

Use Jupyter Lab

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1. Jupyter Lab installation

1.1. Jupyter Lab

Use the following command to install Jupyter Lab: If the download speed of Jupyter Lab is slow, you can use the specified source to install it

```
sudo apt update
sudo apt install python3-pip -y
sudo pip3 install --upgrade pip
```

```
sudo pip3 install jupyterlab
# Tsinghua source: pip3 install jupyterlab -i
https://pypi.tuna.tsinghua.edu.cn/simple
# Alibaba Cloud source: sudo pip3 install jupyterlab -i
https://mirrors.aliyun.com/pypi/simple/
```

```
Jetson@yahboom: ~  
Jetson@yahboom:~$ sudo apt install python3-pip -y  
[sudo] password for jetson:  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
python3-pip is already the newest version (22.0.2+dfsg-1ubuntu0.5).  
The following packages were automatically installed and are no longer required:  
  gdal-data libaec0 libarmadillo10 libarpack2 libavcodec-dev libavformat-dev libavutil-dev libblosc1 libbcfitso9 libcharls2  
  libcd1394-dev libdeflate-dev libdouble-conversion3 libexif-dev libfreexl1 libfyba0 libgdal30 libgdcm-dev libgdcm3.0 libgeos-c1v5  
  libgeos3.10.2 libgeotiff5 libgl2ps1.4 libglew2.2 libgphoto2-dev libhdf4-0-alt libhdf5-103-1 libhdf5-hl-100 libheif1  
  liblmbase-dev libjbig-dev libjpeg-dev libjpeg-turbo8-dev libjpeg8-dev libkmlbase1 libkmldev1 libkmlengine1 libkml1 libminizip1  
  libmysqlclient21 libnetcdf19 libodbc2 libodbcinst2 libogdi4.1 libopencv-calib3d4.5d libopencv-contrib4.5d libopencv-dnn4.5d  
  libopencv-features2d4.5d libopencv-flann4.5d libopencv-highgui4.5d libopencv-imgcodecs4.5d libopencv-imgproc4.5d  
  libopencv-m4.5d libopencv-objectdetect4.5d libopencv-photo4.5d libopencv-shape4.5d libopencv-stitching4.5d libopencv-superres4.5d  
  libopencv-video4.5d libopencv-videoio4.5d libopencv-videostab4.5d libopencv-viz4.5d libopenexr-dev libpng-dev libpq5 libproj22  
  libraw1394-dev librttopo1 libsocket++1 libspatialite7 libsuperlu5 libswresample-dev libswscale-dev libsz2 libtbb-dev  
  libtesseract4 libtiff-dev libtiffxx5 liburiparser1 libvtk9.1 libxerces-c3.2 mysql-common proj-data unixodbc-common  
Use 'sudo apt autoremove' to remove them.  
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.  
Jetson@yahboom:~$ sudo pip3 install --upgrade pip  
Requirement already satisfied: pip in /usr/lib/python3/dist-packages (22.0.2)  
Collecting pip  
  Downloading pip-24.3.1-py3-none-any.whl (1.8 MB)  
    1.8/1.8 MB 128.7 kB/s eta 0:00:00  
Installing collected packages: pip  
  Attempting uninstall: pip  
    Found existing installation: pip 22.0.2  
    Not uninstalling pip at /usr/lib/python3/dist-packages, outside environment /usr  
    Can't uninstall 'pip'. No files were found to uninstall.  
Successfully installed pip-24.3.1  
WARNING: Running pip as the 'root' user can result in broken permissions and conflicting behaviour with the system package manager.  
It is recommended to use a virtual environment instead: https://pip.pypa.io/warnings/venv  
Jetson@yahboom:~$ sudo pip3 install jupyterlab  
Collecting jupyterlab  
  Downloading jupyterlab-4.3.4-py3-none-any.whl.metadata (16 kB)  
Collecting async-lru>=1.0.0 (from jupyterlab)  
  Downloading async_lru-2.0.4-py3-none-any.whl.metadata (4.5 kB)  
Collecting httpx>=0.25.0 (from jupyterlab)  
  Downloading httpx-0.28.1-py3-none-any.whl.metadata (7.1 kB)  
Collecting ipykernel>=6.5.0 (from jupyterlab)
```

```
Jetson@yahboom: ~  
Installing collected packages: webencodings, wcwidth, pure-eval, fastjsonschema, websocket-client, webcolors, uri-template, typing-extensions, types-python-dateutil, traitlets, tornado, tomli, tinycss2, soupsieve, sniffio, send2trash, rpds-py, rfc3986-validator, rfc3339-validator, pyzmq, python-json-logger, python-dateutil, pygments, pycparser, psutil, prompt-toolkit, prometheus-client, platformdirs, parso, pandocfilters, packaging, overrides, nest-asyncio, mistune, jupyterlab-pygments, jsonpointer, json5, Jinja2, h11, fqdn, executing, exceptiongroup, defusedxml, debugpy, charset-normalizer, bleach, babel, attrs, asttokens, terminado, stack_data, requests, referencing, matplotlib-inline, jupyter-core, jedi, httpcore, comm, cffi, beautifulsoup4, async-lru, arrow, anyio, jupyter-server-terminals, jupyter-client, jsonschema-specifications, isoduration, ipython, httpx, argon2-cffi-bindings, jsonschema, ipykernel, argon2-cffi, nbformat, nbclient, jupyter-events, nbconvert, jupyter-server, notebook-shim, jupyterlab-server, jupyter-lsp, jupyterlab  
Attempting uninstall: python-dateutil  
  Found existing installation: python-dateutil 2.8.1  
  Uninstalling python-dateutil-2.8.1:  
    Successfully uninstalled python-dateutil-2.8.1  
Attempting uninstall: packaging  
  Found existing installation: packaging 21.3  
  Uninstalling packaging-21.3:  
    Successfully uninstalled packaging-21.3  
Attempting uninstall: attrs  
  Found existing installation: attrs 21.2.0  
  Uninstalling attrs-21.2.0:  
    Successfully uninstalled attrs-21.2.0  
Attempting uninstall: requests  
  Found existing installation: requests 2.25.1  
  Uninstalling requests-2.25.1:  
    Successfully uninstalled requests-2.25.1  
Successfully installed anyio-4.7.0 argon2-cffi-23.1.0 argon2-cffi-bindings-21.2.0 arrow-1.3.0 asttokens-3.0.0 async-lru-2.0.4 attrs-24.3.0 babel-2.16.0 beautifulsoup4-4.12.3 bleach-6.2.0 cffi-1.17.1 charset-normalizer-3.4.1 comm-0.2.2 debugpy-1.8.11 defusedxml-0.7.1 exceptiongroup-1.2.2 executing-2.1.0 fastjsonschema-2.21.1 fqdn-1.5.1 h11-0.14.0 httpcore-1.0.7 httpx-0.28.1 ipykernel-6.29.5 ipython-8.31.0 isoduration-20.11.0 jedi-0.19.2 Jinja2-3.1.5 json5-0.10.0 jsonpointer-3.0.0 jsonschema-4.23.0 jsonschema-specifications-2024.10.1 jupyter-client-8.6.3 jupyter-core-5.7.2 jupyter-events-0.11.0 jupyter-lsp-2.25.0 jupyter-server-2.15.0 jupyter-server-terminals-0.5.3 jupyterlab-4.3.4 jupyterlab-pygments-0.3.0 jupyterlab-server-2.27.3 matplotlib-inline-0.1.7 mistune-3.0.2 nbclient-0.10.2 nbconvert-7.16.4 nbformat-5.10.4 nest-asyncio-1.6.0 notebook-shim-0.2.4 overrides-7.7.0 packaging-24.2 pandocfilters-1.5.1 parso-0.8.4 platformdirs-4.3.6 prometheus-client-0.21.1 prompt-toolkit-3.0.48 psutil-6.1.1 pure-eval-0.2.3 pycparser-2.22 pygments-2.18.0 python-dateutil-2.9.0.post0 python-json-logger-3.2.1 pyzmq-26.2.0 referencing-0.35.1 requests-2.32.3 rfc3339-validator-0.1.4 rfc3986-validator-0.1.1 rpds-py-0.22.3 send2trash-1.8.3 sniffio-1.3.1 soupsieve-2.6 stack_data-0.6.3 terminado-0.18.1 tinycss2-1.4.0 tomli-2.2.1 tornado-6.4.2 traitlets-5.14.3 types-python-dateutil-2.9.0.20241206 typing-extensions-4.12.2 uri-template-1.3.0 wcwidth-0.2.13 webcolors-24.11.1 webencodings-0.5.1 websocket-client-1.8.0  
WARNING: Running pip as the 'root' user can result in broken permissions and conflicting behaviour with the system package manager, possibly rendering your system unusable. It is recommended to use a virtual environment instead: https://pip.pypa.io/warnings/venv. Use the --root-user-action option if you know what you are doing and want to suppress this warning.  
Jetson@yahboom:~$
```

1.2. Node.js

Use the following command to install the latest Node.js:

```
sudo apt install curl -y
```

```
sudo curl -fsSL https://deb.nodesource.com/setup_22.x | sudo -E bash -
```

```
sudo apt install nodejs -y
```

Verify the version:

```
node -v && npm -v
```

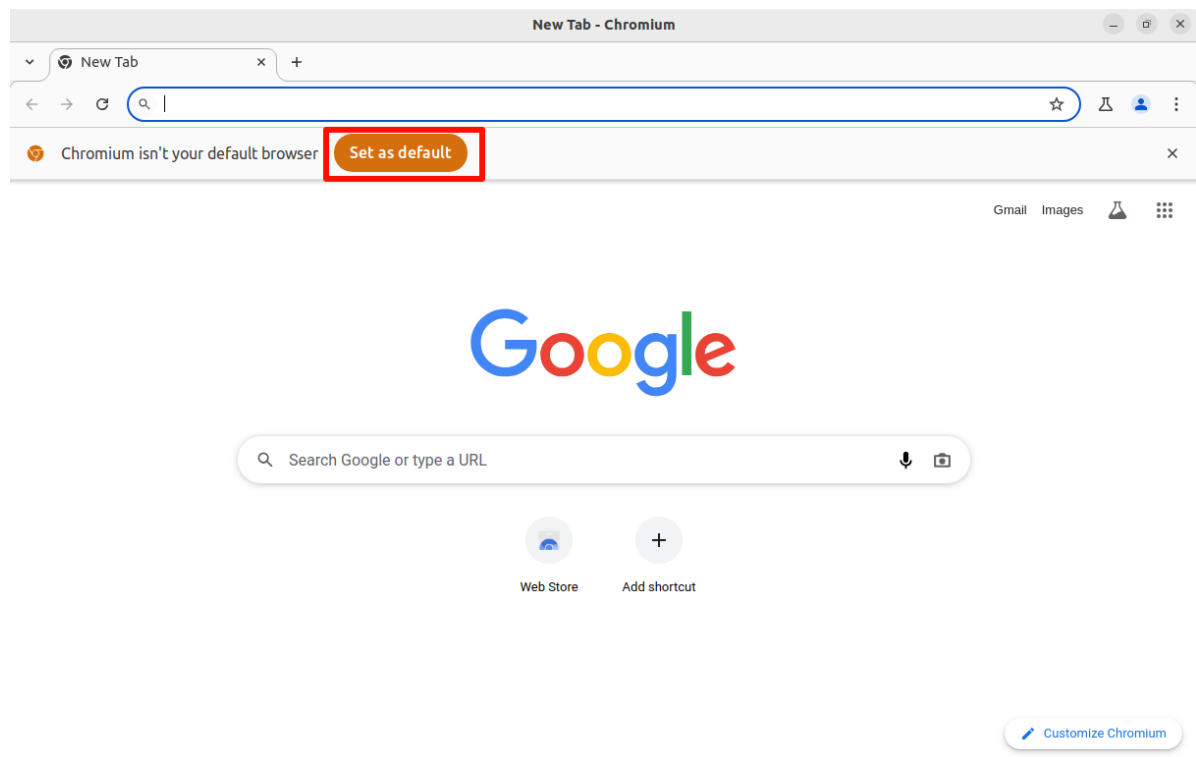
```
jetson@yahboom: ~  
jetson@yahboom:~$ sudo apt install nodejs -y  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
The following packages were automatically installed and are no longer required:  
  gdal-data libaec0 libarmadillo10 libarpack2 libavcodec-dev libavformat-dev libavutil-dev libblosc1 libbcfitsio9  
  libcharls2 libdc1394-dev libdeflate-dev libdouble-conversion3 libexif-dev libfreexl1 libfyba0 libgdal30 libgdcn-dev  
  libgdcn3.0 libgeos-c1v5 libgeos3.10.2 libgeotiff5 libgl2ps1.4 libglew2.2 libgphoto2-dev libhdf4-0-alt libhdf5-103-1  
  libhdf5-hl-100 libheif1 libilmbase-dev libjbig-dev libjpeg-dev libjpeg-turbo8-dev libjpeg8-dev libkmlbase1  
  libkmldev1 libkmlengine1 libkml1 libkmlzip1 libmysqlclient21 libnetcdf19 libodbc2 libodbcinst2 libogdi4.1  
  libopencv-calib3d4.5d libopencv-contrib4.5d libopencv-dnn4.5d libopencv-features2d4.5d libopencv-flann4.5d  
  libopencv-highgui4.5d libopencv-imgcodecs4.5d libopencv-imgproc4.5d libopencv-ml4.5d libopencv-objectdetect4.5d  
  libopencv-photo4.5d libopencv-shape4.5d libopencv-stitching4.5d libopencv-superres4.5d libopencv-video4.5d  
  libopencv-videoio4.5d libopencv-videostab4.5d libopencv-viz4.5d libopenexr-dev libpng-dev libpq5 libproj22  
  libraw1394-dev librttopo1 libsocket++1 libspatialite7 libsuperlu5 libswresample-dev libswscale-dev libsz2  
  libtbb-dev libtesseract4 libtiff-dev libtiffxx5 liburiparser1 libvtk9.1 libxerces-c3.2 mysql-common proj-data  
  unixodbc-common  
Use 'sudo apt autoremove' to remove them.  
The following NEW packages will be installed:  
  nodejs  
0 upgraded, 1 newly installed, 0 to remove and 1 not upgraded.  
Need to get 35.2 MB of archives.  
After this operation, 219 MB of additional disk space will be used.  
Get:1 https://deb.nodesource.com/node_22.x nodistro/main arm64 nodejs arm64 22.12.0-1nodesource1 [35.2 MB]  
Fetched 35.2 MB in 9s (3,804 kB/s)  
debconf: delaying package configuration, since apt-utils is not installed  
Selecting previously unselected package nodejs.  
(Reading database ... 222345 files and directories currently installed.)  
Preparing to unpack .../nodejs_22.12.0-1nodesource1_arm64.deb ...  
Unpacking nodejs (22.12.0-1nodesource1) ...  
Setting up nodejs (22.12.0-1nodesource1) ...  
Processing triggers for man-db (2.10.2-1) ...  
jetson@yahboom:~$ node -v && npm -v  
v22.12.0  
10.9.0  
jetson@yahboom:~$
```

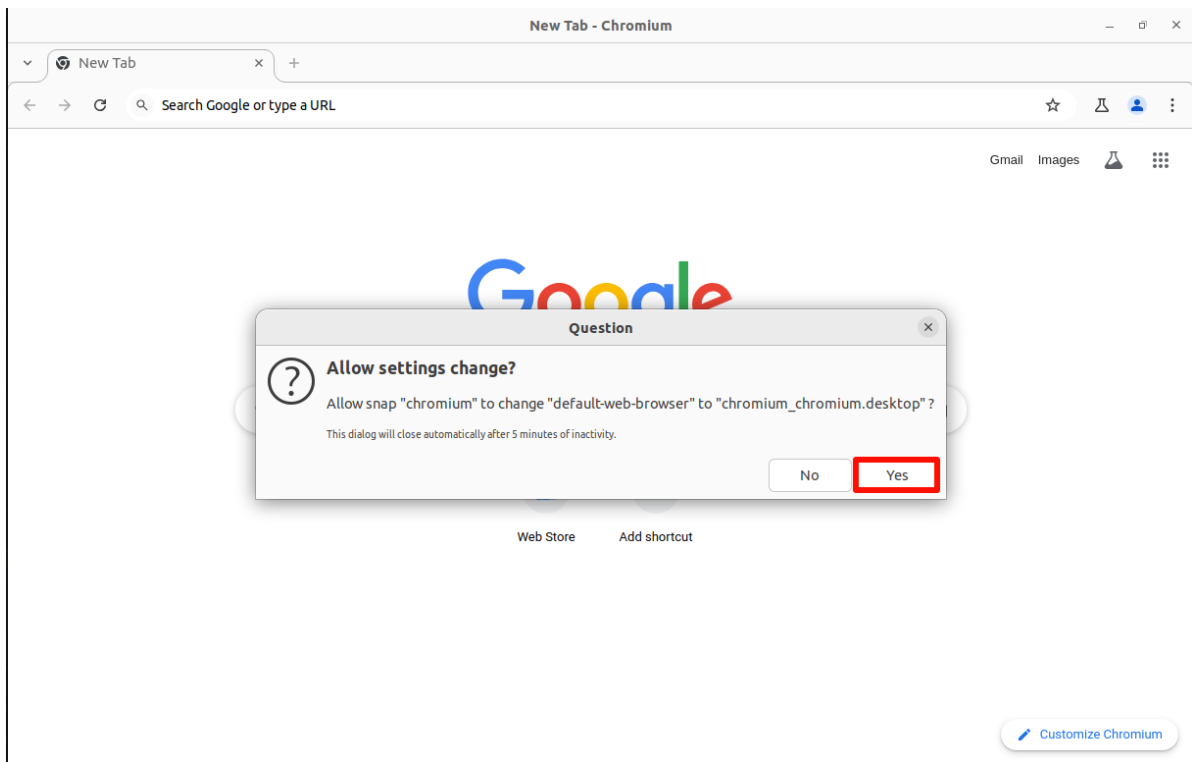
2. Jupyter Lab startup

Before starting Jupyter Lab, you need to set the system default browser, otherwise some prompts will appear when starting the terminal.

2.1. Set the default browser

Open the system Chromium browser and select Set the default browser:



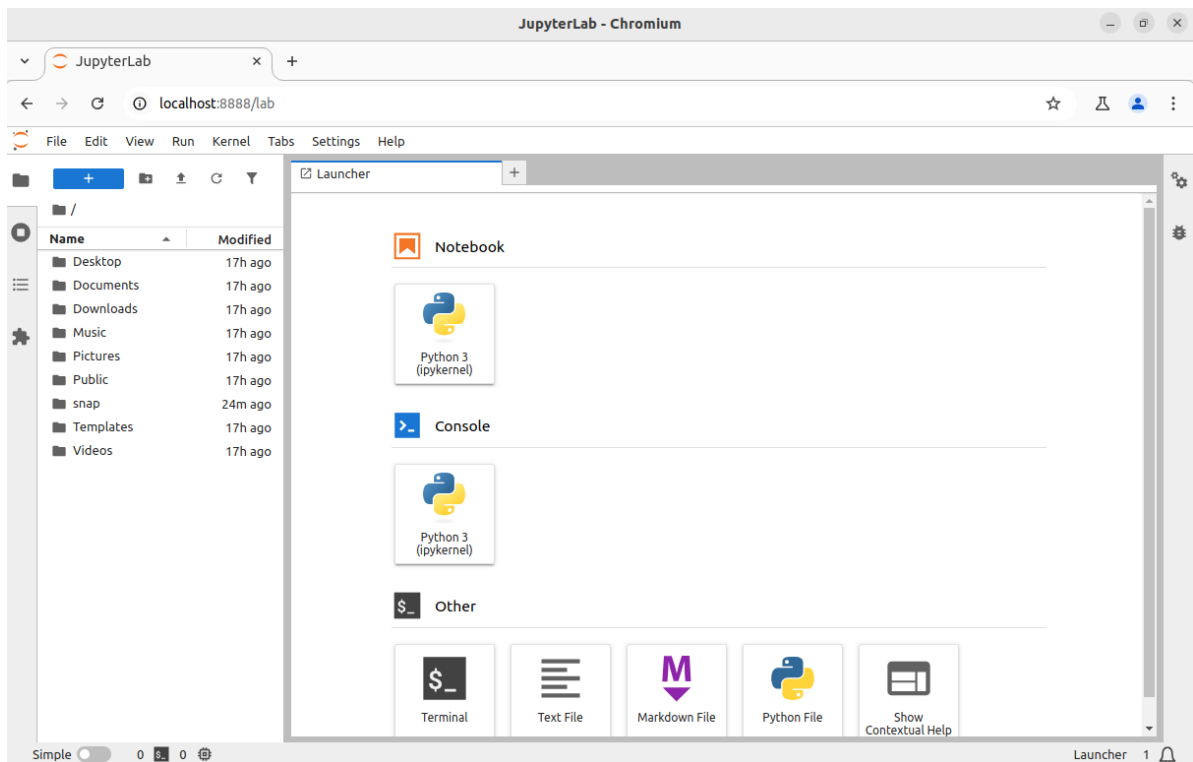


2.2. Start Jupyter Lab

```
jupyter lab
# Start without browser jupyter lab --no-browser
# Start as administrator sudo jupyter lab --allow-root
```

```
jetson@yahboom: ~
jetson@yahboom:~$ jupyter lab
[I 2024-12-26 14:33:04.820 ServerApp] jupyter_lsp | extension was successfully linked.
[I 2024-12-26 14:33:04.828 ServerApp] jupyter_server_terminals | extension was successfully linked.
[I 2024-12-26 14:33:04.836 ServerApp] jupyterlab | extension was successfully linked.
[I 2024-12-26 14:33:05.211 ServerApp] notebook_shim | extension was successfully linked.
[I 2024-12-26 14:33:05.239 ServerApp] notebook_shim | extension was successfully loaded.
[I 2024-12-26 14:33:05.243 ServerApp] jupyter_lsp | extension was successfully loaded.
[I 2024-12-26 14:33:05.245 ServerApp] jupyter_server_terminals | extension was successfully loaded.
[I 2024-12-26 14:33:05.247 LabApp] JupyterLab extension loaded from /usr/local/lib/python3.10/dist-packages/jupyterlab
[I 2024-12-26 14:33:05.248 LabApp] JupyterLab application directory is /usr/local/share/jupyter/lab
[I 2024-12-26 14:33:05.248 LabApp] Extension Manager is 'pypi'.
[I 2024-12-26 14:33:05.356 ServerApp] jupyterlab | extension was successfully loaded.
[I 2024-12-26 14:33:05.357 ServerApp] Serving notebooks from local directory: /home/jetson
[I 2024-12-26 14:33:05.357 ServerApp] Jupyter Server 2.15.0 is running at:
[I 2024-12-26 14:33:05.358 ServerApp] http://localhost:8888/lab?token=74c75cabdb4bf58b7f59673ed6c149e99a3285663eb5755b
[I 2024-12-26 14:33:05.358 ServerApp] http://127.0.0.1:8888/lab?token=74c75cabdb4bf58b7f59673ed6c149e99a3285663eb5755b
[I 2024-12-26 14:33:05.358 ServerApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[C 2024-12-26 14:33:05.392 ServerApp]

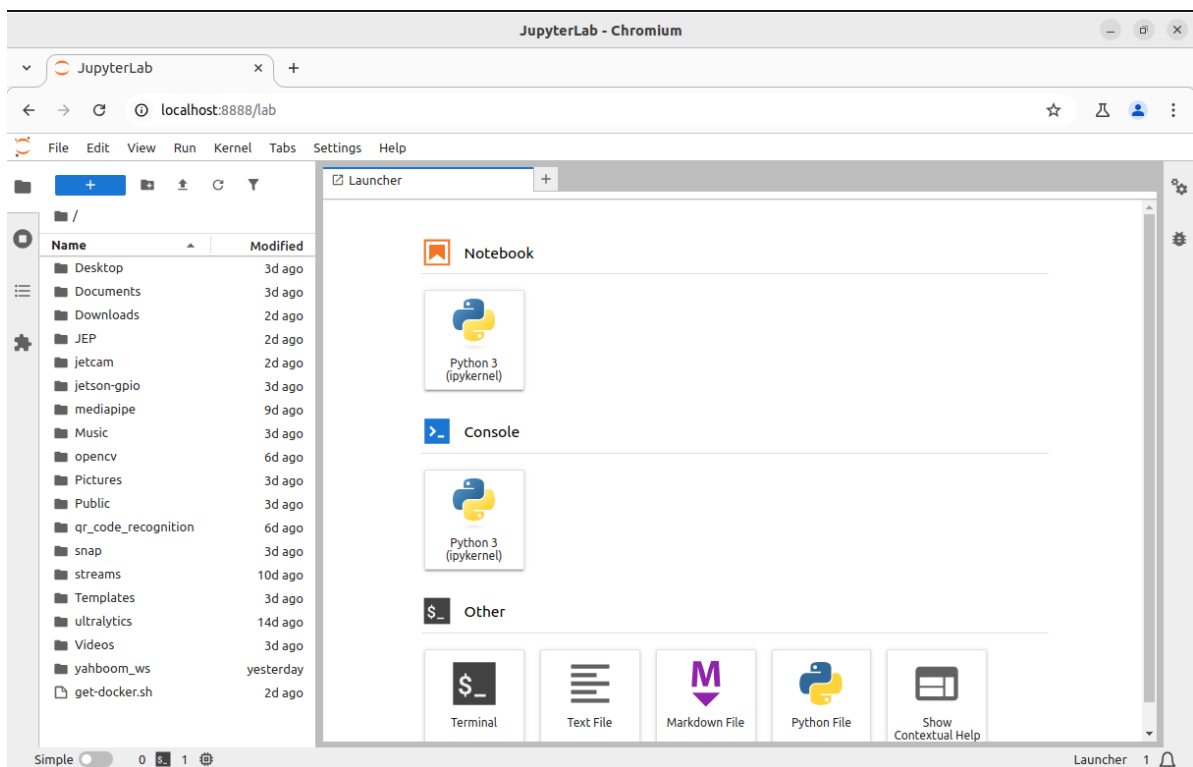
To access the server, open this file in a browser:
file:///home/jetson/.local/share/jupyter/runtime/jpserver-11733-open.html
Or copy and paste one of these URLs:
http://localhost:8888/lab?token=74c75cabdb4bf58b7f59673ed6c149e99a3285663eb5755b
http://127.0.0.1:8888/lab?token=74c75cabdb4bf58b7f59673ed6c149e99a3285663eb5755b
[I 2024-12-26 14:33:05.631 ServerApp] Skipped non-installed server(s): bash-language-server, dockerfile-language-server-nodejs, java
script-typescript-langserver, jedi-language-server, julia-language-server, pyright, python-language-server, python-lsp-server, r-lan
guageserver, sql-language-server, texlab, typescript-language-server, unified-language-server, vscode-css-language-server-bin, vscode
-html-language-server-bin, vscode-json-language-server-bin, yaml-language-server
[I 2024-12-26 14:33:09.487 LabApp] 'sys_prefix' level settings are read-only, using 'user' level for migration to 'lockedExtensions'
[I 2024-12-26 14:33:09.491 LabApp] Build is up to date
```



2.3. Host access

The host refers to the Jetson motherboard system access, which can be accessed directly through <http://localhost:8888/>:

`http://localhost:8888/`



3. Jupyter Lab configuration

Configure LAN access, access password, and auto-start for Jupyter Lab.

3.1. LAN access

Device in the same LAN can be accessed by entering IP:8888 in the browser!

Note: The LAN of the campus network is generally inaccessible. You can change the laptop/mobile phone hotspot to test

For example, the motherboard IP: 192.168.2.114; we can enter 192.168.2.114:8888 through the browser in the same LAN to perform Jupyter Lab on the motherboard

3.1.1, create a configuration file

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

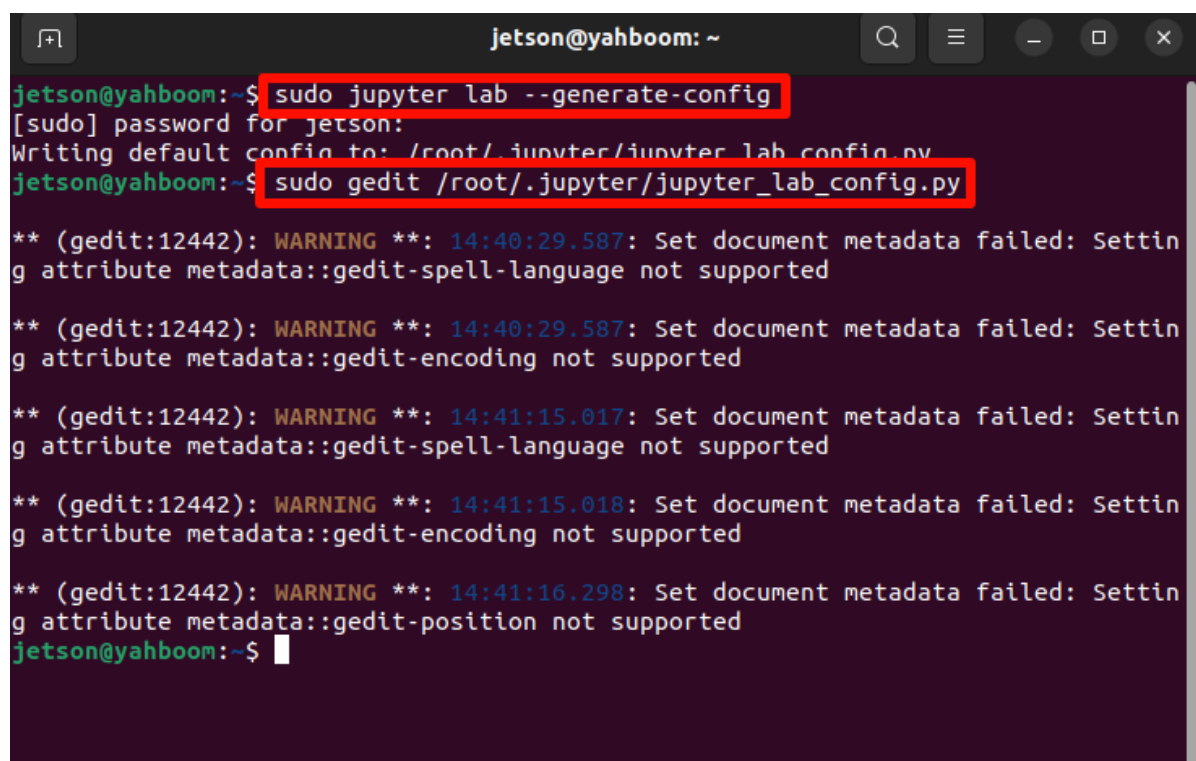
The location of the automatically generated configuration file: Writing default config to: /root/.jupyter/jupyter_lab_config.py

3.1.2, modify the configuration file

```
sudo gedit /root/.jupyter/jupyter_lab_config.py
```

Modified content: After modification, click Save and close the file

```
# Allow requests from any source to access the Jupyter Lab server
c.ServerApp.allow_origin = '*'
# 0.0.0.0 means binding all available network interfaces and allowing access from
any address
c.ServerApp.ip = '0.0.0.0'
# Allow Jupyter Lab server to be started as root user
c.ServerApp.allow_root = True
# Modify the default port to avoid conflicts
c.ServerApp.port = 8888
```



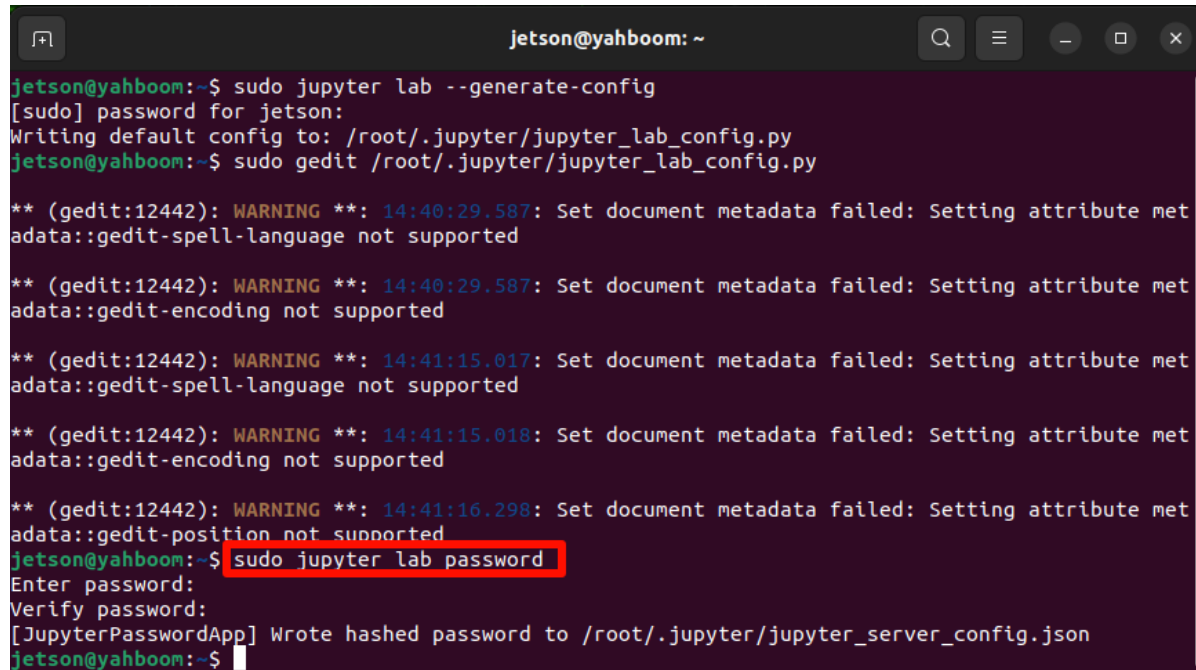
```
jetson@yahboom: ~  
jetson@yahboom:~$ sudo jupyter lab --generate-config  
[sudo] password for jetson:  
Writing default config to: /root/.jupyter/jupyter_lab_config.py  
jetson@yahboom:~$ sudo gedit /root/.jupyter/jupyter_lab_config.py  
  
** (gedit:12442): WARNING **: 14:40:29.587: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported  
  
** (gedit:12442): WARNING **: 14:40:29.587: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported  
  
** (gedit:12442): WARNING **: 14:41:15.017: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported  
  
** (gedit:12442): WARNING **: 14:41:15.018: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported  
  
** (gedit:12442): WARNING **: 14:41:16.298: Set document metadata failed: Setting attribute metadata::gedit-position not supported  
jetson@yahboom:~$
```

3.2, Configure access password

Enter the command to set the password in the terminal twice, and the input will not be displayed when entering the password!

```
sudo jupyter lab password
```

Automatically generated configuration file location: [JupyterPasswordApp] Wrote hashed password to /root/.jupyter/jupyter_server_config.json



```
jetson@yahboom:~$ sudo jupyter lab --generate-config
[sudo] password for jetson:
Writing default config to: /root/.jupyter/jupyter_lab_config.py
jetson@yahboom:~$ sudo gedit /root/.jupyter/jupyter_lab_config.py

** (gedit:12442): WARNING **: 14:40:29.587: Set document metadata failed: Setting attribute met
adata::gedit-spell-language not supported

** (gedit:12442): WARNING **: 14:40:29.587: Set document metadata failed: Setting attribute met
adata::gedit-encoding not supported

** (gedit:12442): WARNING **: 14:41:15.017: Set document metadata failed: Setting attribute met
adata::gedit-spell-language not supported

** (gedit:12442): WARNING **: 14:41:15.018: Set document metadata failed: Setting attribute met
adata::gedit-encoding not supported

** (gedit:12442): WARNING **: 14:41:16.298: Set document metadata failed: Setting attribute met
adata::gedit-position not supported
jetson@yahboom:~$ sudo jupyter lab password
Enter password:
Verify password:
[JupyterPasswordApp] Wrote hashed password to /root/.jupyter/jupyter_server_config.json
jetson@yahboom:~$
```

3.3, Start the service automatically at boot

3.3.1, Edit the service file

```
sudo gedit /etc/systemd/system/jupyterlab.service
```

Add content: Click Save and close the file after adding

```
[Unit]
Description=jupyterlab
After=network.target
[Service]
Type=simple
ExecStart=/usr/local/bin/jupyter-lab
config=/root/.jupyter/jupyter_lab_config.py --no-browser
User=root
Group=root
workingDirectory=/home/jetson/
Restart=always
RestartSec=10
[Install]
wantedBy=multi-user.target
```

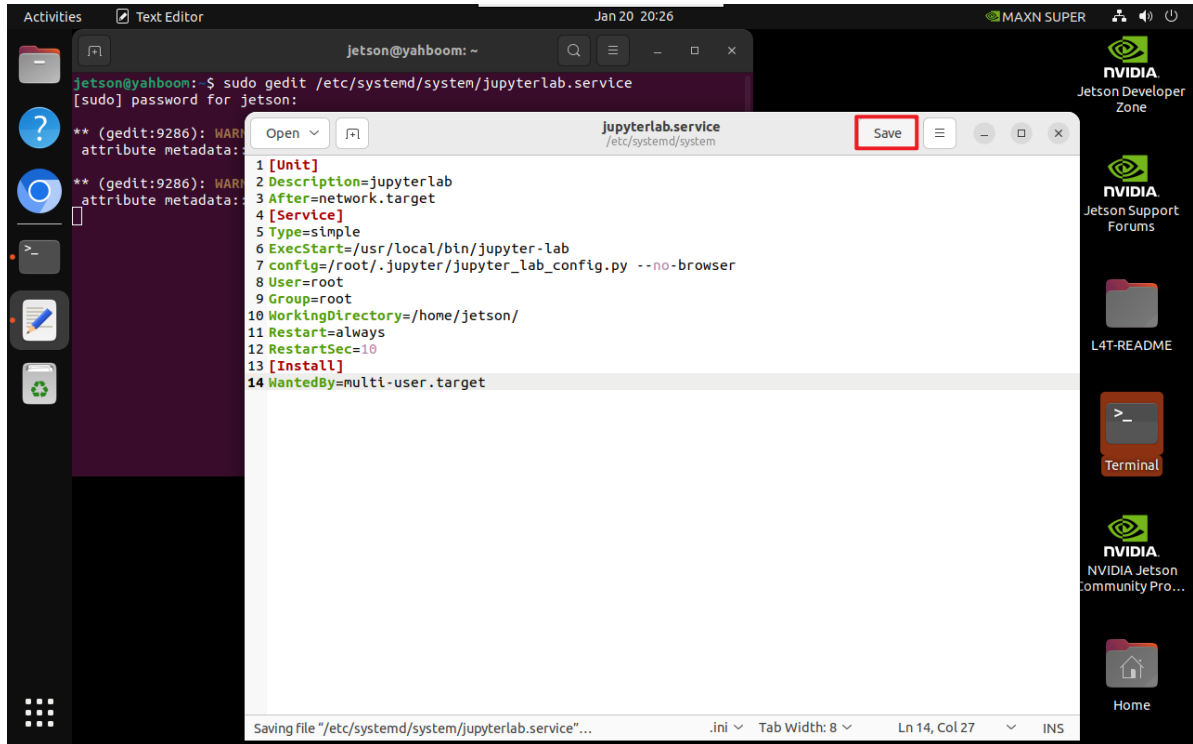
root: System user name

ExecStart: Command to start Jupyter lab, change to JupyterLab installation path

config: Change to JupyterLab configuration file path

WorkingDirectory: The working directory opened when Jupyter-lab is started, which can be changed by yourself (it is recommended to change to the user directory)

view Jupyter-lab installation path: which jupyter-lab
Configuration file path: Refer to the path of the configuration file generated above



3.3.2, Set up automatic service

Automatic service at startup

```
sudo systemctl enable jupyterlab  
# Disable auto-startup systemctl disable jupyterlab
```

Start the service

```
sudo systemctl start jupyterlab  
# Stop the service sudo systemctl stop jupyterlab
```

Check the service status

```
systemctl status jupyterlab
```

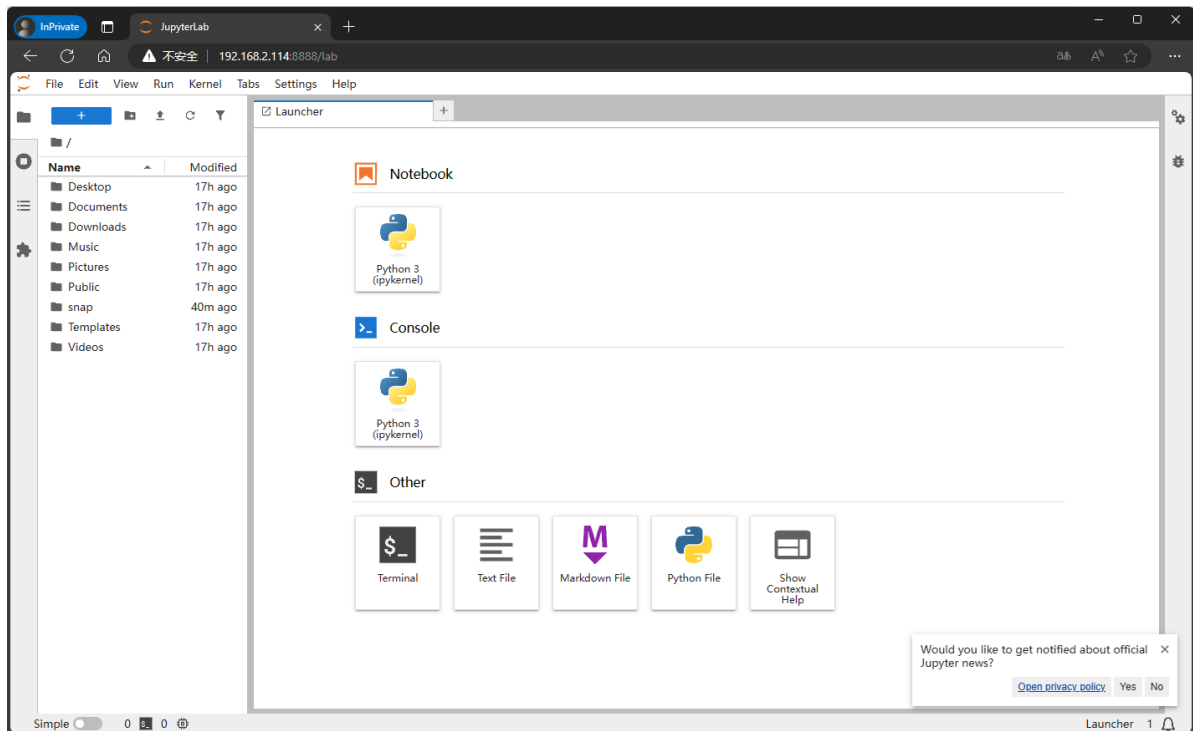


```
jetson@yahboom: ~  
jetson@yahboom:~$ sudo systemctl enable jupyterlab  
[sudo] password for jetson:  
Created symlink /etc/systemd/system/multi-user.target.wants/jupyterlab.service → /etc/systemd/system/jupyterlab.service.  
jetson@yahboom:~$ sudo systemctl start jupyterlab  
jetson@yahboom:~$ systemctl status jupyterlab  
● jupyterlab.service - jupyterlab  
   Loaded: loaded (/etc/systemd/system/jupyterlab.service; enabled; vendor preset: enabled)  
   Active: active (running) since Thu 2024-12-26 14:47:06 CST; 5s ago  
     Main PID: 13074 (jupyter-lab)  
       Tasks: 1 (limit: 8809)  
      Memory: 66.4M  
         CPU: 2.503s  
      CGroup: /system.slice/jupyterlab.service  
              └─13074 /usr/bin/python3 /usr/local/bin/jupyter-lab  
  
Dec 26 14:47:08 yahboom jupyter-lab[13074]: [I 2024-12-26 14:47:08.947 LabApp] JupyterLab application direct>  
Dec 26 14:47:08 yahboom jupyter-lab[13074]: [I 2024-12-26 14:47:08.948 LabApp] Extension Manager is 'pypi'.>  
Dec 26 14:47:09 yahboom jupyter-lab[13074]: [I 2024-12-26 14:47:09.053 ServerApp] jupyterlab | extension wa>  
Dec 26 14:47:09 yahboom jupyter-lab[13074]: [I 2024-12-26 14:47:09.054 ServerApp] Serving notebooks from lo>  
Dec 26 14:47:09 yahboom jupyter-lab[13074]: [I 2024-12-26 14:47:09.054 ServerApp] Jupyter Server 2.15.0 is >  
Dec 26 14:47:09 yahboom jupyter-lab[13074]: [I 2024-12-26 14:47:09.054 ServerApp] http://yahboom:8888/lab>  
Dec 26 14:47:09 yahboom jupyter-lab[13074]: [I 2024-12-26 14:47:09.054 ServerApp] http://127.0.0.1:8888>  
Dec 26 14:47:09 yahboom jupyter-lab[13074]: [I 2024-12-26 14:47:09.055 ServerApp] Use Control-C to stop thi>  
Dec 26 14:47:09 yahboom jupyter-lab[13074]: [W 2024-12-26 14:47:09.060 ServerApp] No web browser found: Err>  
Dec 26 14:47:09 yahboom jupyter-lab[13074]: [I 2024-12-26 14:47:09.276 ServerApp] Skipped non-installed ser>  
lines 1-20/20 (END)
```

Verify auto-startup

After restarting the system, use the device in the same LAN to access the motherboard IP:8888 according to the system IP.

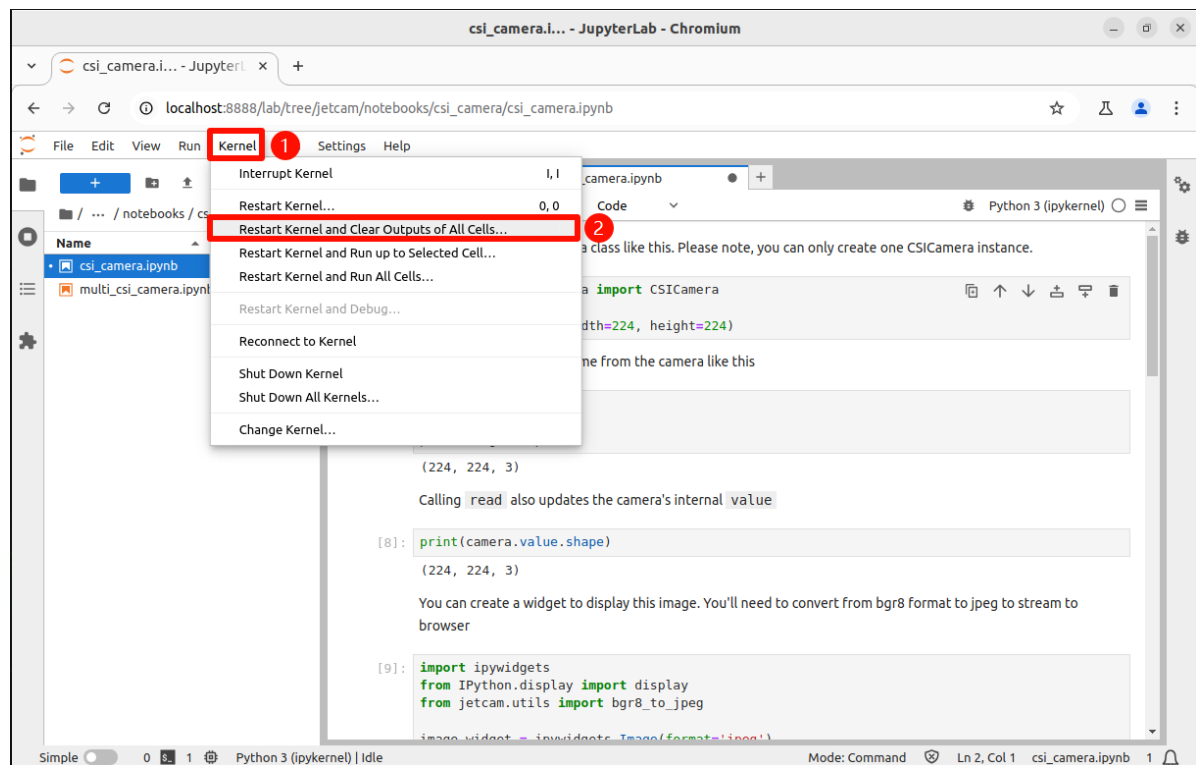
You need to enter a password for the first access, which is the information set in the previous step;
when taking the screenshot, the IP of the motherboard is 192.168.2.114, so devices in the same LAN can access 192.168.2.114:8888



4. Use Jupyter Lab

4.1. Kernel

It is recommended to restart the kernel and clear all unit block output information every time you run a program or the program is abnormal:

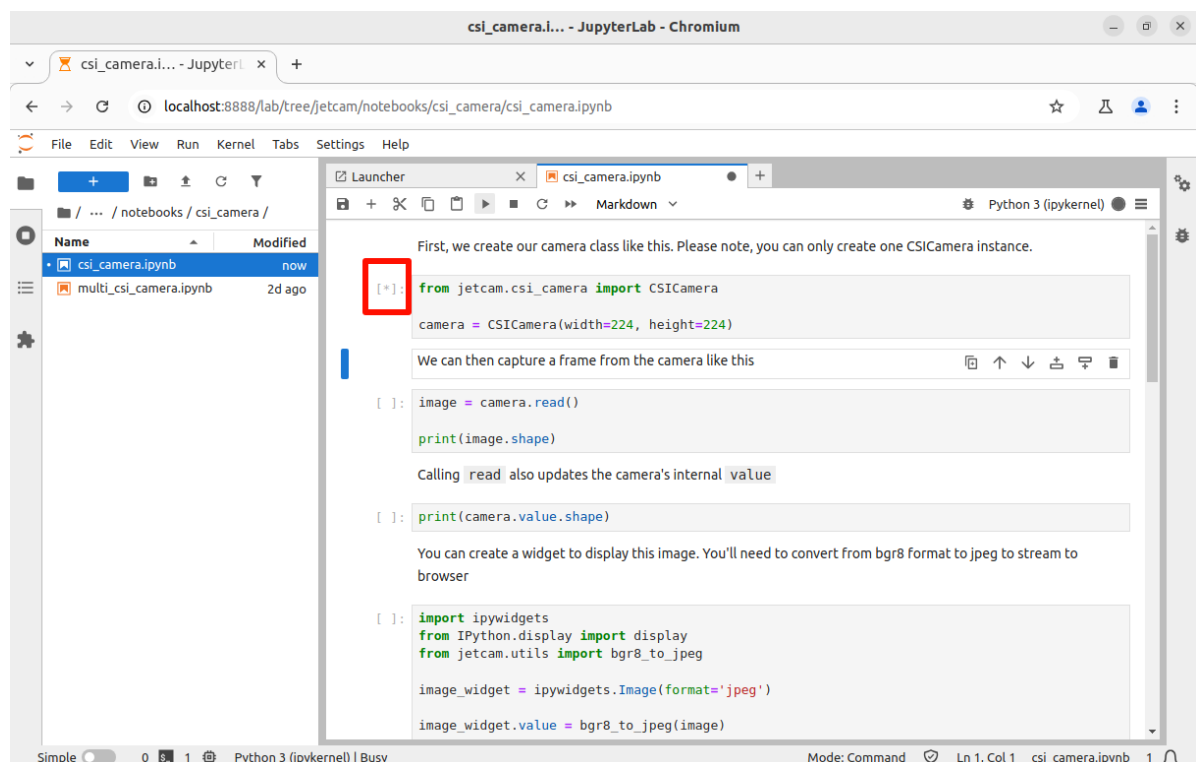


4.2. Run the program

Through Jupyter Open the program file to be run in Lab, and run the program from top to bottom to run the unit blocks in sequence:

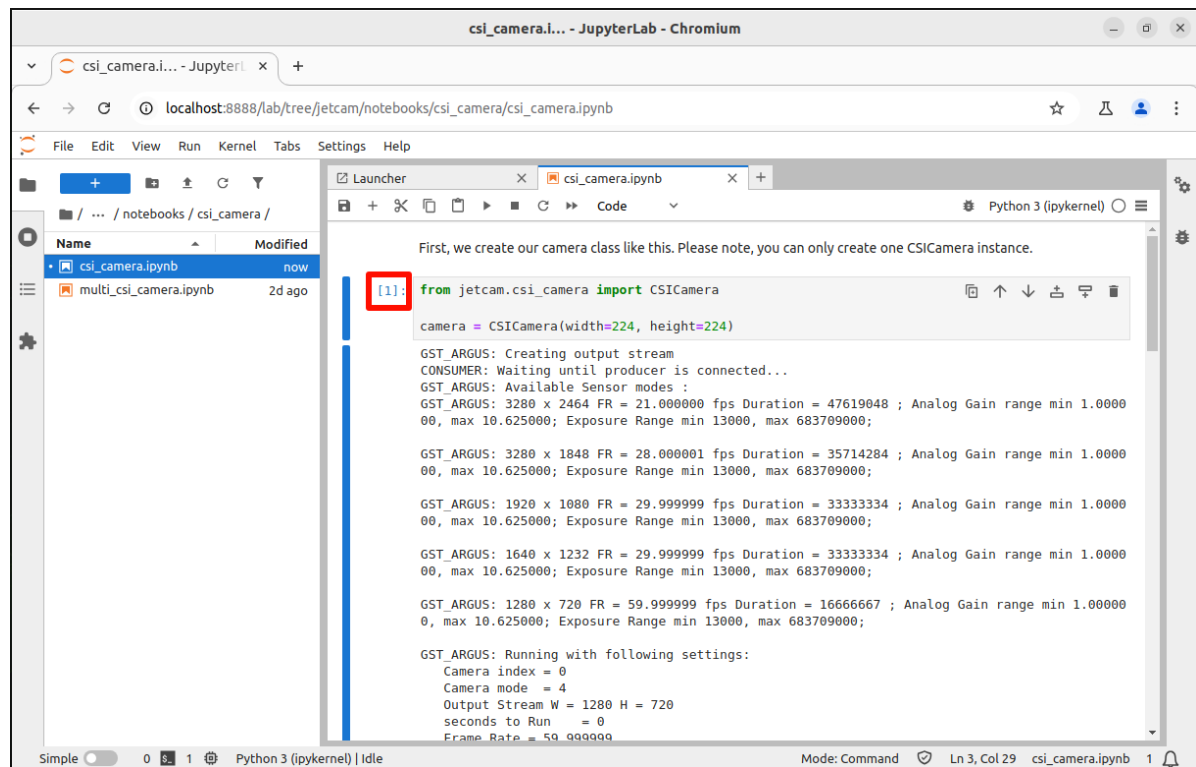
4.2.1. Running

[*] is displayed in the upper left corner of the unit block to indicate that it is running:



4.2.2. Running completed

[Number] is displayed in the upper left corner of the unit block to indicate the number of times it has been run: for example, [1] → the program has run the unit block code for the first time



The screenshot shows a JupyterLab window titled "csi_camera.i... - JupyterLab - Chromium". The address bar indicates the local path: "localhost:8888/lab/tree/jetcam/notebooks/csi_camera/csi_camera.ipynb". The left sidebar shows a file explorer with two notebooks: "csi_camera.ipynb" (modified "now") and "multi_csi_camera.ipynb" (modified "2d ago"). The main area displays the code in "csi_camera.ipynb". The code is as follows:

```
[1]: from jetcam.csi_camera import CSICamera
camera = CSICamera(width=224, height=224)
```

The output of the code execution is shown below the code cell:

```
GST_ARGUS: Creating output stream
CONSUMER: Waiting until producer is connected...
GST_ARGUS: Available Sensor modes :
GST_ARGUS: 3280 x 2464 FR = 21.000000 fps Duration = 47619048 ; Analog Gain range min 1.0000
00, max 10.625000; Exposure Range min 13000, max 683709000;

GST_ARGUS: 3280 x 1848 FR = 28.000001 fps Duration = 35714284 ; Analog Gain range min 1.0000
00, max 10.625000; Exposure Range min 13000, max 683709000;

GST_ARGUS: 1920 x 1080 FR = 29.999999 fps Duration = 33333334 ; Analog Gain range min 1.0000
00, max 10.625000; Exposure Range min 13000, max 683709000;

GST_ARGUS: 1640 x 1232 FR = 29.999999 fps Duration = 33333334 ; Analog Gain range min 1.0000
00, max 10.625000; Exposure Range min 13000, max 683709000;

GST_ARGUS: 1280 x 720 FR = 59.999999 fps Duration = 16666667 ; Analog Gain range min 1.0000
0, max 10.625000; Exposure Range min 13000, max 683709000;

GST_ARGUS: Running with following settings:
Camera index = 0
Camera mode = 4
Output Stream W = 1280 H = 720
seconds to Run = 0
Frame Rate = 59.999999
```

The bottom status bar shows "Simple" mode, "0" cells, "1" selected cell, "Python 3 (ipykernel) | Idle", "Mode: Command", "Ln 3, Col 29", "csi_camera.ipynb", and "1" notification.