

## 2.Environment setup

### 1. Introduction to JupyterLab

JupyterLab is an interactive development environment and the next generation product of Jupyter notebook. It integrates more functions, supports plug-in extensions, and can be run through the web page. It is simple, convenient and powerful. It is a code editor worth using. Artifact.

### 2. Switch to root user

You need to use the root user to install jupyterlab. The root user of the ubuntu mate 20.04 system has no password by default and cannot be switched. Therefore, you need to set a password for root before you can use the root account.

1. Enter the following command to set a password for root, and then enter the same password twice to confirm.

```
sudo passwd
```

```
dofbot@Dofbot:~$ sudo passwd
New password:
Retype new password:
passwd: password updated successfully
dofbot@Dofbot:~$
```

2. Switch to root user

```
sudo su
```

```
dofbot@Dofbot:~$ sudo su
root@Dofbot:/home/dofbot#
```

As you can see from the picture above, you have switched to the root user. And the \$ symbol before the editing command has changed to the # symbol.

### 3. Install JupyterLab

1. Install the ffi library

```
apt-get install libffi-dev
```

```
root@Dofbot:/home/dofbot# apt-get install libffi-dev
Reading package lists... Done
Building dependency tree
Reading state information... Done
libffi-dev is already the newest version (3.3-4).
```

- 2.Install jupyter

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

```

root@dofbot:/home/dofbot# pip3 install -i https://pypi.tuna.tsinghua.edu.cn/simple jupyter
Looking in indexes: https://pypi.tuna.tsinghua.edu.cn/simple
Collecting jupyter
  Using cached https://pypi.tuna.tsinghua.edu.cn/packages/83/df/0f5dd132200728a86190397e1ea87cd76244e42d39ec5e88efd25b2abd7e/jupyter-1.0.0-py2.py3-none-any.whl (2.7 kB)
Collecting ipywidgets
  Using cached https://pypi.tuna.tsinghua.edu.cn/packages/56/a0/dbcf5881bb2f51e8db678211907f16ea0a182b232c591a6d6f276985ca95/ipywidgets-7.5.1-py2.py3-none-any.whl (121 kB)
Collecting jupyter-console

```

### 3. Install jupyter lab

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

```

root@dofbot:/home/dofbot# pip3 install -i https://pypi.tuna.tsinghua.edu.cn/simple jupyterlab
Looking in indexes: https://pypi.tuna.tsinghua.edu.cn/simple
Collecting jupyterlab
  Downloading https://pypi.tuna.tsinghua.edu.cn/packages/31/7b/cd66f306c31a84a53c6a3a86e296586e8664f407a6ac5b7cfe6a433aa8c4/jupyterlab-2.2.9-py3-none-any.whl (7.9 MB)
  | 256 kB 499 kB/s eta 0:00:16

```

4. After the installation is completed, switch back to the normal user

```
su dofbot
```

```

root@dofbot:/home/dofbot# su dofbot
dofbot@dofbot:~$

```

## 4. Configure JupyterLab

1. Generate configuration file

```
jupyter notebook --generate-config
```

```

dofbot@dofbot:~$ jupyter notebook --generate-config
Writing default config to: /home/dofbot/.jupyter/jupyter_notebook_config.py
dofbot@dofbot:~$ ls ~/.jupyter/
jupyter_notebook_config.py
dofbot@dofbot:~$

```

2. Use ipython to generate the login password for jupyterlab.

```
ipython
```

In In [1] enter: **from notebook.auth import passwd**

In In [2] enter: **passwd()**

Then enter the same password twice and press Enter to confirm. Note that the password here is used to log in to the jupyterlab interface. For ease of remembering, it can be consistent with the user password.

Then the system will output the ciphertext of the password. Copy the entire ciphertext. The ciphertext generated for each password may be different. Please copy the actual output ciphertext.

In In [3] enter: **exit()**

```
In [1]: from notebook.auth import passwd

In [2]: passwd()
Enter password:
Verify password:
Out[2]: 'argon2:$argon2id$v=19$m=10240,t=10,p=8$LG0UnIQ/uacA9Uay8ttsFg$0X5ESjL3HpLKqDKQYpJMzg'

In [3]: exit()
dofbot@Dofbot:~$
```

### 3. Compile jupyter configuration file

```
nano ~/.jupyter/jupyter_notebook_config.py
```

Skip directly to the end and add the following.

```
c.NotebookApp.ip = '0.0.0.0'
c.NotebookApp.open_browser = False
c.NotebookApp.password =***** The entire password ciphertext
c.NotebookApp.port = 8888
```

```
GNU nano 4.8 /home/dofbot/.jupyter/jupyter_notebook_config.py
# TerminalManager(LoggingConfigurable) configuration
#-----
##
## Timeout (in seconds) in which a terminal has been inactive and ready to be
# culled. Values of 0 or lower disable culling.
# Default: 0
# c.TerminalManager.cull_inactive_timeout = 0
## The interval (in seconds) on which to check for terminals exceeding the
# inactive timeout value.
# Default: 300
# c.TerminalManager.cull_interval = 300

c.NotebookApp.ip = '0.0.0.0'
c.NotebookApp.open_browser = False
c.NotebookApp.password = 'argon2:$argon2id$v=19$m=10240,t=10,p=8$LG0UnIQ/uacA9Uay8ttsFg$0X5ESjL3HpLKqDKQYpJMzg'
c.NotebookApp.port = 8888

[ Wrote 1258 lines ]
```

Save and exit.

## 5. Install jupyterlab plug-in

### 1. Install nodejs and npm

```
sudo apt install nodejs npm
```

```
dofbot@Dofbot:~$ sudo apt install nodejs npm
正在读取软件包列表... 完成
正在分析软件包的依赖关系树
正在读取状态信息... 完成
下列软件包是自动安装的并且现在不需要了:
apt-clone archdetect-deb cython3 dctrl-tools dpkg-repack fltk1.3-doc fluid
fonts-lato gazebo11 gazebo11-common gazebo11-plugin-base girl1.2-json-1.0
girl1.2-nma-1.0 girl1.2-timezonemap-1.0 girl1.2-xkl-1.0 grub-common
ignition-tools libarmadillo-dev libarpack2-dev libatk-bridge2.0-dev
libatspi2.0-dev libavdevice-dev libavfilter-dev libblas-dev libbcfitsio-dev
libbcfitsio-doc libcharls-dev libdap-dev libdapserver7v5
libdart-collision-bullet-dev libdart-collision-ode-dev libdart-dev
libdart-external-ikfast-dev libdart-external-ode4cpsolver-dev
libdart-utils-dev libdart-utils-urdf-dev libdart6 libdart6-collision-bullet
```

2. Install the jupyter widget extension plug-in. Since it needs to be downloaded and compiled, it will take a long time to run, and errors may occur. If an error occurs, re-run the installation.

```
sudo jupyter labextension install @jupyter-widgets/jupyterlab-manager
```

```
dofbot@Dofbot:~$ sudo jupyter labextension install @jupyter-widgets/jupyterlab-m
anager
[sudo] dofbot 的密码:
Building jupyterlab assets (build:prod:minimize)
dofbot@Dofbot:~$ █
```

3. Install statusbar plug-in

```
sudo jupyter labextension install @jupyterlab/statusbar
```

```
dofbot@Dofbot:~$ sudo jupyter labextension install @jupyterlab/statusbar
Building jupyterlab assets (build:prod:minimize)
dofbot@Dofbot:~$ █
```

4. At this point, jupyterlab has been installed.

## 6.Start up jupyterlab

1. Enter the directory where you want to run the code. Here we take creating a new test folder as an example.

```
mkdir test
cd test
```

```
dofbot@Dofbot:~$ mkdir test
dofbot@Dofbot:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  test  Videos
dofbot@Dofbot:~$ cd test
dofbot@Dofbot:~/test$ █
```

- 2.Open jupyterlab

```
jupyter lab
```

```
dofbot@Dofbot:~/test$ jupyter lab
[I 16:19:05.401 LabApp] Writing notebook server cookie secret to /home/dofbot/.local/share/jupyter/runtime/notebook_cookie_secret
[I 16:19:06.045 LabApp] JupyterLab extension loaded from /usr/local/lib/python3.8/dist-packages/jupyterlab
[I 16:19:06.045 LabApp] JupyterLab application directory is /usr/local/share/jupyterlab
[I 16:19:06.052 LabApp] Serving notebooks from local directory: /home/dofbot/test
[I 16:19:06.052 LabApp] Jupyter Notebook 6.1.4 is running at:
[I 16:19:06.052 LabApp] http://Dofbot:8888/
[I 16:19:06.052 LabApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
```

This port number is the port number we need to access. The default is the port number pointed to by `c.NotebookApp.port` in the jupyter configuration file in the previous step.

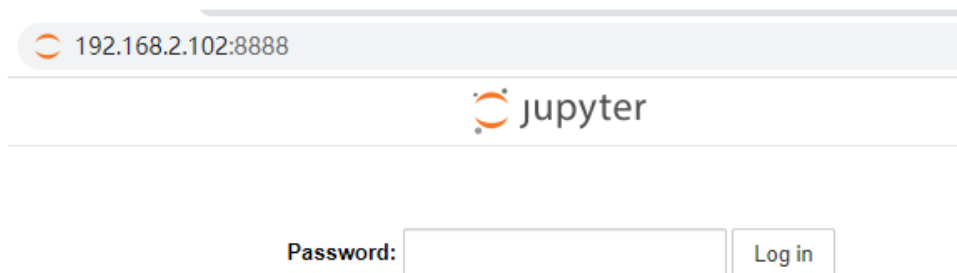
If you open an additional jupyterlab service, the port number will automatically +1, so that different jupyterlabs can be distinguished.

## 7. Remote access jupyterlab

1. Open a browser on your computer (Chrome or Firefox is recommended), and then enter the Raspberry Pi's IP:port number. Here, the IP is 192.168.2.102 and the port is 8888 as an example.

<http://192.168.2.102:8888/>

The jupyterlab interface will pop up and ask for a password. Just fill in the jupyterlab login password set above.

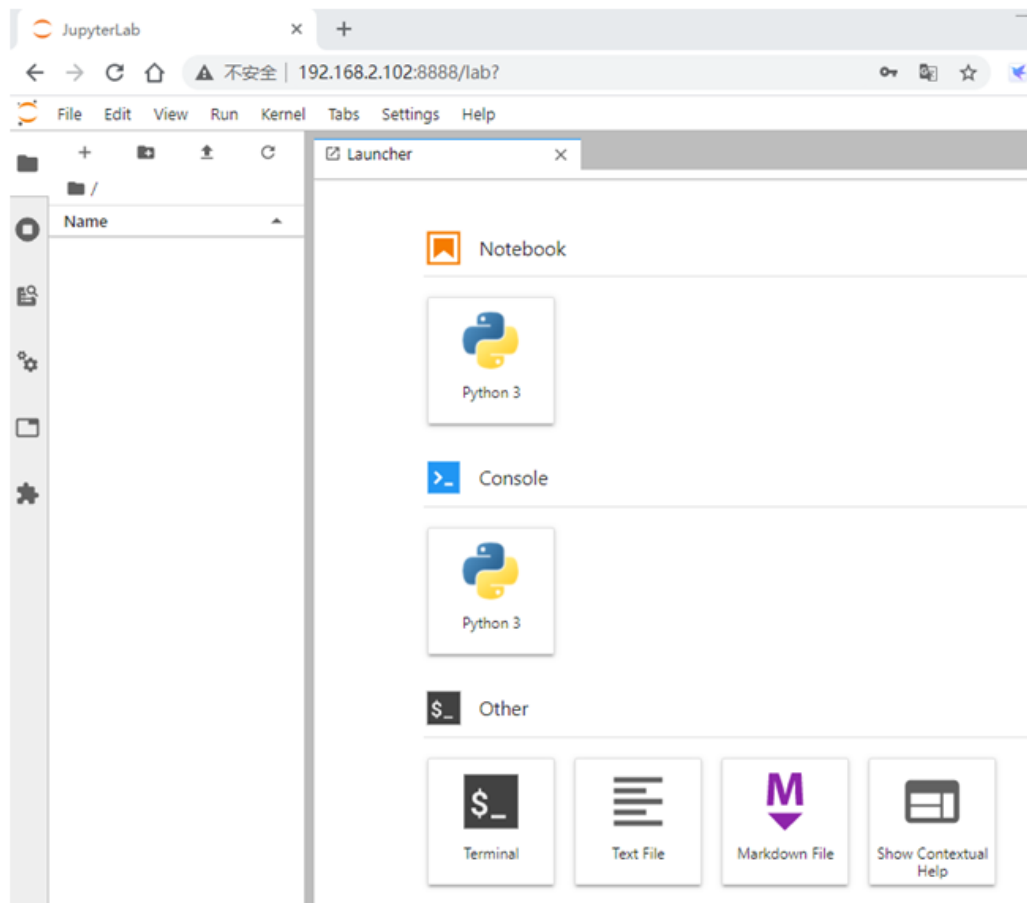


192.168.2.102:8888

jupyter

Password:

2. When you see the following interface, you have successfully logged in to jupyterlab remotely and can create a new Python3 program to run.



## 8. Exit jupyterlab

Press Ctrl+C twice on the terminal where jupyterlab was just opened to exit jupyterlab.