
Jupyter widgets

From Slider to Virtual Reality

By Maarten Breddels

Joy of Coding 2018 - Rotterdam - June 8

I am an

- Ex: astronomer (working on software for big data: vaex)
- Now: Freelancer / consultant / data scientist for Python / Jupyter
- Like: Python, Javascript, C(++), Java, Clojure(Script)
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I live on the internet at:

 @maartenbreddels

 maartenbreddels@gmail.com

 github.com/maartenbreddels

 www.maartenbreddels.com



The agenda:

1. Small Jupyter introduction



The agenda:

1. Small Jupyter introduction
2. Why Jupyter widgets



The agenda:

1. Small Jupyter introduction
2. Why Jupyter widgets
3. Demo



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7. End



1.

What is Project Jupyter?



“Project Jupyter exists to develop **open-source software**, open-standards, and services for **interactive computing across dozens of programming languages.**”

What is project Jupyter?

Jupyter notebook

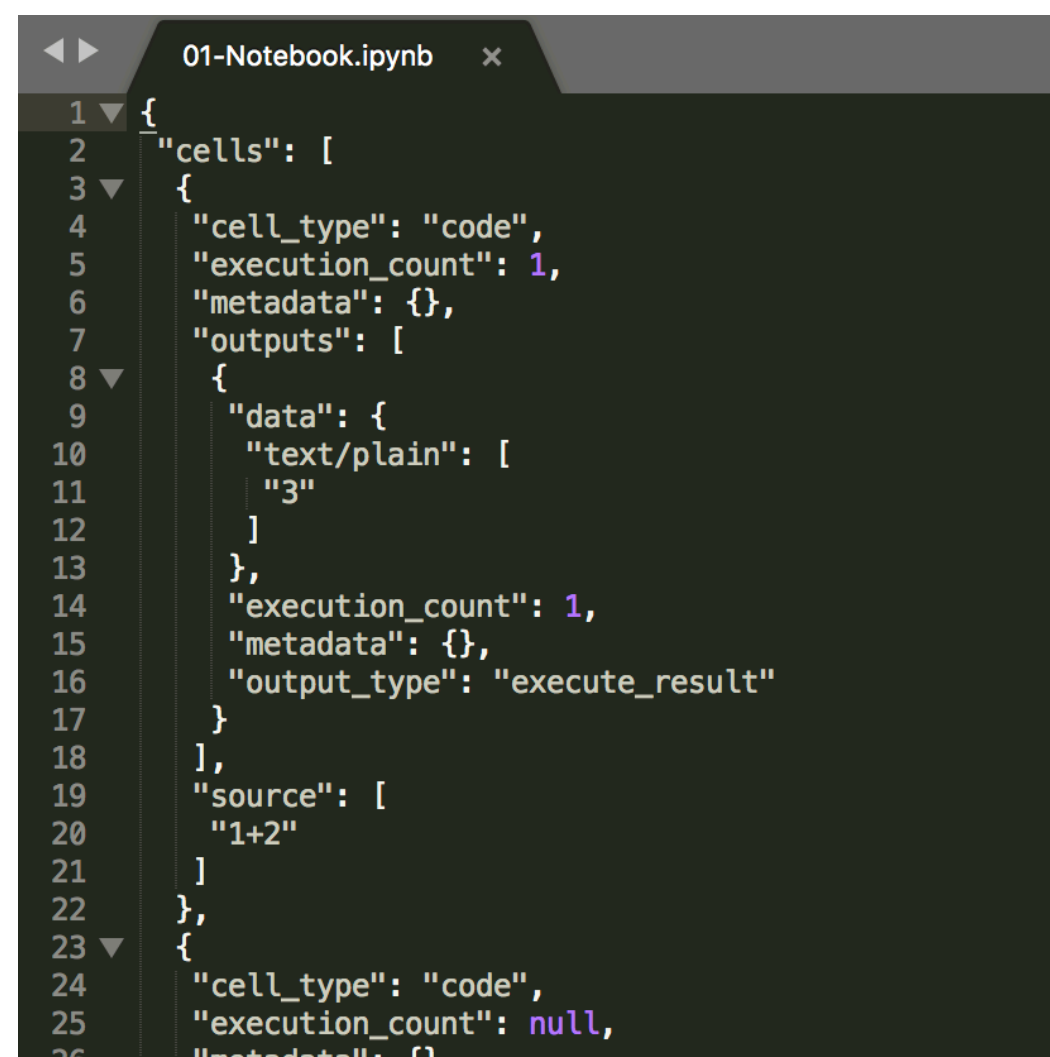
- JSON file with code, text, images
- Can be rendered as HTML, PDF..
- 'Editor' is the Browser+Notebook server/Jupyter Lab
- Language independent!



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The screenshot shows a Jupyter Notebook editor window titled "01-Notebook.ipynb". The editor displays a JSON file structure for a notebook cell. The JSON is as follows:

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        {
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              "3"
            ]
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      ],
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```

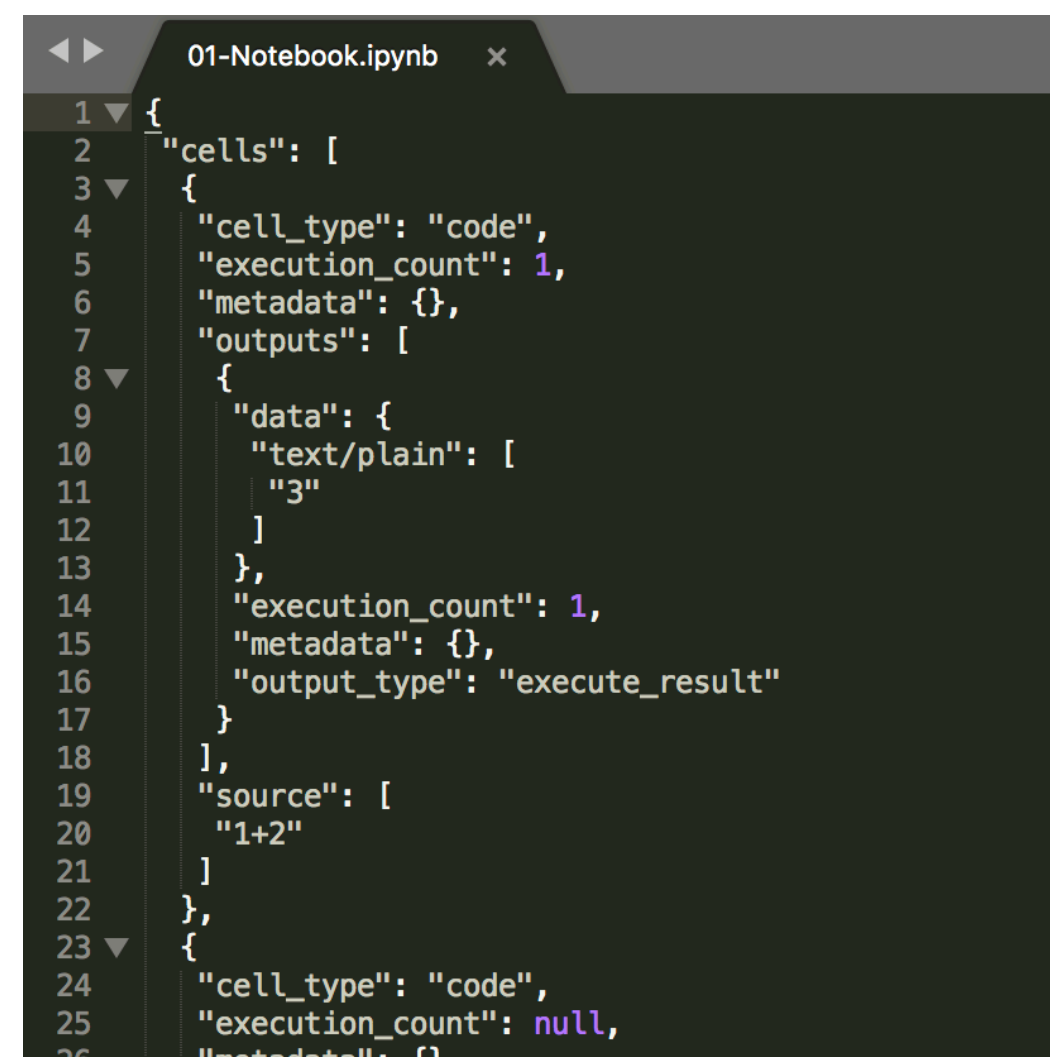
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Notebook server / Jupyter Lab

- Hosts the notebook (open/save)
- Renders the notebook (from JSON to HTML+JS)
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```
maartenbreddels — j
(talks2018) mbp ~$ jupyter notebook --no-browser
[I 20:39:16.712 NotebookApp] [beakerx] enabled
[I 20:39:16.750 NotebookApp] JupyterLab beta preview extension loaded from /Users/maartenbr
[I 20:39:16.750 NotebookApp] JupyterLab application directory is /Users/maartenbreddels/min
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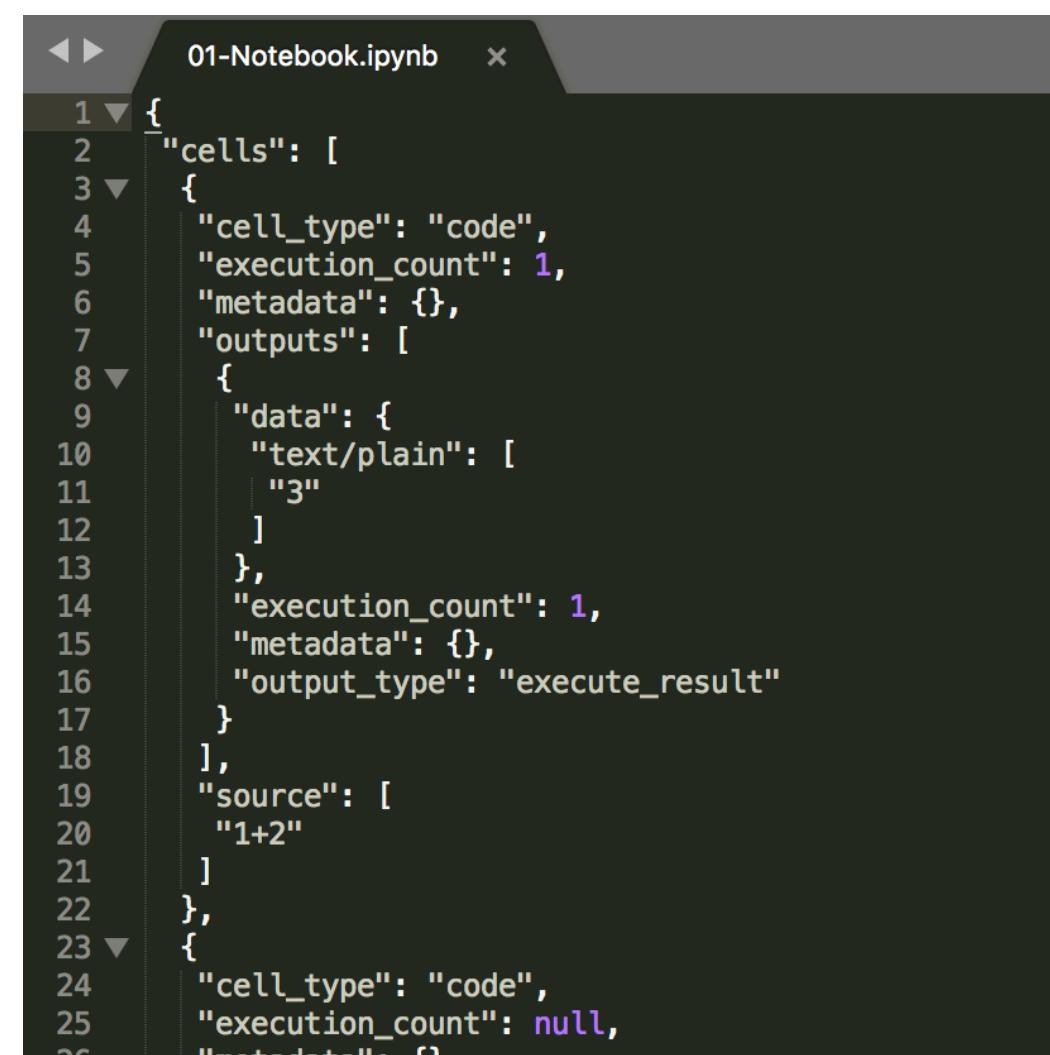
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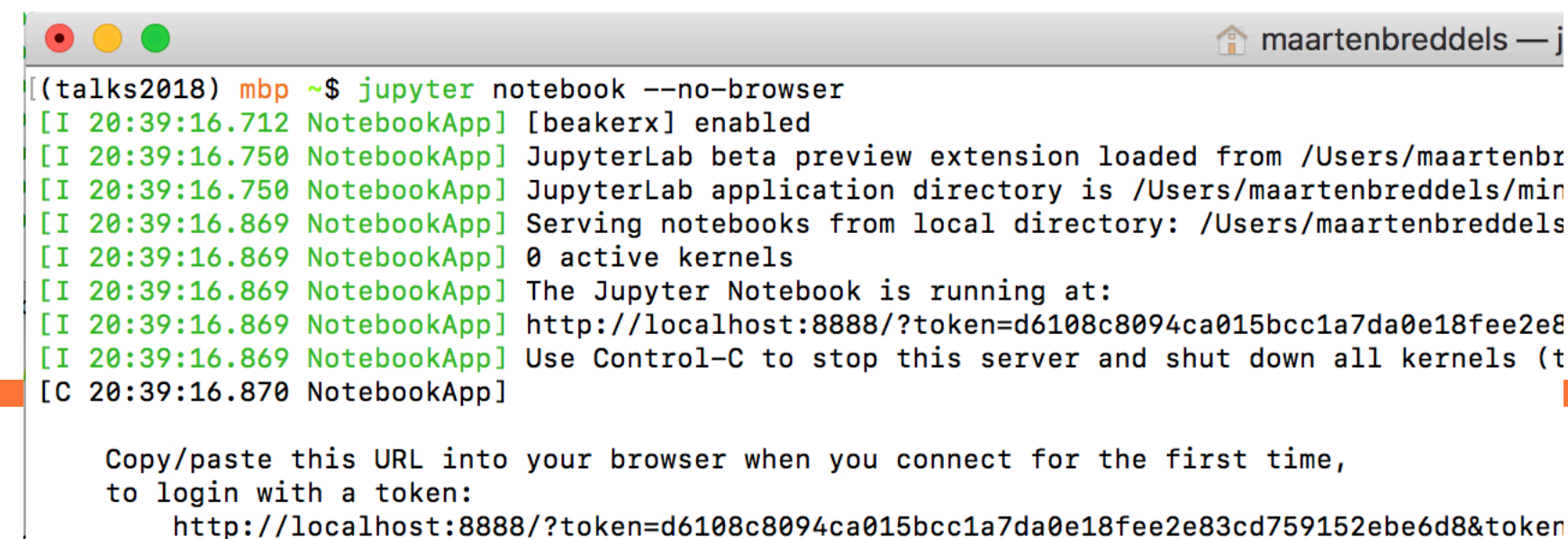
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Jupyter widgets

- This talk
- Interactive elements in the notebook
- Mostly written in Javascript
- Language binding is mostly boilerplate



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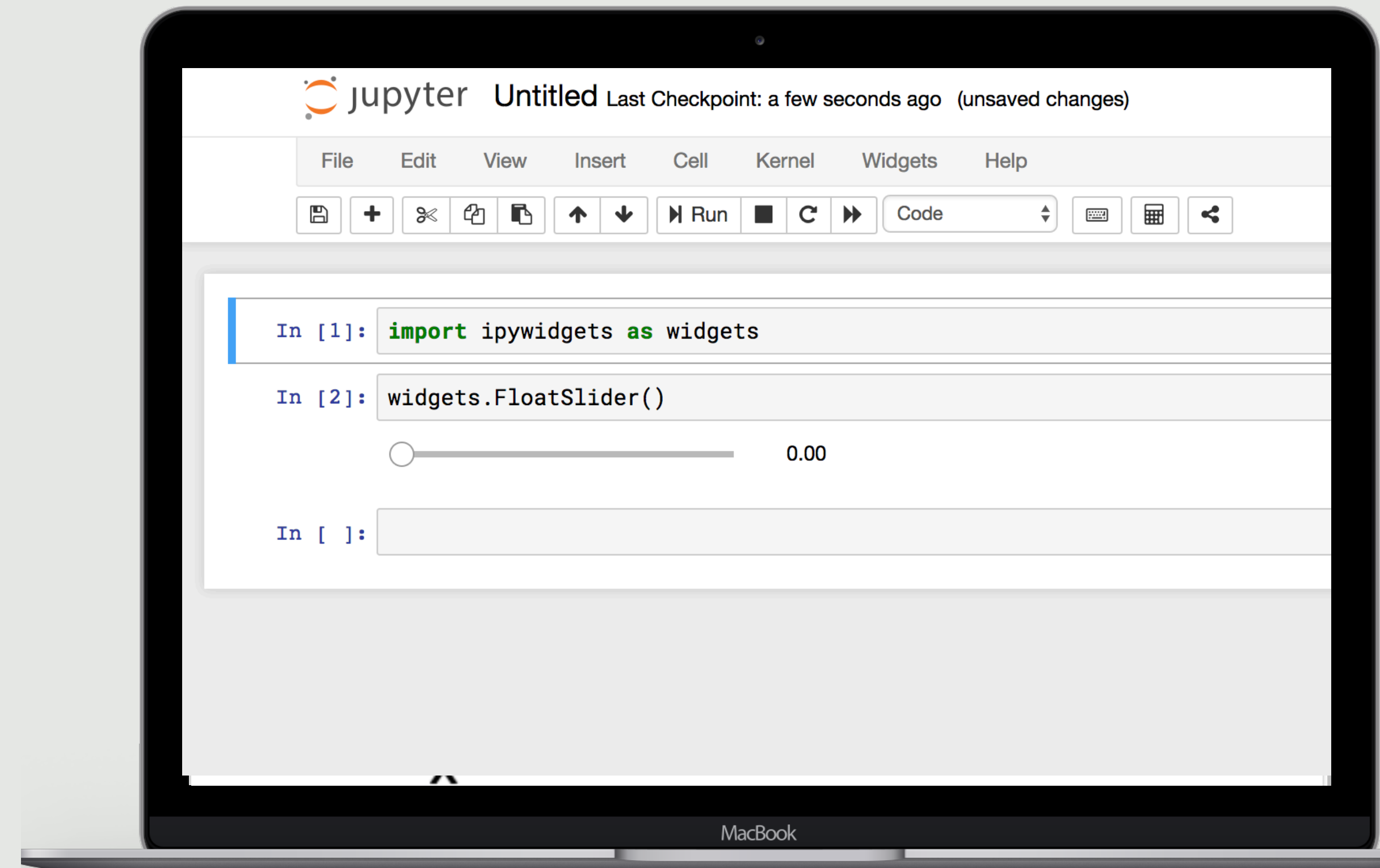
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```
In [1]: import ipywidgets as widgets

In [2]: slider = widgets.FloatSlider(min=0, max=100, value=10, step=1)
        slider
```

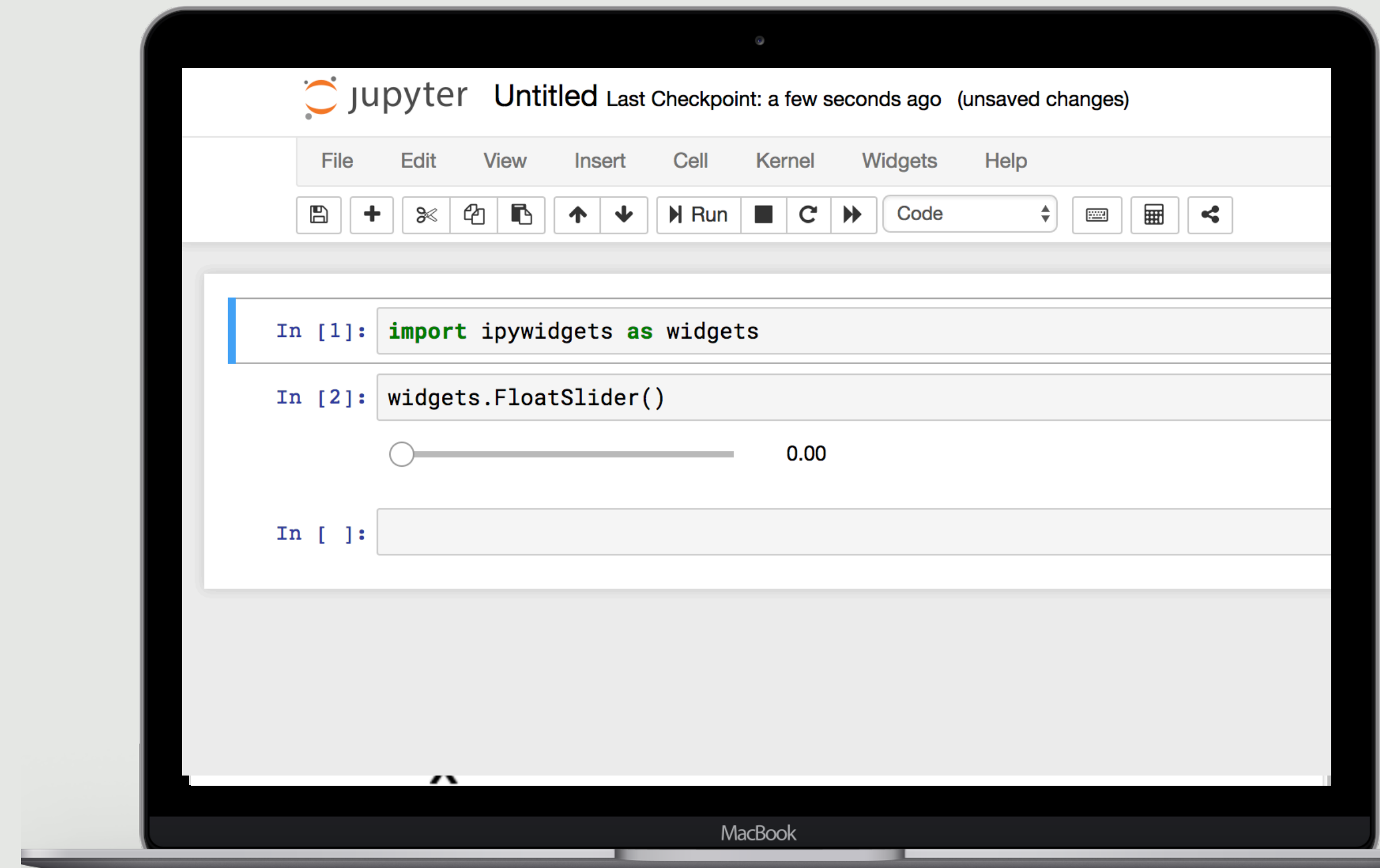


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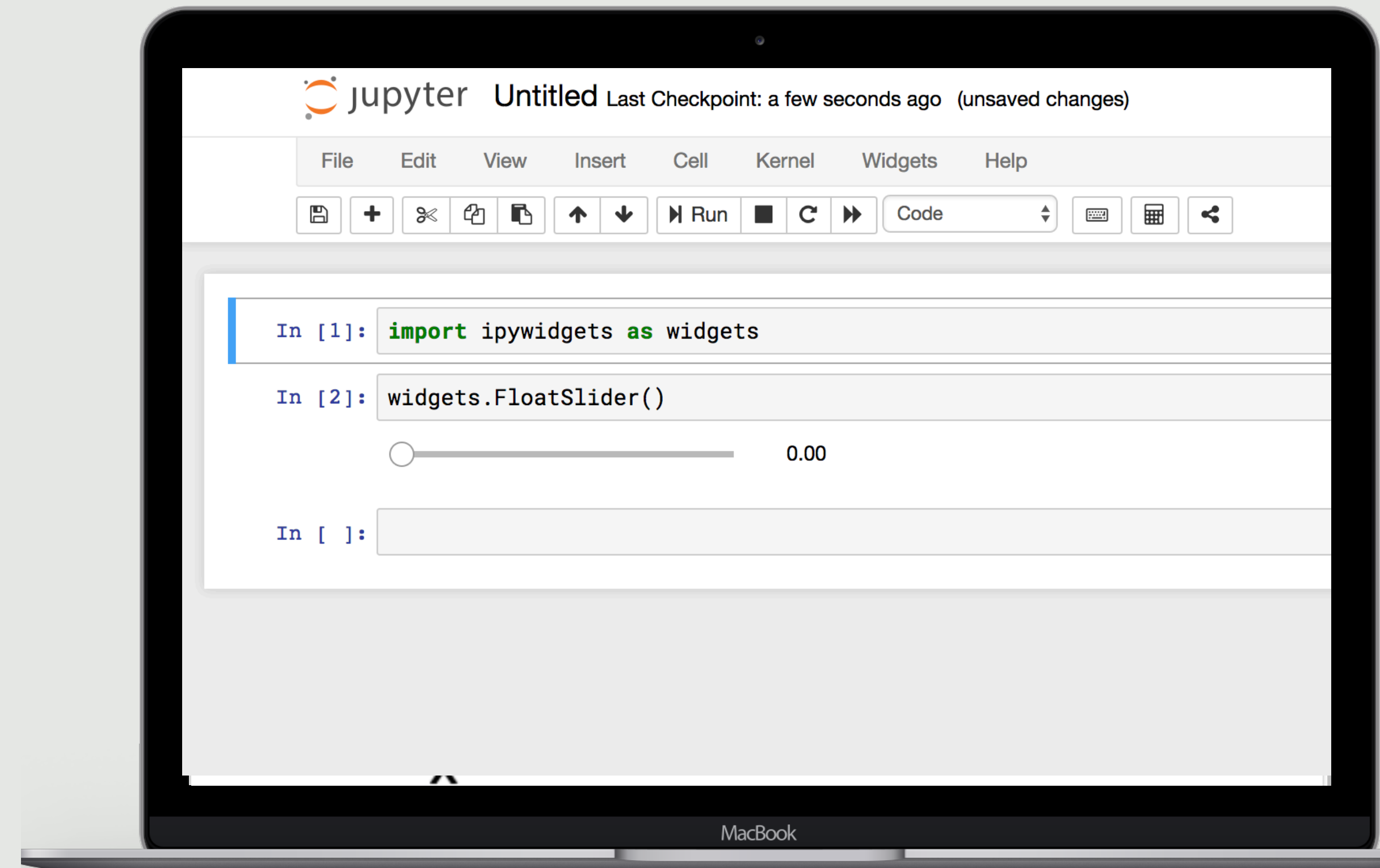
Why Jupyter widgets?

- Make your code interactive



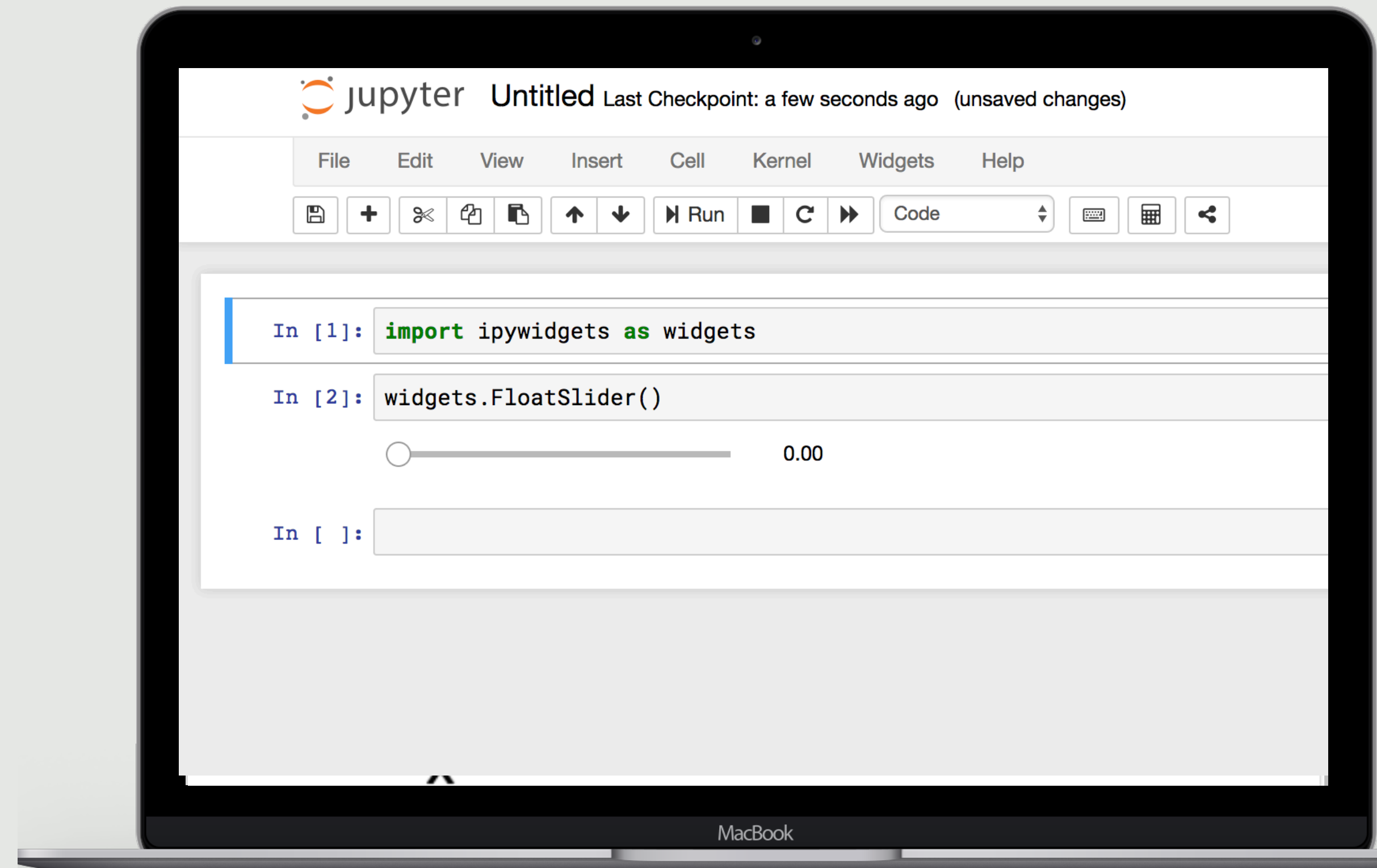
Why Jupyter widgets?

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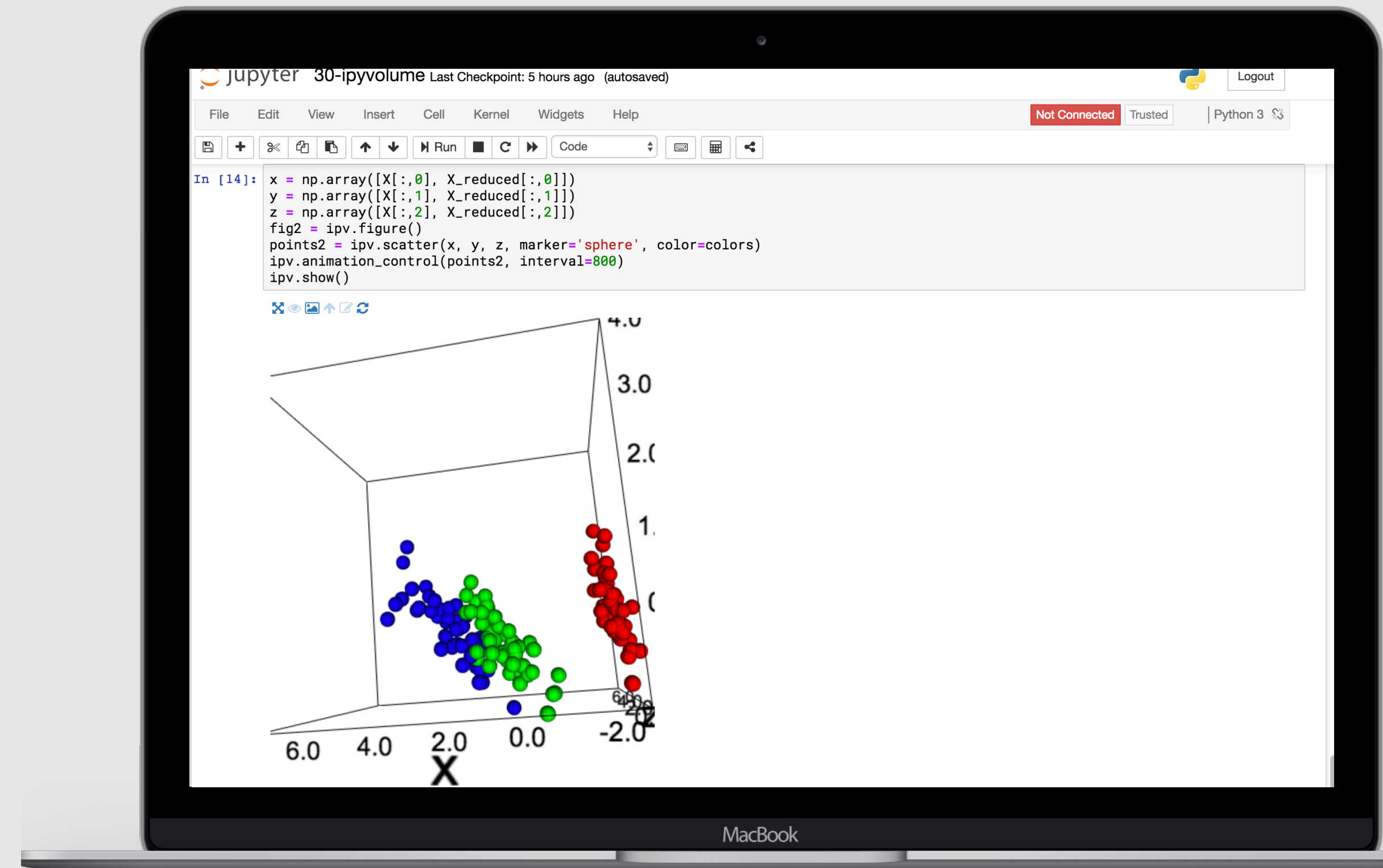
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 - Execute code on a change



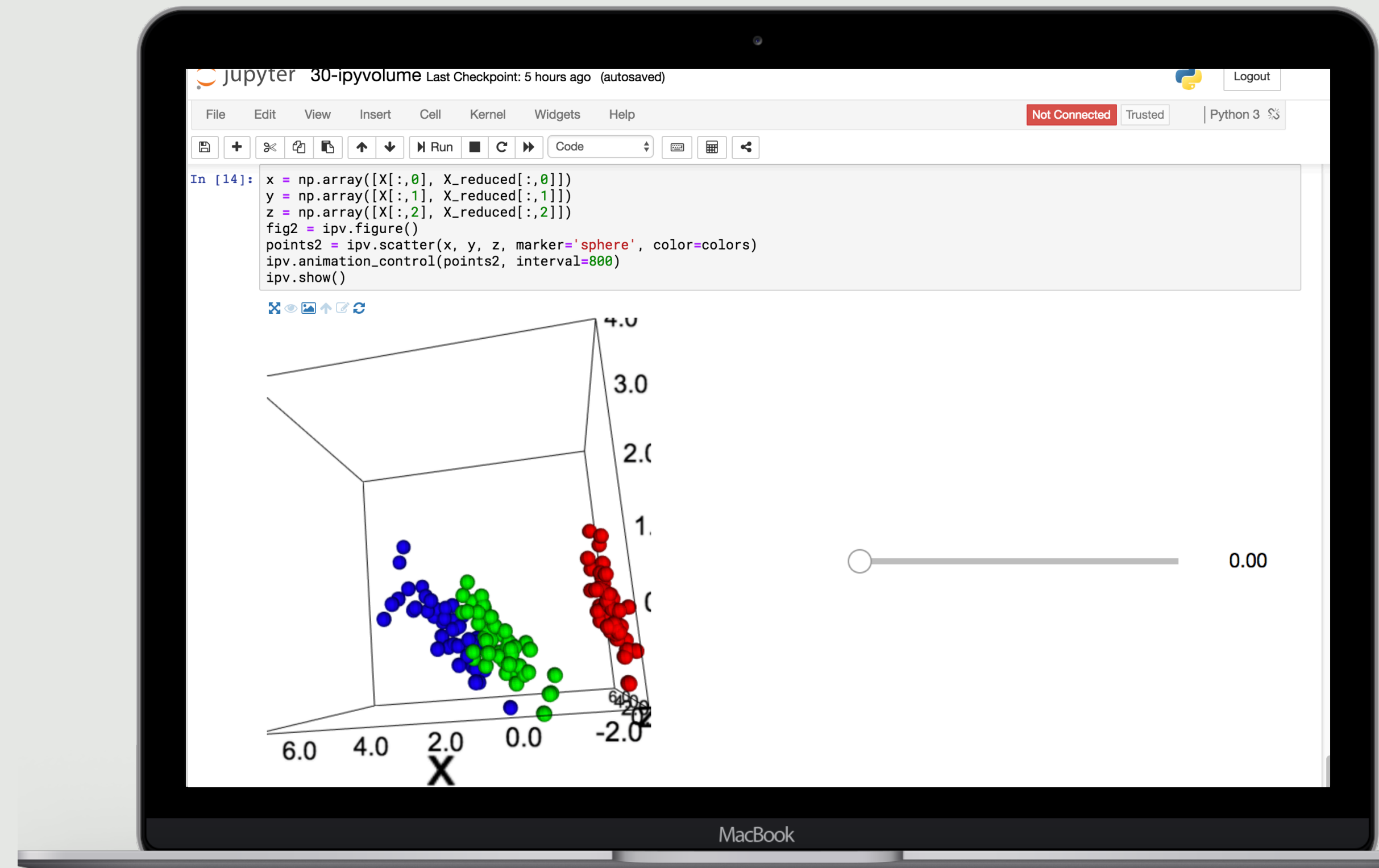
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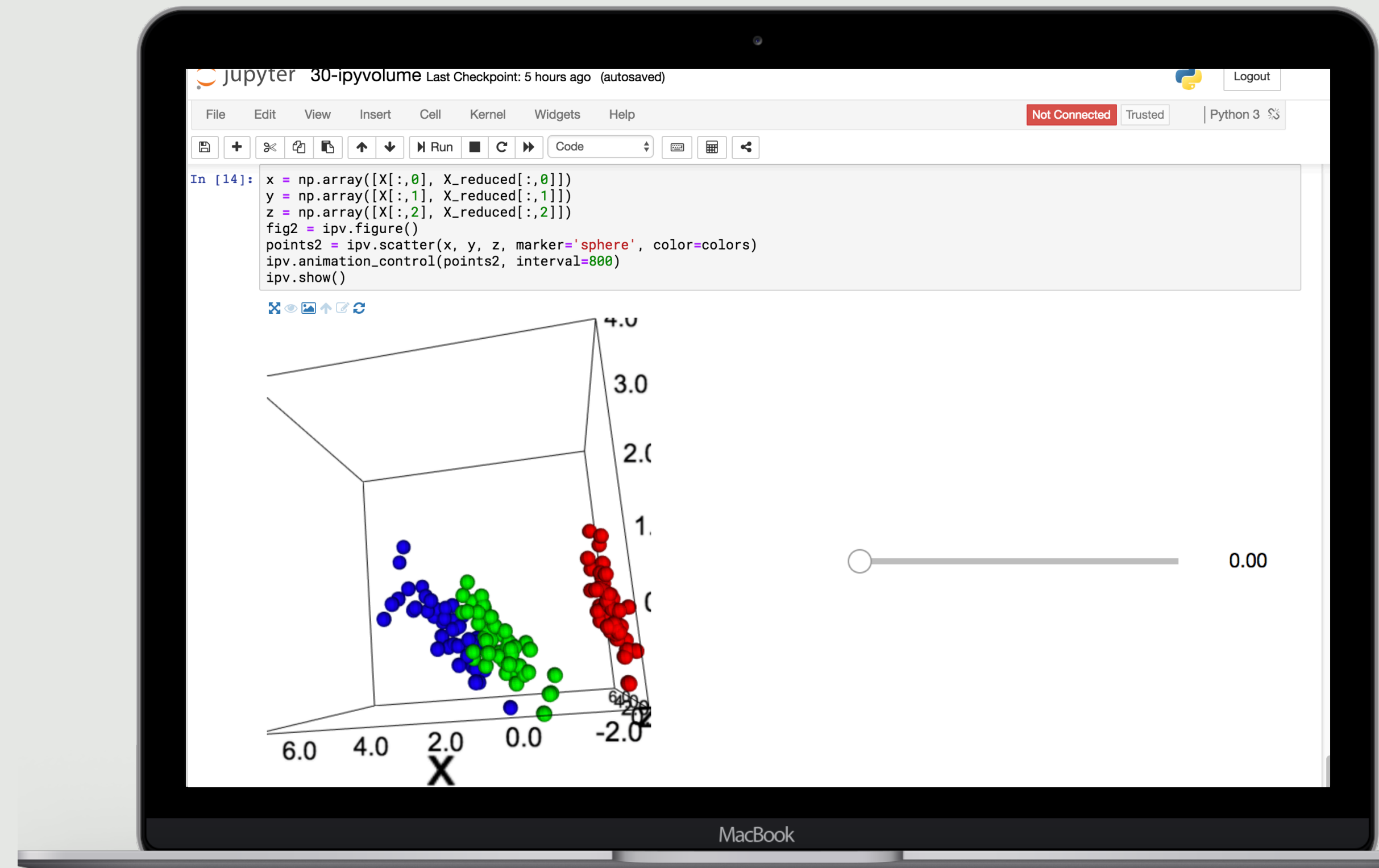
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- Make interactive visualisations
- Create new widgets that work together with all others (avoids duplication)



Why Jupyter widgets?

- Make your code interactive
 - Change properties from code
 - Execute code on a change
- Make interactive visualisations
- Create new widgets that work together with all others (avoids duplication)
- Easy to add to new languages



Less libraries

Python

Basic widgets

ipywidgets

2d plotting

bqplot

3d plotting

ipyvolume

Geo maps

ipyleaflet

Less libraries

	Python	C++
Basic widgets	ipywidgets	xwidgets
2d plotting	bqplot	xplot
3d plotting	ipyvolume	xvolume
Geo maps	ipyleaflet	xleaflet

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	Python	C++	Clojure
Basic widgets	ipywidgets	xwidgets	beakerx
2d plotting	bqplot	xplot	—
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Demo time:
“Never do a live demo”
-Many people

Library scaling

Libraries

- ipywidgets (*jupyter widgets*)
 - ipyvolum (*ipyvolume*)
 - pythreejs (*jupyter-threejs*)
 - ipyleaflet (*jupyter-leaflet*)
 - ipysheet (*jupyter-sheet*)
 - bqplot (*bqplot*)
 - ipywebrtc (*jupyter-webrtc*)
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Languages

- Python
- JVM
 - Java
 - Scala
 - Clojure
 - Kotlin
 - Groovy
- C++
- R?



Library scaling

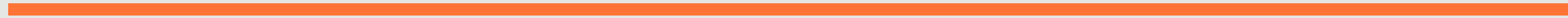
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#Jupyter widgets features >> \sum_i #Library features i

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More information

- Medium: 'Authoring Custom Jupyter Widgets'
 - <https://blog.jupyter.org/authoring-custom-jupyter-widgets-2884a462e724>
 - <https://github.com/jupyter-widgets/>
 - <https://github.com/jupyter-widgets/ipywidgets/>
 - <https://ipywidgets.readthedocs.io/>
 - <https://gitter.im/jupyter-widgets/Lobby>
 - <https://github.com/jupyter-widgets/widget-cookiecutter>
 - <https://github.com/jupyter-widgets/widget-ts-cookiecutter>
 - <https://github.com/vidartf/widget-gen>
-
- source: github.com/maartenbreddels/joyofcoding2018
 - binder: joy.maartenbreddels.com
-

THANKS!

ANY QUESTIONS?

You can find me at



@maartenbreddels



maartenbreddels@gmail.com



github.com/maartenbreddels



www.maartenbreddels.com

demo: joy.maartenbreddels.com

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