

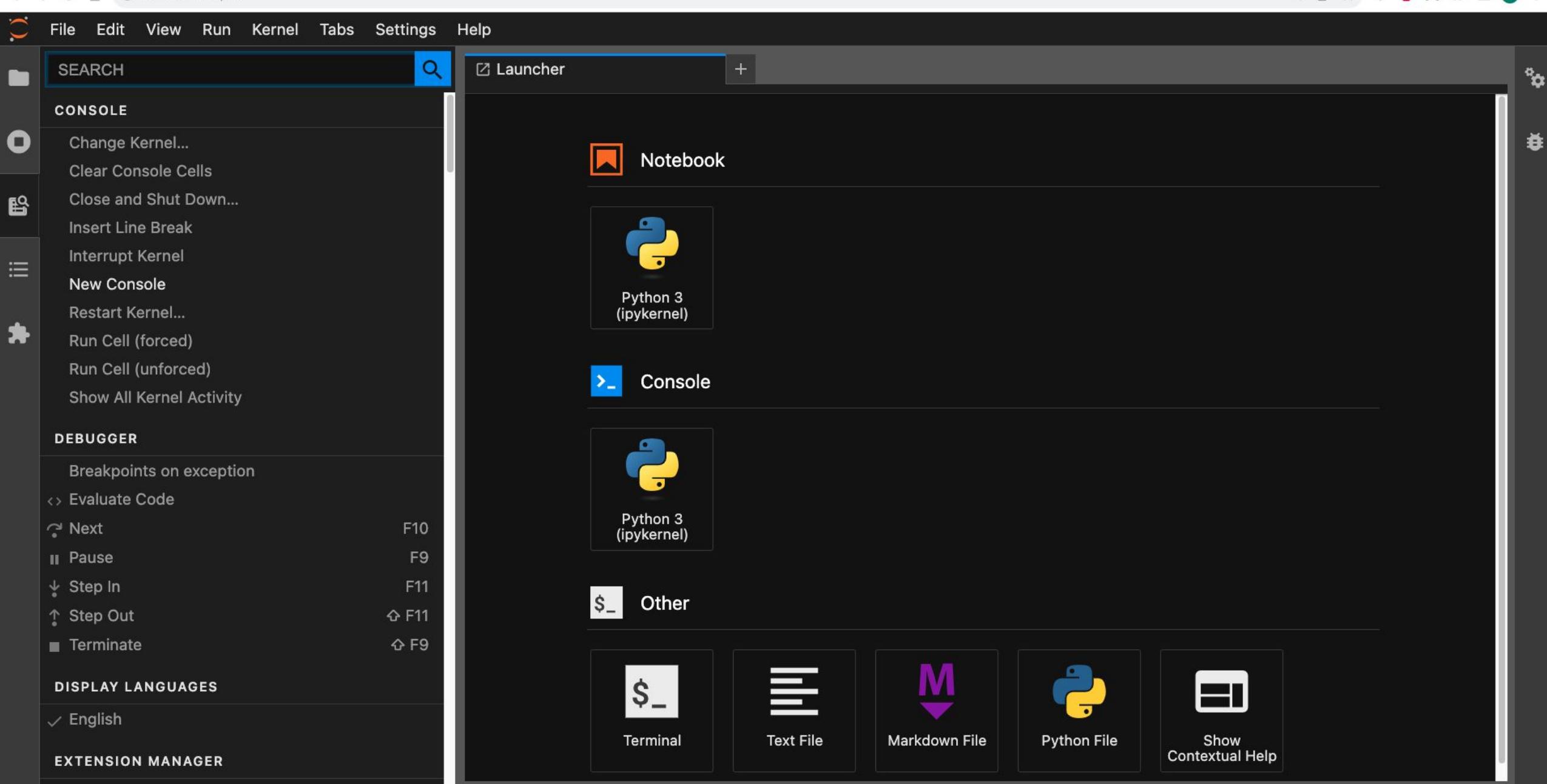
# Adding Your Own Data Apps to JupyterLab

Engineering

Bloomberg

PyData NYC  
November 1, 2023

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Software Engineer  
Fixed Income Credit Apps & Data Services  
[TechAtBloomberg.com](http://TechAtBloomberg.com)



# How to Write Extensions for JupyterLab

- **Code, Explain, Demo**
- **Watch, Ask questions**
- **Code it yourself!**

# PREREQUISITES

- Familiar with Jupyter Notebooks and/or JupyterLab.
- Experience coding classes, objects, and inheritance
- Miniconda (conda, micromamba, mamba also OK).

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

# About Bloomberg

- Data, Analytics, APIs, News, Private Communications Network, and Electronic Trading to >350,000 Financial Market Professionals
- Financial News: TV / Radio / Online

# About Bloomberg

- **21,000+ employees** in 159 locations worldwide
- **8,000+ software engineers**, including **4,500+ Python developers** involved in financial analysis and data science
- **Contribute to, and use, (and sometimes sponsor) Open Source projects**

# We are hiring!

[bloomberg.com/careers](https://www.bloomberg.com/careers)

# About Me

- Engineer @ Bloomberg
  - Most of my career – server-side C/C++
  - Python / Jupyter Notebook ~ 5 years
  - Open Source Advocate @ Bloomberg
  - Maintainer matplotlib:mplfinance
- Chartered Financial Analyst Institute
  - former member ~10 years
- Molecular Biophysics

# Vocabulary

- **nbextension**  
(Classic Jupyter notebook extension)
- **labextension**  
(JupyterLab or Notebook v7 extension)

# Vocabulary

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

# 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)

# Vocabulary

- **commands** – registry of functions (@lumino)  
(property of JupyterFrontEnd application object)
- **widgets** – everything on screen (@lumino widget)
- **jlpm (yarn)** – JupyterLab Packaging Manager

# 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)

# 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=4 nodejs=18 git copier=7 jinja2-time
```

# conda activate jlx

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

# **copier copy <template> <destination>**

```
copier copy \
```

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

```
pydjlx
```

**copier copy <template> <destination>**

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

**copier copy <template> <destination>**

**copier copy \**

**https://github.com/jupyterlab/extension-template \**

**pydjlx**

```
(jlx) Dino@MacDino:~/code$ copier copy https://github.com/jupyterlab/extension-template pydjlx
🎤 What is your extension kind?
frontend
🎤 Extension author name
Daniel Goldfarb
🎤 Extension author email
dgoldfarb.github@gmail.com
🎤 JavaScript package name
pydjlx
🎤 Python package name
pydjlx
🎤 Extension short description
A JupyterLab extension demo for PyData
🎤 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/pydjlx
```

```
Copying from template version 4.2.2
```

```
create .
create pydjlx
create pydjlx/__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$  
(jlx) Dino@MacDino:~/code$ ls -ld pydjlx  
drwxr-xr-x 19 Dino staff 608 Oct 15 13:10 pydjlx  
(jlx) Dino@MacDino:~/code$ ls -l pydjlx  
total 80  
-rw-r--r-- 1 Dino staff 86 Oct 15 13:10 CHANGELOG.md  
-rw-r--r-- 1 Dino staff 1523 Oct 15 13:10 LICENSE  
-rw-r--r-- 1 Dino staff 2323 Oct 15 13:10 README.md  
-rw-r--r-- 1 Dino staff 3915 Oct 15 13:10 RELEASE.md  
-rw-r--r-- 1 Dino staff 173 Oct 15 13:10 install.json  
-rw-r--r-- 1 Dino staff 6155 Oct 15 13:10 package.json  
drwxr-xr-x 3 Dino staff 96 Oct 15 13:10 pydjlx  
-rw-r--r-- 1 Dino staff 2207 Oct 15 13:10 pyproject.toml  
-rw-r--r-- 1 Dino staff 33 Oct 15 13:10 setup.py  
drwxr-xr-x 3 Dino staff 96 Oct 15 13:10 src  
drwxr-xr-x 5 Dino staff 160 Oct 15 13:10 style  
-rw-r--r-- 1 Dino staff 537 Oct 15 13:10 tsconfig.json  
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-rw-r--r-- 1 Dino staff 537 Oct 15 13:10 tsconfig.json  
(jlx) Dino@MacDino:~/code$
```

Default (vi) 781

```
1 {
2     "name": "pydjlx",
3     "version": "0.1.0",
4     "description": "A JupyterLab extension demo for PyData",
5     "keywords": [
6         "jupyter",
7         "jupyterlab",
8         "jupyterlab-extension"
9     ],
10    "homepage": "https://github.com/DanielGoldfarb/pydjlx",
11    "bugs": {
12        "url": "https://github.com/DanielGoldfarb/pydjlx/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    ],
"package.json" 185L, 6155B
```

```
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"  
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21     "style/**/*.{css,js,eot,gif,html,jpg,json,png,svg,woff2,ttf}"  
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```
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 ,
48  "prettier": "jlpm prettier:base --write --list-different",
49  "prettier:base": "prettier \"/**/*{.ts,.tsx,.js,.jsx,.css,.json,.md}\\""",
50  "prettier:check": "jlpm prettier:base --check",
51  "stylelint": "jlpm stylelint:check --fix",
52  "stylelint:check": "stylelint --cache \"style/**/*.css\"",
53  "watch": "run-p watch:src watch:labextension",
54  "watch:src": "tsc -w --sourceMap",
55  "watch:labextension": "jupyter labextension watch ."
56 },
57 "dependencies": {
58   "@jupyterlab/application": "^4.0.0"
59 },
60 "devDependencies": {
61   "@jupyterlab/builder": "^4.0.0",
62   "@types/json-schema": "^7.0.11",
63   "@types/react": "^18.0.26",
64   "@types/react-addons-linked-state-mixin": "^0.14.22",
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49  "prettier:base": "prettier \"/**/*{.ts,.tsx,.js,.jsx,.css,.json,.md}\\""",
50  "prettier:check": "jlpm prettier:base --check",
51  "stylelint": "jlpm stylelint:check --fix",
52  "stylelint:check": "stylelint --cache \"style/**/*.css\"",
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55  "watch:labextension": "jupyter labextension watch ."
56 },
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59 },
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61   "@jupyterlab/builder": "^4.0.0",
62   "@types/json-schema": "^7.0.11",
63   "@types/react": "^18.0.26",
64   "@types/react-addons-linked-state-mixin": "^0.14.22",
```

```
(jlx) Dino@MacDino:~/code/pydjlx$ ls -l
total 80
-rw-r--r-- 1 Dino staff 86 Oct 15 13:10 CHANGELOG.md
-rw-r--r-- 1 Dino staff 1523 Oct 15 13:10 LICENSE
-rw-r--r-- 1 Dino staff 2323 Oct 15 13:10 README.md
-rw-r--r-- 1 Dino staff 3915 Oct 15 13:10 RELEASE.md
-rw-r--r-- 1 Dino staff 173 Oct 15 13:10 install.json
-rw-r--r-- 1 Dino staff 6155 Oct 15 13:10 package.json
drwxr-xr-x 3 Dino staff 96 Oct 15 13:10 pydjlx
-rw-r--r-- 1 Dino staff 2207 Oct 15 13:10 pyproject.toml
-rw-r--r-- 1 Dino staff 33 Oct 15 13:10 setup.py
drwxr-xr-x 3 Dino staff 96 Oct 15 13:10 src
drwxr-xr-x 5 Dino staff 160 Oct 15 13:10 style
-rw-r--r-- 1 Dino staff 537 Oct 15 13:10 tsconfig.json
```

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

```
(jlx) Dino@MacDino:~/code/pydjlx$ ls -l src/*
-rw-r--r-- 1 Dino staff 422 Oct 15 13:10 src/index.ts
```

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

```
(jlx) Dino@MacDino:~/code/pydjlx$ ls -l
total 80
-rw-r--r-- 1 Dino staff 86 Oct 15 13:10 CHANGELOG.md
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(jlx) Dino@MacDino:~/code/pydjlx$
(jlx) Dino@MacDino:~/code/pydjlx$ ls -l src/*
-rw-r--r-- 1 Dino staff 422 Oct 15 13:10 src/index.ts
(jlx) Dino@MacDino:~/code/pydjlx$
```



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

~

~

~

~

"src/index.ts" 18L, 422B

# initialize package repository

```
$ git init
```

```
Initialized empty Git repository in code/pydjlx/.git/
```

```
$ git add .
```

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

# building the project

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

```
$ jlpm run build
```

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

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

(jlx) Dino@MacDino:~/code/pydjlx\$ jlpm install

► YN0000: Resolution step

► YN0002: @jupyterlab/services@npm:7.0.7 doesn't provide react (p1e5c9), requested by @jupyterlab/services@v1.0.0

/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 10s 55ms

► YN0000: Fetch step

► YN0013: y-protocols@npm:1.0.6 can't be found in the cache and will be fetched from the remote

► YN0013: yallist@npm:4.0.0 can't be found in the cache and will be fetched from the remote

► YN0013: yargs-parser@npm:20.2.9 can't be found in the cache and will be fetched from the remote

► YN0013: yjs@npm:13.6.8 can't be found in the cache and will be fetched from the remote

► YN0013: yocto-queue@npm:0.1.0 can't be found in the cache and will be fetched from the remote

► YN0000: Completed in 4s 315ms

► YN0000: Link step

► YN0007: @fortawesome/fontawesome-free@npm:5.15.4 must be built because it never has been built or the last one failed

► YN0000: Completed in 5s 601ms

► YN0000: Done with warnings in 20s 75ms

(jlx) Dino@MacDino:~/code/pydjlx\$ █

```
(jlx) Dino@MacDino:~/code/pydjlx$ ls -ltr
total 472
drwxr-xr-x    3 Dino  staff      96 Oct 15 13:10 pydjlx
-rw-r--r--    1 Dino  staff   3915 Oct 15 13:10 RELEASE.md
-rw-r--r--    1 Dino  staff     86 Oct 15 13:10 CHANGELOG.md
-rw-r--r--    1 Dino  staff   2323 Oct 15 13:10 README.md
drwxr-xr-x    5 Dino  staff    160 Oct 15 13:10 style
-rw-r--r--    1 Dino  staff  1523 Oct 15 13:10 LICENSE
-rw-r--r--    1 Dino  staff     33 Oct 15 13:10 setup.py
-rw-r--r--    1 Dino  staff   6155 Oct 15 13:10 package.json
-rw-r--r--    1 Dino  staff    173 Oct 15 13:10 install.json
-rw-r--r--    1 Dino  staff    537 Oct 15 13:10 tsconfig.json
-rw-r--r--    1 Dino  staff   2207 Oct 15 13:10 pyproject.toml
drwxr-xr-x    3 Dino  staff      96 Oct 15 15:48 src
-rw-r--r--    1 Dino  staff  200113 Oct 15 15:56 yarn.lock
drwxr-xr-x  440 Dino  staff  14080 Oct 15 15:56 node_modules
(jlx) Dino@MacDino:~/code/pydjlx$
```

```
-rw-r--r--    1 Dino  staff  200113 Oct 15 15:56 yarn.lock
drwxr-xr-x  440 Dino  staff   14080 Oct 15 15:56 node_modules
(jlx) Dino@MacDino:~/code/pydjlx$ ls -ld node_modules/* | head -18
drwxr-xr-x    3 Dino  staff      96 Oct 15 15:56 node_modules/@aashutoshrathi
drwxr-xr-x    5 Dino  staff     160 Oct 15 15:56 node_modules/@babel
drwxr-xr-x    3 Dino  staff      96 Oct 15 15:56 node_modules/@codemirror
drwxr-xr-x    6 Dino  staff     192 Oct 15 15:56 node_modules/@csstools
drwxr-xr-x    3 Dino  staff      96 Oct 15 15:56 node_modules/@discoveryjs
drwxr-xr-x    4 Dino  staff     128 Oct 15 15:56 node_modules/@eslint
drwxr-xr-x    4 Dino  staff     128 Oct 15 15:56 node_modules/@eslint-community
drwxr-xr-x    3 Dino  staff      96 Oct 15 15:56 node_modules/@fortawesome
drwxr-xr-x    5 Dino  staff     160 Oct 15 15:56 node_modules/@humanwhocodes
drwxr-xr-x    3 Dino  staff      96 Oct 15 15:56 node_modules/@isaacs
drwxr-xr-x    8 Dino  staff    256 Oct 15 15:56 node_modules/@jridgewell
drwxr-xr-x    3 Dino  staff      96 Oct 15 15:56 node_modules/@jupyter
drwxr-xr-x   18 Dino  staff    576 Oct 15 15:56 node_modules/@jupyterlab
drwxr-xr-x   17 Dino  staff    544 Oct 15 15:56 node_modules/@lumino
drwxr-xr-x    5 Dino  staff     160 Oct 15 15:56 node_modules/@nodelib
drwxr-xr-x    3 Dino  staff      96 Oct 15 15:56 node_modules/@pkgjs
drwxr-xr-x    3 Dino  staff      96 Oct 15 15:56 node_modules/@pkgr
drwxr-xr-x    4 Dino  staff     128 Oct 15 15:56 node_modules/@rjsf
(jlx) Dino@MacDino:~/code/pydjlx$ ls -ld node_modules/* | wc -l
436
(jlx) Dino@MacDino:~/code/pydjlx$
```

```
-rw-r--r--    1 Dino  staff  200113 Oct 15 15:56 yarn.lock
drwxr-xr-x  440 Dino  staff   14080 Oct 15 15:56 node_modules
(jlx) Dino@MacDino:~/code/pydjlx$ ls -ld node_modules/* | head -18
drwxr-xr-x    3 Dino  staff      96 Oct 15 15:56 node_modules/@aashutoshrathi
drwxr-xr-x    5 Dino  staff     160 Oct 15 15:56 node_modules/@babel
drwxr-xr-x    3 Dino  staff      96 Oct 15 15:56 node_modules/@codemirror
drwxr-xr-x    6 Dino  staff     192 Oct 15 15:56 node_modules/@csstools
drwxr-xr-x    3 Dino  staff      96 Oct 15 15:56 node_modules/@discoveryjs
drwxr-xr-x    4 Dino  staff     128 Oct 15 15:56 node_modules/@eslint
drwxr-xr-x    4 Dino  staff     128 Oct 15 15:56 node_modules/@eslint-community
drwxr-xr-x    3 Dino  staff      96 Oct 15 15:56 node_modules/@fortawesome
drwxr-xr-x    5 Dino  staff     160 Oct 15 15:56 node_modules/@humanwhocodes
drwxr-xr-x    3 Dino  staff      96 Oct 15 15:56 node_modules/@isaacs
drwxr-xr-x    8 Dino  staff     256 Oct 15 15:56 node_modules/@jridgewell
drwxr-xr-x    3 Dino  staff      96 Oct 15 15:56 node_modules/@jupyter
drwxr-xr-x   18 Dino  staff    576 Oct 15 15:56 node_modules/@jupyterlab
drwxr-xr-x   17 Dino  staff    544 Oct 15 15:56 node_modules/@lumino
drwxr-xr-x    5 Dino  staff     160 Oct 15 15:56 node_modules/@nodelib
drwxr-xr-x    3 Dino  staff      96 Oct 15 15:56 node_modules/@pkgjs
drwxr-xr-x    3 Dino  staff      96 Oct 15 15:56 node_modules/@pkgr
drwxr-xr-x    4 Dino  staff     128 Oct 15 15:56 node_modules/@rjsf
(jlx) Dino@MacDino:~/code/pydjlx$ ls -ld node_modules/* | wc -l
436
(jlx) Dino@MacDino:~/code/pydjlx$
```

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

# building the project

**\$ jlpm install # installs dependencies (not the extension)**

**\$ jlpm run build**

```
(jlx) Dino@MacDino:~/code/pydjlx$  
(jlx) Dino@MacDino:~/code/pydjlx$ jlpm run build  
Building extension in .  
  
Compilation starting...  
  
Compilation finished  
  
asset style_index_js.4e1f4ab8cfdf0e0a58ba.js 18.9 KiB [emitted] [immutable] 1 related asset  
asset remoteEntry.5a45330209bf00cc16d7.js 16.1 KiB [emitted] [immutable] (name: pydjlx) 1 related asset  
asset lib_index_js.10560475f9a1f51428e9.js 927 bytes [emitted] [immutable] 1 related asset  
runtime modules 9.08 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 302 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]  
webpack 5.89.0 compiled successfully in 353 ms  
(jlx) Dino@MacDino:~/code/pydjlx$
```

# install the extension

```
jupyter labextension list    # list installed extensions  
ls -l .../share/jupyter/labextensions/  
  
# pip install ./  
jupyter labextension develop --overwrite ./  
  
jupyter labextension list  
ls -l .../share/jupyter/labextensions/
```

# install the extension

```
jupyter labextension list    # list installed extensions  
ls -l .../share/jupyter/labextensions/  
  
# pip install ./  
jupyter labextension develop --overwrite ./  
  
jupyter labextension list  
ls -l .../share/jupyter/labextensions/
```

# install the extension

```
jupyter labextension list # list installed extensions
```

```
ls -l .../share/jupyter/labextensions/
```

```
# pip install ./
```

```
jupyter labextension develop --overwrite ./
```

```
jupyter labextension list
```

```
ls -l .../share/jupyter/labextensions/
```

# install the extension

```
jupyter labextension list # list installed extensions
```

```
ls -l .../share/jupyter/labextensions/
```

```
# pip install ./
```

```
jupyter labextension develop --overwrite ./
```

```
jupyter labextension list
```

```
ls -l .../share/jupyter/labextensions/
```



Default (-bash)

```
(jlx) Dino@MacDino:~/code/pydjlx$  
(jlx) Dino@MacDino:~/code/pydjlx$ jupyter labextension list  
JupyterLab v4.0.7  
/Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions  
→ jupyterlab_pygments v0.2.2 enabled ✘ (python, jupyterlab_pygments)
```

The following extensions are outdated:

jupyterlab\_pygments

Consider checking if an update is available for these packages.

```
(jlx) Dino@MacDino:~/code/pydjlx$ ls -l /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions/  
total 0  
drwxr-xr-x 5 Dino staff 160 Oct 15 13:00 jupyterlab_pygments  
(jlx) Dino@MacDino:~/code/pydjlx$  
(jlx) Dino@MacDino:~/code/pydjlx$ █
```



Default (-bash)

```
(jlx) Dino@MacDino:~/code/pydjlx$  
(jlx) Dino@MacDino:~/code/pydjlx$ jupyter labextension list  
JupyterLab v4.0.7  
/Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions  
    jupyterlab_pygments v0.2.2 enabled  X (python, jupyterlab_pygments)
```

The following extensions are outdated:

jupyterlab\_pygments

Consider checking if an update is available for these packages.

```
(jlx) Dino@MacDino:~/code/pydjlx$ ls -l /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions/  
total 0  
drwxr-xr-x  5 Dino  staff  160 Oct 15 13:00 jupyterlab_pygments  
(jlx) Dino@MacDino:~/code/pydjlx$  
(jlx) Dino@MacDino:~/code/pydjlx$
```



Default (-bash)

```
(jlx) Dino@MacDino:~/code/pydjlx$  
(jlx) Dino@MacDino:~/code/pydjlx$ jupyter labextension list  
JupyterLab v4.0.7  
/Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions  
    jupyterlab_pygments v0.2.2 enabled  ✘ (python, jupyterlab_pygments)
```

The following extensions are outdated:

jupyterlab\_pygments

Consider checking if an update is available for these packages.

```
(jlx) Dino@MacDino:~/code/pydjlx$ ls -l /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions/  
total 0  
drwxr-xr-x  5 Dino  staff  160 Oct 15 13:00 jupyterlab_pygments  
(jlx) Dino@MacDino:~/code/pydjlx$  
(jlx) Dino@MacDino:~/code/pydjlx$
```

# install the extension

```
jupyter labextension list # list installed extensions
```

```
ls -l .../share/jupyter/labextensions/
```

```
# pip install ./
```

```
jupyter labextension develop --overwrite ./
```

```
jupyter labextension list
```

```
ls -l .../share/jupyter/labextensions/
```



```
(jlx) Dino@MacDino:~/code/pydjlx$  
(jlx) Dino@MacDino:~/code/pydjlx$ jupyter labextension develop ./  
Installing /Users/Dino/code/pydjlx/pydjlx/labextension -> pydjlx  
Symlinking: /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions/pydjlx -> /Users/Dino/cod  
/pydjlx/labextension  
(jlx) Dino@MacDino:~/code/pydjlx$ jupyter labextension list  
JupyterLab v4.0.7  
/Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions  
    jupyterlab_pygments v0.2.2 enabled X (python, jupyterlab_pygments)  
    pydjlx v0.1.0 enabled OK
```

The following extensions are outdated:

jupyterlab\_pygments

Consider checking if an update is available for these packages.

```
(jlx) Dino@MacDino:~/code/pydjlx$ ls -l /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions  
total 0  
drwxr-xr-x  5 Dino  staff  160 Oct 15 13:00 jupyterlab_pygments  
lrwxr-xr-x  1 Dino  staff   43 Oct 16 14:25 pydjlx -> /Users/Dino/code/pydjlx/pydjlx/labextension  
(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$ jupyter labextension develop ./  
Installing /Users/Dino/code/pydjlx/pydjlx/labextension -> pydjlx  
Symlinking: /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions/pydjlx -> /Users/Dino/cod  
/pydjlx/labextension  
(jlx) Dino@MacDino:~/code/pydjlx$ jupyter labextension list  
JupyterLab v4.0.7  
/Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions  
→ jupyterlab_pygments v0.2.2 enabled X (python, jupyterlab_pygments)  
→ pydjlx v0.1.0 enabled OK
```

The following extensions are outdated:

jupyterlab\_pygments

Consider checking if an update is available for these packages.

```
(jlx) Dino@MacDino:~/code/pydjlx$ ls -l /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions  
total 0  
drwxr-xr-x 5 Dino staff 160 Oct 15 13:00 jupyterlab_pygments  
lrwxr-xr-x 1 Dino staff 43 Oct 16 14:25 pydjlx -> /Users/Dino/code/pydjlx/pydjlx/labextension  
(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$ jupyter labextension develop ./  
Installing /Users/Dino/code/pydjlx/pydjlx/labextension -> pydjlx  
Symlinking: /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions/pydjlx -> /Users/Dino/cod  
/pydjlx/labextension  
(jlx) Dino@MacDino:~/code/pydjlx$ jupyter labextension list  
JupyterLab v4.0.7  
/Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions  
    jupyterlab_pygments v0.2.2 enabled X (python, jupyterlab_pygments)  
    pydjlx v0.1.0 enabled OK
```

The following extensions are outdated:

jupyterlab\_pygments

Consider checking if an update is available for these packages.

```
(jlx) Dino@MacDino:~/code/pydjlx$ ls -l /Users/Dino/miniconda3/envs/jlx/share/jupyter/labextensions  
total 0  
drwxr-xr-x  5 Dino  staff  160 Oct 15 13:00 jupyterlab_pygments  
lrwxr-xr-x  1 Dino  staff   43 Oct 16 14:25 pydjlx -> /Users/Dino/code/pydjlx/pydjlx/labextension  
(jlx) Dino@MacDino:~/code/pydjlx$  
(jlx) Dino@MacDino:~/code/pydjlx$  
(jlx) Dino@MacDino:~/code/pydjlx$
```

# **test run jupyter lab**

**new window:**

```
conda activate jlx
```

```
jupyter lab
```

JupyterLab x +

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** +

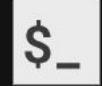
 Notebook

 Python 3 (ipykernel)

 Console

 Python 3 (ipykernel)

 Other

 Terminal

 Text File

 Markdown File

 Python File

 Show Contextual Help

Simple 0 0 0 0 Launcher 0 0

JupyterLab x +

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH 

**CONSOLE**

- Change Kernel...
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**DEBUGGER**

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- <> 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

New Tab ⌘T

New Window ⌘N

New Incognito Window ⌘ShiftN

History ⌘L

Downloads ⌘ShiftL

Bookmarks ⌘B

Google Password Manager New

Extensions ⌘ShiftE

Zoom - 150% + ⌘P

Print... ⌘P

Cast...

Find... ⌘F

More Tools ⌘ShiftT

Edit Cut Copy Paste

Settings ⌘S

Help

Save Page As... ⌘S

Create Shortcut...

Name Window...

Clear Browsing Data... ⌘ShiftDelete

Performance

Task Manager

Developer Tools ⌘ShiftI

Simple  0 \$ 0 ⌘

Launcher 0 ⌘

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

Filter

Info only 8 Issues: 8

Jupyter lib\_index\_js.1056047....js:22  
rLab extension pydjlx is activated!

Simple 0 \$ 0 ⚡

Launcher 0

# TUTORIAL

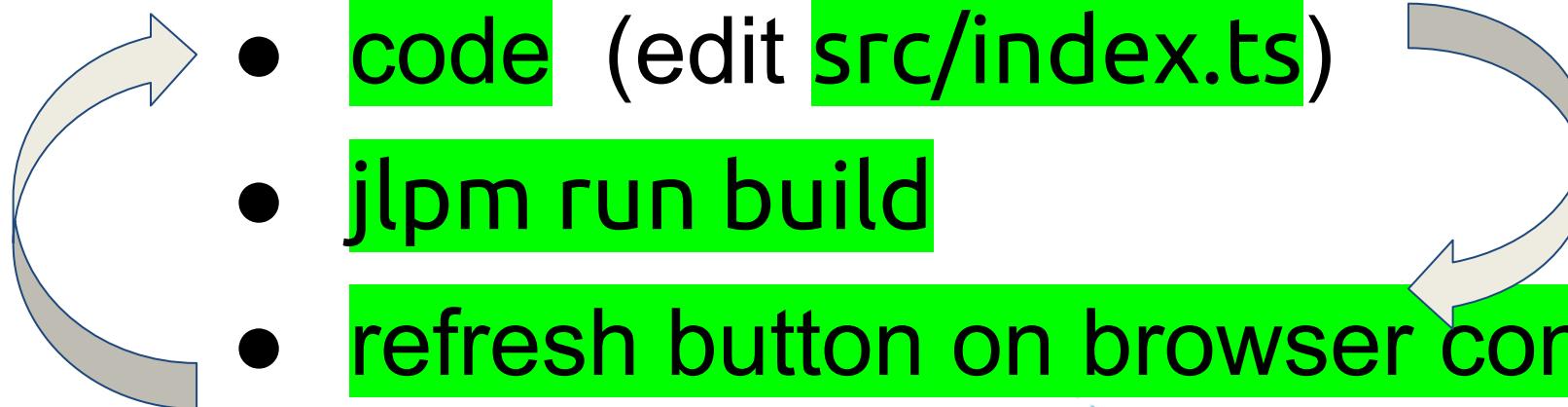
0. copier extension template (basic do-nothing extension)
1. create a command to do something
2. execute command from the Command Palette
3. command adds a Widget to JupyterLab (main area)

# 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)

# 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

▼ ⌂ 11 ■■■■■ src/index.ts ⌂ ...

↑ @@ -12,7 +12,18 @@ const plugin: JupyterFrontEndPlugin<void> = {

12 autoStart: true,  
13 activate: (app: JupyterFrontEnd) => {  
14 console.log('JupyterLab extension pydjlx is activated!');

15 + }  
16 };  
17

18 export default plugin;

12 autoStart: true,  
13 activate: (app: JupyterFrontEnd) => {  
14 console.log('JupyterLab extension pydjlx is activated!');  
15 + let commandId = 'pydjlx:Hello';  
16 + app.commands.addCommand(commandId,  
17 + { label: 'Hello World',  
18 + execute: say\_hello  
19 + });  
20 +  
21 + app.commands.execute(commandId);  
22 + }  
23 +};  
24  
25 + function say\_hello() {  
26 + console.log('pydjlx says "Hello World!"');  
27 + }  
28 +

29 export default plugin;

# TUTORIAL

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

```
(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 0 0

Launcher 0 0

Info only 8 Issues: 8 Jupyter lib\_index\_js.1056047....js:22 rLab extension pydjlx is activated!

JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

CONSOLE

- Change Kernel...
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- Insert Line Break
- Interrupt Kernel
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- Restart Kernel...
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DEBUGGER

- Breakpoints on exception
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- 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

Info only ▾ 8 Issues: 8

Jupyter lib\_index\_js.b0585cc....js:22  
rLab extension pydjlx is activated!

jlxd lib\_index\_js.b0585cc....js:31  
says "Hello World!"

Simple 0 \$ 0 ⚡ Launcher 0 🔔

# 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)

```
⬆ @@ -3,22 +3,29 @@ import {
3   JupyterFrontEndPlugin
4 } from '@jupyterlab/application';
5
6 /**
7  * Initialization data for the pydjlx extension.
8 */
9 const plugin: JupyterFrontEndPlugin<void> = {
10   id: 'pydjlx:plugin',
11   description: 'A JupyterLab extension demo for PyData',
12   autoStart: true,
13 - activate: (app: JupyterFrontEnd) => {
14   console.log('JupyterLab extension pydjlx is activated!');
15   let commandId = 'pydjlx:Hello';
16   app.commands.addCommand(commandId,
17     { label: 'Hello World',
18      execute: say_hello
19    });
20
21 - app.commands.execute(commandId);
22 }
23 };
24
3   JupyterFrontEndPlugin
4 } from '@jupyterlab/application';
5
6 + import { ICommandPalette } from '@jupyterlab/apputils'
7 +
8 /**
9  * Initialization data for the pydjlx extension.
10 */
11 const plugin: JupyterFrontEndPlugin<void> = {
12   id: 'pydjlx:plugin',
13   description: 'A JupyterLab extension demo for PyData',
14   autoStart: true,
15 + requires: [ ICommandPalette ],
16 + activate: (app: JupyterFrontEnd,
17 +           palette: ICommandPalette ) => {
18   console.log('JupyterLab extension pydjlx is activated!');
19   let commandId = 'pydjlx: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 +   });
29 }
30 };
31
```

# TUTORIAL

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

```
(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 x +

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 0

Simple 0 \$ 0 ⚙

**Launcher** +

**Notebook**

 Python 3 (ipykernel)

**Console**

 Python 3 (ipykernel)

**Other**

 Terminal

 Text File

 Markdown File

Info only ▾ 8 Issues: 8

Jupyter lib\_index\_js.b0585cc....js:22  
rLab extension pydjlx is activated!

jlxd lib\_index\_js.b0585cc....js:31  
says "Hello World!"

JupyterLab x +

localhost:8888/lab

Press (Fn) F to exit full screen

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
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- Step Out F11
- Terminate F9

**DISPLAY LANGUAGES**

Launcher

Notebook

Python 3 (ipykernel)

Console

Python 3 (ipykernel)

Other

Terminal

Text File

Markdown File

Filter

Info only ▾ 55 Issues: 55

Jupyter lib\_index\_js.629eee9....js:26  
rLab extension pydjlx is activated!

Simple 0 \$ 0 Launcher 0

JupyterLab x +

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

Launcher +

**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**

Notebook   
 Python 3 (ipykernel)

Console   
 Python 3 (ipykernel)

Other   
  
 Markdown File

R L >

! 1 55

□ ⊖ top 2 hidden

Filter

Info only ▾ 55 Issues: 55

Jupyter lib\_index\_js.629eee9....js:26  
rLab extension pydjlx is  
activated!

pydjlx lib\_index\_js.629eee9....js:37  
says "Hello World!"

Simple 0 \$ 0 Launcher 0

# TUTORIAL

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

JupyterLab (auto-J) x +

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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**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 

@@ -13,21 +13,23 @@ const plugin: JupyterFrontEndPlugin<void> = {

```
13     description: 'A JupyterLab extension demo for PyData',
14     autoStart: true,
15     requires: [ ICommandPalette ],
16     - activate: (app: JupyterFrontEnd,
17                 palette: ICommandPalette ) => {
18       - console.log('JupyterLab extension pydjlx is activated!');
19       - let commandId = 'pydjlx: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     });
29   }
30 };

31
32 function say_hello() {
33   console.log('pydjlx says "Hello World!"');
```

```
13     description: 'A JupyterLab extension demo for PyData',
14     autoStart: true,
15     requires: [ ICommandPalette ],
16     + activate: _activate
17     +
18     +
19     + function _activate(app: JupyterFrontEnd,
20     +                         palette: ICommandPalette ) {
21       + console.log('JupyterLab extension pydjlx is activated!');
22       + let commandId = 'pydjlx:Hello';
23       + app.commands.addCommand(commandId,
24         { label: 'Hello World',
25           execute: say_hello
26     });
27
28     + palette.addItem(
29       { command: commandId,
30         category: 'Anything'
31     });
32   }

33
34 function say_hello() {
35   console.log('pydjlx says "Hello World!"');
```



		34	+	
19	function _activate(app: JupyterFrontEnd,	35		function _activate(app: JupyterFrontEnd,
20	palette: ICommandPalette ) {	36		palette: ICommandPalette ) {
21	console.log('JupyterLab extension pydjlx is activated!');	37		console.log('JupyterLab extension pydjlx is activated!');
22	let commandId = 'pydjlx:Hello';	38		let commandId = 'pydjlx:Hello';
23	app.commands.addCommand(commandId,	39		app.commands.addCommand(commandId,
24	{ label: 'Hello World',	40		{ label: 'Hello World',
25	- execute: say_hello	41	+	execute: () => {say_hello(app)}
26	});	42		});
27		43		
28	palette.addItem(	44		palette.addItem(
↑	@@ -31,8 +47,12 @@ function _activate(app: JupyterFrontEnd,			
31	});	47		});
32	}	48		}
33		49		
34	- function say_hello() {	50	+	function say_hello(app: JupyterFrontEnd) {
35	-    console.log('pydjlx says "Hello World!"');	51	+	let content = new HelloWorldWidget();
		52	+	let widget = new MainAreaWidget({content});
		53	+	
		54	+	app.shell.add(widget,'main');
		55	+	app.shell.activateById(widget.id);
36	}	56		
37		57		
38	export default plugin;	58		export default plugin;

# TUTORIAL

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

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  
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runtime modules 17.7 KiB 13 modules  
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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 (auto-J) x +

localhost:8888/lab/workspaces/auto-J

File Edit View Run Kernel Tabs Settings Help

SEARCH 

Launcher 

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

Notebook

 Python 3 (ipykernel)

Console

 Python 3 (ipykernel)

Other

 Terminal

 Text File

 Markdown File

 Python File

Show Contextual Help

Simple  0 \$ 3 

Launcher 0 

JupyterLab (auto-J) x +

localhost:8888/lab/workspaces/auto-J

File Edit View Run Kernel Tabs Settings Help

SEARCH 

Launcher x Hello World x +

**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

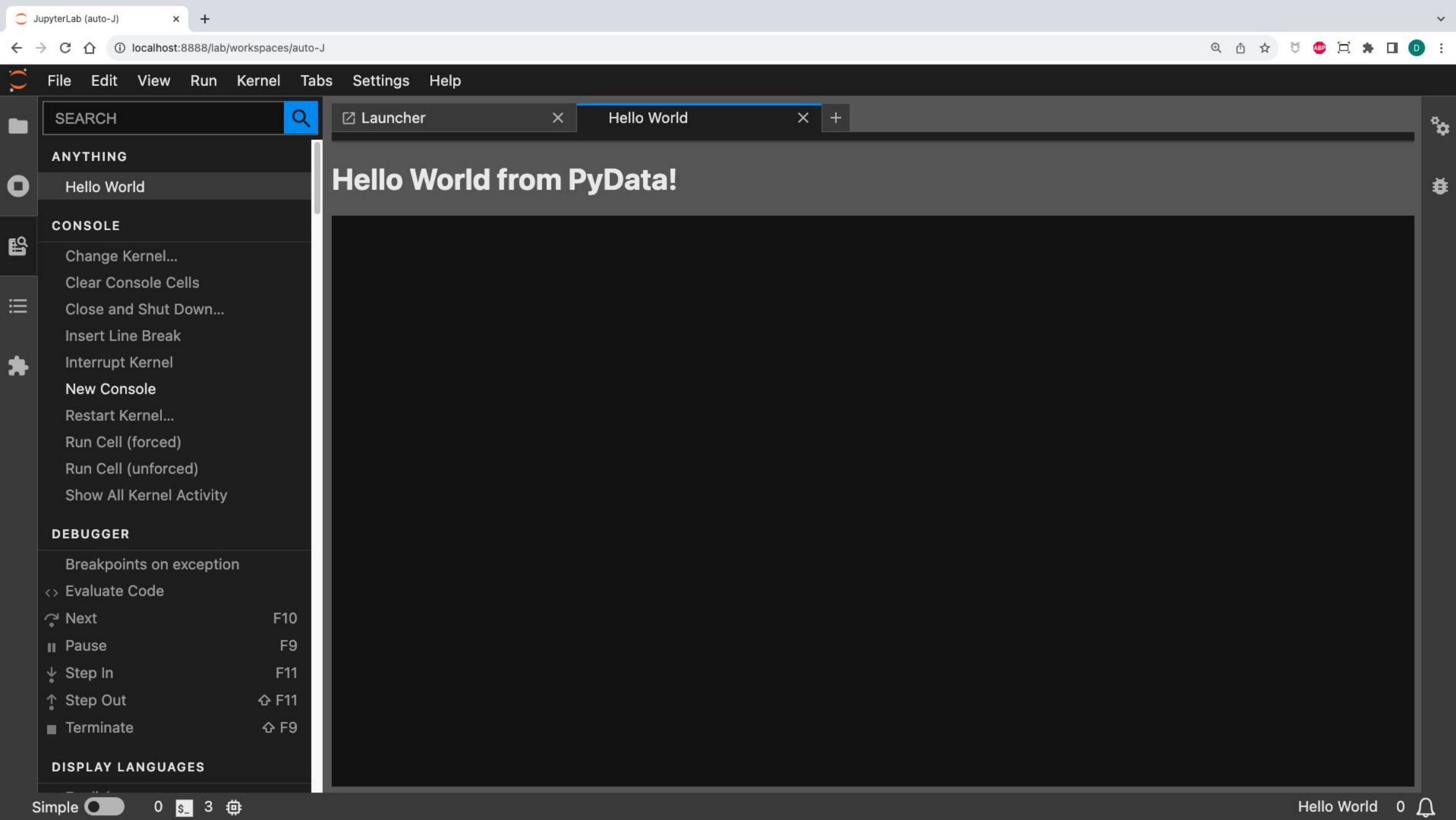
**DEBUGGER**

- Breakpoints on exception
- <> Evaluate Code
- ⟳ Next F10
- ⏸ Pause F9
- ↓ Step In F11
- ↑ Step Out ⌄ F11
- Terminate ⌄ F9

**DISPLAY LANGUAGES**

Simple  0  3 

Hello World 0 



The screenshot shows a JupyterLab interface with a dark theme. At the top, there's a header bar with the title "JupyterLab (auto-J)", a search bar, and various browser-like icons. Below the header is a navigation bar with links for File, Edit, View, Run, Kernel, Tabs, Settings, and Help. A sidebar on the left contains sections for "ANYTHING" (with a "Hello World" item selected), "CONSOLE" (with options like Change Kernel... and Run Cell (forced)), "DEBUGGER" (with breakpoints and step controls), and "DISPLAY LANGUAGES". The main area has tabs for "Launcher" and "Hello World", with the "Hello World" tab currently active. The content area displays the text "Hello World from PyData!". At the bottom, there are status indicators for "Simple" mode, a search input, a settings gear, and a bell notification icon.

JupyterLab (auto-J) x +

localhost:8888/lab/workspaces/auto-J

File Edit View Run Kernel Tabs Settings Help

SEARCH 

Launcher  

Hello World  

ANYTHING  
Hello World

CONSOLE  
Change Kernel...  
Clear Console Cells  
Close and Shut Down...  
Insert Line Break  
Interrupt Kernel  
New Console  
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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

Notebook  Python 3 (ipykernel)

Console  Python 3 (ipykernel)

Other  Terminal  Text File

# Hello World from PyData!

Simple  0 \$ 3 

Hello World 0 

JupyterLab (auto-J) x +

localhost:8888/lab/workspaces/auto-J

File Edit View Run Kernel Tabs Settings Help

SEARCH 

Launcher  

ANYTHING

Hello World

CONSOLE

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

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 Evaluate Code

Next F10  
Pause F9  
Step In F11  
Step Out F11  
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DISPLAY LANGUAGES

Notebook 

 Python 3 (ipykernel)

Console 

Hello World  

# Hello World from PyData!

Simple  0  3 

Hello World 0 

JupyterLab (auto-J) x +

localhost:8888/lab/workspaces/auto-J

File Edit View Run Kernel Tabs Settings Help

SEARCH 

Launcher  +

Hello World  +

ANYTHING

Hello World

CONSOLE

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

DEBUGGER

Breakpoints on exception  
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Next F10  
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DISPLAY LANGUAGES

Notebook   
  
Python 3 (ipykernel)

Console 

Hello World  +

Hello World from PyData!

Simple  0  3  Hello World 0 

# TUTORIAL

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

```
(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$
```

```
1 /*  
2      See the JupyterLab Developer Guide for useful CSS Patterns:  
3  
4      https://jupyterlab.readthedocs.io/en/stable/developer/css.html  
5 */
```

```
1 /*  
2      See the JupyterLab Developer Guide for useful CSS Patterns:  
3  
4      https://jupyterlab.readthedocs.io/en/stable/developer/css.html  
5 */  
6  
7 .hww body {  
8     height: 100%;  
9     position: relative;  
10    text-align: center;  
11    background-color: teal;  
12 }  
13  
14 .hww h1 {  
15     position: absolute;  
16     top: 36%;  
17     left: 0;  
18     right: 0;  
19     font-size: 400%;  
20 }
```

```
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 PyData!';  
        body.appendChild(heading);  
        this.node.appendChild(body);  
    }  
}
```

```
20  
21 class HelloWorldWidget extends Widget {  
22     constructor() {  
23         super();  
24         this.id = 'hello-world';  
25         this.title.label = 'Hello World';  
26         this.title.closable = true;  
27         + this.addClass('hww')  
28         let body = document.createElement('body');  
29         let heading = document.createElement('h1');  
30         heading.innerText = 'Hello World from PyData!';  
31         body.appendChild(heading);  
32         this.node.appendChild(body);  
33     }  
34 }  
35 }
```

JupyterLab (auto-J) x +

localhost:8888/lab/workspaces/auto-J

File Edit View Run Kernel Tabs Settings Help

SEARCH 

Launcher x Hello World x +

**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

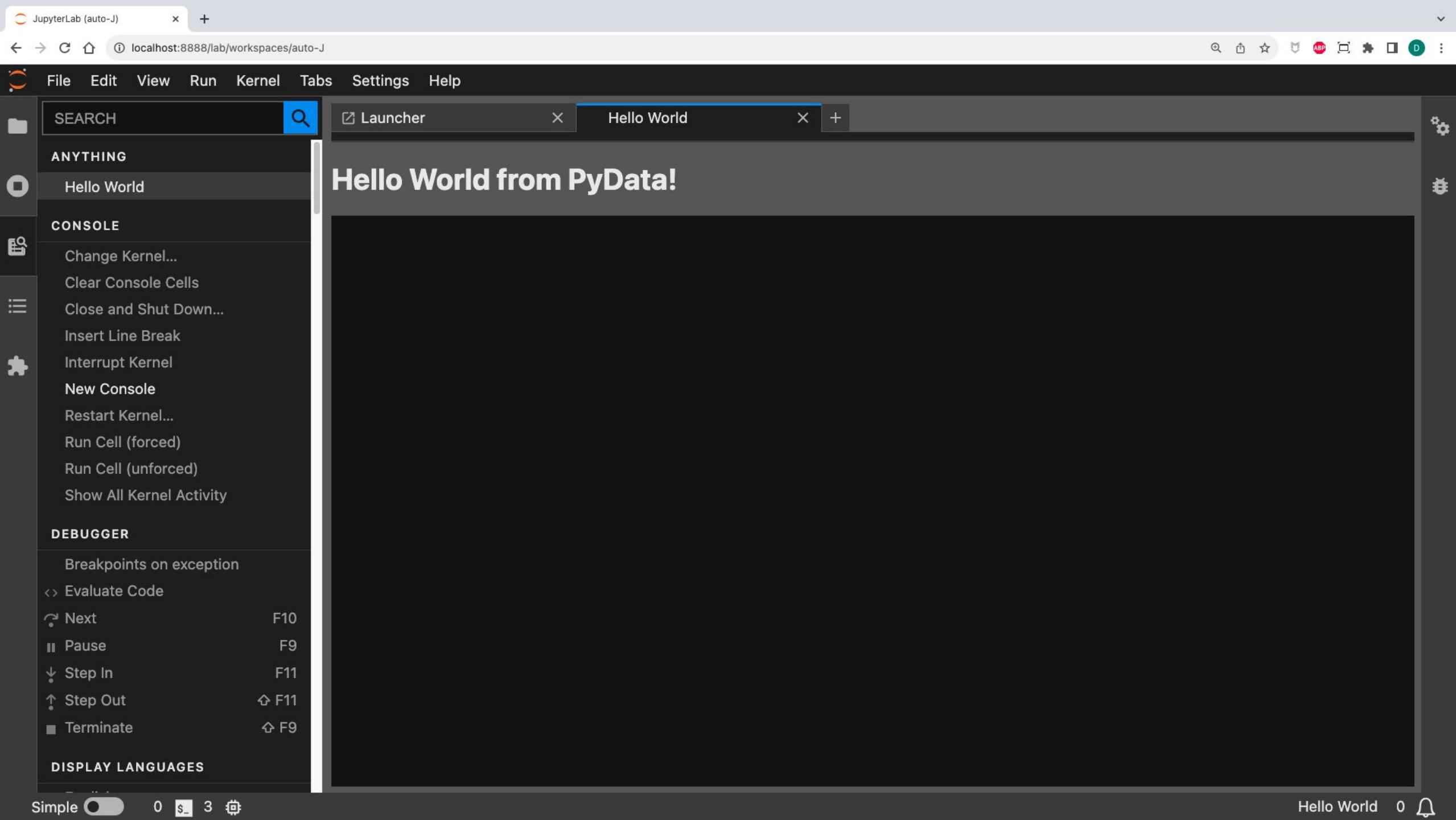
**DEBUGGER**

- Breakpoints on exception
- <> Evaluate Code
- ⟳ Next F10
- ⏸ Pause F9
- ↓ Step In F11
- ↑ Step Out ⌄ F11
- Terminate ⌄ F9

**DISPLAY LANGUAGES**

Simple  0  3 

Hello World 0 



The screenshot shows a JupyterLab interface with a dark theme. At the top, there's a header bar with tabs for 'File', 'Edit', 'View', 'Run', 'Kernel', 'Tabs', 'Settings', and 'Help'. Below the header is a search bar with a magnifying glass icon. There are two tabs open: 'Launcher' and 'Hello World'. The 'Hello World' tab is active and displays the text 'Hello World from PyData!'. To the left of the main content area is a sidebar with several sections: 'ANYTHING' containing a single item 'Hello World'; 'CONSOLE' with various kernel management options like 'Change Kernel...', 'Clear Console Cells', etc.; 'DEBUGGER' with breakpoints and step navigation keys; and 'DISPLAY LANGUAGES' which is currently set to 'Simple'. The bottom of the screen features a footer with status indicators for search, help, and a bell通知 icon.

# TUTORIAL

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

JupyterLab x +

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH 

Launcher Hello World +

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

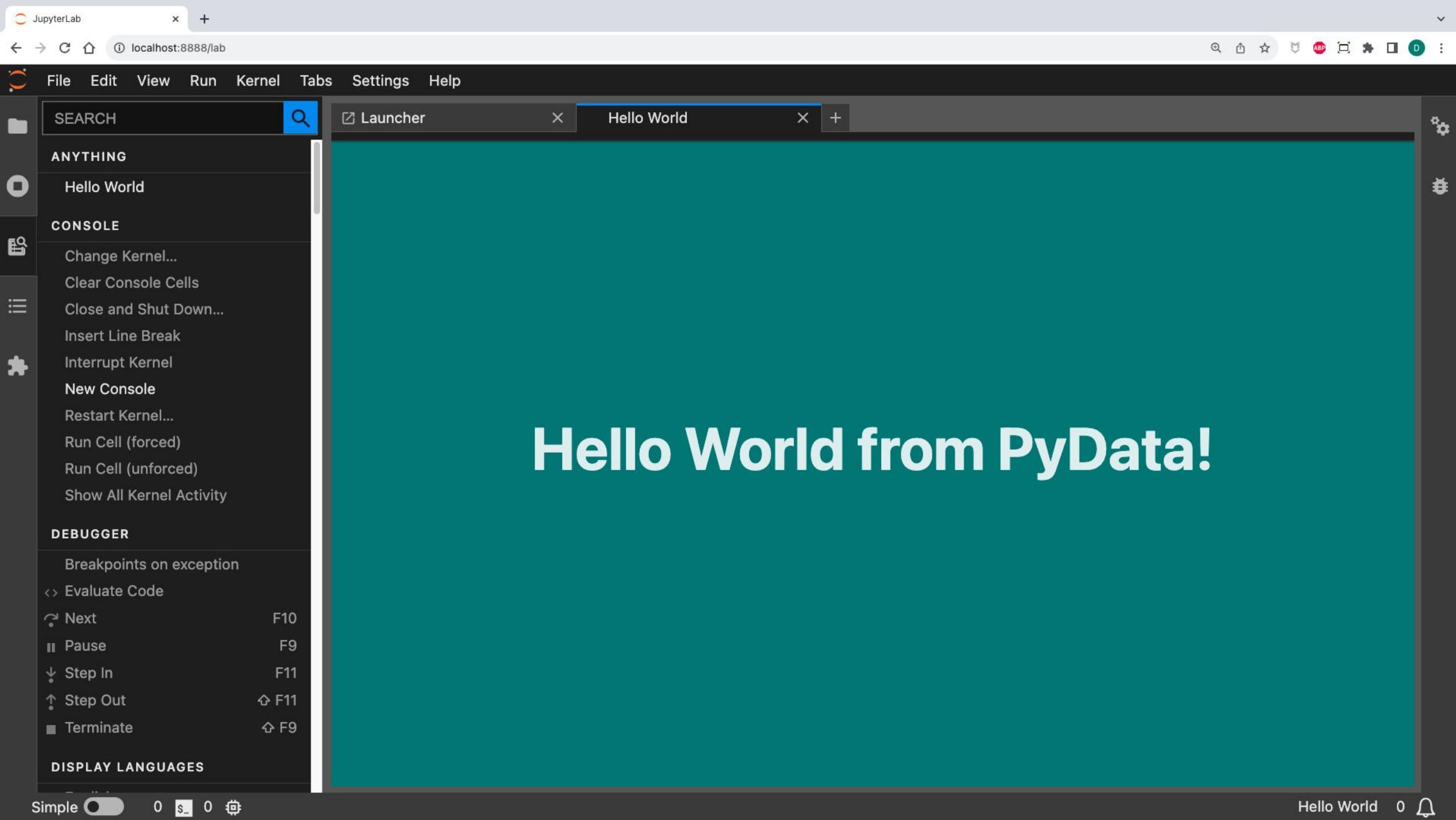
Next F10  
Pause F9  
Step In F11  
Step Out F11  
Terminate F9

DISPLAY LANGUAGES

Simple 0 \$ 0 ⚡

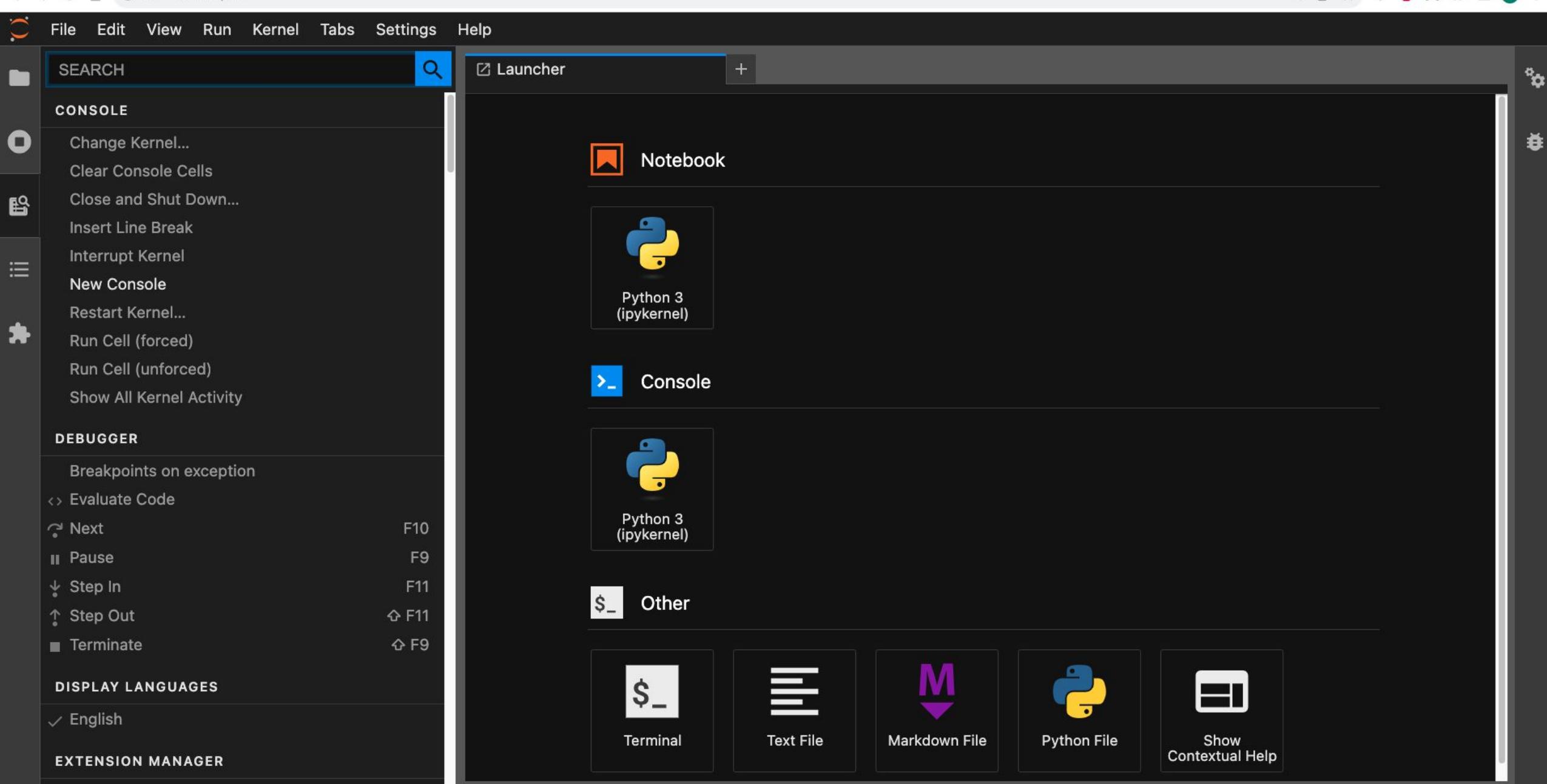
Hello World 0 📲

**Hello World from PyData!**



# 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



▼ ⌂ 15 ■■■■■ src/index.ts ⌂

...

↑ @@ -6,6 +6,7 @@ import {

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 pydjlx extension.  
12 \*/  
13 const plugin: JupyterFrontEndPlugin<void> = {

14 id: 'pydjlx:plugin',  
15 description: 'A JupyterLab extension demo for PyData',  
16 autoStart: true,  
17 requires: [ ICommandPalette ],  
18 activate: \_activate  
19 }  
20

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 pydjlx extension.  
13 \*/  
14 const plugin: JupyterFrontEndPlugin<void> = {  
15 id: 'pydjlx:plugin',  
16 description: 'A JupyterLab extension demo for PyData',  
17 autoStart: true,  
18 requires: [ ICommandPalette ],  
19 + optional: [ ILauncher ],  
20 activate: \_activate  
21 }

```
35
36   function _activate(app: JupyterFrontEnd,
37 -           palette: ICommandPalette ) {
38     console.log('JupyterLab extension pydjlx is activated!');
39     let commandId = 'pydjlx:Hello';
40     app.commands.addCommand(commandId,
41       { label: 'Hello World',
42         execute: () => {say_hello(app)}
43     });
44
45     palette.addItem(
46       { command: commandId,
47         category: 'Anything'
48     });
49 }
```

```
37
38   function _activate(app: JupyterFrontEnd,
39 +           palette: ICommandPalette,
40 +           launcher: ILauncher|null ) {
41     console.log('JupyterLab extension pydjlx is activated!');
42     let commandId = 'pydjlx:Hello';
43     app.commands.addCommand(commandId,
44       { label: 'Hello World',
45         execute: () => {say_hello(app)}
46     });
47
48     palette.addItem(
49       { command: commandId,
50         category: 'Anything'
51     });
52 +
53 +   if (launcher) {
54 +     launcher.add(
55 +       { command: commandId,
56 +         category: 'Notebook'
57 +     });
58 +   } else {
59 +     console.log('ILauncher is not available');
60 +   }
61 +
62 }
```

# TUTORIAL

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

```
(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$  
(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**

```
[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 @jupyterlab/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$
```

```
(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
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$ 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
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$ █
```

Showing 1 changed file with 2 additions and 1 deletion.

Split Unified

v ⇩ 3 ■■■□□ package.json ⚒

↑ @@ -54,7 +54,8 @@

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

↓

# **jlpm add**

- 1. Installs** the new package dependencies into **node\_modules** directory
- 2. Edit** “**dependencies**” section of **packages.json** file

# TUTORIAL

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

SEARCH 

Launcher 

**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**

 **Notebook**

 Python 3 (ipykernel)  
 Hello World

 **Console**

 Python 3 (ipykernel)

 **Other**

 Terminal  
 Text File  
 Markdown File  
 Python File  
 Show Contextual Help

JupyterLab x +

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH 

Launcher Hello World +

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

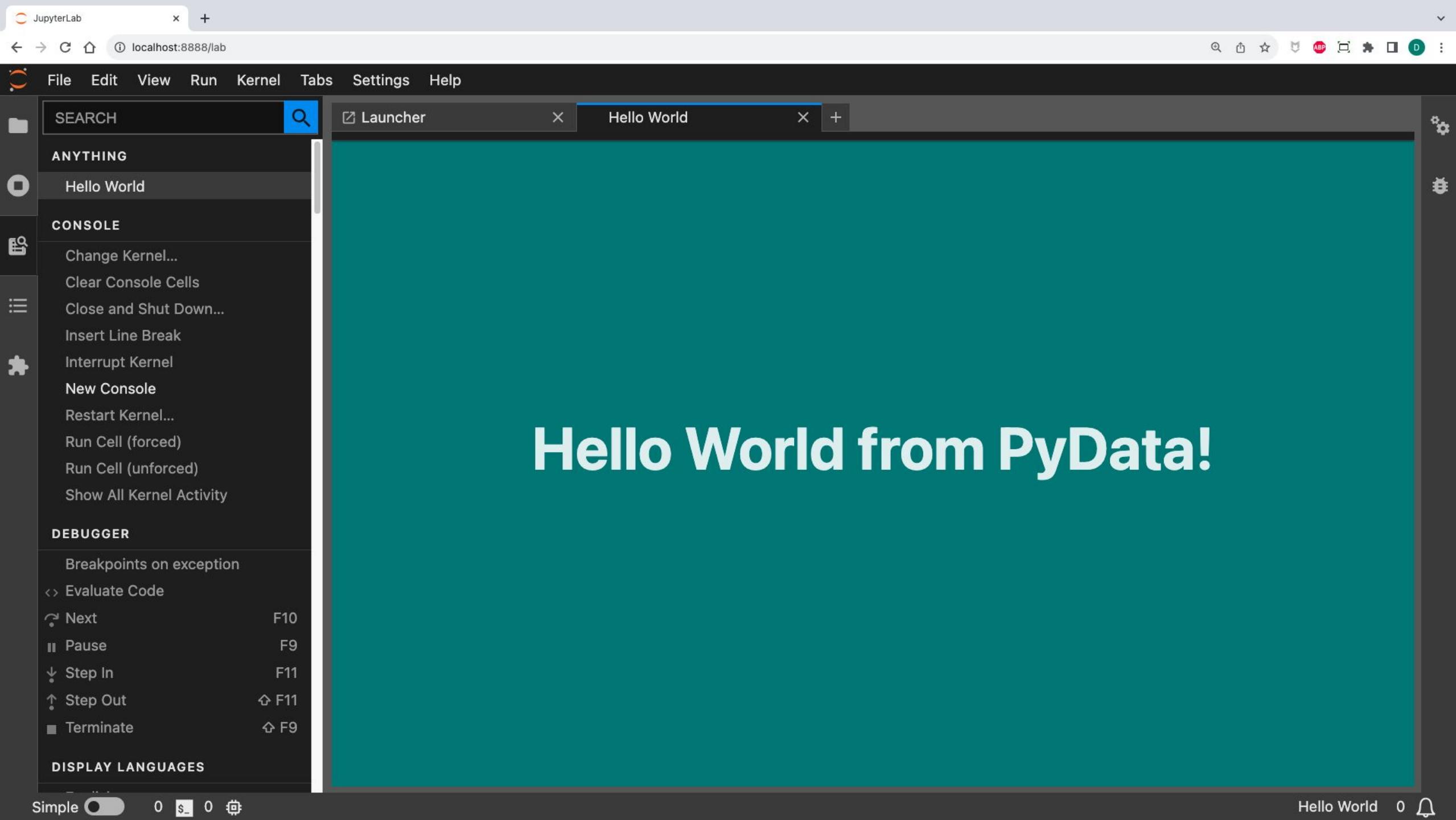
- Breakpoints on exception
- <> Evaluate Code
- ⟳ Next F10
- ⏸ Pause F9
- ⌄ Step In F11
- ⌄ Step Out F11
- ⏹ Terminate F9

DISPLAY LANGUAGES

Simple 0 \$ 0 ⚙️

Hello World 0 📲

**Hello World from PyData!**



JupyterLab x +

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH 

Launcher Hello World Hello World

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

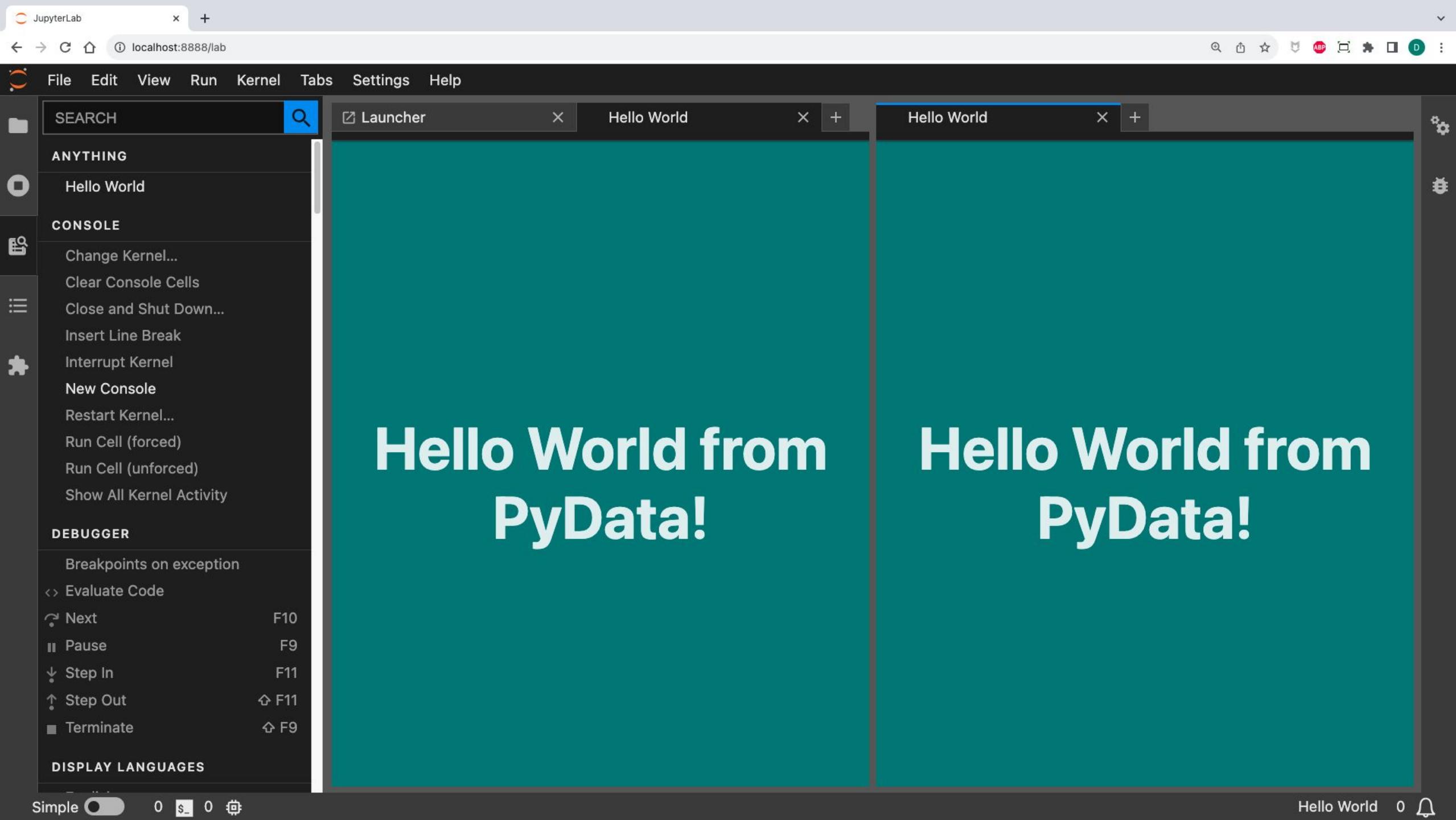
DEBUGGER

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

DISPLAY LANGUAGES

Simple 0 \$ 0 ⚙️

Hello World 0 📲



Large white text on teal background:

Left notebook content: **Hello World from PyData!**

Right notebook content: **Hello World from PyData!**

# 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

```
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: () => {say_hello(app)} });
}

palette.addItem(
  { command: commandId,
    category: 'Anything' });

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

```
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42
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68

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');
}
```

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

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

```
58 if (launcher) {  
59     launcher.add(  
60         { command: commandId,  
61           category: 'Notebook'  
62         });  
63     } else {  
64         console.log('ILauncher is not available');  
65     }  
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     app.shell.add(widget,'main');  
73     app.shell.activateById(widget.id);  
74 }  
75  
76  
77 export default plugin;
```

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

```
22  
23 class HelloWorldWidget extends Widget {  
24     constructor(greeting: string|null) {  
25         super();  
26         this.id = 'hello-world';  
27         this.title.label = 'Hello World';  
28         this.title.closable = true;  
29         this.addClass('hww')  
30         let body = document.createElement('body');  
31         let heading = document.createElement('h1');  
32         if (greeting) {  
33             heading.innerText = greeting;  
34         } else {  
35             heading.innerText = 'Hello World from PyData!';  
36         }  
37         body.appendChild(heading);  
38         this.node.appendChild(body);  
39     }  
40 }  
41  
42 function _activate(app: JupyterFrontEnd,  
43                     palette: ICommandPalette,  
44                     launcher: ILauncher|null ) {  
45     console.log('JupyterLab extension pydjlx is activated')  
46     let commandId = 'pydjlx:Hello';  
47     app.commands.addCommand(commandId,  
48         { label: 'Hello World',  
           execute: (args: any) => {say_hello(app,args)}  
        });  
49 }  
50 }  
51 }
```

# TUTORIAL

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

SEARCH Launcher 

## 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

&lt;&gt; Evaluate Code

⟳ Next F10

⏸ Pause F9

⌄ Step In F11

˄ Step Out ⌂ F11

■ Terminate ⌂ F9

## DISPLAY LANGUAGES

JupyterLab x +

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH 

Launcher  Hello World  +

ANYTHING

Hello World

CONSOLE

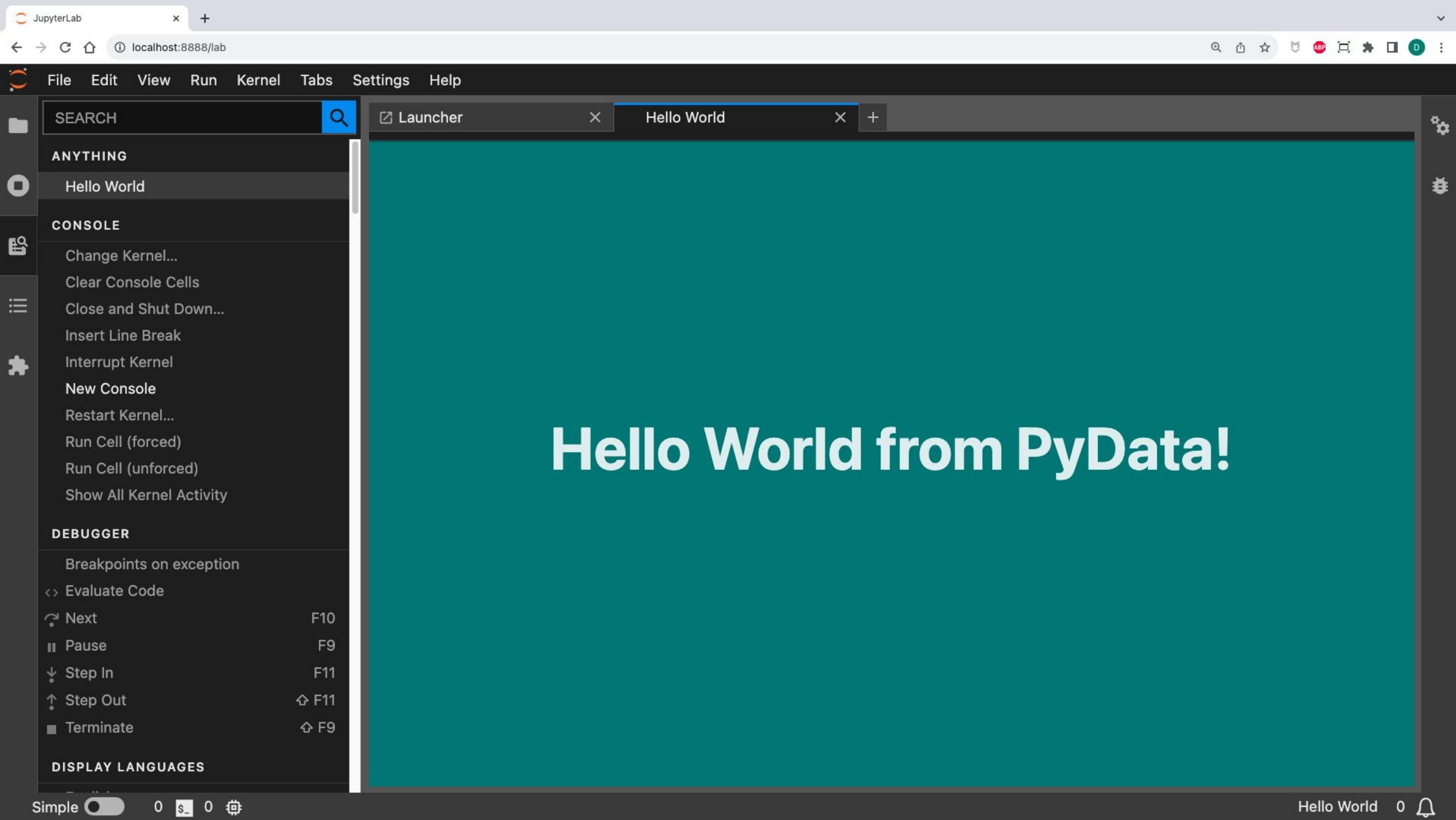
- Change Kernel...
- Clear Console Cells
- Close and Shut Down...
- Insert Line Break
- Interrupt Kernel
- New Console
- Restart Kernel...
- Run Cell (forced)
- Run Cell (unforced)
- Show All Kernel Activity

DEBUGGER

- Breakpoints on exception
- <> Evaluate Code
- ⟳ Next F10
- ⏸ Pause F9
- ⌄ Step In F11
- ⌃ Step Out ⌃ F11
- ⏹ Terminate ⌃ F9

DISPLAY LANGUAGES

Simple  0 s\_ 0  Hello World 0 



The image shows the JupyterLab interface. At the top, there's a header bar with tabs for File, Edit, View, Run, Kernel, Tabs, Settings, and Help. Below the header is a search bar with a magnifying glass icon. The main area has a teal background and displays the text "Hello World from PyData!" in large white font. On the left side, there's a dark sidebar with several sections: "ANYTHING" containing a "Hello World" item, "CONSOLE" with various kernel-related options, "DEBUGGER" with step control keys, and "DISPLAY LANGUAGES". The bottom of the screen shows some status indicators and a footer with the text "Hello World" and a bell icon.

JupyterLab x +

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
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- ⏸ Pause F9
- ⌄ Step In F11
- ⌄ Step Out ⌄ F11
- Terminate ⌄ F9

DISPLAY LANGUAGES

Simple 0 \$ 0 ⚙ Hello World 0 📲

 Launcher 

 Hello World 

 Hello World  +





# Hello from the Command Palette!

JupyterLab x +

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

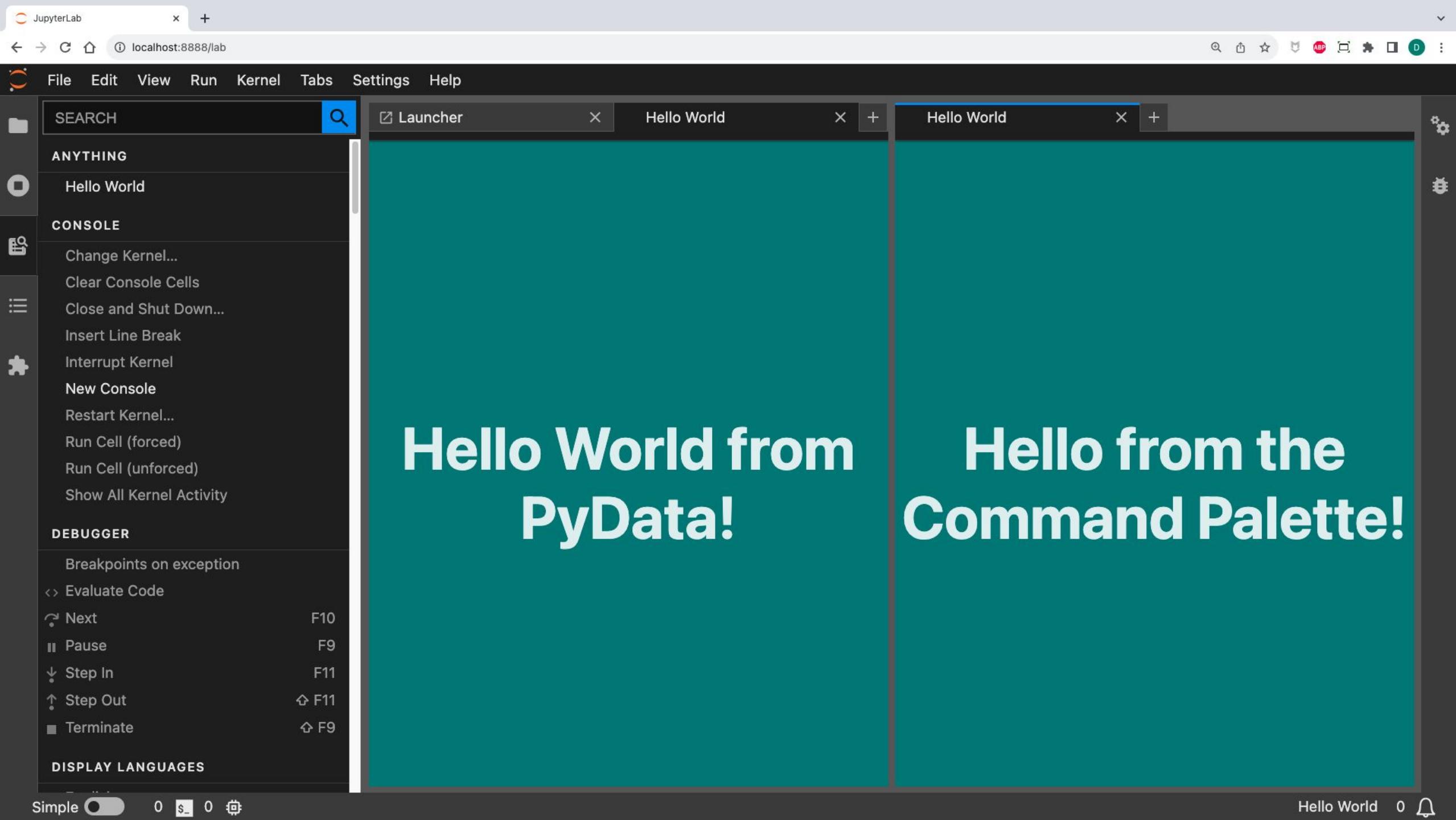
DISPLAY LANGUAGES

Launcher Hello World Hello World

Simple 0 \$ 0 ⚙ 0 Hello World 0 📰

**Hello World from PyData!**

**Hello from the Command Palette!**

A screenshot of the JupyterLab interface. On the left is a sidebar with various options like 'SEARCH', 'ANYTHING', 'CONSOLE' (with kernel management), 'DEBUGGER' (with breakpoints and step controls), and 'DISPLAY LANGUAGES'. The main area has two code cells. The first cell contains the text 'Hello World from PyData!' and the second cell contains 'Hello from the Command Palette!'. A command palette is open on the right, showing the 'Launcher' tab and two 'Hello World' entries. The status bar at the bottom shows basic metrics and a bell icon.

# 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**

# 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.

```
42 class SideBarHelloWidget extends Widget {  
43     constructor() {  
44         super();  
45         this.id = 'sidebar-hello';  
46         this.title.label = 'Hello World';  
47         this.title.closable = true;  
48         this.addClass('sbhw');  
49         let body = document.createElement('body');  
50         let b1 = document.createElement('button');  
51         let b2 = document.createElement('button');  
52         let b3 = document.createElement('button');  
53         let b4 = document.createElement('button');  
54         b1.innerText = 'E';  
55         b2.innerText = 'F';  
56         b3.innerText = 'G';  
57         b4.innerText = 'H';  
58         body.append(b1,b2,b3,b4);  
59         this.node.appendChild(body);  
60     }  
61 }
```

```
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 palette.addItem(
73   { command: commandId,
74     category: 'Anything',
75     args: {greeting: 'Hello from the Command Palette!'}
76   });

77 if (launcher) {
78   launcher.add(
79     { command: commandId,
80       category: 'Notebook'
81     });
82 } else {
83   console.log('ILauncher is not available');
84 }

85 let sbwidget = new SideBarHelloWidget();
86 app.shell.add(sbwidget,'left');
87 app.shell.activateById(sbwidget.id);
88
89
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!'} });
}

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

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

# TUTORIAL

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

SEARCH

Launcher

## 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

&lt;&gt; 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

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

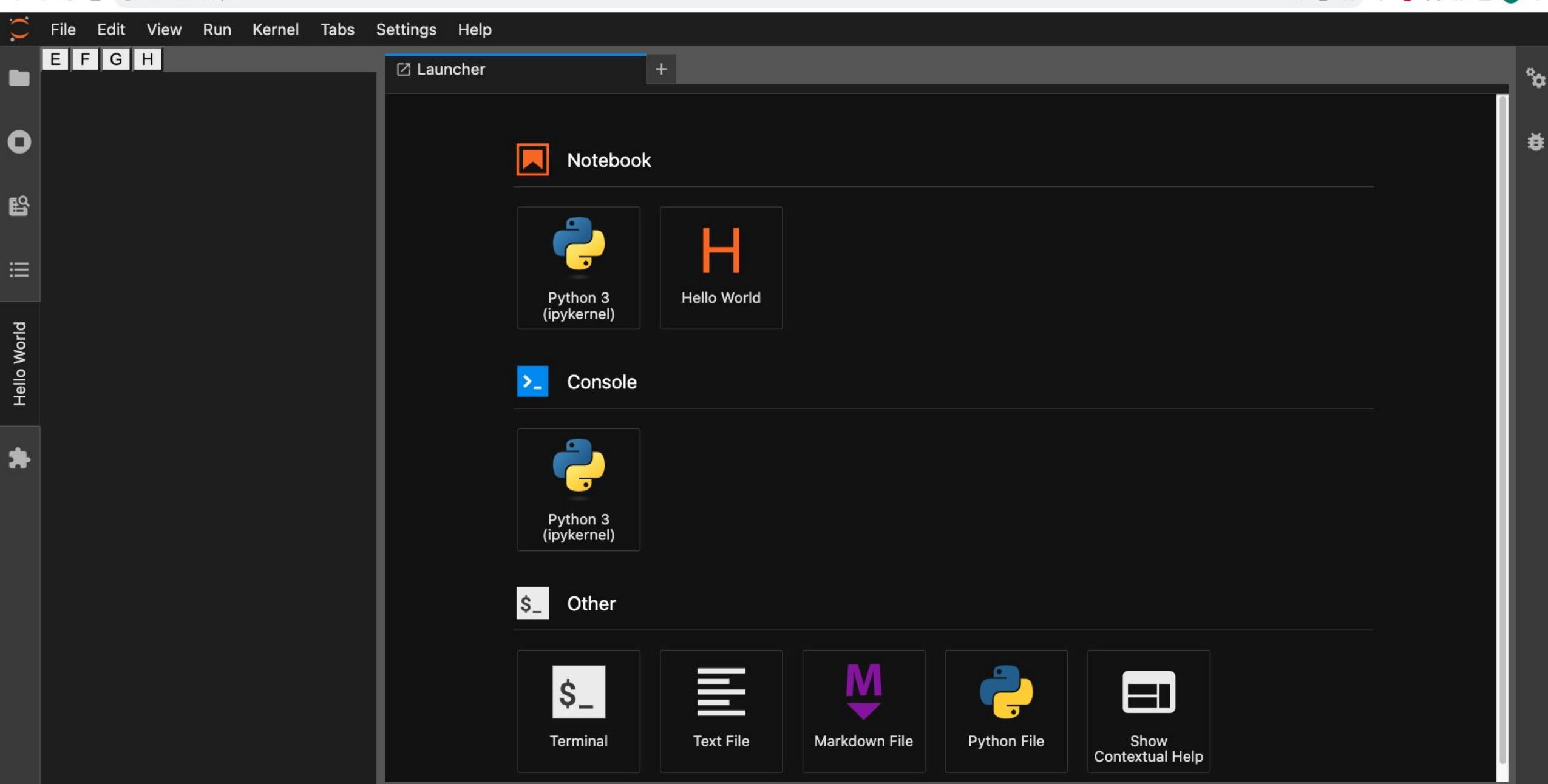
 Terminal

 Text File

 Markdown File

 Python File

Show Contextual Help



E F G H



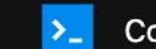
Launcher



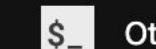
Notebook

Python 3  
(ipykernel)

Hello World



Console

Python 3  
(ipykernel)

Other



Terminal



Text File



Markdown File



Python File

Show  
Contextual Help

# 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.

↑ @@ -4,8 +4,11 @@

```
4      https://jupyterlab.readthedocs.io/en/stable/developer/css.html
5  */
6
7 - .hww body {
8     height: 100%;
9
10    position: relative;
11    text-align: center;
12    background-color: teal;
```

↓ @@ -18,3 +21,15 @@

```
18    right: 0;
19    font-size: 400%;
20 }
```

```
4      https://jupyterlab.readthedocs.io/en/stable/developer/css.html
5  */
6
7 + .html, body, .hww {
8     height: 100%;
9 +
10 +
11 + .hww body {
12     position: relative;
13     text-align: center;
14     background-color: teal;
```

```
21    right: 0;
22    font-size: 400%;
23 }
24 +
25 + .sbhw body {
26 +   background-color: #212121;
27 + }
28 +
29 + .sbhw button {
30 +   width: 72px;
31 +   height: 72px;
32 +   margin: 15%;
33 +   margin-bottom: 5%;
34 +   font-size: 200%;
35 + }
```

# TUTORIAL

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



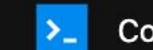
Launcher



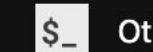
Notebook

Python 3  
(ipykernel)

Hello World



Console

Python 3  
(ipykernel)

Other



Terminal



Text File



Markdown File



Python File

Show  
Contextual Help

# 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.

27 src/index.ts ...

```
@@ -40,22 +40,27 @@ class HelloWorldWidget extends Widget {
40 }
41
42 class SideBarHelloWidget extends Widget {
43 - constructor() {
44     super();
45     this.id = 'sidebar-hello';
46     this.title.label = 'Hello World';
47     this.title.closable = true;
48     this.addClass('sbhw');
49     let body = document.createElement('body');
50 - let b1 = document.createElement('button');
51 - let b2 = document.createElement('button');
52 - let b3 = document.createElement('button');
53 - let b4 = document.createElement('button');
54 - b1.innerText = 'E';
55 - b2.innerText = 'F';
56 - b3.innerText = 'G';
57 - b4.innerText = 'H';
58 - body.appendChild(b1,b2,b3,b4);
59     this.node.appendChild(body);
60 }
61 }

@@ -85,7 +90,7 @@ function _activate(app: JupyterFrontEnd,
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 }
```

40 }
41
42 class SideBarHelloWidget extends Widget {
43 + constructor(app: JupyterFrontEnd, commandId: string) {
44 super();
45 this.id = 'sidebar-hello';
46 this.title.label = 'Hello World';
47 this.title.closable = true;
48 this.addClass('sbhw');
49 let body = document.createElement('body');
50 + let button\_info: Record<string,string> = {
51 + 'E' : 'Hello World!',
52 + 'F' : 'Bonjour le Monde!',
53 + 'G' : 'Hàlo a Shaoghail!',
54 + 'H' : '!שלום עולמו'
55 + }
56 + for (const key in button\_info) {
57 + let b = document.createElement('button');
58 + b.innerText = key;
59 + b.addEventListener('click', () => {
60 + app.commands.execute(commandId,{greeting:button\_info[key]});
61 + });
62 + body.appendChild(b);
63 + }
64 this.node.appendChild(body);
65 }
66 }

90 console.log('ILauncher is not available');
91 }
92
93 + let sbwidget = new SideBarHelloWidget(app, commandId);
94 app.shell.add(sbwidget,'left');
95 app.shell.activateById(sbwidget.id);
96 }

```
41
42 class SideBarHelloWidget extends Widget {
43   constructor(app: JupyterFrontEnd, commandId: string) {
44     super();
45     this.id = 'sidebar-hello';
46     this.title.label = 'Hello World';
47     this.title.closable = true;
48     this.addClass('sbhw');
49     let body = document.createElement('body');
50     let button_info: Record<string, string> = {
51       'E' : 'Hello World!',
52       'F' : 'Bonjour le Monde!',
53       'G' : 'Hàlo a Shaoghail!',
54       'H' : '!שלום עוזי'
55     }
56     for (const key in button_info) {
57       let b = document.createElement('button');
58       b.innerText = key;
59       b.addEventListener('click', () => {
60         app.commands.execute(commandId, {greeting:button_info[key]});
61       });
62       body.appendChild(b);
63     }
64     this.node.appendChild(body);
65   }
66 }
```

```
59 +         b.addEventListener('click', () => {
60 +             app.commands.execute(commandId,{greeting:button_info[key]});
61 +         });
62 +         body.appendChild(b);
63 +     }
64     this.node.appendChild(body);
65   }
66 }
```

```
90       console.log('ILauncher is not available');
91   }
92
93 +   let sbwidget = new SideBarHelloWidget(app, commandId);
94   app.shell.add(sbwidget,'left');
95   app.shell.activateById(sbwidget.id);
96 }
```

# TUTORIAL

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

## Launcher



## Notebook

Python 3  
(ipykernel)

Hello World

## Console

Python 3  
(ipykernel)

## Other



Terminal



Text File

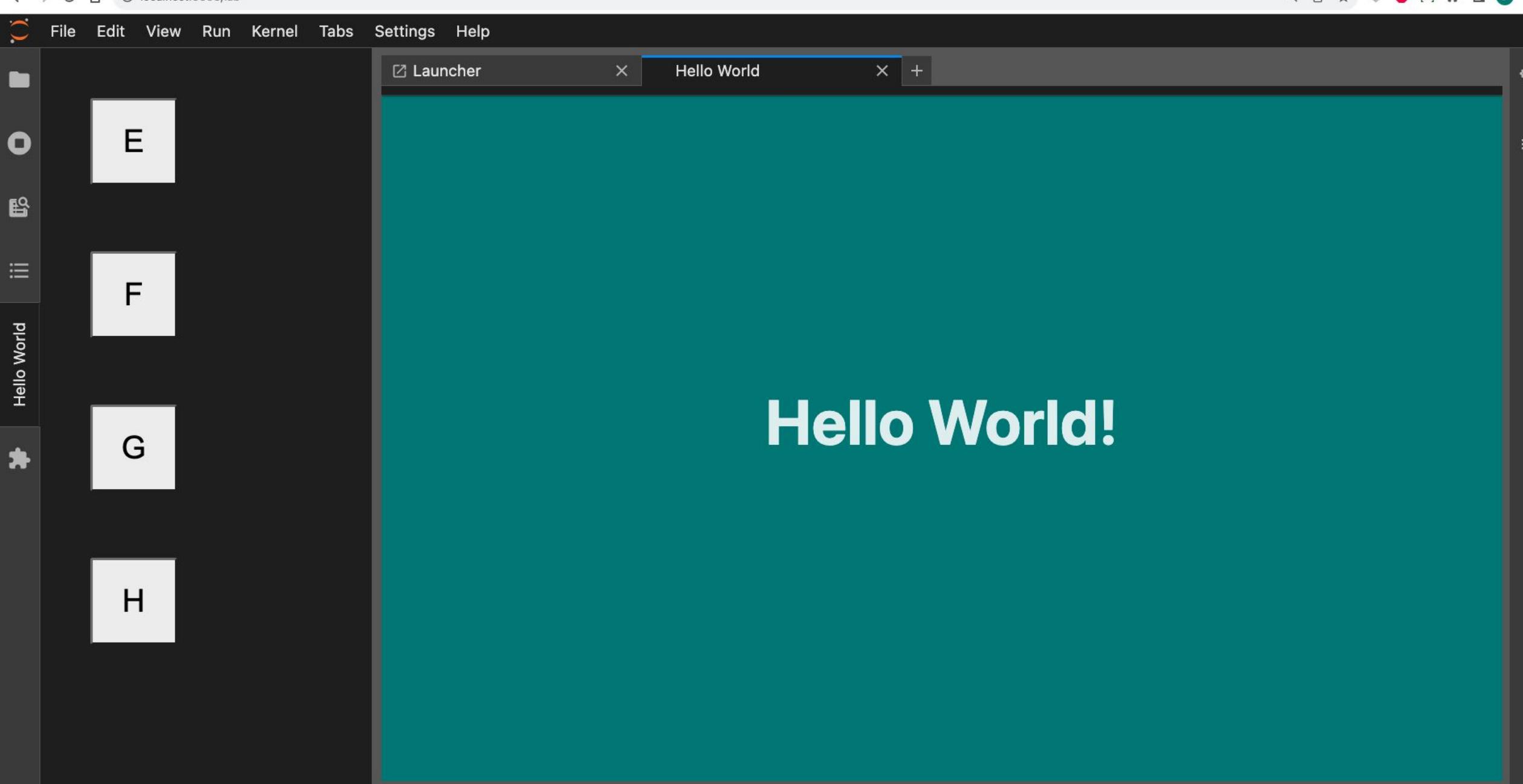


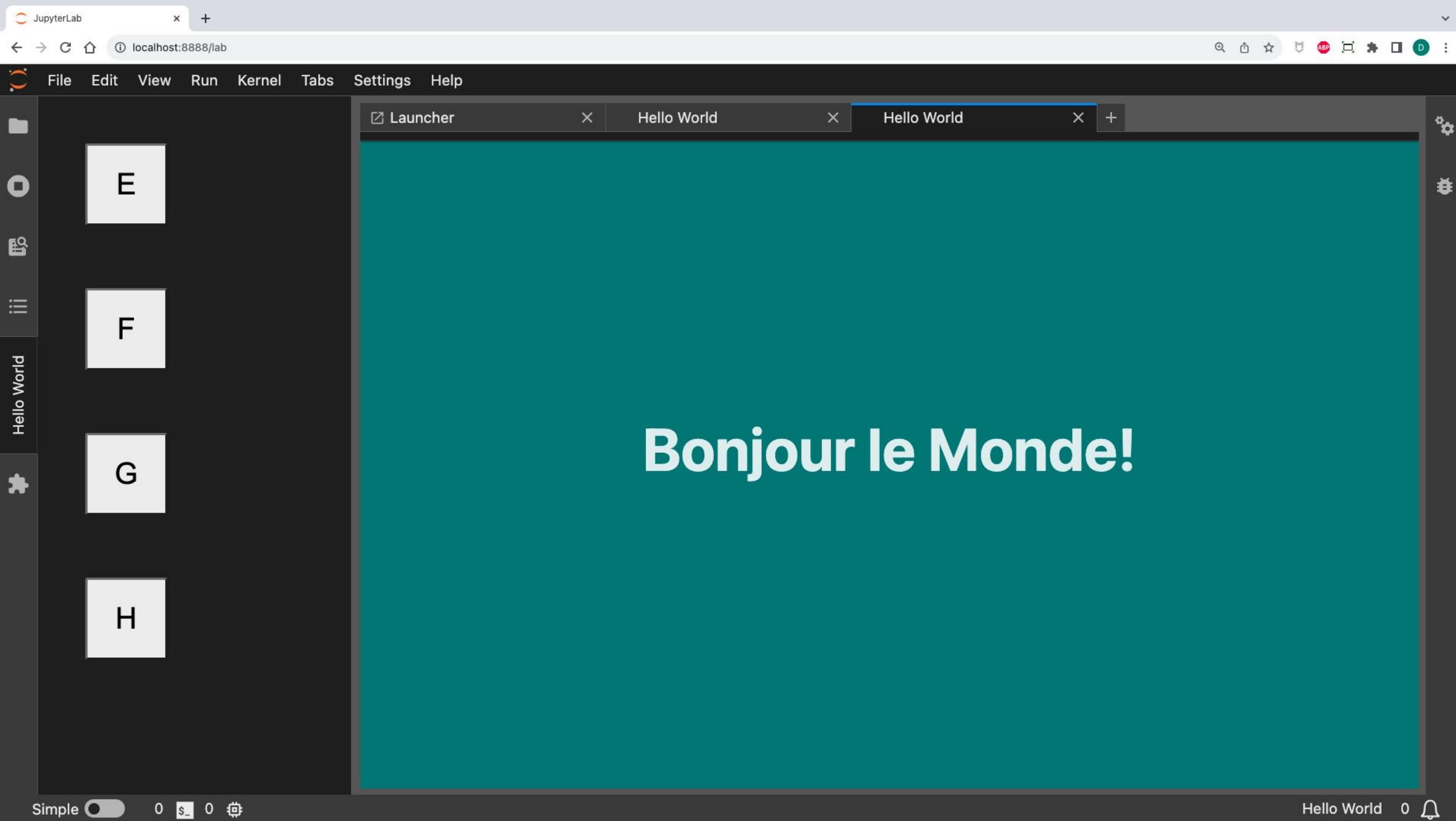
Markdown File

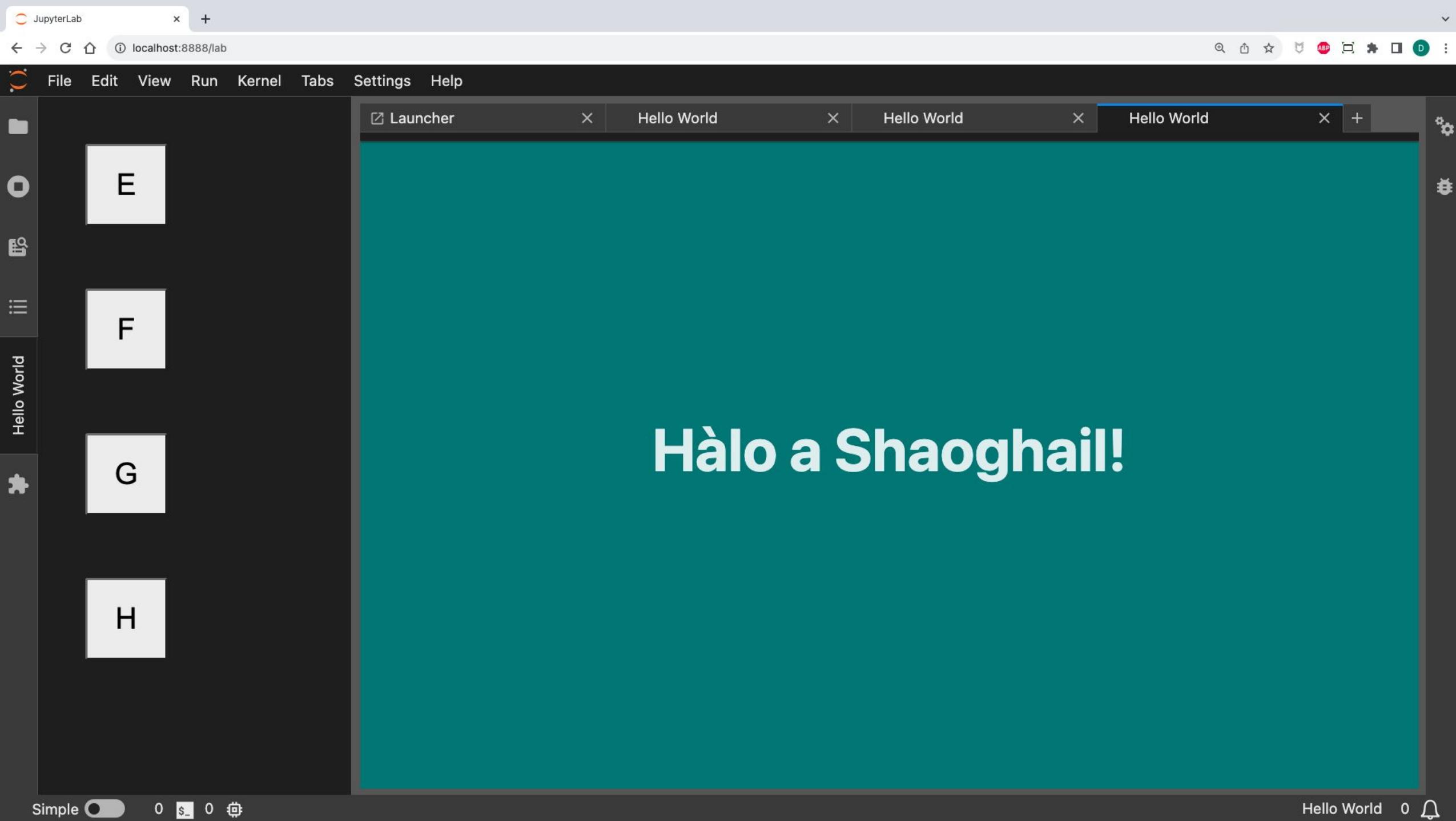


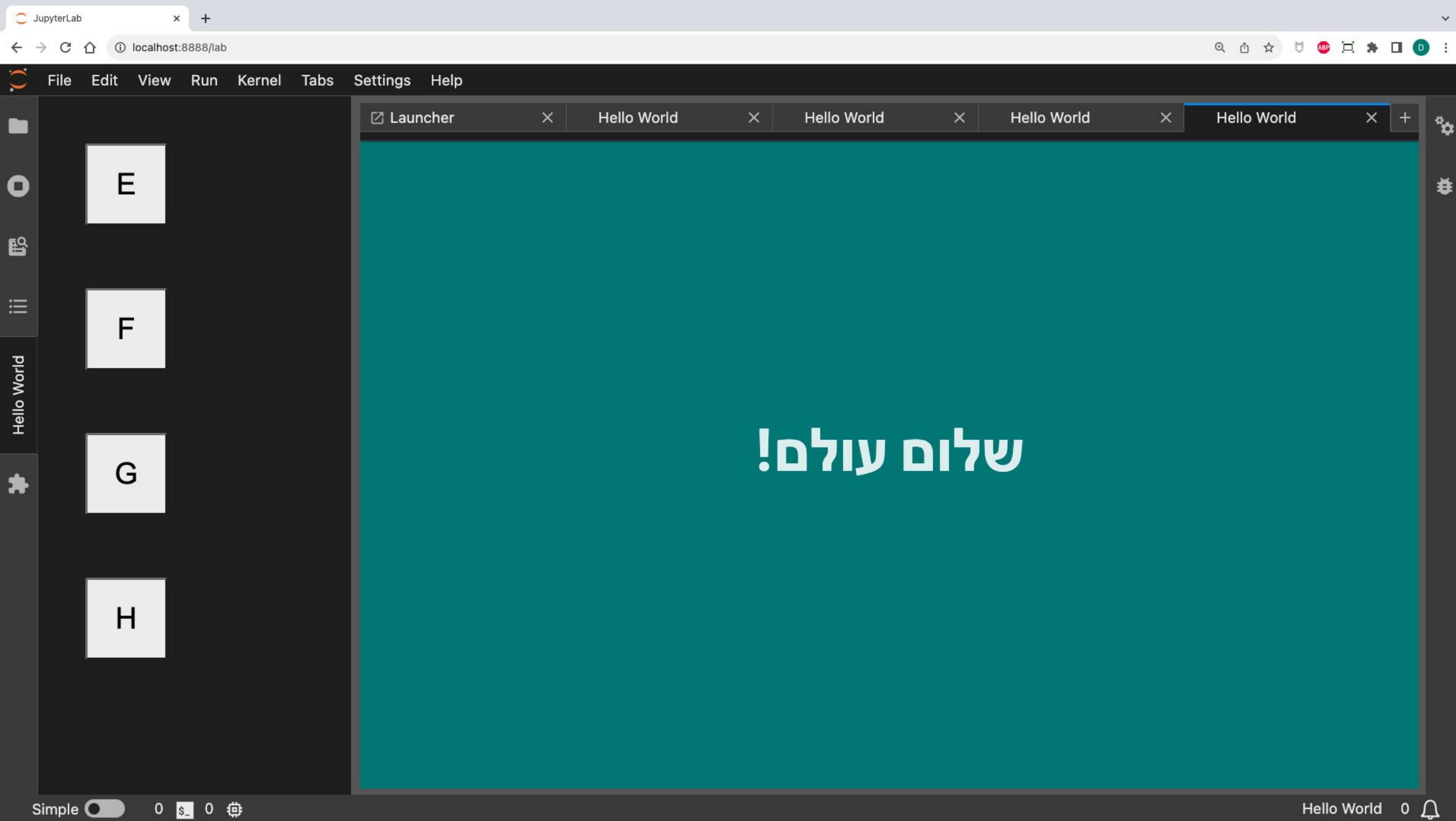
Python File

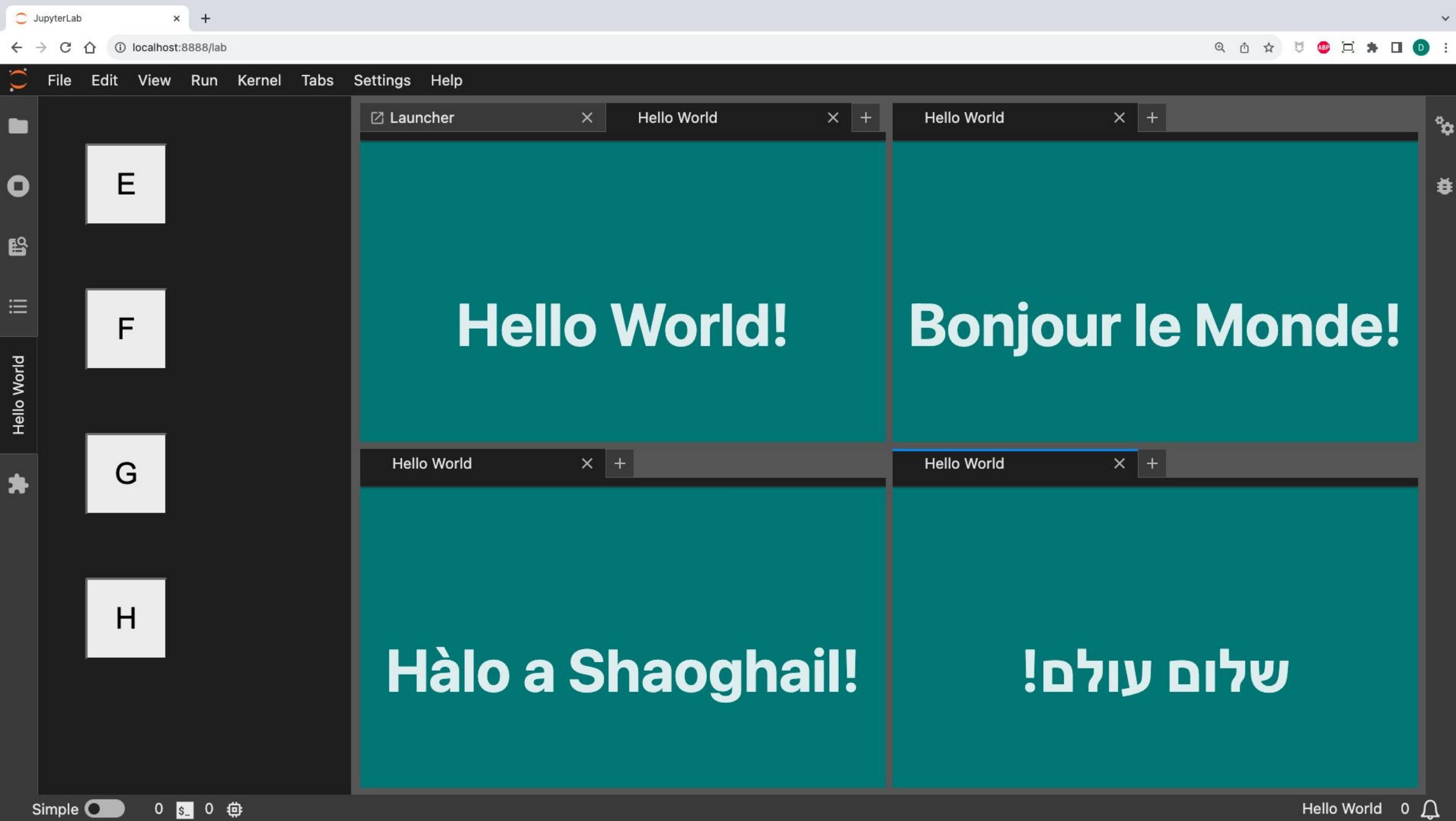
Show  
Contextual Help











# Useful LabExtension Links

- [Jupyterlab Extension Developer Guide](#)
- [Core Tokens](#)
- [Front-End Shell](#)
- [Random Astronomy Picture Extension Tutorial](#)
- [Extension Examples Repository](#)

# Useful LabExtension Links

- Core Tokens

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

# Thank you!

We are hiring: [bloomberg.com/engineering](https://bloomberg.com/engineering)

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