



JupyterLab:
Building Blocks for Interactive
Computing

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Outline

- Motivation for JupyterLab
- Beta release series and more
- Demo with binder
- Extensions
- How to contribute to JupyterLab



Motivation for JupyterLab



Building
blocks for
interactive
computing

File Browser

Notebooks

Terminal

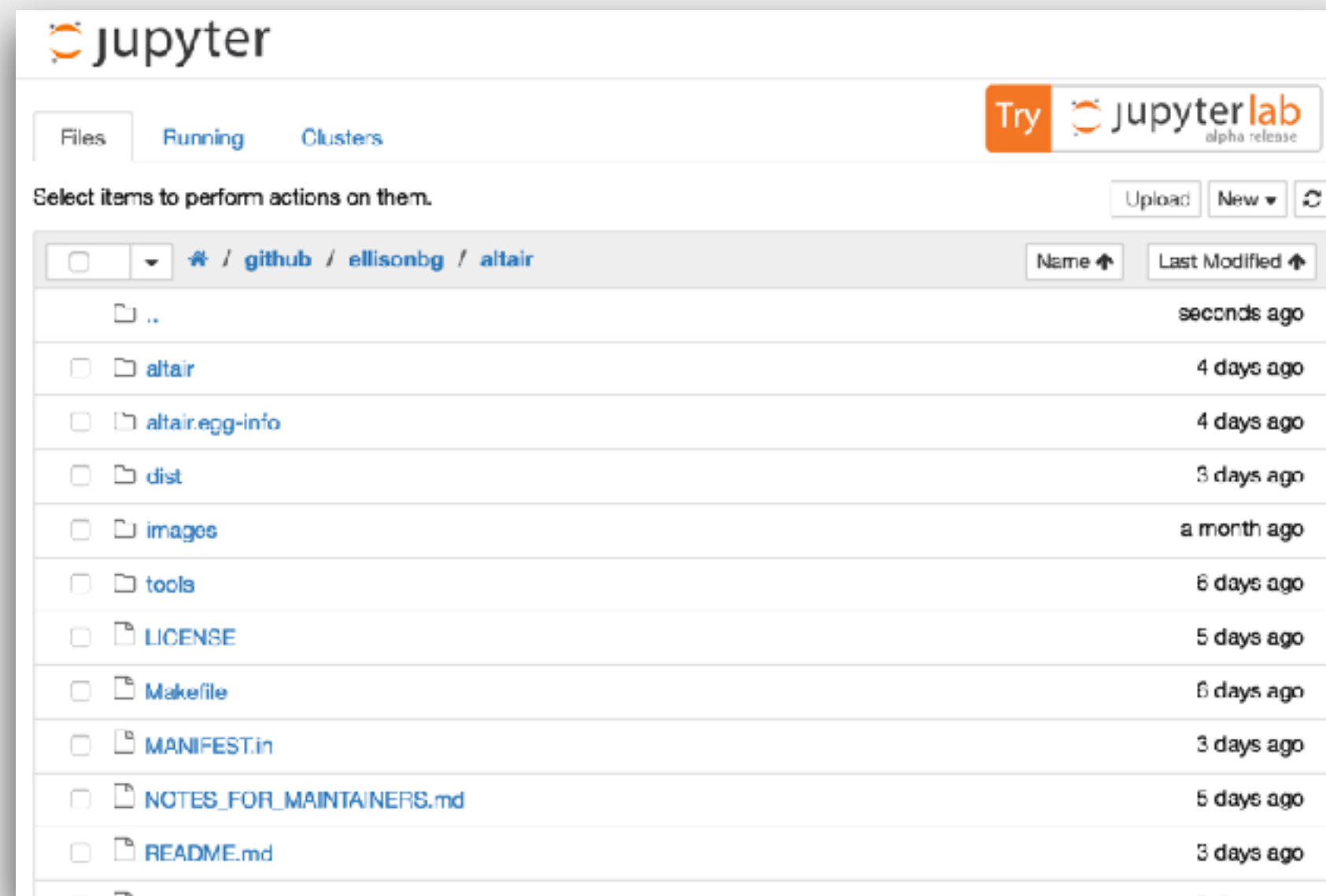
Text Editor

Kernel

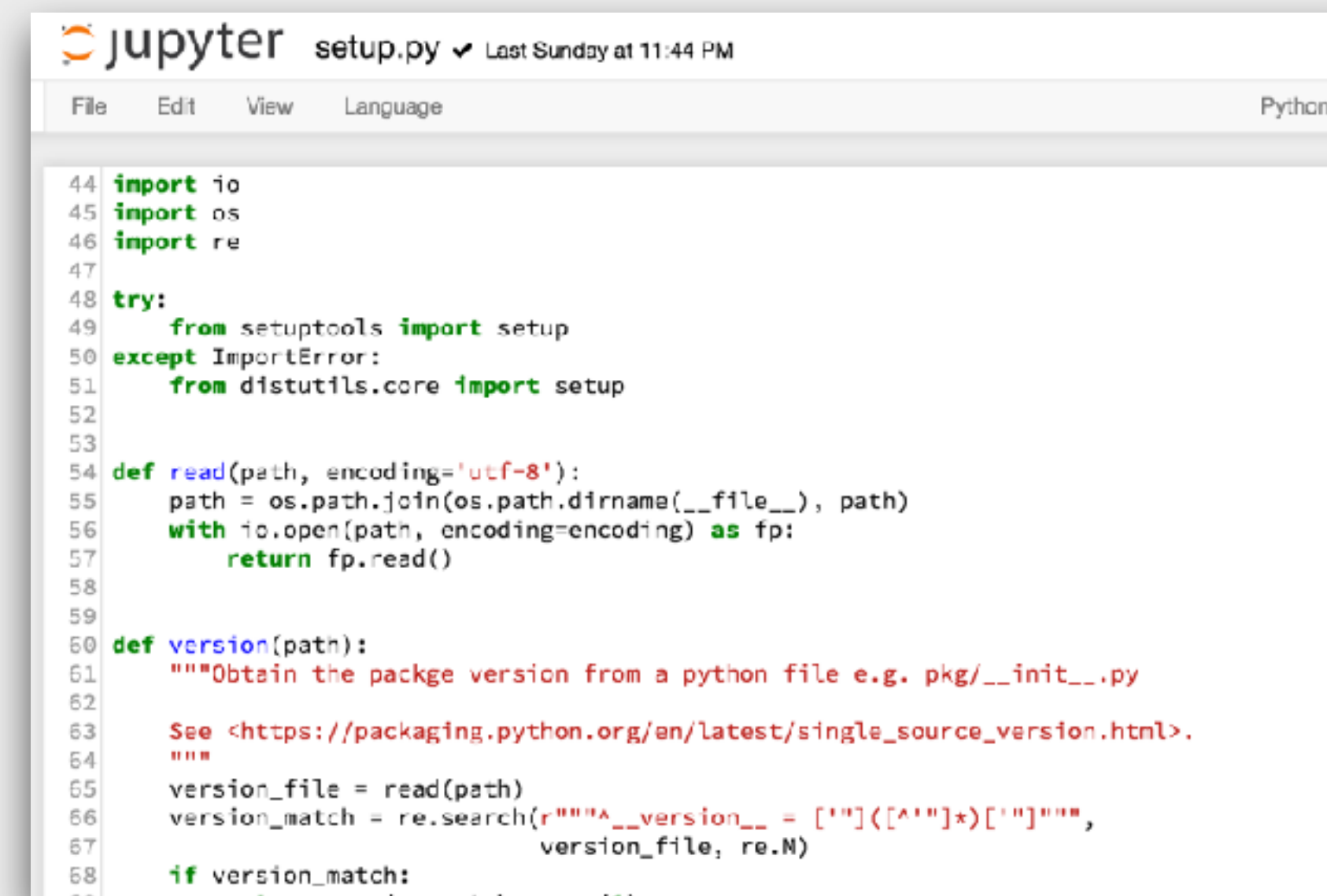
Output



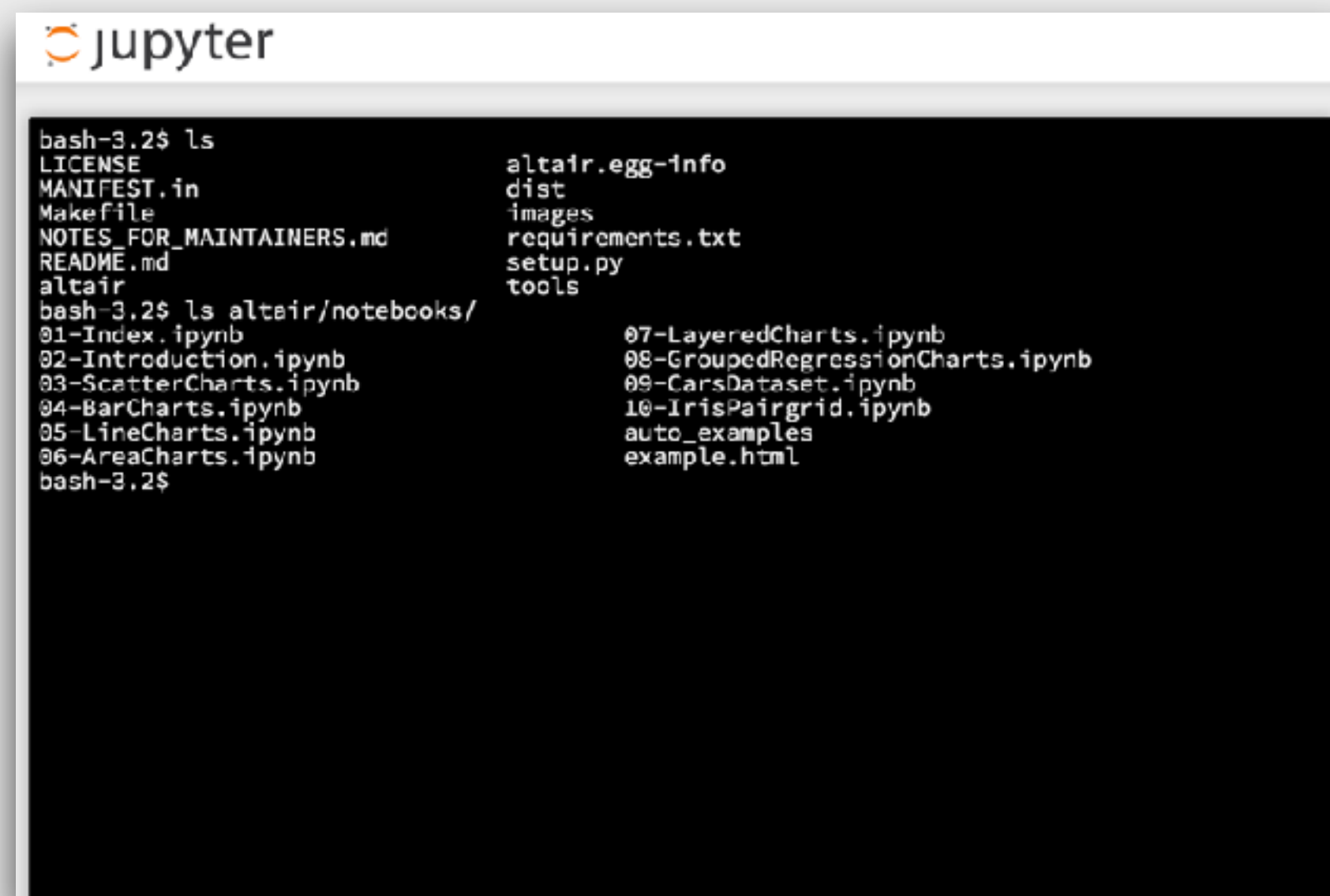
Separated Blocks in the Classic Jupyter



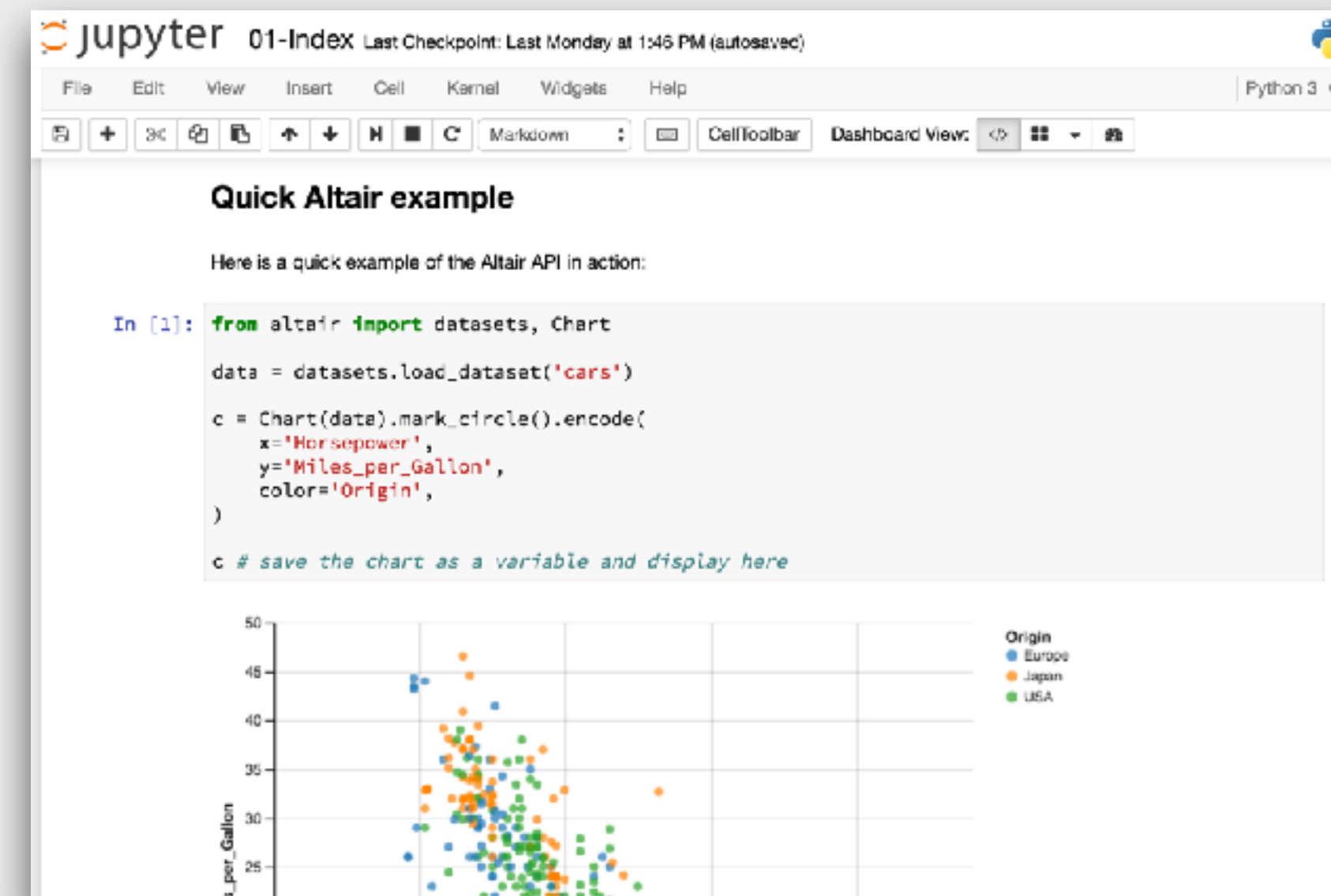
The screenshot shows the Jupyter file browser interface. At the top, there are tabs for 'Files', 'Running', and 'Clusters'. Below the tabs, there's a search bar and a 'Try JupyterLab' button. The main area displays a file tree for the path '/github/ellisonbg/altair'. The files and folders listed are: '..', altair, altair.egg-info, dist, images, tools, LICENSE, Makefile, MANIFEST.in, NOTES_FOR_MAINTAINERS.md, and README.md. Each item has a checkbox and a 'Last Modified' timestamp.



```
44 import io
45 import os
46 import re
47
48 try:
49     from setuptools import setup
50 except ImportError:
51     from distutils.core import setup
52
53
54 def read(path, encoding='utf-8'):
55     path = os.path.join(os.path.dirname(__file__), path)
56     with io.open(path, encoding=encoding) as fp:
57         return fp.read()
58
59
60 def version(path):
61     """Obtain the package version from a python file e.g. pkg/__init__.py
62
63     See <https://packaging.python.org/en/latest/single_source_version.html>.
64     """
65     version_file = read(path)
66     version_match = re.search(r'"""__version__ = ["']([0-9.]+)"""',
67                               version_file, re.M)
68     if version_match:
```



```
bash-3.2$ ls
LICENSE
MANIFEST.in
Makefile
NOTES_FOR_MAINTAINERS.md
README.md
altair
bash-3.2$ ls altair/notebooks/
01-Index.ipynb
02-Introduction.ipynb
03-ScatterCharts.ipynb
04-BarCharts.ipynb
05-LineCharts.ipynb
06-AreaCharts.ipynb
07-LayeredCharts.ipynb
08-GroupedRegressionCharts.ipynb
09-CarsDataset.ipynb
10-IrisPairgrid.ipynb
auto_examples
example.html
altair.egg-info
dist
images
requirements.txt
setup.py
tools
```



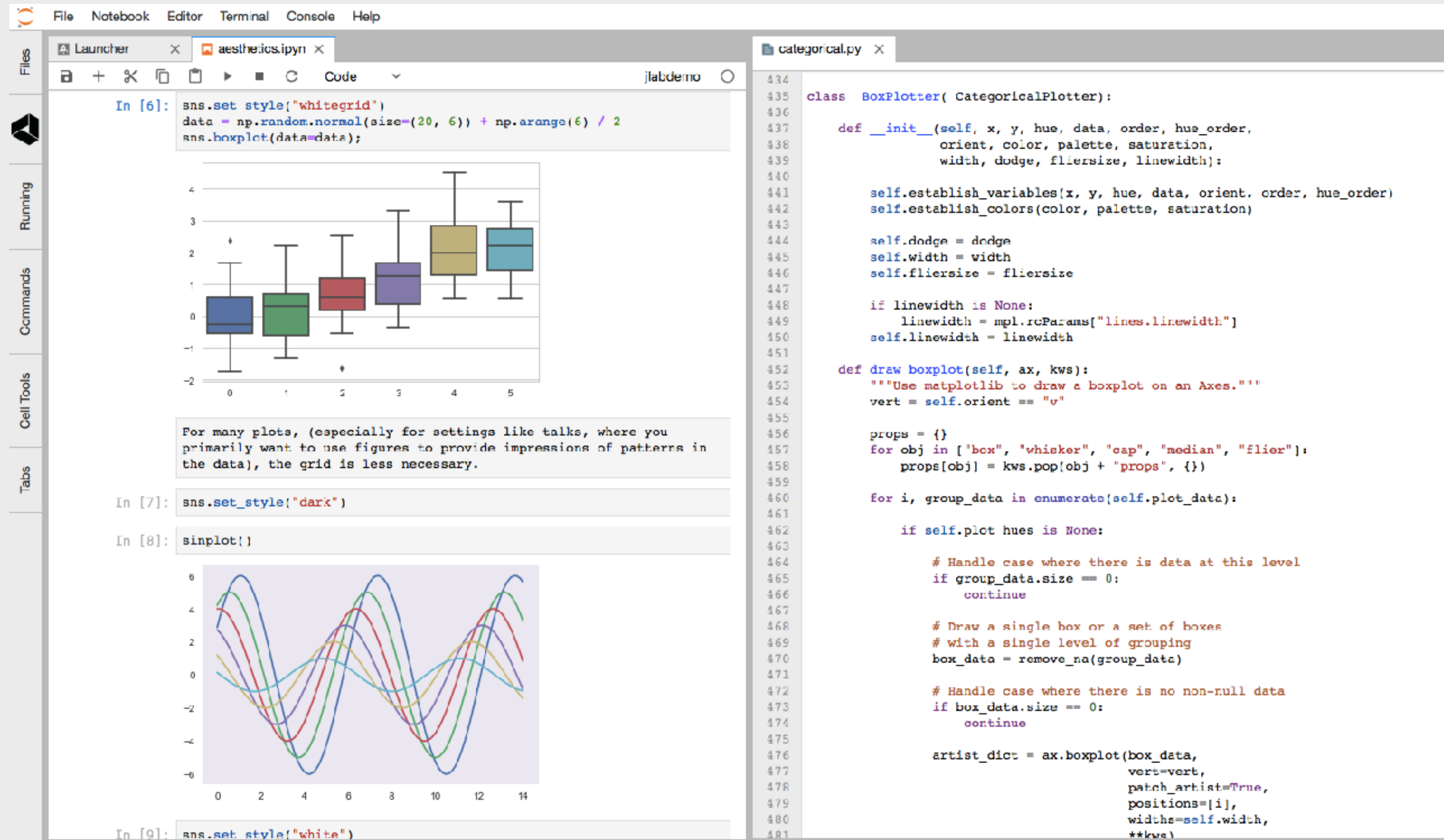
The screenshot shows a Jupyter notebook titled '01-Index'. The code cell contains the following Python code:

```
In [1]: from altair import datasets, Chart
data = datasets.load_dataset('cars')
c = Chart(data).mark_circle().encode(
    x='Horsepower',
    y='Miles_per_Gallon',
    color='Origin',
)
c # save the chart as a variable and display here
```

Below the code cell, a scatter plot is displayed. The x-axis is labeled 'Horsepower' and ranges from 25 to 50. The y-axis is labeled 'Miles per Gallon' and ranges from 25 to 50. The plot shows a negative correlation between horsepower and miles per gallon. The data points are colored by 'Origin', with a legend on the right showing: Europe (blue), Japan (orange), and USA (green).



Integrated in JupyterLab



The image shows a JupyterLab interface with two main components: a notebook editor on the left and a file editor on the right.

Notebook Editor (aesthetics.ipyn):

- In [6]:** `sns.set_style("whitegrid")`
`data = np.random.normal(size=(20, 6)) + np.arange(6) / 2`
`sns.boxplot(data=data)`
- Plot:** A boxplot with six groups (0-5) on the x-axis. The y-axis ranges from -2 to 4. Each group has a different color and a white grid background.
- Text:** "For many plots, (especially for settings like talks, where you primarily want to use figures to provide impressions of patterns in the data), the grid is less necessary."
- In [7]:** `sns.set_style("dark")`
- In [8]:** `sinplot()`
- Plot:** A sine wave plot with six overlapping lines of different colors (blue, green, red, yellow, cyan, magenta) on a dark background. The x-axis ranges from 0 to 14, and the y-axis ranges from -6 to 6.
- In [9]:** `sns.set_style("white")`

File Editor (categorical.py):

```
434
435 class BoxPlotter( CategoricalPlotter):
436
437     def __init__(self, x, y, hue, data, order, hue_order,
438                 orient, color, palette, saturation,
439                 width, dodge, fliersize, linewidth):
440
441         self.establish_variables(x, y, hue, data, orient, order, hue_order)
442         self.establish_colors(color, palette, saturation)
443
444         self.dodge = dodge
445         self.width = width
446         self.fliersize = fliersize
447
448         if linewidth is None:
449             linewidth = mpl.rcParams["lines.linewidth"]
450         self.linewidth = linewidth
451
452     def draw_boxplot(self, ax, kws):
453         """Use matplotlib to draw a boxplot on an Axes."""
454         vert = self.orient == "v"
455
456         props = {}
457         for obj in ["box", "whisker", "cap", "median", "flier"]:
458             props[obj] = kws.pop(obj + "props", {})
459
460         for i, group_data in enumerate(self.plot_data):
461
462             if self.plot_hues is None:
463
464                 # Handle case where there is data at this level
465                 if group_data.size == 0:
466                     continue
467
468                 # Draw a single box or a set of boxes
469                 # with a single level of grouping
470                 box_data = remove_na(group_data)
471
472                 # Handle case where there is no non-null data
473                 if box_data.size == 0:
474                     continue
475
476                 artist_dict = ax.boxplot(box_data,
477                                         vert=vert,
478                                         patch_artist=True,
479                                         positions=[i],
480                                         widths=self.width,
481                                         **kws)
```



JupyterLab

- Work with building blocks in a flexible and integrated manner
- Modern JavaScript development with npm packaging, Typescript, and our new library phosphor.js
- Separation of model/view, public/private APIs
- Fully extensible



Beta Series and More



Beta Series

- <https://github.com/jupyterlab>
- Ready for everyday use! 🎉
- More than 3 years of development
- 100 contributors
- ~50 components
- 2,000 releases (npm+python)



Beta Series

- The API to extend JupyterLab continues to evolve
- jupyterlab.readthedocs.io
- Comments on GitHub issues are appreciated



v. 1.0

- Expected in 2018
- Will stabilize the extension API
- We will retire the classic notebook



Demo with Binder



Extensions



REPOSITORIES 18

Language: All ▾

Sort: Best match ▾

jupyter-widgets / ipywidgets

★ 806

IPython widgets for the Jupyter Notebook

jupyterlab-extension

● TypeScript Updated 14 hours ago 35 issues need help

jupyterlab / jupyterlab-google-drive

★ 91

Realtime collaboration for JupyterLab using Google Drive

jupyterlab

google-drive

realtime-collaboration

jupyterlab-extension

● TypeScript Updated 8 days ago

jupyterlab / jupyter-renderers

★ 42

Renderers and renderer extensions for JupyterLab

jupyterlab

plotly

geojson

katex

fasta

vega

vega-lite

jupyterlab-extension

● Jupyter Notebook Updated 2 days ago

jupyterlab-extension

Related topics

See more topics

jupyterlab

```
jupyter labextension install @jupyterlab/fasta-extension@0.14 --no-build &&
```

```
jupyter labextension install @jupyterlab/geojson-extension@0.14 --no-build &&
```

```
jupyter labextension install @jupyterlab/google-drive@0.11 --no-build &&
```

```
jupyter labextension install @jupyterlab/plotly-extension@0.14 --no-build &&
```

```
jupyter labextension install @jupyter-widgets/jupyterlab-manager@0.33 --no-build &&
```

```
jupyter labextension install bqplot@0.3 --no-build &&
```

Extension Developer Guide

ⓘ Warning

The extension developer API is not stable and will evolve in JupyterLab beta releases. The extension developer API will be stable in JupyterLab 1.0.

JupyterLab can be extended in three ways via:

- **application plugins (top level):** Application plugins extend the functionality of JupyterLab itself.
- **mime renderer extension (top level):** Mime Renderer extensions are a convenience for creating an extension that can render mime data and potentially render files of a given type.
- **document widget extensions (lower level):** Document widget extensions extend the functionality of document widgets added to the application, and we cover them in [Documents](#).

See [Let's Make an xkcd JupyterLab Extension](#) to learn how to make a simple JupyterLab extension.

JupyterLab Alpha Preview Peter

localhost:8889/lab

File Notebook Editor Terminal Console Help

Files: kc



Running: TUTORIAL, Random xkcd, HELP

Commands: Markdown Reference, Notebook Reference, NOTEBOOK OPERATIONS, Restart Kernel & Clear Outputs, Change Kernel, Clear All Outputs, Close and Shutdown, Create Console for Notebook, Reconnect To Kernel, Enter Command Mode (^ M), Run All Cells, Export To Executable Script, Export To ReStructured Text

NOTEBOOK CELL OPERATIONS: Change to Markdown Cell Type (M), Change to Code Cell Type (Y), Change to Heading 1, Change to Heading 2, Change to Heading 3

xkcd.com

WITH THE COLLAPSE OF THE DOLLAR, THE GOVERNMENT HAS ENDORSED AN ALTERNATE CURRENCY. YOUR MONETARY WORTH IS NOW DETERMINED BY THE NUMBER OF FUNNY PICTURES SAVED TO YOUR HARD DRIVE.



I HAVE BEEN PREPARING FOR THIS MOMENT MY WHOLE LIFE.

(CC) BY-NC

We mark issues that are contributor-friendly

jupyterlab / jupyterlab

Unwatch 222 Star 3,379 Fork 438

Code Issues 475 Pull requests 20 Projects 1 Wiki Insights Settings

Label issues and pull requests for new contributors [Dismiss](#)

Now, GitHub will help potential first-time contributors discover issues labeled with **help wanted** or **good first issue**

Filters is:issue is:open label:"good first issue" Labels Milestones [New issue](#)

Clear current search query, filters, and sorts

<input type="checkbox"/>	6 Open ✓ 3 Closed	Author	Labels	Projects	Milestones	Assignee	Sort
<input type="checkbox"/>	Understand audio and video formats the browser can handle good first issue						
	#3860 opened 5 days ago by jasongrout 1.0						
<input type="checkbox"/>	Add "Copy Path" to context menu good first issue pkg:docmanager						4
	#3845 opened 9 days ago by dhirschfeld Future						
<input type="checkbox"/>	Add an "open with" submenu for folders in the file browser context menu. good first issue						2
	pkg:filebrowser type:Enhancement						
	#3775 opened 16 days ago by afshin 1.0						
<input type="checkbox"/>	Error opening a CSV file with single quote in first line good first issue help wanted pkg:csvviewer						5
	type:Bug						
	#3189 opened on Nov 5, 2017 by AbdealJK 1.0						



Contact

- <https://github.com/jupyterlab/jupyterlab>
- <https://gitter.im/jupyterlab/jupyterlab>
- <https://github.com/jupyter/help>
- <https://www.jupyter.org>

