Jupyter Lab environment construction

Jupyter Lab is a web-based interactive development environment that supports multiple programming languages; it provides a flexible workspace that can perform various data science tasks such as data cleaning, visualization, and machine learning modeling.

1. Install Jupyter Lab

- Check the system python version

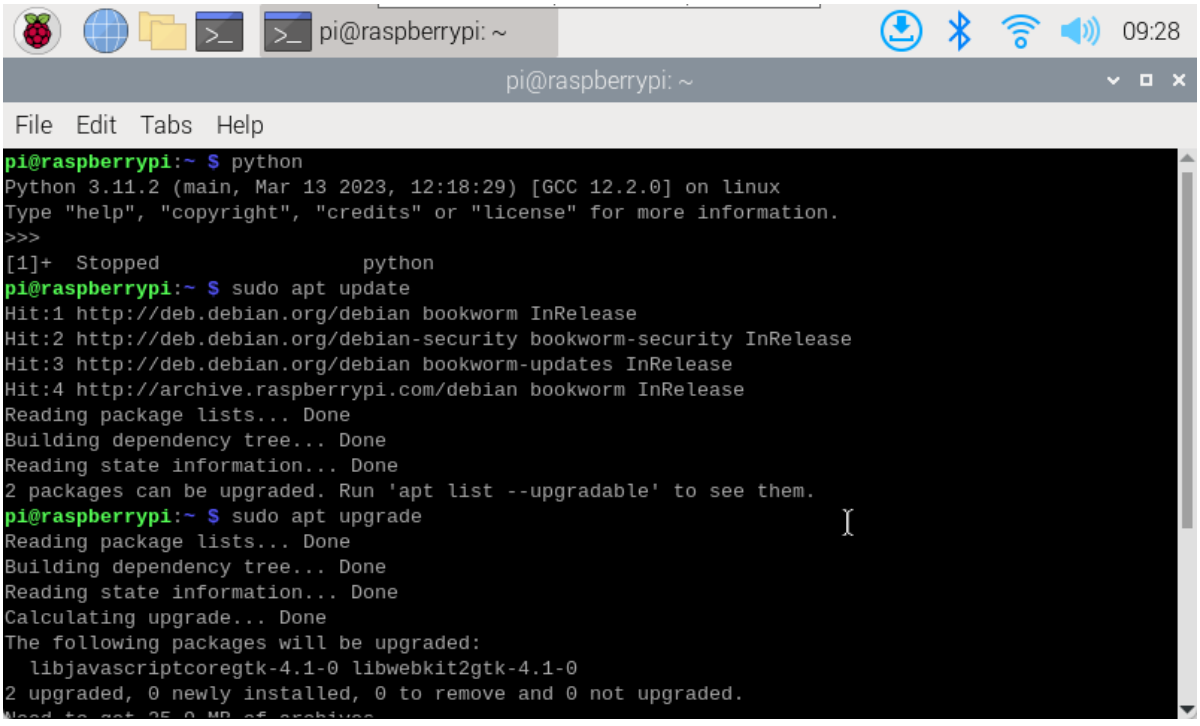
Enter the command in the terminal:

```
python
```

- Install Jupyter Lab

Update the repository list and software before installing the software:

```
sudo apt update
sudo apt upgrade
```



Install Jupyter Lab in a Python 3 environment and enter the command in the terminal:

```
sudo pip3 install jupyterlab
```

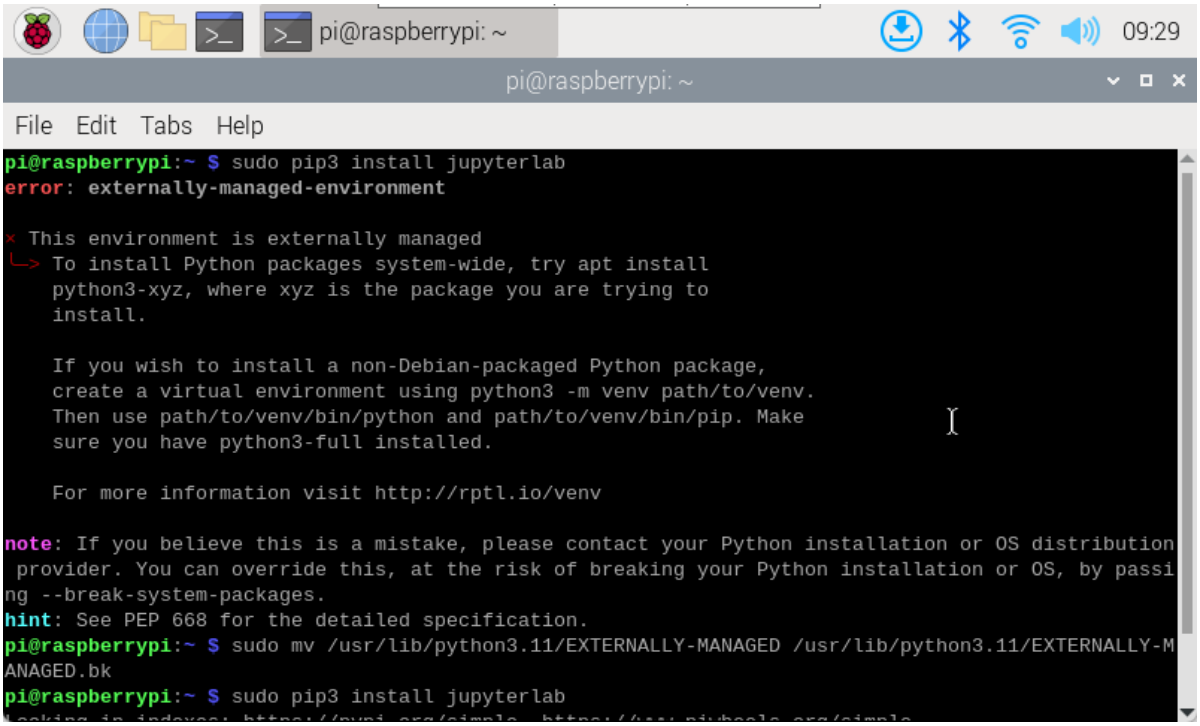
If the download fails multiple times, you can specify the Python software package mirror address of Tsinghua University to speed up domestic downloads:

```
sudo pip3 install jupyterlab -i https://pypi.tuna.tsinghua.edu.cn/simple
```

- Error reporting and resolution

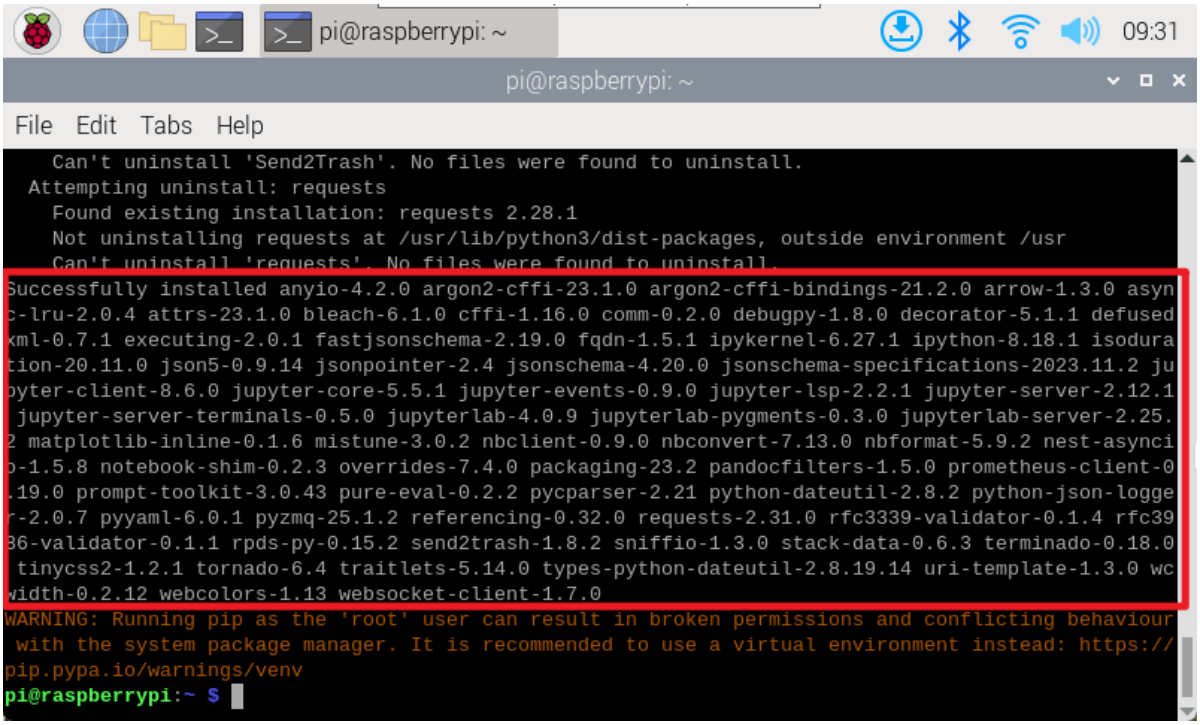
If you directly enter the command to install Jupyter Lab in the terminal, an "error: externally-managed-environment" error will appear. You can use the following command to solve it: The python version is modified according to the version of your own system. My current system version is 3.11.

```
sudo mv /usr/lib/python3.11/EXTERNALLY-MANAGED /usr/lib/python3.11/EXTERNALLY-MANAGED.bk
```



- Installation success prompt

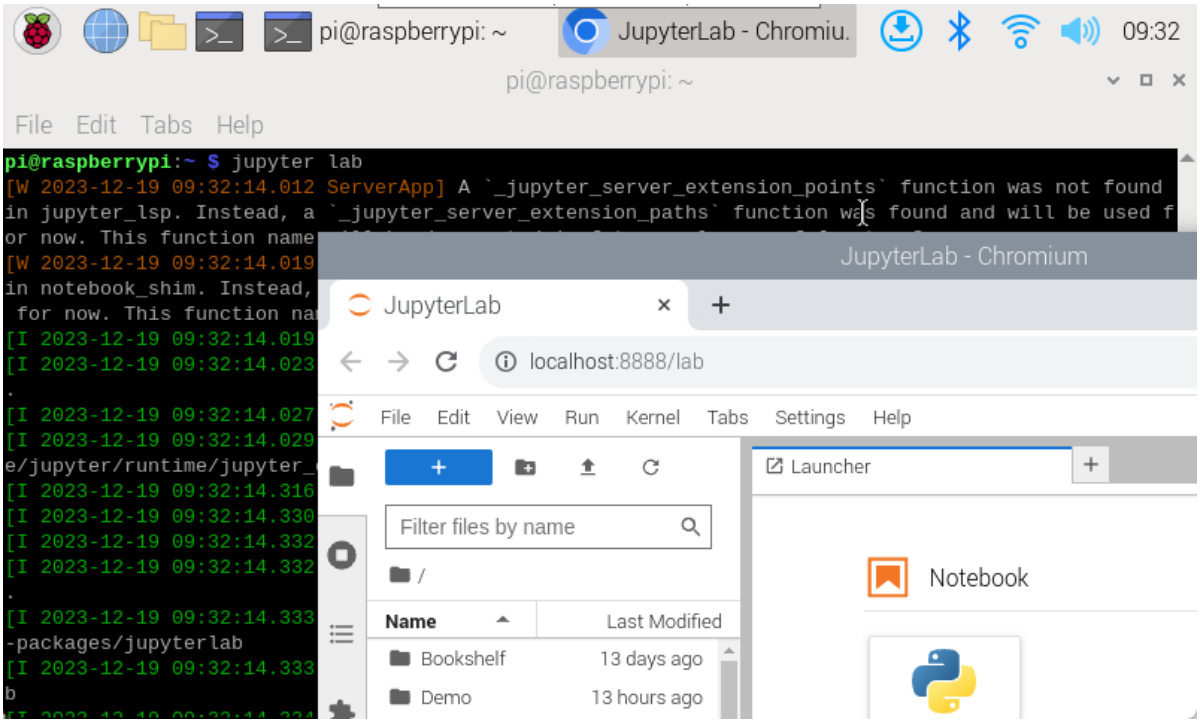
The following prompt appears indicating that the installation is successful.



2. Open Jupyter Lab

Just enter jupyter lab in the terminal. If you need a password, you can follow the fourth step of the tutorial to set the password before using it!

```
jupyterlab
```



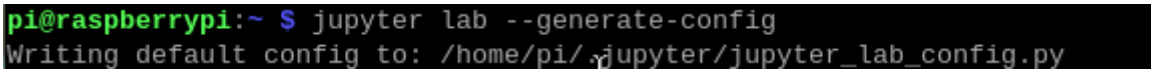

```
Before installing Jupyter Lab, select the system default browser, otherwise
Jupyter Lab will not be started directly from the browser;
Use the sudo command to install jupyter lab. The warning message that appears can
be ignored.
```

3. Set up LAN to access jupyter lab

- Create configuration file

The generated configuration file path is the path to the file that will be modified later.

```
jupyter lab --generate-config
```

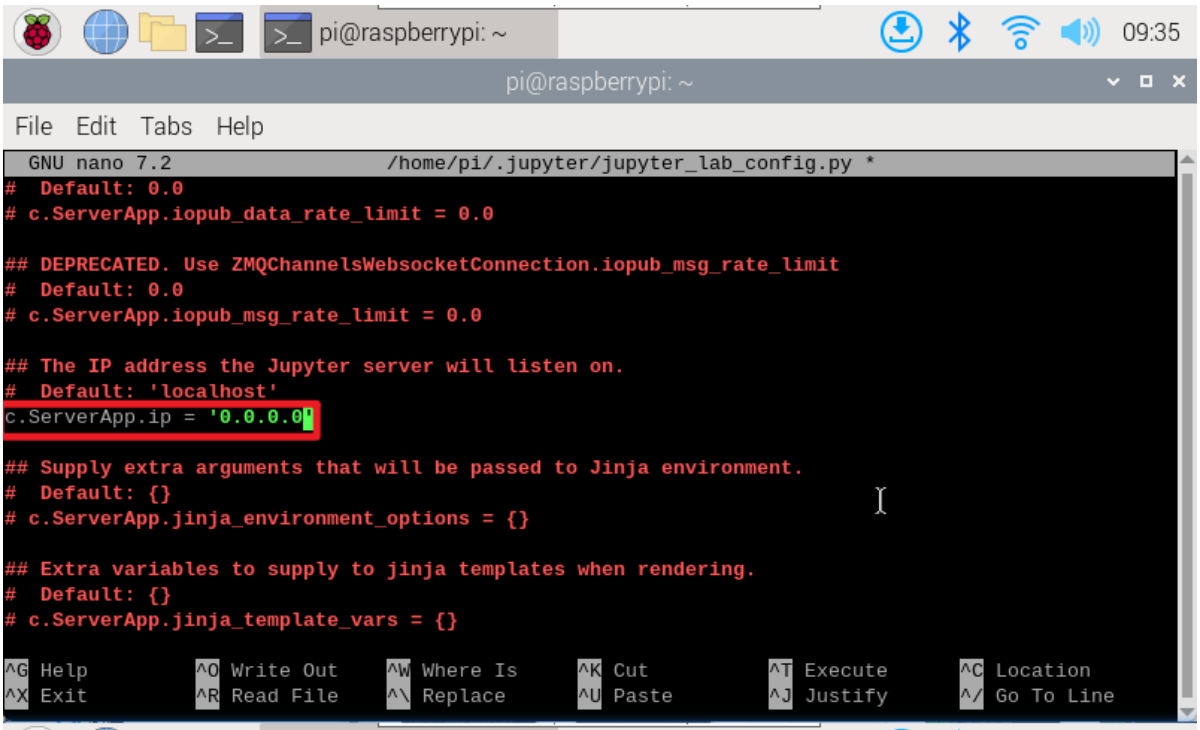


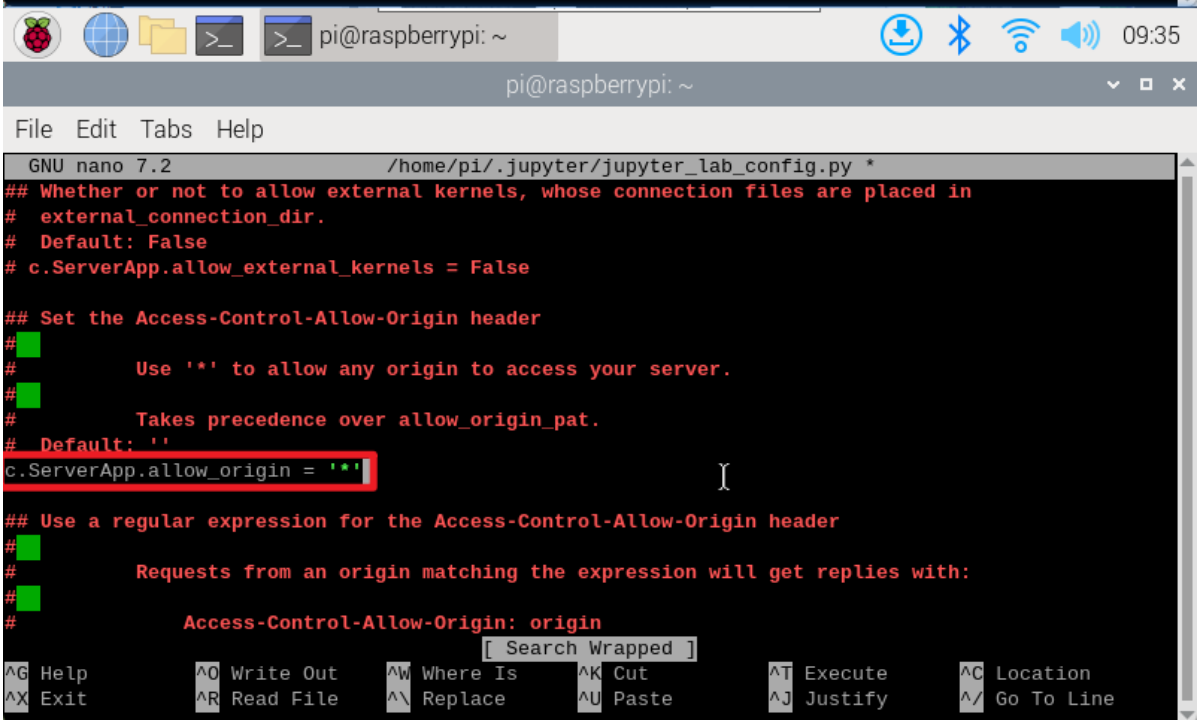
- Modify configuration file

```
sudo nano /home/pi/.jupyter/jupyter_lab_config.py
```

```
Uncomment the content of the file and modify it to the following content: You can
use the Ctrl+W shortcut key to search for keywords in the nano editor
c.ServerApp.allow_origin = '*'
c.ServerApp.ip = '0.0.0.0'
```

Press Ctrl+X, enter Y, then press Enter to save and exit editing!

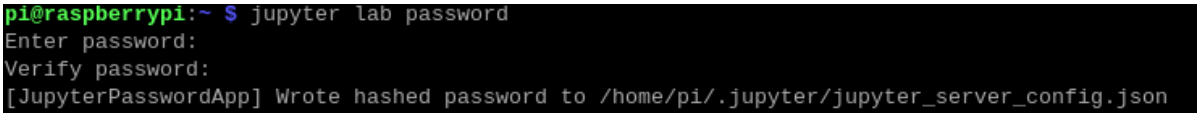




4. Set up access to jupyter lab

Enter the command to set the password on the terminal. You need to enter it twice. Entering the password will not display the input content.

```
jupyter lab password
```

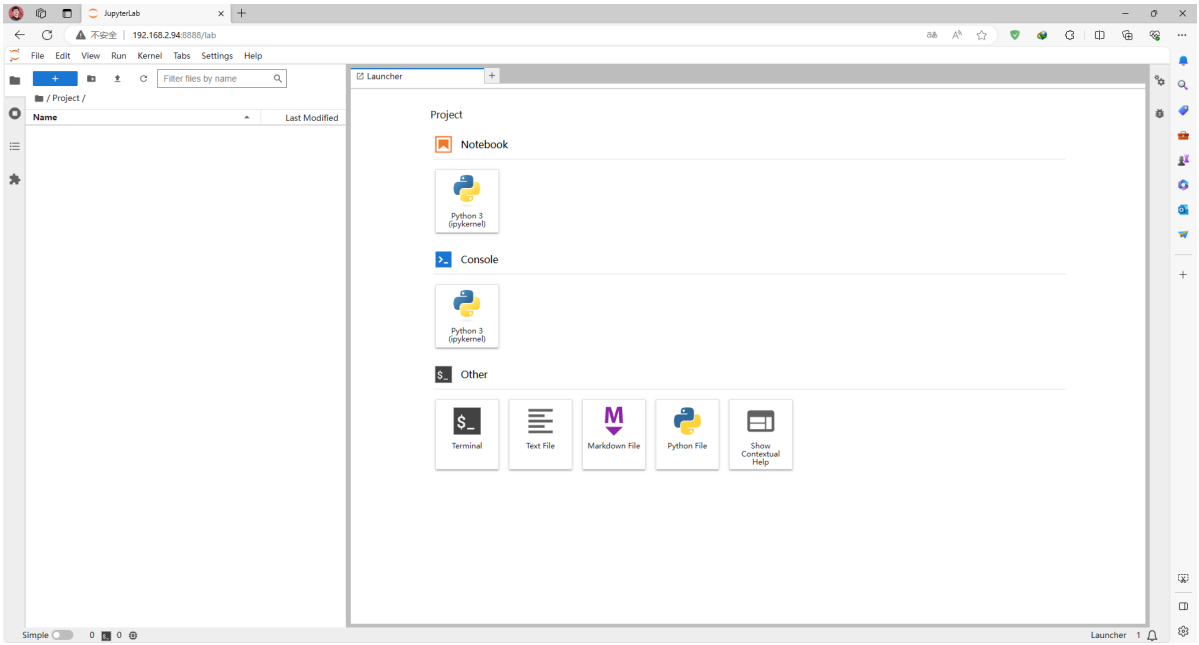


Restart the Raspberry Pi after setting the password!

- verify

Devices on the same LAN can enter IP:8888 in the browser to access!

```
The password is the password set before: yahboom
```



5. Set jupyter lab to start automatically after booting

After completing the above steps, you need to enter a command in the terminal every time you use juypter lab; for more convenient use, we can configure jupyter lab to start automatically at boot.

- Configure startup items

Enter the following command in the terminal:

```
sudo nano /etc/systemd/system/jupyter.service
```

Add the following content to the file:

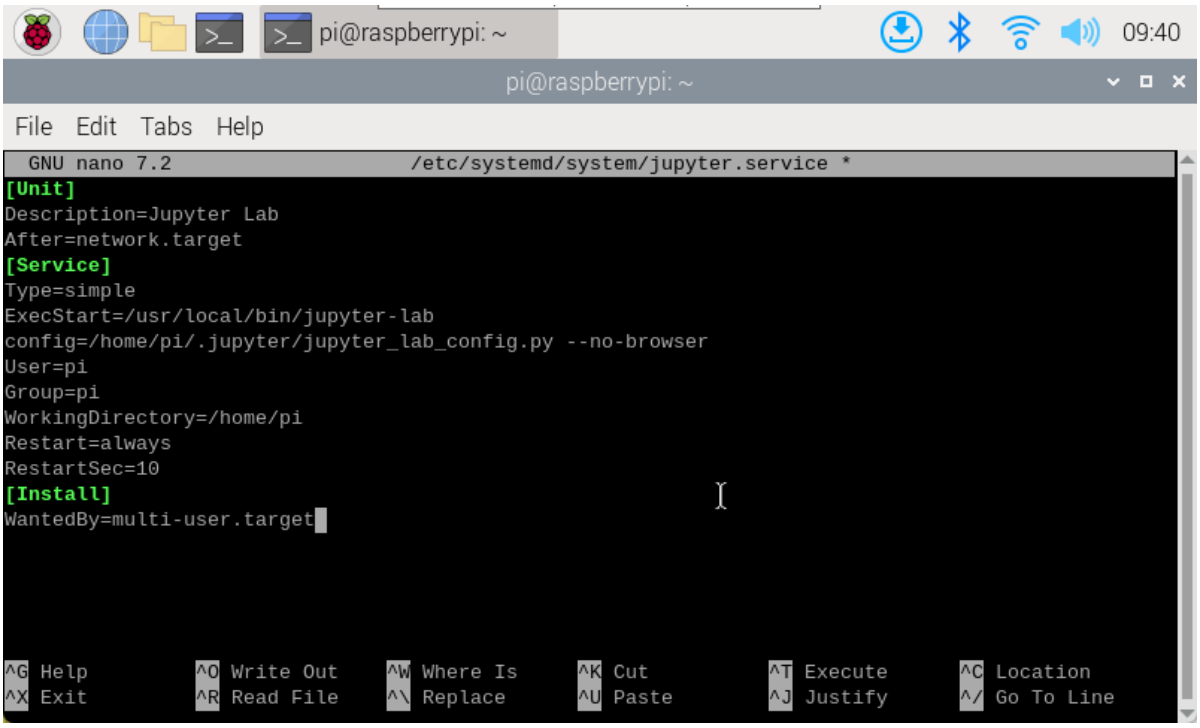
```
[Unit]
Description=Jupyter Lab
After=network.target
[Service]
Type=simple
ExecStart=/usr/local/bin/jupyter-lab
config=/home/pi/.jupyter/jupyter_lab_config.py --no-browser
User=pi
Group=pi
WorkingDirectory=/home/pi
Restart=always
RestartSec=10
[Install]
WantedBy=multi-user.target
```

pi: my current system username

ExecStart: The command to start Jupyter lab, change it to the installation path and configuration file path of JupyterLab (if the steps are all according to our operations, then enter the same path)

```
Check the Jupyter-lab installation path: which jupyter-lab
The configuration file path refers to the path to the configuration file
generated above.
```

WorkingDirectory: The working directory of Jupyter-lab, which can be changed by yourself



- jupyter.service service

Enable auto-start at boot

```
sudo systemctl enable jupyter
```

Disable auto-start at boot

```
sudo systemctl disable jupyter
```

Start service

```
sudo systemctl start jupyter
```

Out of service

```
sudo systemctl stop jupyter
```

Check service status

```
sudo systemctl status jupyter
```

Enter the enable jupyter.service service self-start and start service commands in the terminal and then restart the Raspberry Pi system.

```
pi@raspberrypi:~ $ sudo nano /etc/systemd/system/jupyter.service
pi@raspberrypi:~ $ sudo systemctl enable jupyter
Created symlink /etc/systemd/system/multi-user.target.wants/jupyter.service → /etc/systemd/system/
jupyter.service.
pi@raspberrypi:~ $ sudo systemctl start jupyter
```

After completing the above steps, you can access the LAN without typing jupyter lab in the terminal!