1. Introduction of JupyterLab

JupyterLab is an interactive development environment. It is the next generation of Jupyter notebook. It integrates more functions, supports plug-in extensions, and can run operations through web pages.

2. Start up root user

The root user is required to install jupyterlab, but the root user of the system does not have the password and cannot be switched by default, so we need to set the password for the root user before using the root account.

Note: You need to remember this password.

2.1 Input the following command to set the password for the root user, and then enter the same password twice.

sudo passwd

```
jetson@jetson-desktop:~$ sudo passwd
New password:
Retype new password:
passwd: password updated successfully
```

2.2 Input the following command to switch to root user

sudo su

```
jetson@jetson-desktop:~$ sudo su
[sudo] jetson
root@jetson-desktop:/home/jetson#
```

As shown in the figure above, it means that we have switched to the root user.

3. Install JupyterLab

3.1 Input the following command to install 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).
```

3.2 Input the following command to 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/simp
le jupyter
Looking in indexes: https://pypi.tuna.tsinghua.edu.cn/simple
Collecting jupyter
  Using cached https://pypi.tuna.tsinghua.edu.cn/packages/83/df/0f5dd132200728a8
6190397e1ea87cd76244e42d39ec5e88efd25b2abd7e/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/dbcf5881bb2f51e8
db678211907f16ea0a182b232c591a6d6f276985ca95/ipywidgets-7.5.1-py2.py3-none-any.w
hl (121 kB)
Collecting jupyter-console
```

3.3 Input the following command to 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/simp
le jupyterlab
Looking in indexes: https://pypi.tuna.tsinghua.edu.cn/simple
Collecting jupyterlab
  Downloading https://pypi.tuna.tsinghua.edu.cn/packages/31/7b/cd66f306c31a84a53
c6a3a86e296586e8664f407a6ac5b7cfe6a433aa8c4/jupyterlab-2.2.9-py3-none-any.whl (7
.9 MB)
     |                                | 256 kB 499 kB/s eta 0:00:16
```

3.4 Switch back to normal user after installation is complete

su jetson

```
root@jetson-desktop:/home/jetson# su jetson
jetson@jetson-desktop:~$
```

4. Configurate upyterLab

4.1 Input the following command to generate configuration file

jupyter notebook --generate-config

```
jetson@jetson-desktop:~$ jupyter notebook --generate-config
Writing default config to: /home/dofbot/.jupyter/jupyter_notebook_config.py
jetson@jetson-desktop:~$ ls ~/.jupyter/
jupyter_notebook_config.json  jupyter_notebook_config.py  lab  migrated
```

4.2 Input the following command to generate the log in password for jupyterlab.

ipython

In [1] input command: from notebook.auth import passwd

In [2] input command: passwd()

Then, input the same password twice and press Enter to confirm.

The system will output the cipher text of the password and copy the entire cipher text. The cipher text generated by each password may be different. Please copy the actual output cipher text.

In [3] input command: exit()

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

In [2]: passwd()
Enter password:
Verify password:
Out[2]: 'argon2:$argon2id$v=19$m=10240,t=10,p=8$LGOUnIQ/uacA9Uay8ttsFg$0X5ESjL3H
pLKqDKQYpJMzg'

In [3]: exit()
```

4.3 Compile the configuration file of jupyter

nano ~/.jupyter/jupyter_notebook_config.py

Add the following at the end

c.NotebookApp.ip = '0.0.0.0'

c.NotebookApp.open_browser = False

c.NotebookApp.password = cipher text

c.NotebookApp.port = 8888

```
# 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$m=10240,t=10,p=8$LGOUnIQ/uacA9U
c.NotebookApp.port = 8888

                                [ Wrote 1258 lines ]
```

Finally, press Ctrl+S to save and press Ctrl+X to exit.

5. Install jupyterlab Plug-in

5.1 Input the following command to install nodejs and npm

sudo apt install nodejs npm

```
jetson@jetson-desktop:~$ sudo apt install nodejs npm
```

5.2 Install jupyter widgets, due to it need to download and compile, the running time is longer, and

there may be errors.
if there is an error, run this command again.
sudo jupyter labextension install @jupyter-widgets/jupyterlab-manager

```
jetson@jetson-desktop:~$ sudo jupyter labextension install @jupyter-widgets/jupy
terlab-manager
[sudo] jetson [redacted]:
Building jupyterlab assets (build:prod:minimize)
```

5.3 Input the following command to install statusbar widgets
sudo jupyter labextension install @jupyterlab/statusbar

```
jetson@jetson-desktop:~$ sudo jupyter labextension install @jupyterlab/statusbar
[sudo] jetson [redacted]
Building jupyterlab assets (build:prod:minimize)
```

5.4 After above steps, Jupyterlab has been installed.

6. Start up jupyterlab
6.1 Enter the directory where you want to run the code. Input the following command to create a test directory.
mkdir test
cd test

```
jetson@jetson-desktop:~$ mkdir test
jetson@jetson-desktop:~$ cd test/
jetson@jetson-desktop:~/test$
```

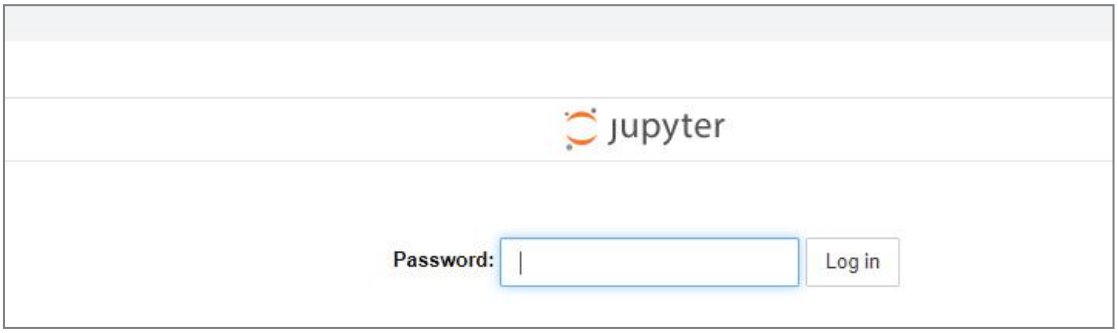
6.2 Open jupyterlab
jupyter lab

```
jetson@jetson-desktop:~/test$ jupyter lab
[I 16:19:05.401 LabApp] Writing notebook server cookie secret to /home/dofbot/.l
ocal/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/jup
yter/lab
[I 16:19:06.052 LabApp] Serving notebooks from local directory: /home/dofbot/tes
t
[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 kern
els (twice to skip confirmation).
```

As shown above, the 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 another jupyterlab service, the port number will be automatically +1, so that we can distinguish different jupyterlab services.

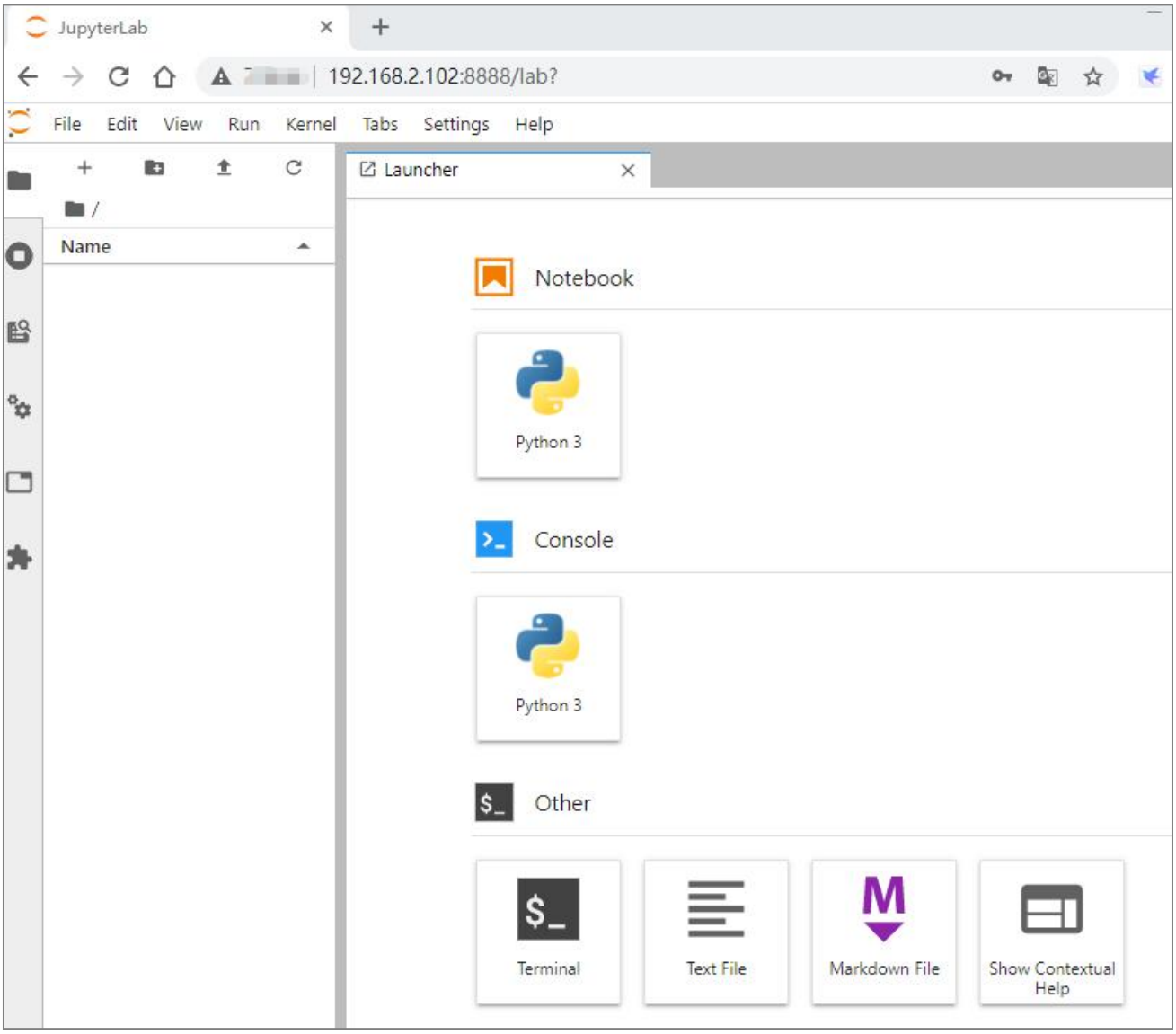
7. Remote access to jupyterlab
7.1 If your DOFBOT is connected to the same LAN as the PC network via WIFI, we can log in directly

on the PC-side Google Chrome or other browser (DOFBOT IP address): 8888 to DOFBOT's Jupyter Lab,
for example: http://192.168.2.102:8888
192.168.1.244 is my DOFBOTIP address. You need to input your own IP address.
As shown below:



2) Input password. If you use image we provided, password is **yahboom**.

7.2 When you seeing the following interface,which means that the successfully remote log in to JupyterLab, and you can create a new Python3 program in here.



8. Exit JupyterLab

Press Ctrl+C twice on the terminal to exit JupyterLab.