Creating Your Own Extensions for Jupyter

EuroPython
11 July 2024

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Software Engineer
Fixed Income Rates and Credit Data

TechAtBloomberg.com

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Bloomberg
Engineering

Jupyter Extensions:

- JupyterLab ✅
- Jupyter Notebook ≥ v7 ✅

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Jupyter Extensions Tutorial

- **Walk through Tutorial**
  - Explain Code, Demo
- Links to Repository and Documentation
- Code it yourself!

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PREREQUISITES

- Familiar with Jupyter Notebook or JupyterLab.
- Experience coding classes and inheritance

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Bloomberg

Engineering

Thank you!

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- Data, Analytics, APIs, News, Communications & Portfolio Management tools for 350,000+ financial market professionals

- Financial News: TV / Radio / Online

- Enterprise Products including
  Trade Management Tools & Data Solutions

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About Bloomberg

- **21,000+ employees** in 159 locations worldwide
- **9,000+ software engineers**, including **4,000+ engineers** involved in financial analysis and data science who **use Python** daily
- **Contribute to, use, and sponsor Open Source**

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About Me

- Engineer @ Bloomberg
  - Most of my career – server-side C/C++
  - Python / Jupyter Notebook ~ 7 years
  - Open Source Advocate @ Bloomberg
  - Maintainer **matplotlib:mplfinance**
- Chartered Financial Analyst Institute
  former member ~10 years
- Molecular Biophysics

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JupyterLab

localhost:8888/lab/tree/code/mplfinance/examples

File Edit View Run Kernel Tabs Settings Help

SEARCH

CONSOLE

- Change Kernel...
- Clear Console Cells
- Close and Shut Down...
- Insert Line Break
- Interrupt Kernel
- New Console
- Restart Kernel...
- Run Cell (forced)
- Run Cell (unforced)
- Show All Kernel Activity

DEBUGGER

- Breakpoints on exception
- Evaluate Code
- Next F10
- Pause F9
- Step In F11
- Step Out ⇧ F11
- Terminate ⇧ F9

DISPLAY LANGUAGES

- English

EXTENSION MANAGER

- Enable Extension Manager

FILE OPERATIONS

- Autosave Documents

Launcher

code/mplfinance/examples

Notebook

Python 3 (ipykernel)

Console

Python 3 (ipykernel)

Other

Terminal | Text File | Markdown File | Python File | Show Contextual Help

Simple 0 6 0

JupyterLab

localhost:8888/lab/tree/code/mplfinance/examples

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code/mplfinance/examples

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Python 3 (ipykernel)

Console

Python 3 (ipykernel)

Other

Terminal

Text File

Markdown File

Python File

VARIABLES

CALLSTA...

BREAKPOINTS

SOURCE

KERNEL SOURCES

Simple 0 6 0

JupyterLab

localhost:8888/lab/tree/code/mplfinance/examples

File Edit View Run Kernel Tabs Settings Help

Launcher

Commands (⇧ ⌘ C)

code/mplfinance/examples

Notebook

Python 3 (ipykernel)

Console

Python 3 (ipykernel)

Other

Terminal

Text File

Markdown File

Python File

Show Contextual Help

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JupyterLab

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Python 3 (ipykernel)

Other

Terminal | Text File | Markdown File | Python File | Show Contextual Help

Simple 0 6 0

JupyterLab

localhost:8888/lab/tree/code/mplfinance/examples

File Edit View Run Kernel Tabs Settings Help

Filter files by name

/ ··· / mplfinance / examples /

Name	Modified
data	2 yr. ago
images	2 yr. ago
indicators	7 mo. ago
original_flavor	3 yr. ago
scratch_pad	7 mo. ago
addplot_legends.ip...	7 mo. ago
addplot.ipynb	26 min. ago
external_axes.ipynb	3 yr. ago
fill_between.ipynb	last yr.
hollow_and_filled_...	2 yr. ago
marketcolor_overri...	last yr.
mpf_animation_de...	3 yr. ago
mpf_animation_de...	3 yr. ago
mpf_animation_gr...	3 yr. ago
mpf_animation_ma...	3 yr. ago
mpf_demo_autocl...	last yr.
mpf_demo_axlabel...	last yr.
mpf_demo.py	last yr.
panels.ipynb	last yr.
plot_customization...	last yr.
price-movement_p...	2 yr. ago
resample10years.i...	2 yr. ago
savefig.ipynb	2 yr. ago

Launcher

code/mplfinance/examples

Notebook

Python 3 (ipykernel)

Console

Python 3 (ipykernel)

Other

Terminal

Text File

Markdown File

Python File

Show Contextual Help

Simple 0 6 0

addplot_lege... - JupyterLab

localhost:8888/lab/tree/code/mplfinance/examples/addplot_legends.ipynb

File Edit View Run Kernel Tabs Settings Help

Filter files by name

/ ··· / mplfinance / examples /

Name	Modified
data	2 yr. ago
images	2 yr. ago
indicators	7 mo. ago
original_flavor	3 yr. ago
scratch_pad	7 mo. ago
addplot_legends.ip...	7 mo. ago
addplot.ipynb	26 min. ago
external_axes.ipynb	3 yr. ago
fill_between.ipynb	last yr.
hollow_and_filled_...	2 yr. ago
marketcolor_overri...	last yr.
mpf_animation_de...	3 yr. ago
mpf_animation_de...	3 yr. ago
mpf_animation_gr...	3 yr. ago
mpf_animation_ma...	3 yr. ago
mpf_demo_autocl...	last yr.
mpf_demo_axlabel...	last yr.
mpf_demo.py	last yr.
panels.ipynb	last yr.
plot_customization...	last yr.
price-movement_p...	2 yr. ago
resample10years.i...	2 yr. ago
savefig.ipynb	2 yr. ago

Launcher | addplot_legends.ipynb

Code | Python 3 (ipykernel)

[1]:
```
# This allows multiple outputs from a single jupyter notebook cell:
from IPython.core.interactiveshell import InteractiveShell
InteractiveShell.ast_node_interactivity = "all"
```

[2]:
```
%matplotlib inline
import pandas as pd
pd.__version__  # for the record
```

[2]: '1.5.1'

Adding plots with *legends* to the basic mplfinance plot()

To add legends to the additional plots, use the keyword `label` in the `make_addplot()` api, .

For example,

```
import mplfinance as mpf
ap = mpf.make_addplot(df['LowerB'],label="LowerB")
mpf.plot(df,addplot=ap)
```

Note: This tutorial assumes you have *already* reviewed the tutorial in `examples/addplot.ipynb`.

`addplot` with legend examples:

Simple 0 6 Python 3 (ipykernel) | Idle Mode: Command Ln 1, Col 1 addplot_legends.ipynb 0

mpf_animatio... (2) - JupyterL

localhost:8888/lab/tree/code/mplfinance/examples/mpf_animation_demo1.py

File Edit View Run Kernel Tabs Settings Help

Filter files by name

/ ··· / mplfinance / examples /

Name	Modified
data	2 yr. ago
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scratch_pad	7 mo. ago
addplot_legends.ip...	7 mo. ago
addplot.ipynb	27 min. ago
external_axes.ipynb	3 yr. ago
fill_between.ipynb	last yr.
hollow_and_filled_...	2 yr. ago
marketcolor_overri...	last yr.
mpf_animation_de...	3 yr. ago
mpf_animation_de...	3 yr. ago
mpf_animation_gr...	3 yr. ago
mpf_animation_ma...	3 yr. ago
mpf_demo_autocl...	last yr.
mpf_demo_axlabel...	last yr.
mpf_demo.py	last yr.
panels.ipynb	last yr.
plot_customization...	last yr.
price-movement_p...	2 yr. ago
resample10years.i...	2 yr. ago
savefig.ipynb	2 yr. ago

Launcher | addplot_legends.ipynb | mpf_animation_demo1.py

```python
'''
This file contains a simple animation demo using mplfinance "external axes mode".

Note that presently mplfinance does not support "blitting" (blitting makes animation
more efficient).  Nonetheless, the animation is efficient enough to update at least
once per second, and typically more frequently depending on the size of the plot.
'''
import pandas as pd
import mplfinance as mpf
import matplotlib.animation as animation

idf = pd.read_csv('data/SPY_20110701_20120630_Bollinger.csv',index_col=0,parse_dates=True)
idf.shape
idf.head(3)
idf.tail(3)
df = idf.loc['2011-07-01':'2011-12-30',:]

fig = mpf.figure(style='charles',figsize=(7,8))
ax1 = fig.add_subplot(2,1,1)
ax2 = fig.add_subplot(3,1,3)

def animate(ival):
    if (20+ival) > len(df):
        print('no more data to plot')
        ani.event_source.interval *= 3
        if ani.event_source.interval > 12000:
            exit()
        return
    data = df.iloc[0:(20+ival)]
    ax1.clear()
    ax2.clear()
    mpf.plot(data,ax=ax1,volume=ax2,type='candle')

ani = animation.FuncAnimation(fig, animate, interval=250)

```

Simple 0 6 Python Ln 1, Col 1 Spaces: 4 mpf_animation_demo1.py 0

mpf_demo_aut... (3) - Jupyte

localhost:8888/lab/tree/code/mplfinance/examples/mpf_demo_autoclose.py

File Edit View Run Kernel Tabs Settings Help

Filter files by name

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mpf_demo_axlabel...	last yr.
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savefig.ipynb	2 yr. ago

Launcher | addplot_legends.ipynb | mpf_animation_demo1.py | mpf_demo_autoclose.py

```python
import pandas as pd
import mplfinance as mpf

import time
import matplotlib.pyplot as plt

infile = 'data/yahoofinance-SPY-20200901-20210113.csv'

df = pd.read_csv(infile, index_col=0, parse_dates=True)

# print('len(df)=',len(df))


for jj in (0,1,2):
    start = jj*35
    stop  = start + 35
    tdf = df.iloc[start:stop]
    fig,_ = mpf.plot(tdf,type='candle',volume=True,mav=(10,20),figscale=1.5,returnfig=True)
    plt.pause(4)
    plt.close(fig)
    del fig

```

Simple 0 6 Python Ln 1, Col 1 Spaces: 4 mpf_demo_autoclose.py 0

mpf_animatio... (3) - JupyterL

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idf.shape
idf.head(3)
idf.tail(3)
df = idf.loc['2011-07-01':'2011-12-30',:]

fig = mpf.figure(style='charles',figsize=(7,8))
ax1 = fig.add_subplot(2,1,1)
ax2 = fig.add_subplot(3,1,3)

def animate(ival):
    if (20+ival) > len(df):
        print('no more data to plot')
        ani.event_source.interval *= 3
        if ani.event_source.interval > 12000:
            exit()
        return
    data = df.iloc[0:(20+ival)]
```

Launcher | addplot_legend | mpf_demo_autc

```python
import pandas as pd
import mplfinance as mpf

import time
import matplotlib.pyplot as plt

infile = 'data/yahoofinance-SPY-20200901-20210113.csv'

df = pd.read_csv(infile, index_col=0, parse_dates=True)

# print('len(df)=',len(df))


for jj in (0,1,2):
    start = jj*35
    stop  = start + 35
    tdf = df.iloc[start:stop]
    fig,_ = mpf.plot(tdf,type='candle',volume=True,mav=(10,20),figscale=1.5,returnfig=True)
    plt.pause(4)
    plt.close(fig)
    del fig

```

Simple 0 6 Python Ln 1, Col 1 Spaces: 4 mpf_animation_demo1.py 0

mpf_animatio... (3) - JupyterL

localhost:8888/lab/tree/code/mplfinance/examples/mpf_animation_demo1.py

File Edit View Run Kernel Tabs Settings Help

mpf_animation_demo1.py

File Browser (⇧ ⌘ F)

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    data = df.iloc[0:(20+ival)]
```

Launcher | addplot_legends.ipynb | mpf_demo_autoclose.py

```python
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import mplfinance as mpf

import time
import matplotlib.pyplot as plt

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df = pd.read_csv(infile, index_col=0, parse_dates=True)

# print('len(df)=',len(df))


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    plt.pause(4)
    plt.close(fig)
    del fig

```

Simple 0 6 Python Ln 1, Col 1 Spaces: 4 mpf_animation_demo1.py

JupyterLab

localhost:8888/lab/tree/code/mplfinance/examples

File Edit View Run Kernel Tabs Settings Help

SEARCH

CONSOLE

- Change Kernel...
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DISPLAY LANGUAGES

- English

EXTENSION MANAGER

- Enable Extension Manager

FILE OPERATIONS

- Autosave Documents

Launcher

code/mplfinance/examples

Notebook

Python 3 (ipykernel)

Console

Python 3 (ipykernel)

Other

Terminal | Text File | Markdown File | Python File | Show Contextual Help

Simple 0 6

Launcher 0

JupyterLab

localhost:8888/lab/tree/code/mplfinance/examples

File Edit View Run Kernel Tabs Settings Help

SEARCH

ANYTHING

Hello World

CONSOLE

Change Kernel...
Clear Console Cells
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DISPLAY LANGUAGES

English

EXTENSION MANAGER

Enable Extension Manager

Hello World

Launcher

code/mplfinance/examples

Notebook

Python 3 (ipykernel)

Hello World

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Python 3 (ipykernel)

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JupyterLab

localhost:8888/lab

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SEARCH

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Hello World

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Terminate ⇧ F9

DISPLAY LANGUAGES

Launcher | Hello World

Hello World from EuroPython!

Simple 0 $_ 0

Hello World 0

JupyterLab

localhost:8888/lab/tree/code/mplfinance/examples

File Edit View Run Kernel Tabs Settings Help

Hello World

C

D

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F

Launcher

code/mplfinance/examples

Notebook

Python 3 (ipykernel)

Hello World

Console

Python 3 (ipykernel)

Other

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Markdown File

Python File

Show Contextual Help

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JupyterLab

localhost:8888/lab/tree/code/mplfinance/examples

File Edit View Run Kernel Tabs Settings Help

Launcher | Hello World

Hello World

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Simple 0 6

Hello World 0

JupyterLab

localhost:8888/lab/tree/code/mplfinance/examples

File Edit View Run Kernel Tabs Settings Help

Launcher | Hello World | Hello World

C

D

E

F

Hello World

Ahoj Světe

Simple 0 6

Hello World 0

JupyterLab

localhost:8888/lab/tree/code/mplfinance/examples

File Edit View Run Kernel Tabs Settings Help

Launcher | Hello World

Hello World

C

D

E

F

Simple 0 6

Hello World 0

JupyterLab

localhost:8888/lab/tree/code/mplfinance/examples

File Edit View Run Kernel Tabs Settings Help

Analyze

Enter Ticker Symbol:

SEARCH

Candle Chart

MACD Chart

Launcher

code/mplfinance/examples

Notebook

Python 3 (ipykernel)

Hello World

Console

Python 3 (ipykernel)

Other

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Markdown File

Python File

Show Contextual Help

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JupyterLab

localhost:8888/lab/tree/code/mplfinance/examples

File Edit View Run Kernel Tabs Settings Help

Analyze

Enter Ticker Symbol:

SPY

SPDR S&P 500 ETF Trust

Candle Chart

MACD Chart

Launcher

code/mplfinance/examples

Notebook

Python 3 (ipykernel)

Hello World

Console

Python 3 (ipykernel)

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Show Contextual Help

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Launcher 0

JupyterLab

localhost:8888/lab/tree/code/mplfinance/examples

File Edit View Run Kernel Tabs Settings Help

Analyze

Enter Ticker Symbol:

SPY

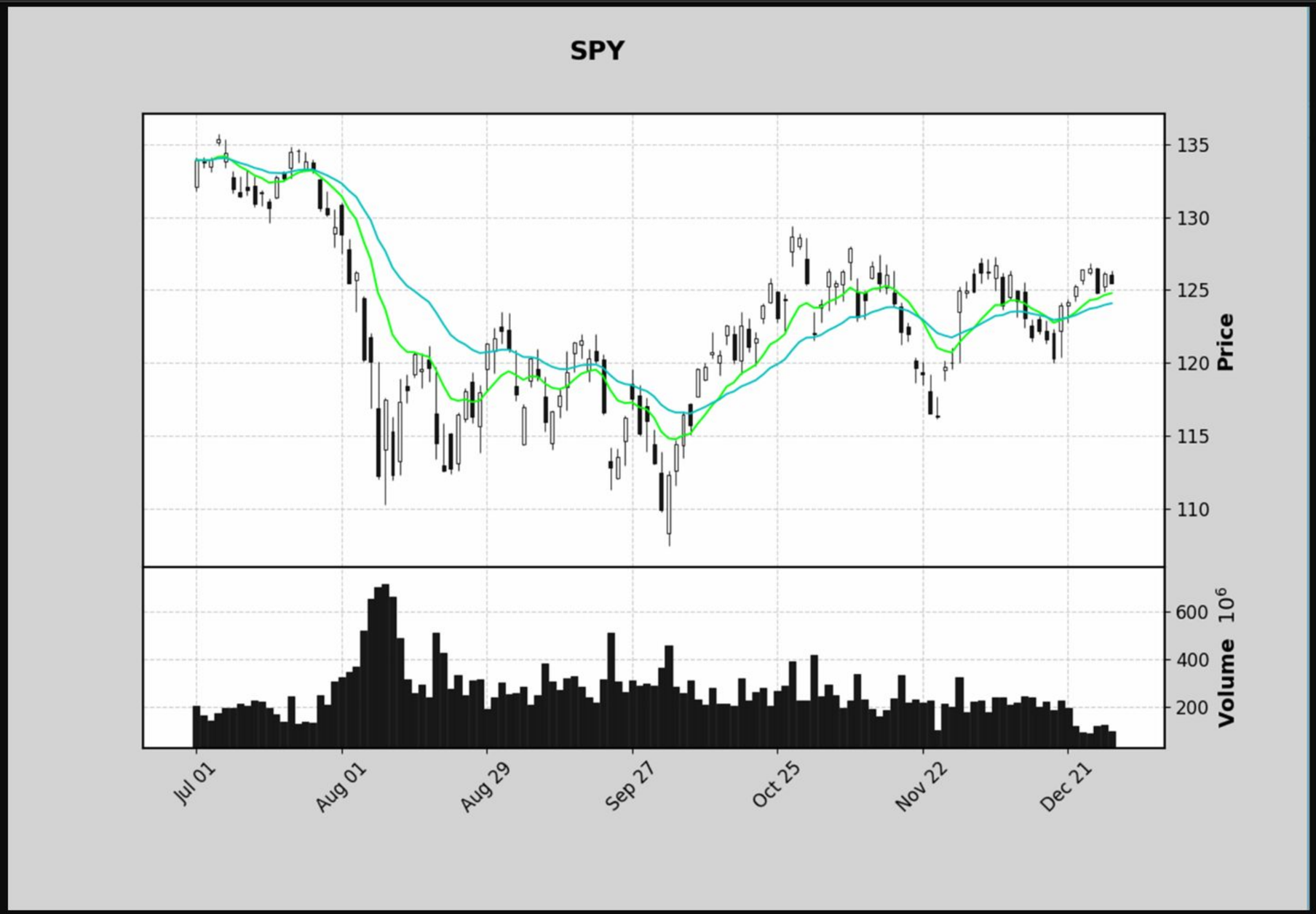
SPDR S&P 500 ETF Trust

Candle Chart

MACD Chart

Launcher

Candle Chart



Simple 0 6

Launcher 0

JupyterLab

localhost:8888/lab/tree/code/mplfinance/examples

File Edit View Run Kernel Tabs Settings Help

Launcher | Candle Chart | MACD Chart

Enter Ticker Symbol:

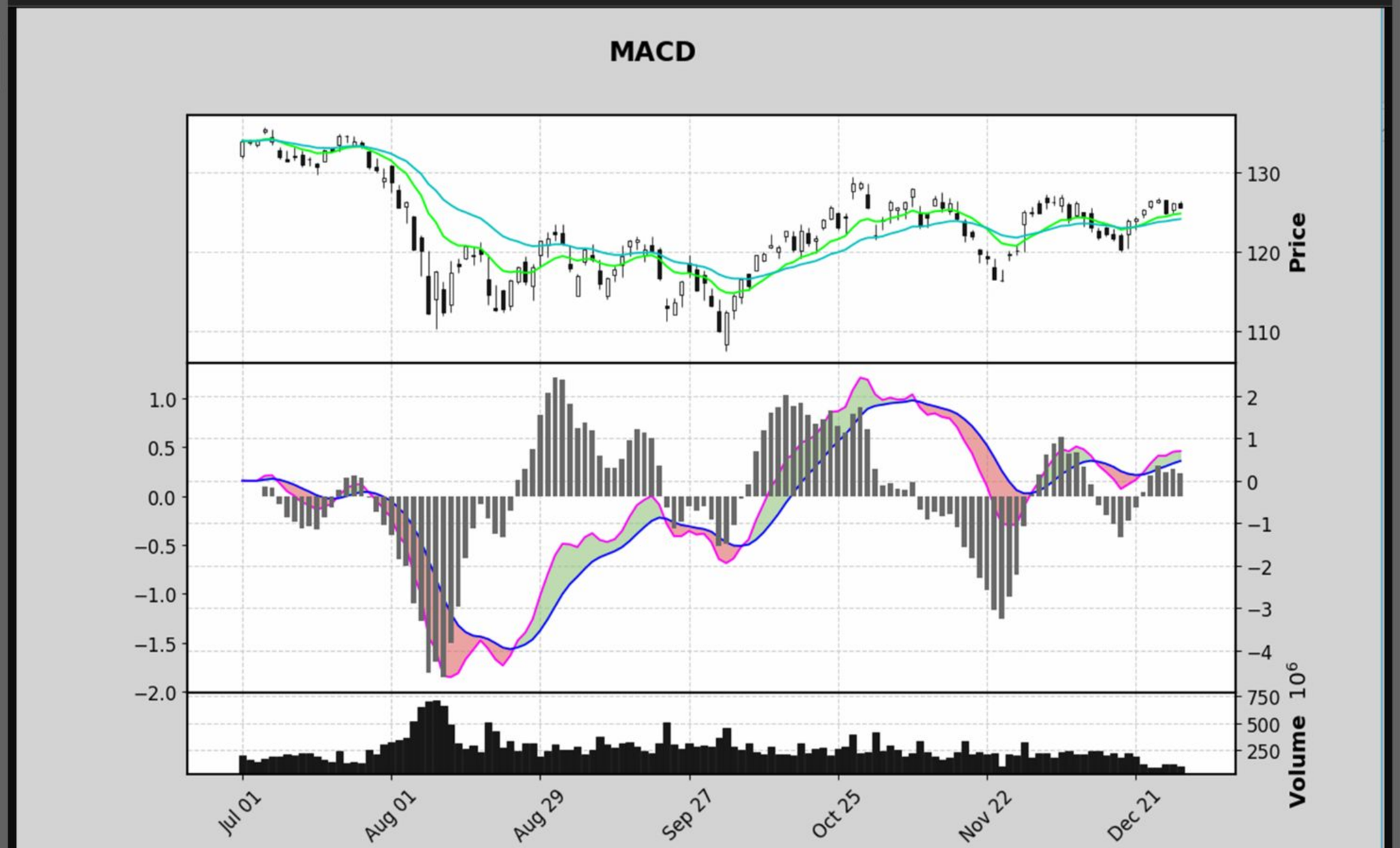
SPY

SPDR S&P 500 ETF Trust

Candle Chart

MACD Chart

Analyze



Simple 0 6

Launcher 0

Vocabulary

- **nbextension**
  Classic Jupyter notebook extension
  (being deprecated)

- **labextension**
  JupyterLab and Notebook v7 extension

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Vocabulary

- **@lumino** (npm package scope: ts/js packages)

- **@jupyterlab** (npm package scope: ts/js packages)

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Vocabulary

- **plugin** – Class providing extension functionality
- **extension** – Package containing one or more plugins
- **token** – Identifier for a **service** provided by a plugin (i.e., an instance of the Lumino Token class)

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Vocabulary

- **commands** – registry of functions (@lumino)

  (property of JupyterFrontEnd application object)

- **widgets** – everything on screen

  (@lumino widget)

- **jlpm** (yarn) – JupyterLab Packaging Manager

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TUTORIAL

0. copier extension template
   (basic do-nothing extension)
1. create a command in Command Registry
2. execute command from the Command Palette
3. command add Widget to JupyterLab
   (main area)

TUTORIAL

4. style the widget
5. execute the command from the Launcher
6. execute command with arguments
7. create SideBar widget to execute our command with various options

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conda create

```
conda create -n jlx --override-channels \
--strict-channel-priority -c conda-forge -c nodefaults \
jupyterlab=4 nodejs=18 git copier=7 jinja2-time
```

create virtual environment for development

miniconda, mamba, micromamba

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conda create

```
conda create -n jlx --override-channels \
--strict-channel-priority -c conda-forge -c nodefaults \
jupyterlab=4 nodejs=18 git copier=7 jinja2-time
```

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```
Dino@MacDino:~/code$
Dino@MacDino:~/code$ # create the conda environment
Dino@MacDino:~/code$ conda create -n jlx --override-channels --strict-channel-priority -c conda-forge -c nodef
aults jupyterlab=4 nodejs=18 git copier=7 jinja2-time
Retrieving notices: ...working... done
Collecting package metadata (current_repodata.json): done
Solving environment: failed with repodata from current_repodata.json, will retry with next repodata source.
Collecting package metadata (repodata.json): done
Solving environment: done

## Package Plan ##

  environment location: /Users/Dino/miniconda3/envs/jlx

  added / updated specs:
    - copier=7
    - git
    - jinja2-time
    - jupyterlab=4
    - nodejs=18


The following packages will be downloaded:

    package                    |            build
    ---------------------------|-----------------
    anyio-4.3.0                |     pyhd8ed1ab_0         100 KB  conda-forge
    appnope-0.1.4              |     pyhd8ed1ab_0          10 KB  conda-forge
    argon2-cffi-bindings-21.2.0|  py312h104f124_4          32 KB  conda-forge
    asttokens-2.4.1            |     pyhd8ed1ab_0          28 KB  conda-forge
```

```
attrs-23.2.0                |     pyh71513ae_0          53 KB  conda-forge
babel-2.14.0                |     pyhd8ed1ab_0         7.3 MB  conda-forge
bcrypt-4.1.3                |  py312ha47ea1c_0         226 KB  conda-forge
beautifulsoup4-4.12.3       |     pyha770c72_0         115 KB  conda-forge
brotli-python-1.1.0         |  py312heafc425_1         358 KB  conda-forge
bzip2-1.0.8                 |       h10d778d_5         125 KB  conda-forge
c-ares-1.28.1               |       h10d778d_0         149 KB  conda-forge
ca-certificates-2024.2.2    |       h8857fd0_0         152 KB  conda-forge
certifi-2024.2.2            |     pyhd8ed1ab_0         157 KB  conda-forge
cffi-1.16.0                 |  py312h38bf5a0_0         276 KB  conda-forge
charset-normalizer-3.3.2    |     pyhd8ed1ab_0          46 KB  conda-forge
comm-0.2.2                  |     pyhd8ed1ab_0          12 KB  conda-forge
cryptography-42.0.7         |  py312h7e81a9d_0         1.2 MB  conda-forge
debugpy-1.8.1               |  py312hede676d_0         2.0 MB  conda-forge
dunamai-1.21.1              |     pyhd8ed1ab_0          28 KB  conda-forge
exceptiongroup-1.2.0        |     pyhd8ed1ab_2          20 KB  conda-forge
executing-2.0.1             |     pyhd8ed1ab_0          27 KB  conda-forge
git-2.45.1                  | pl5321h9d8b143_0        11.2 MB  conda-forge
h11-0.14.0                  |     pyhd8ed1ab_0          47 KB  conda-forge
h2-4.1.0                    |     pyhd8ed1ab_0          46 KB  conda-forge
hpack-4.0.0                 |     pyh9f0ad1d_0          25 KB  conda-forge
httpcore-1.0.5              |     pyhd8ed1ab_0          45 KB  conda-forge
httpx-0.27.0                |     pyhd8ed1ab_0          63 KB  conda-forge
hyperframe-6.0.1            |     pyhd8ed1ab_0          14 KB  conda-forge
idna-3.7                    |     pyhd8ed1ab_0          51 KB  conda-forge
importlib-metadata-7.1.0    |     pyha770c72_0          26 KB  conda-forge
importlib_metadata-7.1.0    |       hd8ed1ab_0           9 KB  conda-forge
importlib_resources-6.4.0   |     pyhd8ed1ab_0          32 KB  conda-forge
ipykernel-6.29.3            |     pyh3cd1d5f_0         117 KB  conda-forge
ipython-8.24.0              |     pyh707e725_0         582 KB  conda-forge
```

```
    zeromq-4.3.5                |       hde137ed_4         297 KB  conda-forge
    zlib-1.2.13                 |       h87427d6_6          87 KB  conda-forge
    zstd-1.5.6                  |       h915ae27_0         487 KB  conda-forge
    ------------------------------------------------------------
                                           Total:        92.5 MB

The following NEW packages will be INSTALLED:

  anyio              conda-forge/noarch::anyio-4.3.0-pyhd8ed1ab_0
  appnope            conda-forge/noarch::appnope-0.1.4-pyhd8ed1ab_0
  argon2-cffi        conda-forge/noarch::argon2-cffi-23.1.0-pyhd8ed1ab_0
  argon2-cffi-bindi~ conda-forge/osx-64::argon2-cffi-bindings-21.2.0-py312h104f124_4
  arrow              conda-forge/noarch::arrow-1.3.0-pyhd8ed1ab_0
  asttokens          conda-forge/noarch::asttokens-2.4.1-pyhd8ed1ab_0
  async-lru          conda-forge/noarch::async-lru-2.0.4-pyhd8ed1ab_0
  attrs              conda-forge/noarch::attrs-23.2.0-pyh71513ae_0
  babel              conda-forge/noarch::babel-2.14.0-pyhd8ed1ab_0
  bcrypt             conda-forge/osx-64::bcrypt-4.1.3-py312ha47ea1c_0
  beautifulsoup4     conda-forge/noarch::beautifulsoup4-4.12.3-pyha770c72_0
  bleach             conda-forge/noarch::bleach-6.1.0-pyhd8ed1ab_0
  brotli-python      conda-forge/osx-64::brotli-python-1.1.0-py312heafc425_1
  bzip2              conda-forge/osx-64::bzip2-1.0.8-h10d778d_5
  c-ares             conda-forge/osx-64::c-ares-1.28.1-h10d778d_0
  ca-certificates    conda-forge/osx-64::ca-certificates-2024.2.2-h8857fd0_0
  cached-property    conda-forge/noarch::cached-property-1.5.2-hd8ed1ab_1
  cached_property    conda-forge/noarch::cached_property-1.5.2-pyha770c72_1
  certifi            conda-forge/noarch::certifi-2024.2.2-pyhd8ed1ab_0
  cffi               conda-forge/osx-64::cffi-1.16.0-py312h38bf5a0_0
  charset-normalizer conda-forge/noarch::charset-normalizer-3.3.2-pyhd8ed1ab_0
  colorama           conda-forge/noarch::colorama-0.4.6-pyhd8ed1ab_0
```

```
  wheel              conda-forge/noarch::wheel-0.43.0-pyhd8ed1ab_1
  xz                 conda-forge/osx-64::xz-5.2.6-h775f41a_0
  yaml               conda-forge/osx-64::yaml-0.2.5-h0d85af4_2
  zeromq             conda-forge/osx-64::zeromq-4.3.5-hde137ed_4
  zipp               conda-forge/noarch::zipp-3.17.0-pyhd8ed1ab_0
  zlib               conda-forge/osx-64::zlib-1.2.13-h87427d6_6
  zstd               conda-forge/osx-64::zstd-1.5.6-h915ae27_0


Proceed ([y]/n)? y


Downloading and Extracting Packages
anyio-4.3.0          | 100 KB    | ############################################################# | 100%

Preparing transaction: done
Verifying transaction: done
Executing transaction: done
#
# To activate this environment, use
#
#     $ conda activate jlx
#
# To deactivate an active environment, use
#
#     $ conda deactivate

Dino@MacDino:~/code$
Dino@MacDino:~/code$ conda activate jlx
(jlx) Dino@MacDino:~/code$
```

conda activate jlx

```
Dino@MacDino:~/code$ conda activate jlx
(jlx) Dino@MacDino:~/code$
(jlx) Dino@MacDino:~/code$
```

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copier copy <template> <destination>

```
copier copy \
https://github.com/jupyterlab/extension-template \
epjlx
```

“copier” is a Project Templating Tool similar to “cookiecutter” and “yeoman” and “hygen”

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copier copy <template> <destination>

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epjlx
```

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```
(jlx) Dino@MacDino:~/code$
(jlx) Dino@MacDino:~/code$
(jlx) Dino@MacDino:~/code$ copier copy https://github.com/jupyterlab/
🎤 What is your extension kind?
   (Use arrow keys)
» frontend
  mimerenderer
  server
  theme
```

```
(jlx) Dino@MacDino:~/code$ copier copy https://github.com/jupyterlab/extension-template epjlx
🎤 What is your extension kind?
   frontend
🎤 Extension author name
   Daniel Goldfarb
🎤 Extension author email
   dgoldfarb.github@gmail.com
🎤 JavaScript package name
   epjlx
🎤 Python package name
   epjlx
🎤 Extension short description
   A JupyterLab extension for EuroPython 2024
🎤 Does the extension have user settings?
   No
🎤 Do you want to set up Binder example?
   No
🎤 Do you want to set up tests for the extension?
   No
🎤 Git remote repository URL
   https:/github.com/DanielGoldfarb/epjlx/
```

```
Copying from template version 4.3.1
    create  .
    create  epjlx
    create  epjlx/__init__.py
    create  .gitignore
    create  RELEASE.md
    create  CHANGELOG.md
    create  .yarnrc.yml
    create  README.md
    create  style
    create  style/base.css
    create  style/index.css
    create  style/index.js
    create  LICENSE
    create  .prettierignore
    create  .copier-answers.yml
    create  setup.py
    create  package.json
    create  install.json
    create  .github
    create  .github/workflows
    create  .github/workflows/prep-release.yml
    create  .github/workflows/check-release.yml
    create  .github/workflows/build.yml
    create  .github/workflows/publish-release.yml
    create  .github/workflows/enforce-label.yml
    create  tsconfig.json
    create  pyproject.toml
    create  src
    create  src/index.ts
```

```
(jlx) Dino@MacDino:~/code$ cd epjlx
/Users/Dino/code/epjlx
(jlx) Dino@MacDino:~/code/epjlx$ ls -l
total 80
-rw-r--r--  1 Dino  staff    86 May 30 14:32 CHANGELOG.md
-rw-r--r--  1 Dino  staff  1523 May 30 14:32 LICENSE
-rw-r--r--  1 Dino  staff  2320 May 30 14:32 README.md
-rw-r--r--  1 Dino  staff  2383 May 30 14:32 RELEASE.md
drwxr-xr-x  3 Dino  staff    96 May 30 14:32 epjlx
-rw-r--r--  1 Dino  staff   171 May 30 14:32 install.json
-rw-r--r--  1 Dino  staff  6254 May 30 14:32 package.json
-rw-r--r--  1 Dino  staff  2243 May 30 14:32 pyproject.toml
-rw-r--r--  1 Dino  staff    33 May 30 14:32 setup.py
drwxr-xr-x  3 Dino  staff    96 May 30 14:32 src
drwxr-xr-x  5 Dino  staff   160 May 30 14:32 style
-rw-r--r--  1 Dino  staff   537 May 30 14:32 tsconfig.json
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-rw-r--r--  1 Dino  staff   537 May 30 14:32 tsconfig.json
(jlx) Dino@MacDino:~/code/epjlx$
```

```
1  {
2      "name": "epjlx",
3      "version": "0.1.0",
4      "description": "A JupyterLab extension for EuroPython 2024",
5      "keywords": [
6          "jupyter",
7          "jupyterlab",
8          "jupyterlab-extension"
9      ],
10     "homepage": "https:/github.com/DanielGoldfarb/epjlx/",
11     "bugs": {
12         "url": "https:/github.com/DanielGoldfarb/epjlx//issues"
13     },
14     "license": "BSD-3-Clause",
15     "author": {
16         "name": "Daniel Goldfarb",
17         "email": "dgoldfarb.github@gmail.com"
18     },
19     "files": [
20         "lib/**/*.{d.ts,eot,gif,html,jpg,js,js.map,json,png,svg,woff2,ttf}",
21         "style/**/*.{css,js,eot,gif,html,jpg,json,png,svg,woff2,ttf}",
22         "src/**/*.{ts,tsx}"
23     ],
```

```
21          "style/**/*.{css,js,eot,gif,html,jpg,json,png,svg,woff2,ttf}"
22      ],
23      "main": "lib/index.js",
24      "types": "lib/index.d.ts",
25      "style": "style/index.css",
26      "repository": {
27          "type": "git",
28          "url": "https://github.com/DanielGoldfarb/pydjlx.git"
29      },
30      "scripts": {
31          "build": "jlpm build:lib && jlpm build:labextension:dev",
32          "build:prod": "jlpm clean && jlpm build:lib:prod && jlpm build:labextension",
33          "build:labextension": "jupyter labextension build .",
34          "build:labextension:dev": "jupyter labextension build --development True .",
35          "build:lib": "tsc --sourceMap",
36          "build:lib:prod": "tsc",
37          "clean": "jlpm clean:lib",
38          "clean:lib": "rimraf lib tsconfig.tsbuildinfo",
39          "clean:lintcache": "rimraf .eslintcache .stylelintcache",
40          "clean:labextension": "rimraf pydjlx/labextension pydjlx/_version.py",
41          "clean:all": "jlpm clean:lib && jlpm clean:labextension && jlpm clean:lintcache
,
```

```
21          "style/**/*.{css,js,eot,gif,html,jpg,json,png,svg,woff2,ttf}"
22      ],
23      "main": "lib/index.js",
24      "types": "lib/index.d.ts",
25      "style": "style/index.css",
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    ,
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39          "clean:lintcache": "rimraf .eslintcache .stylelintcache",
40          "clean:labextension": "rimraf pydjlx/labextension pydjlx/_version.py",
41          "clean:all": "jlpm clean:lib && jlpm clean:labextension && jlpm clean:lintcache
,
```

```
21          "style/**/*.{css,js,eot,gif,html,jpg,json,png,svg,woff2,ttf}"
22      ],
23      "main": "lib/index.js",
24      "types": "lib/index.d.ts",
25      "style": "style/index.css",
26      "repository": {
27          "type": "git",
28          "url": "https://github.com/DanielGoldfarb/pydjlx.git"
29      },
30      "scripts": {
31          "build": "jlpm build:lib && jlpm build:labextension:dev",
32          "build:prod": "jlpm clean && jlpm build:lib:prod && jlpm build:labextension",
33          "build:labextension": "jupyter labextension build .",
34          "build:labextension:dev": "jupyter labextension build --development True .",
35          "build:lib": "tsc --sourceMap",
36          "build:lib:prod": "tsc",
37          "clean": "jlpm clean:lib",
38          "clean:lib": "rimraf lib tsconfig.tsbuildinfo",
39          "clean:lintcache": "rimraf .eslintcache .stylelintcache",
40          "clean:labextension": "rimraf pydjlx/labextension pydjlx/_version.py",
41          "clean:all": "jlpm clean:lib && jlpm clean:labextension && jlpm clean:lintcache
,
```

```
21          "style/**/*.{css,js,eot,gif,html,jpg,json,png,svg,woff2,ttf}"
22      ],
23      "main": "lib/index.js",
24      "types": "lib/index.d.ts",
25      "style": "style/index.css",
26      "repository": {
27          "type": "git",
28          "url": "https://github.com/DanielGoldfarb/pydjlx.git"
29      },
30      "scripts": {
31          "build": "jlpm build:lib && jlpm build:labextension:dev",
32          "build:prod": "jlpm clean && jlpm build:lib:prod && jlpm build:labextension",
33          "build:labextension": "jupyter labextension build .",
34          "build:labextension:dev": "jupyter labextension build --development True .",
35          "build:lib": "tsc --sourceMap",
36          "build:lib:prod": "tsc",
37          "clean": "jlpm clean:lib",
38          "clean:lib": "rimraf lib tsconfig.tsbuildinfo",
39          "clean:lintcache": "rimraf .eslintcache .stylelintcache",
40          "clean:labextension": "rimraf pydjlx/labextension pydjlx/_version.py",
41          "clean:all": "jlpm clean:lib && jlpm clean:labextension && jlpm clean:lintcache
,
```

Default (vi)

```
43          "eslint:check": "eslint . --cache --ext .ts,.tsx",
44          "install:extension": "jlpm build",
45          "lint": "jlpm stylelint && jlpm prettier && jlpm eslint",
46          "lint:check": "jlpm stylelint:check && jlpm prettier:check && jlpm eslint:check"
    ,
47          "prettier": "jlpm prettier:base --write --list-different",
48          "prettier:base": "prettier \"**/*{.ts,.tsx,.js,.jsx,.css,.json,.md}\"",
49          "prettier:check": "jlpm prettier:base --check",
50          "stylelint": "jlpm stylelint:check --fix",
51          "stylelint:check": "stylelint --cache \"style/**/*.css\"",
52          "watch": "run-p watch:src watch:labextension",
53          "watch:src": "tsc -w --sourceMap",
54          "watch:labextension": "jupyter labextension watch ."
55      },
56      "dependencies": {
57          "@jupyterlab/application": "^4.0.0"
58      },
59      "devDependencies": {
60          "@jupyterlab/builder": "^4.0.0",
61          "@types/json-schema": "^7.0.11",
62          "@types/react": "^18.0.26",
63          "@types/react-addons-linked-state-mixin": "^0.14.22",
```

Default (vi)

```
43          "eslint:check": "eslint . --cache --ext .ts,.tsx",
44          "install:extension": "jlpm build",
45          "lint": "jlpm stylelint && jlpm prettier && jlpm eslint",
46          "lint:check": "jlpm stylelint:check && jlpm prettier:check && jlpm eslint:check"
    ,
47          "prettier": "jlpm prettier:base --write --list-different",
48          "prettier:base": "prettier \"**/*{.ts,.tsx,.js,.jsx,.css,.json,.md}\"",
49          "prettier:check": "jlpm prettier:base --check",
50          "stylelint": "jlpm stylelint:check --fix",
51          "stylelint:check": "stylelint --cache \"style/**/*.css\"",
52          "watch": "run-p watch:src watch:labextension",
53          "watch:src": "tsc -w --sourceMap",
54          "watch:labextension": "jupyter labextension watch ."
55      },
56      "dependencies": {
57          "@jupyterlab/application": "^4.0.0"
58      },
59      "devDependencies": {
60          "@jupyterlab/builder": "^4.0.0",
61          "@types/json-schema": "^7.0.11",
62          "@types/react": "^18.0.26",
63          "@types/react-addons-linked-state-mixin": "^0.14.22",
```

```
(jlx) Dino@MacDino:~/code$ cd epjlx
/Users/Dino/code/epjlx
(jlx) Dino@MacDino:~/code/epjlx$ ls -l
total 80
-rw-r--r--  1 Dino  staff    86 May 30 14:32 CHANGELOG.md
-rw-r--r--  1 Dino  staff  1523 May 30 14:32 LICENSE
-rw-r--r--  1 Dino  staff  2320 May 30 14:32 README.md
-rw-r--r--  1 Dino  staff  2383 May 30 14:32 RELEASE.md
drwxr-xr-x  3 Dino  staff    96 May 30 14:32 epjlx
-rw-r--r--  1 Dino  staff   171 May 30 14:32 install.json
-rw-r--r--  1 Dino  staff  6254 May 30 14:32 package.json
-rw-r--r--  1 Dino  staff  2243 May 30 14:32 pyproject.toml
-rw-r--r--  1 Dino  staff    33 May 30 14:32 setup.py
drwxr-xr-x  3 Dino  staff    96 May 30 14:32 src
drwxr-xr-x  5 Dino  staff   160 May 30 14:32 style
-rw-r--r--  1 Dino  staff   537 May 30 14:32 tsconfig.json
(jlx) Dino@MacDino:~/code/epjlx$
```

```
-rw-r--r--  1 Dino  staff    86 May 30 14:32 CHANGELOG.md
-rw-r--r--  1 Dino  staff  1523 May 30 14:32 LICENSE
-rw-r--r--  1 Dino  staff  2320 May 30 14:32 README.md
-rw-r--r--  1 Dino  staff  2383 May 30 14:32 RELEASE.md
drwxr-xr-x  3 Dino  staff    96 May 30 14:32 epjlx
-rw-r--r--  1 Dino  staff   171 May 30 14:32 install.json
-rw-r--r--  1 Dino  staff  6254 May 30 14:32 package.json
-rw-r--r--  1 Dino  staff  2243 May 30 14:32 pyproject.toml
-rw-r--r--  1 Dino  staff    33 May 30 14:32 setup.py
drwxr-xr-x  3 Dino  staff    96 May 30 14:32 src
drwxr-xr-x  5 Dino  staff   160 May 30 14:32 style
-rw-r--r--  1 Dino  staff   537 May 30 14:32 tsconfig.json
(jlx) Dino@MacDino:~/code$ cd epjlx
/Users/Dino/code/epjlx
(jlx) Dino@MacDino:~/code/epjlx$ ls -l src/*
-rw-r--r--  1 Dino  staff  423 May 30 14:32 src/index.ts
(jlx) Dino@MacDino:~/code/epjlx$
```

```
1  import {
2    JupyterFrontEnd,
3    JupyterFrontEndPlugin
4  } from '@jupyterlab/application';
5
6  /**
7   * Initialization data for the epjlx extension.
8   */
9  const plugin: JupyterFrontEndPlugin<void> = {
10   id: 'epjlx:plugin',
11   description: 'A JupyterLab extension for EuroPython 2024',
12   autoStart: true,
13   activate: (app: JupyterFrontEnd) => {
14     console.log('JupyterLab extension epjlx is activated!');
15   }
16 };
17
18 export default plugin;
~
~
~
```

initialize package repository

```
$ git init

Initialized empty Git repository in code/epjlx/.git/

$ git add .

$ git commit -m 'step0: template extension'
```

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building the project

$ jlpm install # installs dependencies (not the extension)

$ jlpm run build

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```
(jlx) Dino@MacDino:~/code/epjlx$ jlpm install
➤ YN0000: ┌ Resolution step
➤ YN0061: │ abab@npm:2.0.6 is deprecated: Use your platform's native atob() and btoa() methods instead
➤ YN0061: │ rimraf@npm:3.0.2 is deprecated: Rimraf versions prior to v4 are no longer supported
➤ YN0061: │ glob@npm:7.2.3 is deprecated: Glob versions prior to v9 are no longer supported
➤ YN0061: │ inflight@npm:1.0.6 is deprecated: This module is not supported, and leaks memory. Do not use it.
heck out lru-cache if you want a good and tested way to coalesce async requests by a key value, which is much
more comprehensive and powerful.
➤ YN0061: │ glob@npm:7.1.7 is deprecated: Glob versions prior to v9 are no longer supported
➤ YN0002: │ @jupyterlab/services@npm:7.2.1 doesn't provide react (p3c2ea), requested by @jupyterlab/settingre
istry
➤ YN0002: │ epjlx@workspace:. doesn't provide webpack (pdfeb5), requested by source-map-loader
➤ YN0002: │ epjlx@workspace:. doesn't provide webpack (p06982), requested by style-loader
➤ YN0000: │ Some peer dependencies are incorrectly met; run yarn explain peer-requirements <hash> for details
 where <hash> is the six-letter p-prefixed code
➤ YN0000: └ Completed in 8s 388ms
➤ YN0000: ┌ Fetch step
➤ YN0013: │ y-protocols@npm:1.0.6 can't be found in the cache and will be fetched from the remote registry
➤ YN0013: │ yallist@npm:4.0.0 can't be found in the cache and will be fetched from the remote registry
➤ YN0013: │ yargs-parser@npm:20.2.9 can't be found in the cache and will be fetched from the remote registry
➤ YN0013: │ yjs@npm:13.6.15 can't be found in the cache and will be fetched from the remote registry
➤ YN0013: │ yocto-queue@npm:0.1.0 can't be found in the cache and will be fetched from the remote registry
➤ YN0000: └ Completed in 5s 403ms
➤ YN0000: ┌ Link step
➤ YN0007: │ @fortawesome/fontawesome-free@npm:5.15.4 must be built because it never has been before or the la
t one failed
➤ YN0000: └ Completed in 6s 349ms
➤ YN0000: Done with warnings in 20s 258ms
(jlx) Dino@MacDino:~/code/epjlx$
```

```
(jlx) Dino@MacDino:~/code/epjlx$ ls -ltr
total 472
drwxr-xr-x    3 Dino  staff      96 May 30 14:32 epjlx
-rw-r--r--    1 Dino  staff    2383 May 30 14:32 RELEASE.md
-rw-r--r--    1 Dino  staff      86 May 30 14:32 CHANGELOG.md
-rw-r--r--    1 Dino  staff    2320 May 30 14:32 README.md
drwxr-xr-x    5 Dino  staff     160 May 30 14:32 style
-rw-r--r--    1 Dino  staff    1523 May 30 14:32 LICENSE
-rw-r--r--    1 Dino  staff      33 May 30 14:32 setup.py
-rw-r--r--    1 Dino  staff    6254 May 30 14:32 package.json
-rw-r--r--    1 Dino  staff     171 May 30 14:32 install.json
-rw-r--r--    1 Dino  staff     537 May 30 14:32 tsconfig.json
-rw-r--r--    1 Dino  staff    2243 May 30 14:32 pyproject.toml
drwxr-xr-x    3 Dino  staff      96 May 30 16:27 src
-rw-r--r--    1 Dino  staff  199840 May 30 16:29 yarn.lock
drwxr-xr-x  433 Dino  staff   13856 May 30 16:29 node_modules
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
```

```
-rw-r--r--    1 Dino  staff  199840 May 30 16:29 yarn.lock
drwxr-xr-x  433 Dino  staff   13856 May 30 16:29 node_modules
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$ ls -ld node_modules/* | head -18
drwxr-xr-x    5 Dino  staff    160 May 30 16:29 node_modules/@babel
drwxr-xr-x    3 Dino  staff     96 May 30 16:29 node_modules/@codemirror
drwxr-xr-x    6 Dino  staff    192 May 30 16:29 node_modules/@csstools
drwxr-xr-x    3 Dino  staff     96 May 30 16:29 node_modules/@discoveryjs
drwxr-xr-x    4 Dino  staff    128 May 30 16:29 node_modules/@eslint
drwxr-xr-x    4 Dino  staff    128 May 30 16:29 node_modules/@eslint-community
drwxr-xr-x    3 Dino  staff     96 May 30 16:29 node_modules/@fortawesome
drwxr-xr-x    5 Dino  staff    160 May 30 16:29 node_modules/@humanwhocodes
drwxr-xr-x    3 Dino  staff     96 May 30 16:29 node_modules/@isaacs
drwxr-xr-x    8 Dino  staff    256 May 30 16:29 node_modules/@jridgewell
drwxr-xr-x    5 Dino  staff    160 May 30 16:29 node_modules/@jupyter
drwxr-xr-x   18 Dino  staff    576 May 30 16:29 node_modules/@jupyterlab
drwxr-xr-x   17 Dino  staff    544 May 30 16:29 node_modules/@lumino
drwxr-xr-x    7 Dino  staff    224 May 30 16:29 node_modules/@microsoft
drwxr-xr-x    5 Dino  staff    160 May 30 16:29 node_modules/@nodelib
drwxr-xr-x    3 Dino  staff     96 May 30 16:29 node_modules/@pkgjs
drwxr-xr-x    3 Dino  staff     96 May 30 16:29 node_modules/@pkgr
drwxr-xr-x    4 Dino  staff    128 May 30 16:29 node_modules/@rjsf
(jlx) Dino@MacDino:~/code/epjlx$ ls -ld node_modules/* | wc -l
     429
(jlx) Dino@MacDino:~/code/epjlx$
```

```
-rw-r--r--    1 Dino  staff  199840 May 30 16:29 yarn.lock
drwxr-xr-x  433 Dino  staff   13856 May 30 16:29 node_modules
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$ ls -ld node_modules/* | head -18
drwxr-xr-x    5 Dino  staff    160 May 30 16:29 node_modules/@babel
drwxr-xr-x    3 Dino  staff     96 May 30 16:29 node_modules/@codemirror
drwxr-xr-x    6 Dino  staff    192 May 30 16:29 node_modules/@csstools
drwxr-xr-x    3 Dino  staff     96 May 30 16:29 node_modules/@discoveryjs
drwxr-xr-x    4 Dino  staff    128 May 30 16:29 node_modules/@eslint
drwxr-xr-x    4 Dino  staff    128 May 30 16:29 node_modules/@eslint-community
drwxr-xr-x    3 Dino  staff     96 May 30 16:29 node_modules/@fortawesome
drwxr-xr-x    5 Dino  staff    160 May 30 16:29 node_modules/@humanwhocodes
drwxr-xr-x    3 Dino  staff     96 May 30 16:29 node_modules/@isaacs
drwxr-xr-x    8 Dino  staff    256 May 30 16:29 node_modules/@jridgewell
drwxr-xr-x    5 Dino  staff    160 May 30 16:29 node_modules/@jupyter
drwxr-xr-x   18 Dino  staff    576 May 30 16:29 node_modules/@jupyterlab
drwxr-xr-x   17 Dino  staff    544 May 30 16:29 node_modules/@lumino
drwxr-xr-x    7 Dino  staff    224 May 30 16:29 node_modules/@microsoft
drwxr-xr-x    5 Dino  staff    160 May 30 16:29 node_modules/@nodelib
drwxr-xr-x    3 Dino  staff     96 May 30 16:29 node_modules/@pkgjs
drwxr-xr-x    3 Dino  staff     96 May 30 16:29 node_modules/@pkgr
drwxr-xr-x    4 Dino  staff    128 May 30 16:29 node_modules/@rjsf
(jlx) Dino@MacDino:~/code/epjlx$ ls -ld node_modules/* | wc -l
     429
(jlx) Dino@MacDino:~/code/epjlx$
```

```
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$ ls -ld node_modules/@jupyterlab/*
drwxr-xr-x  7 Dino  staff  224 May 30 16:29 node_modules/@jupyterlab/application
drwxr-xr-x  7 Dino  staff  224 May 30 16:29 node_modules/@jupyterlab/apputils
drwxr-xr-x  8 Dino  staff  256 May 30 16:29 node_modules/@jupyterlab/builder
drwxr-xr-x  7 Dino  staff  224 May 30 16:29 node_modules/@jupyterlab/codeeditor
drwxr-xr-x  6 Dino  staff  192 May 30 16:29 node_modules/@jupyterlab/coreutils
drwxr-xr-x  7 Dino  staff  224 May 30 16:29 node_modules/@jupyterlab/docregistry
drwxr-xr-x  5 Dino  staff  160 May 30 16:29 node_modules/@jupyterlab/nbformat
drwxr-xr-x  6 Dino  staff  192 May 30 16:29 node_modules/@jupyterlab/observables
drwxr-xr-x  7 Dino  staff  224 May 30 16:29 node_modules/@jupyterlab/rendermime
drwxr-xr-x  6 Dino  staff  192 May 30 16:29 node_modules/@jupyterlab/rendermime-interfaces
drwxr-xr-x  7 Dino  staff  224 May 30 16:29 node_modules/@jupyterlab/services
drwxr-xr-x  5 Dino  staff  160 May 30 16:29 node_modules/@jupyterlab/settingregistry
drwxr-xr-x  5 Dino  staff  160 May 30 16:29 node_modules/@jupyterlab/statedb
drwxr-xr-x  6 Dino  staff  192 May 30 16:29 node_modules/@jupyterlab/statusbar
drwxr-xr-x  6 Dino  staff  192 May 30 16:29 node_modules/@jupyterlab/translation
drwxr-xr-x  7 Dino  staff  224 May 30 16:29 node_modules/@jupyterlab/ui-components
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
```

```
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$ ls -ld node_modules/@jupyterlab/*
drwxr-xr-x  7 Dino  staff  224 May 30 16:29 node_modules/@jupyterlab/application
drwxr-xr-x  7 Dino  staff  224 May 30 16:29 node_modules/@jupyterlab/apputils
drwxr-xr-x  8 Dino  staff  256 May 30 16:29 node_modules/@jupyterlab/builder
drwxr-xr-x  7 Dino  staff  224 May 30 16:29 node_modules/@jupyterlab/codeeditor
drwxr-xr-x  6 Dino  staff  192 May 30 16:29 node_modules/@jupyterlab/coreutils
drwxr-xr-x  7 Dino  staff  224 May 30 16:29 node_modules/@jupyterlab/docregistry
drwxr-xr-x  5 Dino  staff  160 May 30 16:29 node_modules/@jupyterlab/nbformat
drwxr-xr-x  6 Dino  staff  192 May 30 16:29 node_modules/@jupyterlab/observables
drwxr-xr-x  7 Dino  staff  224 May 30 16:29 node_modules/@jupyterlab/rendermime
drwxr-xr-x  6 Dino  staff  192 May 30 16:29 node_modules/@jupyterlab/rendermime-interfaces
drwxr-xr-x  7 Dino  staff  224 May 30 16:29 node_modules/@jupyterlab/services
drwxr-xr-x  5 Dino  staff  160 May 30 16:29 node_modules/@jupyterlab/settingregistry
drwxr-xr-x  5 Dino  staff  160 May 30 16:29 node_modules/@jupyterlab/statedb
drwxr-xr-x  6 Dino  staff  192 May 30 16:29 node_modules/@jupyterlab/statusbar
drwxr-xr-x  6 Dino  staff  192 May 30 16:29 node_modules/@jupyterlab/translation
drwxr-xr-x  7 Dino  staff  224 May 30 16:29 node_modules/@jupyterlab/ui-components
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
```

building the project

```
$ jlpm install   # installs dependencies (not the extension)

$ jlpm run build
```

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```
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$ jlpm run build
Building extension in .

Compilation starting…


Compilation finished

asset style_index_js.20ebf64a3cb7994bb7df.js 18.9 KiB [emitted] [immutable] 1 related asset
asset remoteEntry.1a5ce16f6fb2cabb000d.js 16.2 KiB [emitted] [immutable] (name: epjlx) 1 related asset
asset lib_index_js.f1fcbb81ac773710a5e4.js 926 bytes [emitted] [immutable] 1 related asset
runtime modules 9.11 KiB 13 modules
built modules 10.9 KiB (javascript) 42 bytes (share-init) [built]
  cacheable modules 10.8 KiB
    modules by path ./node_modules/ 8.58 KiB
      modules by path ./node_modules/style-loader/dist/runtime/*.js 5.84 KiB 6 modules
      modules by path ./node_modules/css-loader/dist/runtime/*.js 2.74 KiB
        ./node_modules/css-loader/dist/runtime/sourceMaps.js 505 bytes [built] [code generated]
        ./node_modules/css-loader/dist/runtime/api.js 2.25 KiB [built] [code generated]
    modules by path ./style/ 1.94 KiB
      ./style/index.js 21 bytes [built] [code generated]
      ./style/base.css 1.11 KiB [built] [code generated]
      ./node_modules/css-loader/dist/cjs.js!./style/base.css 829 bytes [built] [code generated]
    ./lib/index.js 303 bytes [built] [code generated]
  container entry 42 bytes [built] [code generated]
  provide shared module (default) epjlx@0.1.0 = ./lib/index.js 42 bytes [built] [code generated]
webpack 5.91.0 compiled successfully in 441 ms
(jlx) Dino@MacDino:~/code/epjlx$
```

install the extension

```
jupyter labextension list  # list installed extensions
ls -l  …/share/jupyter/labextentions/

#  pip install ./
jupyter labextension develop --overwrite ./

jupyter labextension list
ls -l  …/share/jupyter/labextentions/
```

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install the extension

```
jupyter labextension list  # list installed extensions
ls -l  …/share/jupyter/labextentions/

#  pip install ./
jupyter labextension develop --overwrite ./

jupyter labextension list
ls -l  …/share/jupyter/labextentions/
```

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ls -l  …/share/jupyter/labextentions/
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install the extension

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jupyter labextension develop --overwrite ./

jupyter labextension list
ls -l  …/share/jupyter/labextentions/
```

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```
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$ jupyter labextension list
JupyterLab v4.2.1
/Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions
        jupyterlab_pygments v0.3.0 enabled OK (python, jupyterlab_pygments)

(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$ ls -l /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions
total 0
drwxr-xr-x  5 Dino  staff  160 May 29 19:36 jupyterlab_pygments
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
```

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(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
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(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$ jupyter labextension list
JupyterLab v4.2.1
/Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions
   jupyterlab_pygments v0.3.0 enabled OK (python, jupyterlab_pygments)

(jlx) Dino@MacDino:~/code/epjlx$
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total 0
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(jlx) Dino@MacDino:~/code/epjlx$
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(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
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(jlx) Dino@MacDino:~/code/epjlx$
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(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$ jupyter labextension list
JupyterLab v4.2.1
/Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions
        jupyterlab_pygments v0.3.0 enabled OK (python, jupyterlab_pygments)

(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$ ls -l /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions
total 0
drwxr-xr-x  5 Dino  staff  160 May 29 19:36 jupyterlab_pygments
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
```

```
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$ jupyter labextension list
JupyterLab v4.2.1
/Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions
        jupyterlab_pygments v0.3.0 enabled OK (python, jupyterlab_pygments)

(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$ ls -l /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions
total 0
drwxr-xr-x  5 Dino  staff  160 May 29 19:36 jupyterlab_pygments
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
```

install the extension

```
jupyter labextension list   # list installed extensions
ls -l  …/share/jupyter/labextentions/

#  pip install ./
jupyter labextension develop --overwrite ./

jupyter labextension list
ls -l  …/share/jupyter/labextentions/
```

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```
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$ jupyter labextension develop --overwrite ./
Obtaining file:///Users/Dino/code/epjlx
  Installing build dependencies ... done
  Checking if build backend supports build_editable ... done
  Getting requirements to build editable ... done
  Installing backend dependencies ... done
  Preparing editable metadata (pyproject.toml) ... done
Building wheels for collected packages: epjlx
  Building editable for epjlx (pyproject.toml) ... done
  Created wheel for epjlx: filename=epjlx-0.1.0-py3-none-any.whl size=28109 sha256=300cf4507400911a942fcd3284a
8ba65cdbd86f18586c519d4abedea37188a9d
  Stored in directory: /private/var/folders/y2/tp5x99n97yb92r_r__z_5q2r0000gn/T/pip-ephem-wheel-cache-ww4501t2
/wheels/1d/99/ce/5a6a856e84d3f04031f9970260b1817f15bdae6f2d352d1b77
Successfully built epjlx
Installing collected packages: epjlx
Successfully installed epjlx-0.1.0
Installing /Users/Dino/code/epjlx/epjlx/labextension -> epjlx
Removing: /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions/epjlx
Symlinking: /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions/epjlx -> /Users/Dino/code/epjlx/epjlx/
labextension
(jlx) Dino@MacDino:~/code/epjlx$ jupyter labextension list
JupyterLab v4.2.1
/Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions
        jupyterlab_pygments v0.3.0 enabled OK (python, jupyterlab_pygments)
        epjlx v0.1.0 enabled OK
```

```
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$ jupyter labextension develop --overwrite ./
Obtaining file:///Users/Dino/code/epjlx
  Installing build dependencies ... done
  Checking if build backend supports build_editable ... done
  Getting requirements to build editable ... done
  Installing backend dependencies ... done
  Preparing editable metadata (pyproject.toml) ... done
Building wheels for collected packages: epjlx
  Building editable for epjlx (pyproject.toml) ... done
  Created wheel for epjlx: filename=epjlx-0.1.0-py3-none-any.whl size=28109 sha256=300cf4507400911a942fcd3284a
8ba65cdbd86f18586c519d4abedea37188a9d
  Stored in directory: /private/var/folders/y2/tp5x99n97yb92r_r__z_5q2r0000gn/T/pip-ephem-wheel-cache-ww4501t2
/wheels/1d/99/ce/5a6a856e84d3f04031f9970260b1817f15bdae6f2d352d1b77
Successfully built epjlx
Installing collected packages: epjlx
Successfully installed epjlx-0.1.0
Installing /Users/Dino/code/epjlx/epjlx/labextension -> epjlx
Removing: /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions/epjlx
Symlinking: /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions/epjlx -> /Users/Dino/code/epjlx/epjlx/
labextension
(jlx) Dino@MacDino:~/code/epjlx$ jupyter labextension list
JupyterLab v4.2.1
/Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions
        jupyterlab_pygments v0.3.0 enabled OK (python, jupyterlab_pygments)
        epjlx v0.1.0 enabled OK
```

```
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$
(jlx) Dino@MacDino:~/code/epjlx$ jupyter labextension develop --overwrite ./
Obtaining file:///Users/Dino/code/epjlx
  Installing build dependencies ... done
  Checking if build backend supports build_editable ... done
  Getting requirements to build editable ... done
  Installing backend dependencies ... done
  Preparing editable metadata (pyproject.toml) ... done
Building wheels for collected packages: epjlx
  Building editable for epjlx (pyproject.toml) ... done
  Created wheel for epjlx: filename=epjlx-0.1.0-py3-none-any.whl size=28109 sha256=300cf4507400911a942fcd3284a
8ba65cdbd86f18586c519d4abedea37188a9d
  Stored in directory: /private/var/folders/y2/tp5x99n97yb92r_r__z_5q2r0000gn/T/pip-ephem-wheel-cache-ww4501t2
/wheels/1d/99/ce/5a6a856e84d3f04031f9970260b1817f15bdae6f2d352d1b77
Successfully built epjlx
Installing collected packages: epjlx
Successfully installed epjlx-0.1.0
Installing /Users/Dino/code/epjlx/epjlx/labextension -> epjlx
Removing: /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions/epjlx
Symlinking: /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions/epjlx -> /Users/Dino/code/epjlx/epjlx/
labextension
(jlx) Dino@MacDino:~/code/epjlx$ jupyter labextension list
JupyterLab v4.2.1
/Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions
        jupyterlab_pygments v0.3.0 enabled OK (python, jupyterlab_pygments)
        epjlx v0.1.0 enabled OK
```

```
  Preparing editable metadata (pyproject.toml) ... done
Building wheels for collected packages: epjlx
  Building editable for epjlx (pyproject.toml) ... done
  Created wheel for epjlx: filename=epjlx-0.1.0-py3-none-any.whl size=28109 sha256=300cf4507400911a94
8ba65cdbd86f18586c519d4abedea37188a9d
  Stored in directory: /private/var/folders/y2/tp5x99n97yb92r_r__z_5q2r0000gn/T/pip-ephem-wheel-cache
/wheels/1d/99/ce/5a6a856e84d3f04031f9970260b1817f15bdae6f2d352d1b77
Successfully built epjlx
Installing collected packages: epjlx
Successfully installed epjlx-0.1.0
Installing /Users/Dino/code/epjlx/epjlx/labextension -> epjlx
Removing: /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions/epjlx
Symlinking: /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions/epjlx -> /Users/Dino/code/epj
labextension
(jlx) Dino@MacDino:~/code/epjlx$ jupyter labextension list
JupyterLab v4.2.1
/Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions
  jupyterlab_pygments v0.3.0 enabled OK (python, jupyterlab_pygments)
  epjlx v0.1.0 enabled OK

(jlx) Dino@MacDino:~/code/epjlx$ ls -l /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions
total 0
lrwxr-xr-x  1 Dino  staff   41 May 30 16:42 epjlx -> /Users/Dino/code/epjlx/epjlx/labextension
drwxr-xr-x  5 Dino  staff  160 May 29 19:36 jupyterlab_pygments
(jlx) Dino@MacDino:~/code/epjlx$
```

```
  Preparing editable metadata (pyproject.toml) ... done
Building wheels for collected packages: epjlx
  Building editable for epjlx (pyproject.toml) ... done
  Created wheel for epjlx: filename=epjlx-0.1.0-py3-none-any.whl size=28109 sha256=300cf4507400911a94
8ba65cdbd86f18586c519d4abedea37188a9d
  Stored in directory: /private/var/folders/y2/tp5x99n97yb92r_r__z_5q2r0000gn/T/pip-ephem-wheel-cache
/wheels/1d/99/ce/5a6a856e84d3f04031f9970260b1817f15bdae6f2d352d1b77
Successfully built epjlx
Installing collected packages: epjlx
Successfully installed epjlx-0.1.0
Installing /Users/Dino/code/epjlx/epjlx/labextension -> epjlx
Removing: /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions/epjlx
Symlinking: /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions/epjlx -> /Users/Dino/code/epj
labextension
(jlx) Dino@MacDino:~/code/epjlx$ jupyter labextension list
JupyterLab v4.2.1
/Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions
  jupyterlab_pygments v0.3.0 enabled OK (python, jupyterlab_pygments)
  epjlx v0.1.0 enabled OK
```

```
(jlx) Dino@MacDino:~/code/epjlx$ ls -l /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions
total 0
lrwxr-xr-x  1 Dino  staff   41 May 30 16:42 epjlx -> /Users/Dino/code/epjlx/epjlx/labextension
drwxr-xr-x  5 Dino  staff  160 May 29 19:36 jupyterlab_pygments
(jlx) Dino@MacDino:~/code/epjlx$
```

test run jupyter lab

new window:

```
conda activate jlx
jupyter lab
```

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JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

CONSOLE

- Change Kernel...
- Clear Console Cells
- Close and Shut Down...
- Insert Line Break
- Interrupt Kernel
- New Console
- Restart Kernel...
- Run Cell (forced)
- Run Cell (unforced)
- Show All Kernel Activity

DEBUGGER

- Breakpoints on exception
- Evaluate Code
- Next F10
- Pause F9
- Step In F11
- Step Out ⇧ F11
- Terminate ⇧ F9

DISPLAY LANGUAGES

- English

EXTENSION MANAGER

Launcher

Notebook

Python 3 (ipykernel)

Console

Python 3 (ipykernel)

Other

Terminal | Text File | Markdown File | Python File | Show Contextual Help

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JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

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EXTENSION MANAGER

Launcher

Notebook

Python 3 (ipykernel)

Console

Python 3 (ipykernel)

Other

Terminal | Text File | Markdown File | Python File | Show Contextual Help

New Tab ⌘T
New Window ⌘N
New Incognito Window ⇧⌘N
History
Downloads ⌥⌘L
Bookmarks
Google Password Manager New
Extensions
Zoom − 150% +
Print... ⌘P
Cast...
Find... ⌘F
More Tools
Edit Cut Copy Paste
Settings ⌘,
Help

Save Page As... ⌘S
Create Shortcut...
Name Window...
Clear Browsing Data... ⇧⌘⌫
Performance
Task Manager
Developer Tools ⌥⌘I

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JupyterLab

localhost:8888/lab

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SEARCH

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EXTENSION MANAGER

Launcher

Notebook

Python 3 (ipykernel)

Console

Python 3 (ipykernel)

Other

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Text File

Markdown File

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top

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Filter

Info only

8 Issues: 8

```
Jupyte lib_index_js.1056047….js:22
rLab extension pydjlx is activated!
```

›

TUTORIAL

0. copier extension template
   (basic do-nothing extension)
1. create a command to do something
2. execute command from the Command Palette
3. command adds a Widget to JupyterLab
   (main area)

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TUTORIAL

0. copier extension template
   (basic do-nothing extension)
1. create a command to do something
2. execute command from the Command Palette
3. command adds a Widget to JupyterLab
   (main area)

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TUTORIAL

0. copier extension template
   (basic do-nothing extension)
1. create a command to do something

- code (edit src/index.ts)
- jlpm run build
- refresh button on browser containing JupyterLab

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Showing **1 changed file** with **11 additions** and **0 deletions**.

Whitespace | Ignore whitespace | Split | Unified

11 src/index.ts

```diff
@@ -12,7 +12,18 @@ const plugin: JupyterFrontEndPlugin<void> = {
 12  autoStart: true,
 13  activate: (app: JupyterFrontEnd) => {
 14    console.log('JupyterLab extension epjlx is activated!');
+ 15    let commandId = 'epjlx:Hello';
+ 16    app.commands.addCommand(commandId,
+ 17      { label: 'Hello World',
+ 18        execute: say_hello
+ 19      });
+ 20
+ 21    app.commands.execute(commandId);
 15  }
 16 };
 17
+ 25 function say_hello() {
+ 26   console.log('epjlx says "Hello World!"');
+ 27 }
+ 28
 18 export default plugin;
```

0 comments on commit `5c290e2`

Lock conversation

```
n: JupyterFrontEndPlugin<void> = {

End) => {
tension epjlx is activated!');

    autoStart: true,
    activate: (app: JupyterFrontEnd) => {
      console.log('JupyterLab extension epjlx is activated!');
+     let commandId = 'epjlx:Hello';
+     app.commands.addCommand(commandId,
+       { label: 'Hello World',
+         execute: say_hello
+       });
+
+     app.commands.execute(commandId);
    }
  };

+ function say_hello() {
+   console.log('epjlx says "Hello World!"');
+ }
+
  export default plugin;
```

TUTORIAL

- **jlpm run build**
- **refresh** JupyterLab browser

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Default (-bash)

```
(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$ jlpm run build
Building extension in .

Compilation starting…


Compilation finished

asset remoteEntry.0cf2effff510efef0eea.js 26.7 KiB [emitted] [immutable] (name: pydjlx) 1 related asset
asset style_index_js.4e1f4ab8cfdf0e0a58ba.js 18.9 KiB [emitted] [immutable] 1 related asset
asset lib_index_js.629eee99200c505f31cb.js 1.65 KiB [emitted] [immutable] 1 related asset
runtime modules 17.7 KiB 13 modules
built modules 11.3 KiB (javascript) 42 bytes (share-init) 42 bytes (consume-shared) [built]
  cacheable modules 11.2 KiB
    modules by path ./node_modules/ 8.58 KiB
      modules by path ./node_modules/style-loader/dist/runtime/*.js 5.84 KiB 6 modules
      modules by path ./node_modules/css-loader/dist/runtime/*.js 2.74 KiB 2 modules
    modules by path ./style/ 1.94 KiB
      ./style/index.js 21 bytes [built] [code generated]
      ./style/base.css 1.11 KiB [built] [code generated]
      ./node_modules/css-loader/dist/cjs.js!./style/base.css 829 bytes [built] [code generated]
    ./lib/index.js 713 bytes [built] [code generated]
  container entry 42 bytes [built] [code generated]
  provide shared module (default) pydjlx@0.1.0 = ./lib/index.js 42 bytes [built] [code generated]
  consume shared module (default) @jupyterlab/apputils@^4.1.7 (singleton) 42 bytes [built] [code generated]
webpack 5.89.0 compiled successfully in 343 ms
(jlx) Dino@MacDino:~/code/pydjlx$
```

JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

CONSOLE

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- Insert Line Break
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- New Console
- Restart Kernel...
- Run Cell (forced)
- Run Cell (unforced)
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DISPLAY LANGUAGES

- English

EXTENSION MANAGER

Launcher

Notebook

Python 3 (ipykernel)

Console

Python 3 (ipykernel)

Other

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Text File

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Filter

Info only

8 Issues: 8

```
Jupyte lib_index_js.1056047….js:22
rLab extension pydjlx is activated!
```

JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

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Info only

8 Issues: 8

```
Jupyte  lib_index_js.b0585cc….js:22
rLab extension pydjlx is activated!

jlxd    lib_index_js.b0585cc….js:31
says "Hello World!"
```

TUTORIAL

0. copier extension template (basic do-nothing extension)
1. create a command to do something
2. execute command from the Command Palette
3. command adds a Widget to JupyterLab (main area)

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```
3     JupyterFrontEndPlugin
4   } from '@jupyterlab/application';
5
6   /**
7    * Initialization data for the epjlx extension.
8    */
9   const plugin: JupyterFrontEndPlugin<void> = {
10    id: 'epjlx:plugin',
11    description: 'A JupyterLab extension for EuroPython 2024',
12    autoStart: true,
13  -  activate: (app: JupyterFrontEnd) => {
14      console.log('JupyterLab extension epjlx is activated!');
15      let commandId = 'epjlx:Hello';
16      app.commands.addCommand(commandId,
17        { label: 'Hello World',
18          execute: say_hello
19        });
20
21  -   app.commands.execute(commandId);
```

```
3     JupyterFrontEndPlugin
4   } from '@jupyterlab/application';
5
6   + import { ICommandPalette } from '@jupyterlab/apputils'
7   +
8   /**
9    * Initialization data for the epjlx extension.
10   */
11  const plugin: JupyterFrontEndPlugin<void> = {
12    id: 'epjlx:plugin',
13    description: 'A JupyterLab extension for EuroPython 2024',
14    autoStart: true,
15  +  requires: [ ICommandPalette ],
16  +  activate: (app: JupyterFrontEnd,
17  +            palette: ICommandPalette ) => {
18      console.log('JupyterLab extension epjlx is activated!');
19      let commandId = 'epjlx:Hello';
20      app.commands.addCommand(commandId,
21        { label: 'Hello World',
22          execute: say_hello
23        });
24
25  +   palette.addItem(
26  +     { command: commandId,
27  +       category: 'Anything'
28  +     });
```

```
lugin
o/application';

data for the epjlx extension.

terFrontEndPlugin<void> = {
n',
JupyterLab extension for EuroPython 2024',

JupyterFrontEnd) => {

upyterLab extension epjlx is activated!');
= 'epjlx:Hello';
ddCommand(commandId,
llo World',
ay_hello
```

```
  JupyterFrontEndPlugin
} from '@jupyterlab/application';

+ import { ICommandPalette } from '@jupyterlab/apputils'
+
/**
 * Initialization data for the epjlx extension.
 */
const plugin: JupyterFrontEndPlugin<void> = {
  id: 'epjlx:plugin',
  description: 'A JupyterLab extension for EuroPython 2024',
  autoStart: true,
+ requires: [ ICommandPalette ],
+ activate: (app: JupyterFrontEnd,
+             palette: ICommandPalette ) => {
    console.log('JupyterLab extension epjlx is activated!');
    let commandId = 'epjlx:Hello';
    app.commands.addCommand(commandId,
      { label: 'Hello World',
        execute: say_hello
      });
```

```
in<void> = {

nsion for EuroPython 2024',

) => {

sion epjlx is activated!');
;
ndId,

d);
```

```
11    const plugin: JupyterFrontEndPlugin<void> = {
12      id: 'epjlx:plugin',
13      description: 'A JupyterLab extension for EuroPython 2024',
14      autoStart: true,
15  +   requires: [ ICommandPalette ],
16  +   activate: (app: JupyterFrontEnd,
17  +                 palette: ICommandPalette ) => {
18        console.log('JupyterLab extension epjlx is activated!');
19        let commandId = 'epjlx:Hello';
20        app.commands.addCommand(commandId,
21          { label: 'Hello World',
22            execute: say_hello
23          });
24
25  +     palette.addItem(
26  +       { command: commandId,
27  +         category: 'Anything'
28  +       });
```

TUTORIAL

- **jlpm run build**
- **refresh** JupyterLab browser

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Default (-bash)

```
(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$ jlpm run build
Building extension in .

Compilation starting…


Compilation finished

asset remoteEntry.0cf2effff510efef0eea.js 26.7 KiB [emitted] [immutable] (name: pydjlx) 1 related asset
asset style_index_js.4e1f4ab8cfdf0e0a58ba.js 18.9 KiB [emitted] [immutable] 1 related asset
asset lib_index_js.629eee99200c505f31cb.js 1.65 KiB [emitted] [immutable] 1 related asset
runtime modules 17.7 KiB 13 modules
built modules 11.3 KiB (javascript) 42 bytes (share-init) 42 bytes (consume-shared) [built]
  cacheable modules 11.2 KiB
    modules by path ./node_modules/ 8.58 KiB
      modules by path ./node_modules/style-loader/dist/runtime/*.js 5.84 KiB 6 modules
      modules by path ./node_modules/css-loader/dist/runtime/*.js 2.74 KiB 2 modules
    modules by path ./style/ 1.94 KiB
      ./style/index.js 21 bytes [built] [code generated]
      ./style/base.css 1.11 KiB [built] [code generated]
      ./node_modules/css-loader/dist/cjs.js!./style/base.css 829 bytes [built] [code generated]
    ./lib/index.js 713 bytes [built] [code generated]
  container entry 42 bytes [built] [code generated]
  provide shared module (default) pydjlx@0.1.0 = ./lib/index.js 42 bytes [built] [code generated]
  consume shared module (default) @jupyterlab/apputils@^4.1.7 (singleton) 42 bytes [built] [code generated]
webpack 5.89.0 compiled successfully in 343 ms
(jlx) Dino@MacDino:~/code/pydjlx$
```

JupyterLab

localhost:8888/lab

File View Run Kernel Tabs Settings Help

SEARCH

CONSOLE

- Change Kernel...
- Clear Console Cells
- Close and Shut Down...
- Insert Line Break
- Interrupt Kernel
- New Console
- Restart Kernel...
- Run Cell (forced)
- Run Cell (unforced)
- Show All Kernel Activity

DEBUGGER

- Breakpoints on exception
- Evaluate Code
- Next F10
- Pause F9
- Step In F11
- Step Out ⇧ F11
- Terminate ⇧ F9

DISPLAY LANGUAGES

- English

EXTENSION MANAGER

Launcher

Notebook

Python 3 (ipykernel)

Console

Python 3 (ipykernel)

Other

Terminal

Text File

Markdown File

Simple 0 0

Launcher 0

1 8

top

2 hidden

Filter

Info only

8 Issues: 8

```
Jupyte  lib_index_js.b0585cc….js:22
rLab extension pydjlx is activated!
jlxd    lib_index_js.b0585cc….js:31
says "Hello World!"
```

JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

ANYTHING

Hello World

CONSOLE

Change Kernel...

Clear Console Cells

Close and Shut Down...

Insert Line Break

Interrupt Kernel

New Console

Restart Kernel...

Run Cell (forced)

Run Cell (unforced)

Show All Kernel Activity

DEBUGGER

Breakpoints on exception

Evaluate Code

Next F10

Pause F9

Step In F11

Step Out ⇧ F11

Terminate ⇧ F9

DISPLAY LANGUAGES

Launcher

Notebook

Python 3 (ipykernel)

Console

Python 3 (ipykernel)

Other

Terminal

Text File

Markdown File

Simple 0 0

Launcher 0

1 55

top

2 hidden

Filter

Info only

55 Issues: 55

```
Jupyte lib_index_js.629eee9….js:26
rLab extension pydjlx is
activated!
```

JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

ANYTHING

Hello World

CONSOLE

Change Kernel...
Clear Console Cells
Close and Shut Down...
Insert Line Break
Interrupt Kernel
New Console
Restart Kernel...
Run Cell (forced)
Run Cell (unforced)
Show All Kernel Activity

DEBUGGER

Breakpoints on exception
Evaluate Code
Next F10
Pause F9
Step In F11
Step Out ⇧ F11
Terminate ⇧ F9

DISPLAY LANGUAGES

Launcher

Notebook

Python 3 (ipykernel)

Console

Python 3 (ipykernel)

Other

Terminal

Text File

Markdown File

Simple 0 0

Launcher 0

1 55

top

2 hidden

Filter

Info only

55 Issues: 55

```
Jupyte lib_index_js.629eee9….js:26
rLab extension pydjlx is
activated!
pydjlx lib_index_js.629eee9….js:37
says "Hello World!"
>
```

TUTORIAL

0. copier extension template (basic do-nothing extension)
1. do something (create a command)
2. execute command from the Command Palette
3. Command to add a widget to JupyterLab (main area)

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JupyterLab (auto-J)

localhost:8888/lab/workspaces/auto-J

File Edit View Run Kernel Tabs Settings Help

SEARCH

ANYTHING

Hello World

CONSOLE

Change Kernel...
Clear Console Cells
Close and Shut Down...
Insert Line Break
Interrupt Kernel
New Console
Restart Kernel...
Run Cell (forced)
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Show All Kernel Activity

DEBUGGER

Breakpoints on exception
Evaluate Code
Next F10
Pause F9

Launcher

Notebook

Python 3 (ipykernel)

Console

Python 3 (ipykernel)

Other

Simple 0 3

Launcher 0

Step 3a:

`activate()` function ***not*** anonymous

Step 3b:

Modify command to

create a Main Area Widget

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```
cation';

} from '@jupyterlab/apputils'

r the epjlx extension.

n _activate(app: JupyterFrontEnd,

Hello';
(commandId,
',
```

```
3       JupyterFrontEndPlugin
4     } from '@jupyterlab/application';
5
6   + import { ICommandPalette } from '@jupyterlab/apputils';
7   + import { Widget          } from '@lumino/widgets';
8   + import { MainAreaWidget  } from '@jupyterlab/apputils';
9
10    /**
11     * Initialization data for the epjlx extension.
24      let commandId = 'epjlx:Hello';
25      app.commands.addCommand(commandId,
26        { label: 'Hello World',
27  +       execute: () => { say_hello(app) }
28        });
29
30      palette.addItem(
```

on _activate(app: JupyterFrontEnd

```
- function say_hello() {
-   console.log('epjlx says "Hello World!"');
```

```
36 + class HelloWorldWidget extends Widget {
37 +   constructor() {
38 +     super();
39 +     this.id = 'hello-world';
40 +     this.title.label = 'Hello World';
41 +     this.title.closable = true;
42 +     let body = document.createElement('body');
43 +     let heading = document.createElement('h1');
44 +     heading.innerText = 'Hello World from EuroPython!';
45 +     body.appendChild(heading);
46 +     this.node.appendChild(body);
47 +   }
48 + }
49 +
50 + function say_hello(app: JupyterFrontEnd) {
51 +   let content = new HelloWorldWidget();
52 +   let widget  = new MainAreaWidget({content});
53 +
54 +   app.shell.add(widget,'main');
55 +   app.shell.activateById(widget.id);
56   }
```

```
}
```

```
);
```

```
+ class HelloWorldWidget extends Widget {
+   constructor() {
+     super();
+     this.id = 'hello-world';
+     this.title.label = 'Hello World';
+     this.title.closable = true;
+     let body = document.createElement('body');
+     let heading = document.createElement('h1');
+     heading.innerText = 'Hello World from EuroPython!';
+     body.appendChild(heading);
+     this.node.appendChild(body);
+   }
+ }
```

```
function say_hello() {
  console.log('epjlx says "Hello World!"');
```

```
+ function say_hello(app: JupyterFrontEnd) {
+   let content = new HelloWorldWidget();
+   let widget  = new MainAreaWidget({content});
+
+   app.shell.add(widget,'main');
+   app.shell.activateById(widget.id);
  }
```

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```
+ function say_hello(app: JupyterFrontEnd) {
+   let content = new HelloWorldWidget();
+   let widget  = new MainAreaWidget({content});
+
+   app.shell.add(widget,'main');
+   app.shell.activateById(widget.id);
  }
```

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```
let commandId = 'epjlx:Hello';
app.commands.addCommand(commandId,
  { label: 'Hello World',
    execute: say_hello
  });

palette.addItem(
```

```
24        let commandId = 'epjlx:Hello';
25        app.commands.addCommand(commandId,
26          { label: 'Hello World',
27  +         execute: () => { say_hello(app) }
28          });
29
30        palette.addItem(
```

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TUTORIAL

- **jlpm run build**
- **refresh** JupyterLab browser

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JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

ANYTHING

Hello World

CONSOLE

Change Kernel...
Clear Console Cells
Close and Shut Down...
Insert Line Break
Interrupt Kernel
New Console
Restart Kernel...
Run Cell (forced)
Run Cell (unforced)
Show All Kernel Activity

DEBUGGER

Breakpoints on exception
Evaluate Code
Next F10
Pause F9
Step In F11
Step Out ⇧ F11
Terminate ⇧ F9

DISPLAY LANGUAGES

English

EXTENSION MANAGER

Enable Extension Manager

Launcher

code/mplfinance/examples

Notebook

Python 3 (ipykernel)

Console

Python 3 (ipykernel)

Other

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Python File
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Launcher 0

JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

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Next F10
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DISPLAY LANGUAGES

English

EXTENSION MANAGER

Enable Extension Manager

Launcher | Hello World

Hello World from EuroPython!

Simple 0 0

Hello World 0

JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

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Hello World

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DISPLAY LANGUAGES

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code/mplfinance/examples

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Python 3 (ipykernel)

Console

Python 3 (ipykernel)

Other

Terminal

Text File

Hello World

Hello World from EuroPython!

Simple 0 0

Hello World 0

JupyterLab

localhost:8888/lab

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SEARCH

ANYTHING

Hello World

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code/mplfinance/examples

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Python 3 (ipykernel)

Console

Hello World

Hello World from EuroPython!

Simple 0 0

Hello World 0

JupyterLab

localhost:8888/lab

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EXTENSION MANAGER

Enable Extension Manager

Launcher

code/mplfinance/examples

Notebook

Python 3 (ipykernel)

Console

Hello World

Hello World from EuroPython!

Hello World

Hello World from EuroPython!

Simple 0 0

Hello World 0

TUTORIAL

4. style the widget
5. execute the command from the Launcher
6. execute command with arguments
7. create SideBar widget to execute our command with various options

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Default (-bash)

```
(jlx) Dino@MacDino:~/code/pydjlx$ ls -l
total 640
-rw-r--r--    1 Dino  staff      86 Oct 17 13:47 CHANGELOG.md
-rw-r--r--    1 Dino  staff    1523 Oct 17 13:47 LICENSE
-rw-r--r--    1 Dino  staff    2323 Oct 17 13:47 README.md
-rw-r--r--    1 Dino  staff    3915 Oct 17 13:47 RELEASE.md
-rw-r--r--    1 Dino  staff     173 Oct 17 13:47 install.json
drwxr-xr-x    5 Dino  staff     160 Oct 15 19:50 lib
drwxr-xr-x  440 Dino  staff   14080 Oct 15 15:56 node_modules
-rw-r--r--    1 Dino  staff    6155 Oct 17 13:47 package.json
drwxr-xr-x    6 Dino  staff     192 Oct 17 13:47 pydjlx
-rw-r--r--    1 Dino  staff    2207 Oct 17 13:47 pyproject.toml
-rw-r--r--    1 Dino  staff      33 Oct 17 13:47 setup.py
drwxr-xr-x    3 Dino  staff      96 Oct 17 18:05 src
drwxr-xr-x    5 Dino  staff     160 Oct 17 13:47 style
-rw-r--r--    1 Dino  staff     537 Oct 17 13:47 tsconfig.json
-rw-r--r--    1 Dino  staff   85538 Oct 17 18:05 tsconfig.tsbuildinfo
-rw-r--r--    1 Dino  staff  200113 Oct 15 15:56 yarn.lock
(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$ ls -l style/*
-rw-r--r--  1 Dino  staff  138 Oct 17 13:47 style/base.css
-rw-r--r--  1 Dino  staff   25 Oct 17 13:47 style/index.css
-rw-r--r--  1 Dino  staff   21 Oct 17 13:47 style/index.js
(jlx) Dino@MacDino:~/code/pydjlx$
```

Default (vi)

```
/*
    See the JupyterLab Developer Guide for useful CSS Patterns:

    https://jupyterlab.readthedocs.io/en/stable/developer/css.html
*/
```

Default (vi)

```
/*
    See the JupyterLab Developer Guide for useful CSS Patterns:

    https://jupyterlab.readthedocs.io/en/stable/developer/css.html
*/

.hww body {
   height: 100%;
   position: relative;
   text-align: center;
   background-color: teal;
}

.hww h1 {
   position: absolute;
   top: 36%;
   left: 0;
   right: 0;
   font-size: 400%;
}
~
```

```
35
36    class HelloWorldWidget extends Widget {
37      constructor() {
38        super();
39        this.id = 'hello-world';
40        this.title.label = 'Hello World';
41        this.title.closable = true;
42  +     this.addClass('hww');
43        let body = document.createElement('body');
44        let heading = document.createElement('h1');
45        heading.innerText = 'Hello World from EuroPython!';
46        body.appendChild(heading);
47        this.node.appendChild(body);
48      }
49    }
50
```

TUTORIAL

- **jlpm run build**
- **refresh** JupyterLab browser

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JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

ANYTHING

Hello World

CONSOLE

Change Kernel...
Clear Console Cells
Close and Shut Down...
Insert Line Break
Interrupt Kernel
New Console
Restart Kernel...
Run Cell (forced)
Run Cell (unforced)
Show All Kernel Activity

DEBUGGER

Breakpoints on exception
Evaluate Code
Next F10
Pause F9
Step In F11
Step Out ⇧ F11
Terminate ⇧ F9

DISPLAY LANGUAGES

Launcher | Hello World

Hello World from EuroPython!

Simple 0 $_ 0

Hello World 0

JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

ANYTHING

Hello World

CONSOLE

Change Kernel...
Clear Console Cells
Close and Shut Down...
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Step Out ⇧ F11
Terminate ⇧ F9

DISPLAY LANGUAGES

Launcher | Hello World

Hello World from EuroPython!

Simple 0 $_ 0

Hello World 0

TUTORIAL

4. style the widget
5. execute the command from the Launcher
6. execute command with arguments
7. create SideBar widget to execute our command with various options

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JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

CONSOLE

- Change Kernel...
- Clear Console Cells
- Close and Shut Down...
- Insert Line Break
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- Restart Kernel...
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DEBUGGER

- Breakpoints on exception
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DISPLAY LANGUAGES

- English

EXTENSION MANAGER

Launcher

Notebook

Python 3 (ipykernel)

Console

Python 3 (ipykernel)

Other

Terminal | Text File | Markdown File | Python File | Show Contextual Help

Simple 0 0

Launcher 0

```
upyterlab/apputils';
umino/widgets';
upyterlab/apputils';

x extension.
upyterFrontEndPlugin<void> = {
sion for EuroPython 2024',

tEnd,
dPalette ) {

epjlx is activated!');
```

```
6    import { ICommandPalette } from '@jupyterlab/apputils';
7    import { Widget          } from '@lumino/widgets';
8    import { MainAreaWidget  } from '@jupyterlab/apputils';
9  + import { ILauncher       } from '@jupyterlab/launcher';
10
11   /**
12    * Initialization data for the epjlx extension.

16     description: 'A JupyterLab extension for EuroPython 2024',
17     autoStart: true,
18     requires: [ ICommandPalette ],
19 +   optional: [ ILauncher ],
20     activate: _activate
21   }
22
23   function _activate(app: JupyterFrontEnd,
24 +                    palette: ICommandPalette,
25 +                    launcher: ILauncher|null ) {
26     console.log('JupyterLab extension epjlx is activated!');
```

```
activate(app: JupyterFrontEnd,
         palette: ICommandPalette ) {

log('JupyterLab extension epjlx is activated!');
andId = 'epjlx:Hello';
ands.addCommand(commandId,
l: 'Hello World',
ute: () => { say_hello(app) }


addItem(
and: commandId,
gory: 'Anything'
```

```
23    function _activate(app: JupyterFrontEnd,
24  +                    palette: ICommandPalette,
25  +                    launcher: ILauncher|null ) {
26      console.log('JupyterLab extension epjlx is activated!');
27      let commandId = 'epjlx:Hello';
28      app.commands.addCommand(commandId,
29        { label: 'Hello World',
30          execute: () => { say_hello(app) }
31        });
32
33      palette.addItem(
34        { command: commandId,
35          category: 'Anything'
36        });
37  +
38  +   if (launcher) {
39  +     launcher.add(
40  +       { command: commandId,
41  +         category: 'Notebook'
42  +       });
43  +   } else {
44  +     console.log('ILauncher is not available');
45  +   }
46  +
```

TUTORIAL

- **jlpm run build**
- **refresh** JupyterLab browser

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```
(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$ jlpm run build
src/index.ts:9:33 - error TS2307: Cannot find module '@jupyterlab/launcher'
or its corresponding type declarations.

9 import { ILauncher        } from '@jupyterlab/launcher';
                                ~~~~~~~~~~~~~~~~~~~~~~~

Found 1 error in src/index.ts:9

(jlx) Dino@MacDino:~/code/pydjlx$
```

```
(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$ ls -l node_modules/@jupyterlab
total 0
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 application
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 apputils
drwxr-xr-x  8 Dino  staff  256 Oct 15 15:56 builder
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 codeeditor
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 coreutils
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 docregistry
drwxr-xr-x  5 Dino  staff  160 Oct 15 15:56 nbformat
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 observables
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 rendermime
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 rendermime-interfaces
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 services
drwxr-xr-x  5 Dino  staff  160 Oct 15 15:56 settingregistry
drwxr-xr-x  5 Dino  staff  160 Oct 15 15:56 statedb
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 statusbar
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 translation
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 ui-components
(jlx) Dino@MacDino:~/code/pydjlx$
```

```
(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$ ls -l node_modules/@jupyterlab
total 0
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 application
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 apputils
drwxr-xr-x  8 Dino  staff  256 Oct 15 15:56 builder
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 codeeditor
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 coreutils
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 docregistry
drwxr-xr-x  5 Dino  staff  160 Oct 15 15:56 nbformat
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 observables
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 rendermime
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 rendermime-interfaces
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 services
drwxr-xr-x  5 Dino  staff  160 Oct 15 15:56 settingregistry
drwxr-xr-x  5 Dino  staff  160 Oct 15 15:56 statedb
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 statusbar
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 translation
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 ui-components
(jlx) Dino@MacDino:~/code/pydjlx$
```

jlpm add @jupyterlab/launcher

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```
(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$ jlpm add @jupyterlab/launcher
➤ YN0000: ┌ Resolution step
➤ YN0002: │ @jupyterlab/services@npm:7.0.7 doesn't provide react (p1e5c9), requested by @jupyter
lab/settingregistry
➤ YN0002: │ pydjlx@workspace:. doesn't provide webpack (p67dd7), requested by css-loader
➤ YN0002: │ pydjlx@workspace:. doesn't provide webpack (p8ad17), requested by source-map-loader
➤ YN0002: │ pydjlx@workspace:. doesn't provide webpack (p9acd8), requested by style-loader
➤ YN0000: │ Some peer dependencies are incorrectly met; run yarn explain peer-requirements <hash
> for details, where <hash> is the six-letter p-prefixed code
➤ YN0000: └ Completed in 0s 351ms
➤ YN0000: ┌ Fetch step
➤ YN0013: │ @jupyterlab/launcher@npm:4.0.7 can't be found in the cache and will be fetched from
t
➤ YN0000: └ Completed in 0s 218ms
➤ YN0000: ┌ Link step
➤ YN0000: └ Completed in 0s 259ms
➤ YN0000: Done with warnings in 0s 921ms
(jlx) Dino@MacDino:~/code/pydjlx$
```

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```
(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$ ls -l node_modules/@jupyterlab
total 0
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 application
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 apputils
drwxr-xr-x  8 Dino  staff  256 Oct 15 15:56 builder
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 codeeditor
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 coreutils
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 docregistry
drwxr-xr-x  7 Dino  staff  224 Oct 19 19:38 launcher
drwxr-xr-x  5 Dino  staff  160 Oct 15 15:56 nbformat
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 observables
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 rendermime
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 rendermime-interfaces
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 services
drwxr-xr-x  5 Dino  staff  160 Oct 15 15:56 settingregistry
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drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 statusbar
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(jlx) Dino@MacDino:~/code/pydjlx$
```

```
(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$ ls -l node_modules/@jupyterlab
total 0
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 application
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drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 codeeditor
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 coreutils
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 docregistry
drwxr-xr-x  7 Dino  staff  224 Oct 19 19:38 launcher
drwxr-xr-x  5 Dino  staff  160 Oct 15 15:56 nbformat
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 observables
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 rendermime
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 rendermime-interfaces
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 services
drwxr-xr-x  5 Dino  staff  160 Oct 15 15:56 settingregistry
drwxr-xr-x  5 Dino  staff  160 Oct 15 15:56 statedb
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 statusbar
drwxr-xr-x  6 Dino  staff  192 Oct 15 15:56 translation
drwxr-xr-x  7 Dino  staff  224 Oct 15 15:56 ui-components
(jlx) Dino@MacDino:~/code/pydjlx$
```

```
(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$ git status
On branch main
Your branch is ahead of 'origin/main' by 1 commit.
  (use "git push" to publish your local commits)

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        modified:   package.json

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        yarn.lock

no changes added to commit (use "git add" and/or "git commit -a")
(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$
```

hanged file with 2 additions and 1 deletion.

Split Unified

package.json

-54,7 +54,8 @@

```
    "watch:labextension": "jupyter labextension watch ."
},
"dependencies": {
    "@jupyterlab/application": "^4.0.0"

},
"devDependencies": {
    "@jupyterlab/builder": "^4.0.0",
```

```
54          "watch:labextension": "jupyter labextension watch ."
55      },
56      "dependencies": {
57  +       "@jupyterlab/application": "^4.0.0",
58  +       "@jupyterlab/launcher": "^4.0.7"
59      },
60      "devDependencies": {
61          "@jupyterlab/builder": "^4.0.0",
```

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jlpm add

1. **Installs** package into node_modules directory
2. **Edits** “dependencies” section of packages.json

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TUTORIAL

- **jlpm run build**
- **refresh** JupyterLab browser

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JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

ANYTHING

Hello World

CONSOLE

Change Kernel...
Clear Console Cells
Close and Shut Down...
Insert Line Break
Interrupt Kernel
New Console
Restart Kernel...
Run Cell (forced)
Run Cell (unforced)
Show All Kernel Activity

DEBUGGER

Breakpoints on exception
Evaluate Code
Next F10
Pause F9
Step In F11
Step Out ⇧ F11
Terminate ⇧ F9

DISPLAY LANGUAGES

Launcher

Notebook

Python 3 (ipykernel)

Hello World

Console

Python 3 (ipykernel)

Other

Terminal

Text File

Markdown File

Python File

Show Contextual Help

Simple 0 0

Launcher 0

JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

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Step In F11
Step Out ⇧ F11
Terminate ⇧ F9

DISPLAY LANGUAGES

Launcher | Hello World

Hello World from EuroPython!

Simple 0 $_ 0

Hello World 0

JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

ANYTHING

Hello World

CONSOLE

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Breakpoints on exception
Evaluate Code
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Pause F9
Step In F11
Step Out ⇧ F11
Terminate ⇧ F9

DISPLAY LANGUAGES

Launcher | Hello World | Hello World

Hello World from EuroPython!

Hello World from EuroPython!

Simple 0 $_ 0

Hello World 0

TUTORIAL

4. style the widget
5. execute the command from the Launcher
6. execute command with arguments
7. create SideBar widget to execute our command with various options

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```
o';
mandId,

llo(app) }

not available');
```

```
27      let commandId = 'epjlx:Hello';
28      app.commands.addCommand(commandId,
29        { label: 'Hello World',
30  +       execute: (args: any) => { say_hello(app, args) }
31        });
32
33      palette.addItem(
34        { command: commandId,
35  +       category: 'Anything',
36  +       args: {greeting: 'Hello from the Command Palette!'}
37        });
38
39      if (launcher) {
40        launcher.add(
41          { command: commandId,
42            category: 'Notebook'
43          });
44      } else {
45        console.log('ILauncher is not available');
46      }
```

```
63  +       }
64          body.appendChild(heading);
65          this.node.appendChild(body);
66      }
67  }
68
69  + function say_hello(app: JupyterFrontEnd, args: any) {
70  +   let content = new HelloWorldWidget(args['greeting']);
71      let widget  = new MainAreaWidget({content});
72
73      app.shell.add(widget,'main');
```

```
 Widget {

World';
;

Element('body');
ateElement('h1');
 World from EuroPython!';

);
```

```
49
50    class HelloWorldWidget extends Widget {
51  +   constructor(greeting: string|null) {
52        super();
53        this.id = 'hello-world';
54        this.title.label = 'Hello World';
55        this.title.closable = true;
56        this.addClass('hww');
57        let body = document.createElement('body');
58        let heading = document.createElement('h1');
59  +     if (greeting) {
60  +       heading.innerText = greeting;
61  +     } else {
62  +       heading.innerText = 'Hello World from EuroPython!';
63  +     }
64        body.appendChild(heading);
65        this.node.appendChild(body);
66      }
67    }
68
```

TUTORIAL

- **jlpm run build**
- **refresh** JupyterLab browser

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JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

ANYTHING

Hello World

CONSOLE

Change Kernel...
Clear Console Cells
Close and Shut Down...
Insert Line Break
Interrupt Kernel
New Console
Restart Kernel...
Run Cell (forced)
Run Cell (unforced)
Show All Kernel Activity

DEBUGGER

Breakpoints on exception
Evaluate Code
Next F10
Pause F9
Step In F11
Step Out ⇧ F11
Terminate ⇧ F9

DISPLAY LANGUAGES

Launcher

Notebook

Python 3 (ipykernel)

Hello World

Console

Python 3 (ipykernel)

Other

Terminal

Text File

Markdown File

Python File

Show Contextual Help

Simple 0 0

Launcher 0

JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

ANYTHING

Hello World

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Next F10
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Terminate ⇧ F9

DISPLAY LANGUAGES

Launcher | Hello World

Hello World from EuroPython!

Simple 0 $_ 0

Hello World 0

JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

ANYTHING

Hello World

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Breakpoints on exception
Evaluate Code
Next F10
Pause F9
Step In F11
Step Out ⇧ F11
Terminate ⇧ F9

DISPLAY LANGUAGES

Launcher | Hello World | Hello World

Hello from the Command Palette!

Simple 0 $_ 0

Hello World 0

JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

ANYTHING

Hello World

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Clear Console Cells
Close and Shut Down...
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New Console
Restart Kernel...
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DEBUGGER

Breakpoints on exception
Evaluate Code
Next F10
Pause F9
Step In F11
Step Out ⇧ F11
Terminate ⇧ F9

DISPLAY LANGUAGES

Launcher | Hello World | Hello World

Hello World from EuroPython!

Hello from the Command Palette!

Simple 0 0

Hello World 0

TUTORIAL

4. style the widget
5. execute the command from the Launcher
6. execute command with arguments
7. create SideBar widget to execute our command with various options

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TUTORIAL

7. create SideBar widget to execute our command with various options
   a. side-bar widget with buttons
   b. style side-bar widget
   c. event listeners on buttons to create main-area widgets on click.

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```
71
72 class SideBarHelloWidget extends Widget {
73   constructor() {
74     super();
75     this.id = 'sidebar-hello';
76     this.title.label = 'Hello World';
77     this.title.closable = true;
78     this.addClass('sbhw');
79     let body = document.createElement('body');
80     let b1 = document.createElement('button');
81     let b2 = document.createElement('button');
82     let b3 = document.createElement('button');
83     let b4 = document.createElement('button');
84     b1.innerText = 'C';
85     b2.innerText = 'D';
86     b3.innerText = 'E';
87     b4.innerText = 'F';
88     body.append(b1,b2,b3,b4);
89     this.node.appendChild(body);
90   }
91 }
92
```

```
function _activate(app:     JupyterFrontEnd,
                   palette: ICommandPalette,
                   launcher: ILauncher|null ) {
  console.log('JupyterLab extension pydjlx is activated!');
  let commandId = 'pydjlx:Hello';
  app.commands.addCommand(commandId,
    { label: 'Hello World',
      execute: (args: any) => {say_hello(app,args)}
    });

  palette.addItem(
    { command: commandId,
      category: 'Anything',
      args: {greeting: 'Hello from the Command Palette!'}
    });

  if (launcher) {
    launcher.add(
      { command: commandId,
        category: 'Notebook'
      });
  } else {
    console.log('ILauncher is not available');
  }


}
```

```
63  function _activate(app:     JupyterFrontEnd,
64                     palette: ICommandPalette,
65                     launcher: ILauncher|null ) {
66    console.log('JupyterLab extension pydjlx is activated!');
67    let commandId = 'pydjlx:Hello';
68    app.commands.addCommand(commandId,
69      { label: 'Hello World',
70        execute: (args: any) => {say_hello(app,args)}
71      });
72
73    palette.addItem(
74      { command: commandId,
75        category: 'Anything',
76        args: {greeting: 'Hello from the Command Palette!'}
77      });
78
79    if (launcher) {
80      launcher.add(
81        { command: commandId,
82          category: 'Notebook'
83        });
84    } else {
85      console.log('ILauncher is not available');
86    }
87
88    let sbwidget = new SideBarHelloWidget();
89    app.shell.add(sbwidget,'left');
90    app.shell.activateById(sbwidget.id);
91  }
92
```

```
{say_hello(app,args)}

from the Command Palette!'}

not available');
```

```
70      execute: (args: any) => {say_hello(app,args)}
71    });
72
73  palette.addItem(
74    { command: commandId,
75      category: 'Anything',
76      args: {greeting: 'Hello from the Command Palette!'}
77    });
78
79  if (launcher) {
80    launcher.add(
81      { command: commandId,
```

```
87
88    let sbwidget = new SideBarHelloWidget();
89    app.shell.add(sbwidget,'left');
90    app.shell.activateById(sbwidget.id);
91  }
92
```

```
91  }
92
```

TUTORIAL

- **jlpm run build**
- **refresh** JupyterLab browser

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JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

ANYTHING

Hello World

CONSOLE

Change Kernel...
Clear Console Cells
Close and Shut Down...
Insert Line Break
Interrupt Kernel
New Console
Restart Kernel...
Run Cell (forced)
Run Cell (unforced)
Show All Kernel Activity

DEBUGGER

Breakpoints on exception
Evaluate Code
Next F10
Pause F9
Step In F11
Step Out ⇧ F11
Terminate ⇧ F9

DISPLAY LANGUAGES

Hello World

Launcher

Notebook

Python 3 (ipykernel)

Hello World

Console

Python 3 (ipykernel)

Other

Terminal

Text File

Markdown File

Python File

Show Contextual Help

Simple 0 0

Launcher 0

JupyterLab

localhost:8888/lab

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SEARCH

ANYTHING

Hello World

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DISPLAY LANGUAGES

Hello World

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Python 3 (ipykernel)

Hello World

Console

Python 3 (ipykernel)

Other

Terminal

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Markdown File

Python File

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Simple 0 0

Launcher 0

JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

C D E F

Hello World

Launcher

Notebook

Python 3 (ipykernel)

Hello World

Console

Python 3 (ipykernel)

Other

Terminal

Text File

Markdown File

Python File

Show Contextual Help

Simple 0 0

Launcher 0

JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

C D E F

Hello World

Launcher

Notebook

Python 3 (ipykernel)

Hello World

Console

Python 3 (ipykernel)

Other

Terminal

Text File

Markdown File

Python File

Show Contextual Help

Simple 0 0

Launcher 0

TUTORIAL

7. create SideBar widget to execute our command with various options
   a. side-bar widget with buttons
   b. style side-bar widget
   c. event listeners on buttons to create main-area widgets on click.

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17 style/base.css

```diff
@@ -4,8 +4,11 @@
     https://jupyterlab.readthedocs.io/en/stable/developer/css.html
 */

- .hww body {
+ .html, body, .hww {
     height: 100%;
+ }
+
+ .hww body {
     position: relative;
     text-align: center;
     background-color: teal;
@@ -18,3 +21,15 @@
     right: 0;
     font-size: 400%;
 }
+
+ .sbhw body {
+     background-color: #212121;
+ }
+
+ .sbhw button {
+     width:  72px;
+     height: 72px;
+     margin: 15%;
+     margin-bottom: 5%;
+     font-size: 200%;
+ }
```

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TUTORIAL

- **jlpm run build**
- **refresh** JupyterLab browser

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JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

C

D

E

F

Hello World

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Python 3 (ipykernel)

Hello World

Console

Python 3 (ipykernel)

Other

Terminal

Text File

Markdown File

Python File

Show Contextual Help

Simple 0 0

Launcher 0

TUTORIAL

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   a. side-bar widget with buttons
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```
71
72    class SideBarHelloWidget extends Widget {
73  -   constructor() {
74        super();
75        this.id = 'sidebar-hello';
76        this.title.label = 'Hello World';
77        this.title.closable = true;
78        this.addClass('sbhw');
79        let body = document.createElement('body');
80  -     let b1 = document.createElement('button');
81  -     let b2 = document.createElement('button');
82  -     let b3 = document.createElement('button');
83  -     let b4 = document.createElement('button');
84  -     b1.innerText = 'C';
85  -     b2.innerText = 'D';
86  -     b3.innerText = 'E';
87  -     b4.innerText = 'F';
88  -     body.append(b1,b2,b3,b4);
89        this.node.appendChild(body);
90      }
```

```
71
72    class SideBarHelloWidget extends Widget {
73  +   constructor(app: JupyterFrontEnd, commandId: string) {
74        super();
75        this.id = 'sidebar-hello';
76        this.title.label = 'Hello World';
77        this.title.closable = true;
78        this.addClass('sbhw');
79        let body = document.createElement('body');
80  +     let button_info: Record<string,string> = {
81  +       'C' : 'Ahoj Světe',
82  +       'D' : 'Hej Verden',
83  +       'E' : 'Hello World',
84  +       'F' : 'Salut le Monde'
85  +     };
86  +     for (const key in button_info) {
87  +       let b = document.createElement('button');
88  +       b.innerText = key;
89  +       b.addEventListener('click', () => {
90  +         app.commands.execute(commandId,{greeting:button_info[key]});
91  +       });
92  +       body.appendChild(b);
93  +     }
94        this.node.appendChild(body);
95      }
```

```
3arHelloWidget extends Widget {
tor() {
);
d = 'sidebar-hello';
itle.label = 'Hello World';
itle.closable = true;
ddClass('sbhw');
dy = document.createElement('body');
 = document.createElement('button');
 = document.createElement('button');
 = document.createElement('button');
 = document.createElement('button');
erText = 'C';
erText = 'D';
erText = 'E';
erText = 'F';
pend(b1,b2,b3,b4);
```

```
72    class SideBarHelloWidget extends Widget {
73  +   constructor(app: JupyterFrontEnd, commandId: string) {
74        super();
75        this.id = 'sidebar-hello';
76        this.title.label = 'Hello World';
77        this.title.closable = true;
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85  +     };
86  +     for (const key in button_info) {
87  +       let b = document.createElement('button');
88  +       b.innerText = key;
89  +       b.addEventListener('click', () => {
90  +         app.commands.execute(commandId,{greeting:button_info[key]});
91  +       });
92  +       body.appendChild(b);
93  +     }
```

```
tem(
 commandId,
: 'Anything',
reeting: 'Hello from the Command Palette!'}

) {
dd(
d: commandId,
ry: 'Notebook'

g('ILauncher is not available');

= new SideBarHelloWidget();
d(sbwidget,'left');
tivateById(sbwidget.id);
```

```
33      palette.addItem(
34        { command: commandId,
35          category: 'Anything',
36          args: {greeting: 'Hello from the Command Palette!'}
37        });
38
39      if (launcher) {
40        launcher.add(
41          { command: commandId,
42            category: 'Notebook'
43          });
44      } else {
45        console.log('ILauncher is not available');
46      }
47
48  +   let sbwidget = new SideBarHelloWidget(app, commandId);
49      app.shell.add(sbwidget,'left');
50      app.shell.activateById(sbwidget.id);
51    }
```

```
27 @@ class HelloWorldWidget extends Widget {
```

TUTORIAL

- **jlpm run build**
- **refresh** JupyterLab browser

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JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

C

D

E

F

Hello World

Launcher

Notebook

Python 3 (ipykernel)

Hello World

Console

Python 3 (ipykernel)

Other

Terminal

Text File

Markdown File

Python File

Show Contextual Help

Simple 0 0

Launcher 0

JupyterLab

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File Edit View Run Kernel Tabs Settings Help

Launcher | Hello World

C

D

E

F

Ahoj Světe

Hello World

Simple 0 $_ 0

Hello World 0

JupyterLab

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Hello World

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E

F

Hej Verden

Simple 0 $_ 0

Hello World 0

JupyterLab

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File Edit View Run Kernel Tabs Settings Help

Hello World

C

D

E

F

Launcher | Hello World | Hello World | Hello World

Hello World

Simple 0 $_ 0

Hello World 0

JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

Launcher | Hello World | Hello World | Hello World | Hello World

Hello World

C

D

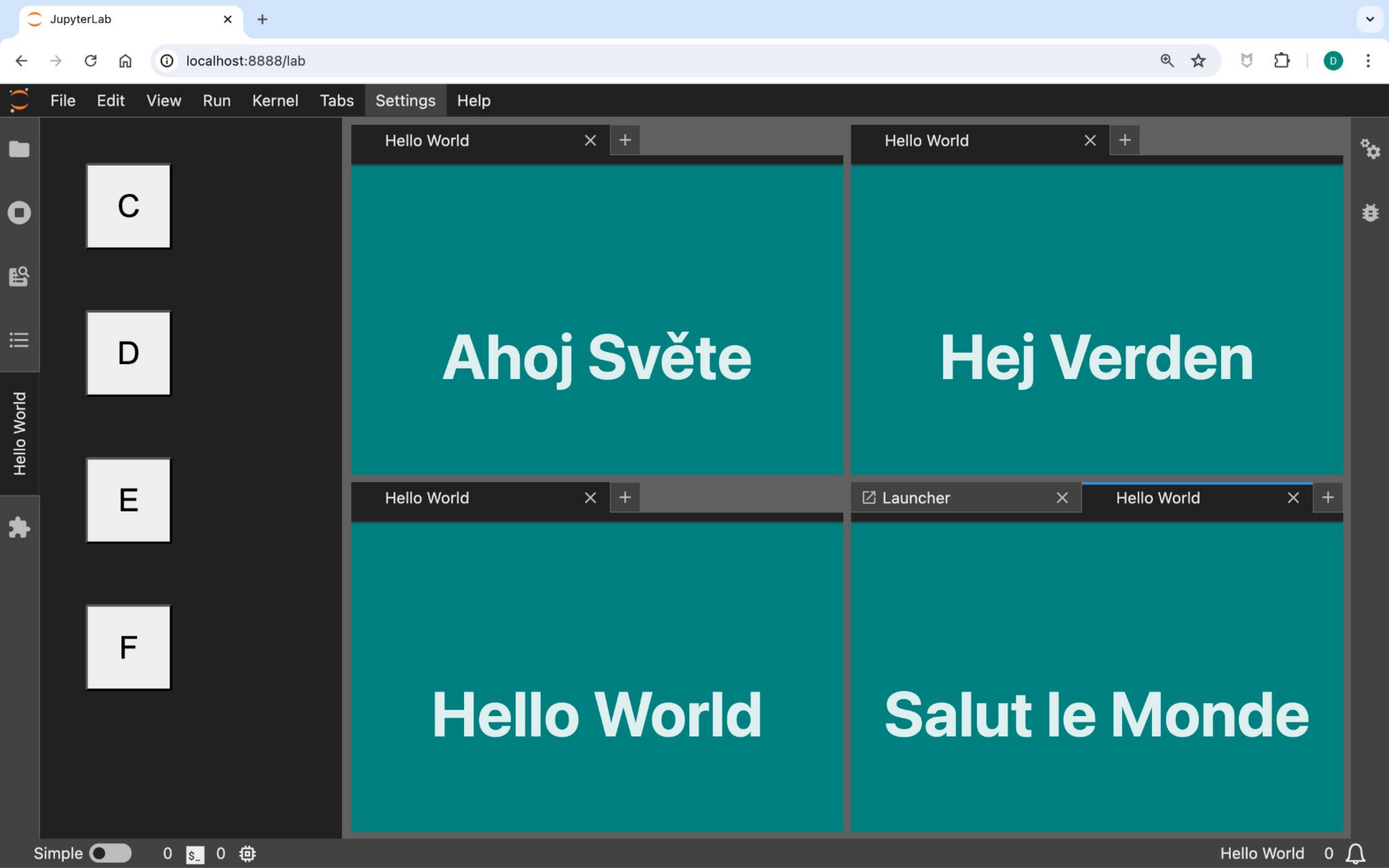
E

F

Salut le Monde

Simple 0 $_ 0

Hello World 0


JupyterLab
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Hej Verden
Hello World
Hello World
Launcher
Hello World
Salut le Monde
Simple
0
0
Hello World
0

Useful LabExtension Links

- Core Tokens
  - ICommandPalette, ILauncher
  - IMainMenu
  - ILayoutRestorer
  - ISettingsRegistry
  - Trackers: ex: INotebookTracker, ISettingEditorTracker

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Useful LabExtension Links

- **github.com/DanielGoldfarb/epjlx**
- Jupyterlab Extension Developer Guide
- Front-End Shell
- Random Astronomy Picture Extension Tutorial
- Extension Examples Repository

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Thank you!

github.com/DanielGoldfarb/epjlx

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