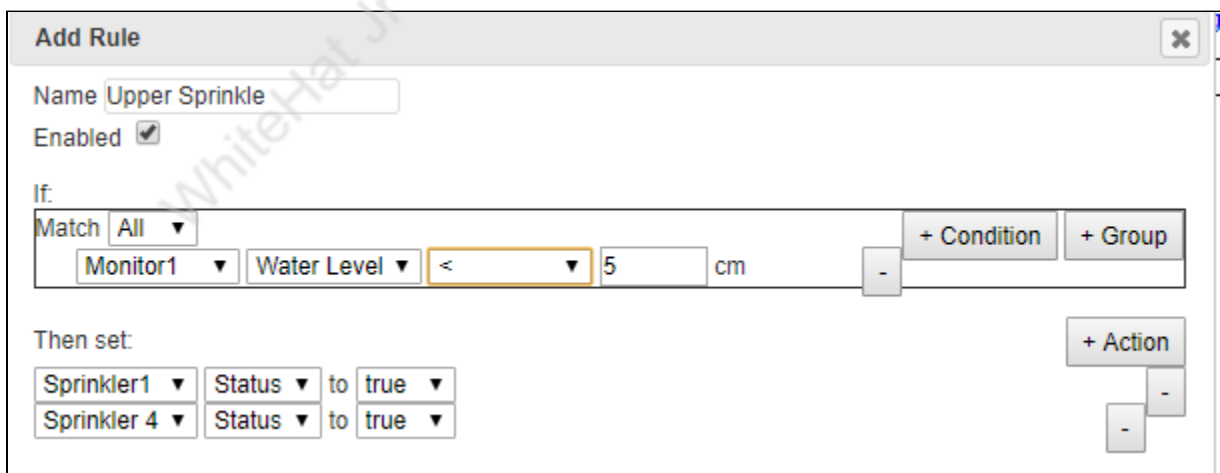
- Go to **Tablet**.
- Enter the **IP Address (192.168.0.1)**, and then write **admin** as the **Username** and **Password**.



Output:

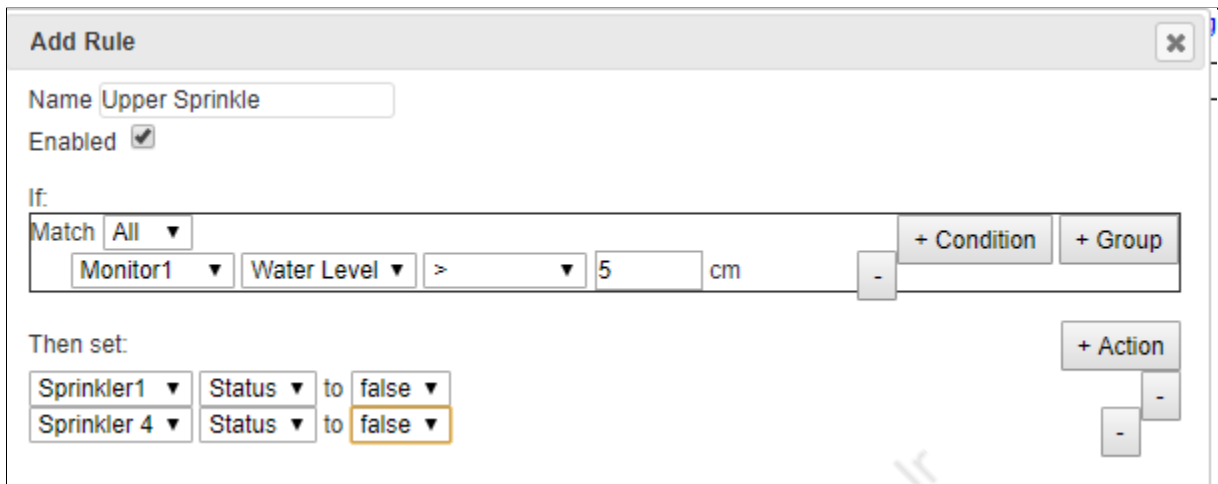


21. Set the conditions for sprinklers to make them work automatically as per soil moisture level.
- Go to **Tablet**.
  - Go to **Web Browser**.
  - Write down IP Address **192.165.25.1**.
  - Write **admin** as both the **Username** and **Password**.
  - Go to **Conditions**.
22. Click on **Add Rule**.
- Name them (you may choose any name.)
  - Go to **Match**.
  - Set the condition for water level monitor. A water level of less than 5 cm should result in the uppers sprinklers (Sprinklers 1 and 4) being turned on.



23. If the water level detected is greater than 5 cm, then set **Sprinkler1** and **Sprinkler 4** as **false**.





**Add Rule**

Name: Upper Sprinkle

Enabled: ☒

If:

Match: All

Monitor1 Water Level > 5 cm

+ Condition + Group


Then set:

Sprinkler1 Status to false

Sprinkler 4 Status to false

+ Action

24. Repeat the same for bottom sprinklers and set the same conditions for **Monitor2**. Turn off the bottom sprinklers if the water level is greater than 5 cm, otherwise turn them on.



**Add Rule**

Name: Bottom Sprinkle

Enabled: ☒

If:

Match: All

Monitor2 Water Level > 5 cm

+ Condition + Group

Then set:

Sprinkler 2 Status to false

Sprinkler 3 Status to false

+ Action

25. Turn on the bottom sprinklers if the water level is less than 5 cm, otherwise turn them off.

Add Rule

Name

Bottom Sprinkle

Enabled

☒

If:

Match

All

Monitor2

Water Level

<

5

cm

+ Condition

+ Group

Then set:

Sprinkler 2

Status

to

true

Sprinkler 3

Status

to

true

+ Action

26. The **Conditions** should look like this:

Tablet PC0

Physical

Config

Desktop

Programming

Attributes

Web Browser

<

>

URL

http://192.168.25.1/conditions.html

Go

Stop

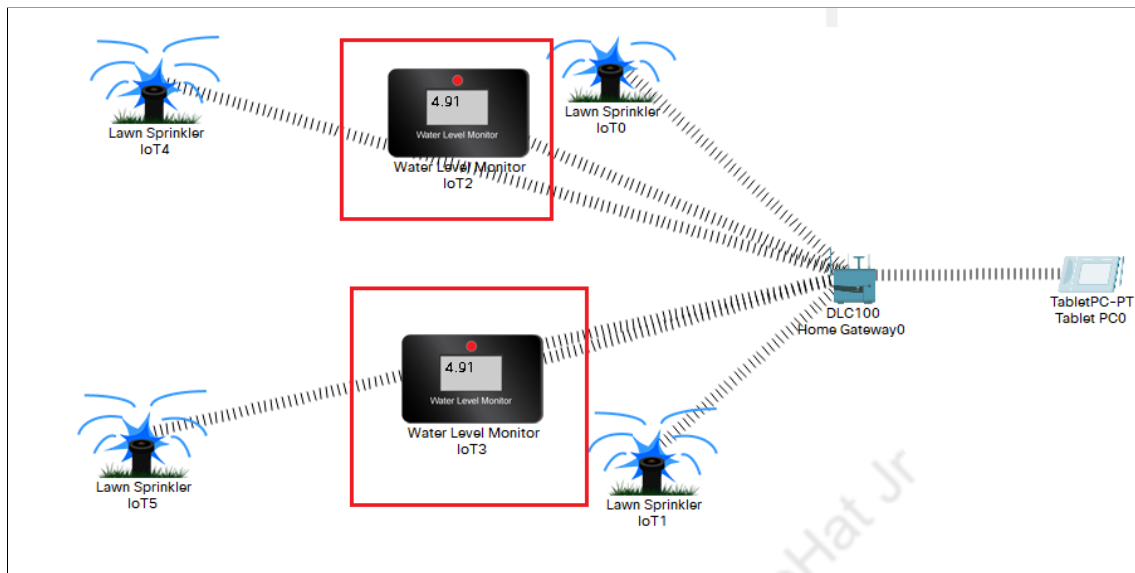
IoT Server - Device Conditions

[Home](#) | [Conditions](#) | [Editor](#) | [Log Out](#)

Actions	Enabled	Name	Condition	Actions
<div>Edit</div> <div>Remove</div>	Yes	Bottom Sprinkle	Monitor2 Water Level < 5.0 cm	<div>Set Sprinkler 2 Status to true</div> <div>Set Sprinkler 3 Status to true</div>
<div>Edit</div> <div>Remove</div>	Yes	Bottom Sprinkler	Monitor2 Water Level > 5.0 cm	<div>Set Sprinkler 2 Status to false</div> <div>Set Sprinkler 3 Status to false</div>
<div>Edit</div> <div>Remove</div>	Yes	Upper Sprinkler	Monitor1 Water Level < 5.0 cm	<div>Set Sprinkler1 Status to true</div> <div>Set Sprinkler 4 Status to true</div>
<div>Edit</div> <div>Remove</div>	Yes	Upper Sprikler	Monitor1 Water Level > 5.0 cm	<div>Set Sprinkler1 Status to false</div> <div>Set Sprinkler 4 Status to false</div>

Add

Output:



We have successfully learned how to do IoT simulation. Using this, we can see how the IoT works in real life too.

### What's next?

In the next class, we will learn about **Visual Signals**.

### EXTEND YOUR KNOWLEDGE:

Learn more about [IoT](#) here.