

```
import numpy as np
import pandas as pd
import seaborn as sns
```

Чтобы изменить содержимое ячейки, дважды нажмите на нее (или выберите "Ввод")

```
!pip install arch
```

```
Collecting arch
  Downloading arch-6.2.0-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (981 kB)
    981.7/981.7 kB
Requirement already satisfied: numpy>=1.19 in /usr/local/lib/python3.10/dist-packages (from arch)
Requirement already satisfied: scipy>=1.5 in /usr/local/lib/python3.10/dist-packages (from arch)
Requirement already satisfied: pandas>=1.1 in /usr/local/lib/python3.10/dist-packages (from arch)
Requirement already satisfied: statsmodels>=0.12 in /usr/local/lib/python3.10/dist-packages (from arch)
Requirement already satisfied: python-dateutil>=2.8.1 in /usr/local/lib/python3.10/dist-packages (from arch)
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.10/dist-packages (from arch)
Requirement already satisfied: patsy>=0.5.2 in /usr/local/lib/python3.10/dist-packages (from arch)
Requirement already satisfied: packaging>=21.3 in /usr/local/lib/python3.10/dist-packages (from arch)
Requirement already satisfied: six in /usr/local/lib/python3.10/dist-packages (from patsy>=0.5.2 in /usr/local/lib/python3.10/dist-packages (from arch))
Installing collected packages: arch
Successfully installed arch-6.2.0
```

```
from arch.bootstrap import IIDBootstrap, IndependentSamplesBootstrap
```

```
rng = np.random.default_rng(360)
x = rng.normal(loc=19000, scale=200, size=20)
```

```
x
array([19182.60668341, 18978.26046202, 18935.38641039, 18984.63468303,
       18760.6083078 , 18976.72323565, 19013.80826521, 18920.19406795,
       18978.26809612, 19037.18690531, 18852.23287174, 19216.10863405,
       18972.06574251, 18746.62722648, 19082.33017382, 19275.30443047,
       18786.06153928, 18957.00149686, 18808.06410797, 19103.87194918])
```

```
np.mean(x)

18978.367264463264
```

```
mu_hat = np.mean(x)
mu_hat

18978.367264463264
```

```
x_star1 = rng.choice(x, size=len(x))
```

```
x_star1
array([19013.80826521, 19103.87194918, 19216.10863405, 19103.87194918,
       18984.63468303, 18978.26809612, 19216.10863405, 18808.06410797,
       19275.30443047, 19182.60668341, 19216.10863405, 18957.00149686,
       18976.72323565, 18808.06410797, 19037.18690531, 18920.19406795,
       19216.10863405, 18935.38641039, 19037.18690531, 18957.00149686])
```

```
x_star2 = rng.choice(x, size=len(x))
np.mean(x_star2)
```

```
19030.167087785354
```

```
x_star2
```

Примечания к вычислениям

Please follow our [blog](#) to see more information about new features, tips and tricks, and featured notebooks such as [Analyzing a Bank Failure with Colab](#).

2023-10-23

- Updated the **Open notebook** dialog for better usability and support for smaller screen sizes
- Added smart paste support for data from Google Sheets for R notebooks
- Enabled showing release notes in a tab
- Launched AI coding features for Pro/Pro+ users in Australia ☐ Canada ☐ India ☐ and Japan ☐ ([tweet](#))
- Python package upgrades
 - earthengine-api 0.1.357 -> 0.1.375
 - flax 0.7.2 -> 0.7.4
 - geemap 0.27.4 -> 0.28.2
 - jax 0.4.14 -> 0.4.16
 - jaxlib 0.4.14 -> 0.4.16
 - keras 2.13.1 -> 2.14.0
 - tensorflow 2.13.0 -> 2.14.1
 - tensorflow 2.13.0 -> 2.14.0
 - tensorflow-gcs-config 2.13.0 -> 2.14.0
 - tensorflow-hub 0.14.0 -> 0.15.0
 - tensorflow-probability 0.20.1 -> 0.22.0
 - torch 2.0.1 -> 2.0.1

```
array([19216.10863405, 19275.30443047, 19082.33017382, 18957.00149686,
       18957.00149686, 18852.23287174, 18786.06153928, 18984.63468303,
       18935.38641039, 19216.10863405, 18978.26809612, 19013.80826521,
       19182.60668341, 18978.26046202, 19275.30443047, 18976.72323565,
       18972.06574251, 18972.06574251, 19013.80826521, 18978.26046202])
```

```
n_boot = 1000
```

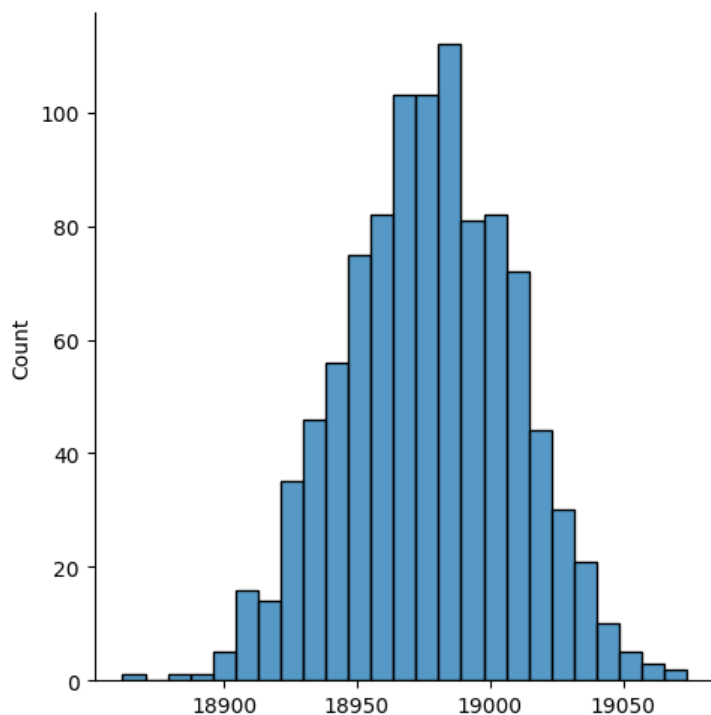
```
mu_hat_star = [np.mean(rng.choice(x, size=len(x))) for i in range(n_boot)]
```

```
mu_hat_star[1:10]
```

```
[18974.950721752954,
 18974.894899184383,
 18965.5421749239,
 19004.354126258553,
 18977.106018264112,
 18974.774707725483,
 18975.89794149038,
 19030.123423082077,
 19014.268823764534]
```

```
sns.displot(x=np.array(mu_hat_star))
```

```
<seaborn.axisgrid.FacetGrid at 0x7909a7b801c0>
```



```
[np.quantile(mu_hat_star, 0.025), np.quantile(mu_hat_star, 0.975)]
```

```
[18914.09557274508, 19036.68005360697]
```

Чтобы изменить содержимое ячейки, дважды нажмите на нее (или выберите "Ввод")

Чтобы изменить содержимое ячейки, дважды нажмите на нее (или выберите "Ввод")

- 2.1.0
- torchaudio 2.0.2 -> 2.1.0
- torchtext 0.15.2 -> 0.16.0
- torchvision 0.15.2 -> 0.16.0
- xgboost 1.7.6 -> 2.0.0
- Python package inclusions
 - bigframes 0.10.0
 - malloy 2023.105

2023-09-22

- Added the ability to scope an AI generated suggestion to a specific Pandas dataframe ([tweet](#))
- Added Colab link previews to Docs ([tweet](#))
- Added smart paste support for data from Google Sheets
- Increased font size of dropdowns in interactive forms
- Improved rendering of the notebook when printing
- Python package upgrades
 - tensorflow 2.12.0 -> 2.13.0
 - tensorflow 2.12.3 -> 2.13.0
 - keras 2.12.0 -> 2.13.1
 - tensorflow-gcs-config 2.12.0 -> 2.13.
 - scipy 1.10.1 -> 1.11.2
 - cython 0.29.6 -> 3.0.2
- Python package inclusions
 - geopandas 0.26.0

2023-08-18

- Added "Change runtime type" to the menu in the

- connection button
- Improved auto-reconnection to an already running notebook ([#3764](#))
- Increased the specs of our highmem machines for Pro users
- Fixed add-apt-repository command on Ubuntu 22.04 runtime ([#3867](#))
- Python package upgrades
 - bokeh 2.4.3 -> 3.2.2
 - cmake 3.25.2 -> 3.27.2
 - cryptogra 3.4.8 -> 41.0.3
 - dask 2022.12.1 -> 2023.8.0
 - distribute 2022.12.1 -> 2023.8.0
 - earthengi api 0.1.358 -> 0.1.364
 - flax 0.7.0 -> 0.7.2
 - ipython-sql 0.4.0 -> 0.5.0
 - jax 0.4.13 -> 0.4.14
 - jaxlib 0.4.13 -> 0.4.14
 - lightgbm 3.3.5 -> 4.0.0
 - mkl 2019.0 -> 2023.2.0
 - notebook 6.4.8 -> 6.5.5
 - numpy 1.22.4 -> 1.23.5
 - opencv-python 4.7.0.72 -> 4.8.0.76
 - pillow 8.4.0 -> 9.4.0
 - plotly 5.13.1 -> 5.15.0
 - prettytabl 0.7.2 -> 3.8.0
 - pytensor 2.10.1 ->

- 2.14.2
 - spacy 3.5.4 -> 3.6.1
 - statsmod 0.13.5 -> 0.14.0
 - xarray 2022.12.0 -> 2023.7.0
- Python package inclusions
 - PyDrive2 1.6.3

2023-07-21

- Launched auto-plotting for dataframes, available using the chart button that shows up alongside datatables ([post](#))



- Added a menu to the table of contents to support running a section or collapsing/expanding sections ([post](#))

Table of contents

Making the Most of Your Subscription

{x}

Faster GPUs

More memory

Longer runtime

Relaxing resource constraints

Pro

Send us feedback

- Added an option to automatically run the first cell or section, available under Edit -> Notebook settings ([post](#))

Notebook settings

Runtime type

Python 3

Hardware accelerator

None

☒ Automatically run the first cell

☐ Omit code cell output when idle

- Launched Pro/Pro+ to Algeria, Argentina, Chile, Ecuador, Egypt, Ghana, Kenya, Malaysia, Nepal, Nigeria, Peru, Rwanda, Saudi Arabia, South Africa, Sri Lanka, Tunisia,

and Ukraine
([tweet](#))

- Added a command, "Toggle tab moves focus" for toggling tab trapping in the editor (Tools -> Command palette, "Toggle tab moves focus")
- Fixed issue where `files.upload()` was sometimes returning an incorrect filename ([#1550](#))
- Fixed f-string syntax highlighting bug ([#3802](#))
- Disabled ambiguous characters highlighting for commonly used LaTeX characters ([#3648](#))
- Upgraded Ubuntu from 20.04 LTS to [22.04 LTS](#)
- Updated the Colab Marketplace VM image
- Python package upgrades:
 - autograd 1.6.1 -> 1.6.2
 - drivefs 76.0 -> 77.0
 - flax 0.6.11 -> 0.7.0
 - earthengine-api 0.1.357 -> 0.1.358
 - GDAL 3.3.2 -> 3.4.3
 - google-cloud-bigquery-storage 2.20.0 -> 2.22.2
 - gspread-dataframe 3.0.8 -> 3.3.1
 - holidays 0.27.1 -> 0.29
 - jax 0.4.10 -> jax 0.4.13

- jaxlib
0.4.10 ->
jax 0.4.13
- jupyterlab
widgets
3.0.7 ->
3.0.8
- nbformat
5.9.0 ->
5.9.1
- opencv-
python-
headless
4.7.0.72 -
> 4.8.0.74
- pygame
2.4.0 ->
2.5.0
- spacy
3.5.3 ->
3.5.4
- SQLAlchemy
2.0.16 ->
2.0.19
- tabulate
0.8.10 ->
0.9.0
- tensorflow
hub
0.13.0 ->
0.14.0

2023-06-23

- Launched AI coding features to subscribed users starting with Pro+ users in the US ([tweet post](#))
- Added the Kernel Selector in the Notebook Settings ([tweet](#))
- Fixed double space trimming issue in markdown [#3766](#)
- Fixed run button indicator not always centered [#3609](#)
- Fixed inconsistencies for automatic indentation on multi-line [#3697](#)
- Upgraded Python from 3.10.11 to 3.10.12
- Python package updates:
 - duckdb
0.7.1 ->
0.8.1
 - earthengi
api
0.1.350 ->
0.1.357
 - flax 0.6.9
-> 0.6.11
 - google-
cloud-
bigquery
3.9.0 ->
3.10.0

- google-cloud-bigquery-storage 2.19.1 -> 2.20.0
- grpcio 1.54.0 -> 1.56.0
- holidays 0.25 -> 0.27.1
- nbformat 5.8.0 -> 5.9.0
- prophet 1.1.3 -> 1.1.4
- pydata-google-auth 1.7.0 -> 1.8.0
- spacy 3.5.2 -> 3.5.3
- tensorflow 2.12.2 -> 2.12.3
- xgboost 1.7.5 -> 1.7.6
- Python package inclusions:
 - gcsfs 2023.6.0
 - geopandas 0.13.2
 - google-cloud-bigquery-connectio 1.12.0
 - google-cloud-functions 1.13.0
 - grpc-google-iam-v1 0.12.6
 - multidict 6.0.4
 - tensorflow-data-server 0.7.1

2023-06-02

- Released the new site colab.google
- Published Colab's Docker runtime image to us-docker.pkg.dev/images/public/r [\(tweet, instructions\)](#)
- Launched support for Google children accounts [\(tweet\)](#)
- Launched DagsHub integration [\(tweet, post\)](#)

- Upgraded to Monaco Editor Version 0.37.1
- Fixed various Vim keybinding bugs
- Fixed issue where the N and P letters sometimes couldn't be typed ([#3664](#))
- Fixed rendering support for compositional inputs ([#3660](#), [#3679](#))
- Fixed lag in notebooks with lots of cells ([#3676](#))
- Improved support for R by adding a Runtime type notebook setting (Edit -> Notebook settings)
- Improved documentation for connecting to a local runtime (Connect -> Connect to a local runtime)
- Python package updates:
 - holidays 0.23 -> 0.25
 - jax 0.4.8 -> 0.4.10
 - jaxlib 0.4.8 -> 0.4.10
 - pip 23.0.1 -> 23.1.2
 - tensorflow-probability 0.19.0 -> 0.20.1
 - torch 2.0.0 -> 2.0.1
 - torchaudio 2.0.1 -> 2.0.2
 - torchdata 0.6.0 -> 0.6.1
 - torchtext 0.15.1 -> 0.15.2
 - torchvision 0.15.1 -> 0.15.2
 - tornado 6.2 -> 6.3.1

2023-05-05

- Released GPU type selection for paid users, allowing them to choose a

preferred NVidia
GPU

- Upgraded R
from 4.2.3 to
4.3.0
- Upgraded
Python from
3.9.16 to
3.10.11
- Python package
updates:
 - attrs
22.2.0 ->
attrs
23.1.0
 - earthengi
api
0.1.349 ->
earthengi
api
0.1.350
 - flax 0.6.8
-> 0.6.9
 - grpcio
1.53.0 ->
1.54.0
 - nbclient
0.7.3 ->
0.7.4
 - tensorflow
datasets
4.8.3 ->
4.9.2
 - termcolor
2.2.0 ->
2.3.0
 - zict 2.2.0
-> 3.0.0

2023-04-14

- Python package
updates:
 - google-
api-
python-
client
2.70.0 ->
2.84.0
 - google-
auth-
oauthlib
0.4.6 ->
1.0.0
 - google-
cloud-
bigquery
3.4.2 ->
3.9.0
 - google-
cloud-
datastore
2.11.1 ->
2.15.1
 - google-
cloud-
firestore
2.7.3 ->
2.11.0
 - google-
cloud-
language
2.6.1 ->
2.9.1
 - google-
cloud-
storage

```

2.7.0 ->
2.8.0
◦ google-
cloud-
translate
3.8.4 ->
3.11.1
◦ networkx
3.0 -> 3.1
◦ notebook
6.3.0 ->
6.4.8
◦ jax 0.4.7 -
> 0.4.8
◦ pandas
1.4.4 ->
1.5.3
◦ spacy
3.5.1 ->
3.5.2
◦ SQLAlchemy
1.4.47 ->
2.0.9
◦ xgboost
1.7.4 ->
1.7.5

```

2023-03-31

- Improve bash !
syntax
highlighting
([GitHub issue](#))
- Fix bug where
VIM keybindings
weren't working
in the file editor
- Upgraded R
from 4.2.2 to
4.2.3
- Python package
updates:
 - arviz
0.12.1 -->
0.15.1
 - astropy
4.3.1 -->
5.2.2
 - dopamine
rl 1.0.5 -->
4.0.6
 - gensim
3.6.0 -->
4.3.1
 - ipykernel
5.3.4 ->
5.5.6
 - ipython
7.9.0 ->
7.34.0
 - jax 0.4.4 -
> 0.4.7
 - jaxlib
0.4.4 ->
0.4.7
 - jupyter_co
5.2.0 ->
5.3.0
 - keras
2.11.0 ->
2.12.0
 - lightgbm
2.2.3 ->
3.3.5
 - matplotlib
3.5.3 ->
3.7.1
 - nltk 3.7 ->
3.8.1

- opencv-python 4.6.0.66 -> 4.7.0.72
- plotly 5.5.0 -> 5.13.1
- pymc 4.1.4 -> 5.1.2
- seaborn 0.11.2 -> 0.12.2
- spacy 3.4.4 -> 3.5.1
- sympy 1.7.1 -> 1.11.1
- tensorbooster 2.11.2 -> 2.12.0
- tensorflow 2.11.0 -> 2.12.0
- tensorflow-estimator 2.11.0 -> 2.12.0
- tensorflow-hub 0.12.0 -> 0.13.0
- torch 1.13.1 -> 2.0.0
- torchaudio 0.13.1 -> 2.0.1
- torchtext 0.14.1 -> 0.15.1
- torchvision 0.14.1 -> 0.15.1

2023-03-10

- Added the [Colab editor shortcuts](#) example notebook
- Fixed triggering of @-mention and email autocomplete for large comments ([GitHub issue](#))
- Added View Resources to the Runtime menu
- Made file viewer images fit the view by default, resizing to original size on click
- When in VIM mode, enable copy as well as allowing propagation to monaco-vim to escape visual mode ([GitHub issue](#))

- Upgraded CUDA 11.6.2 -> 11.8.0 and cuDNN 8.4.0.27 -> 8.7.0.84
- Upgraded Nvidia drivers 525.78.01 -> 530.30.02
- Upgraded Python 3.8.10 -> 3.9.16
- Python package updates:
 - beautifulsoup4 4.6.3 -> 4.9.3
 - bokeh 2.3.3 -> 2.4.3
 - debugpy 1.0.0 -> 1.6.6
 - Flask 1.1.4 -> 2.2.3
 - jax 0.3.25 -> 0.4.4
 - jaxlib 0.3.25 -> 0.4.4
 - Jinja2 2.11.3 -> 3.1.2
 - matplotlib 3.2.2 -> 3.5.3
 - nbconvert 5.6.1 -> 6.5.4
 - pandas 1.3.5 -> 1.4.4
 - pandas-datareader 0.9.0 -> 0.10.0
 - pandas-profiling 1.4.1 -> 3.2.0
 - Pillow 7.1.2 -> 8.4.0
 - plotnine 0.8.0 -> 0.10.1
 - scikit-image 0.18.3 -> 0.19.3
 - scikit-learn 1.0.2 -> 1.2.2
 - scipy 1.7.3 -> 1.10.1
 - setuptools 57.4.0 -> 63.4.3
 - sklearn-pandas 1.8.0 -> 2.2.0
 - statsmodels 0.12.2 -> 0.13.5

- urllib3
1.24.3 ->
1.26.14
- Werkzeug
1.0.1 ->
2.2.3
- wrapt
1.14.1 ->
1.15.0
- xgboost
0.90 ->
1.7.4
- xlrd 1.2.0
-> 2.0.1

2023-02-17

- Show graphs of RAM and disk usage in notebook toolbar
- Copy cell links directly to the clipboard instead of showing a dialog when clicking on the link icon in the cell toolbar
- Updated the [Colab Marketplace VM image](#)
- Upgraded CUDA to 11.6.2 and cuDNN to 8.4.0.27
- Python package updates:
 - tensorflow
2.9.2 ->
2.11.0
 - tensorflow
2.9.1 ->
2.11.2
 - keras
2.9.0 ->
2.11.0
 - tensorflow
estimator
2.9.0 ->
2.11.0
 - tensorflow
probabilit
0.17.0 ->
0.19.0
 - tensorflow
gcs-
config
2.9.0 ->
2.11.0
 - earthengi
api
0.1.339 ->
0.1.341
 - flatbuffer
1.12 ->
23.1.21
 - platformd
2.6.2 ->
3.0.0
 - pydata-
google-
auth 1.6.0
-> 1.7.0
 - python-
utils 3.4.5

- > 3.5.2
- tenacity
 - 8.1.0 ->
 - 8.2.1
- tiffiffle
 - 2023.1.23
 - >
 - 2023.2.3
- notebook
 - 5.7.16 ->
 - 6.3.0
- tornado
 - 6.0.4 ->
 - 6.2
- aiohttp
 - 3.8.3 ->
 - 3.8.4
- charset-normalize
 - 2.1.1 ->
 - 3.0.1
- fastai
 - 2.7.0 ->
 - 2.7.1
- soundfile
 - 0.11.0 ->
 - 0.12.1
- typing-extension
 - 4.4.0 ->
 - 4.5.0
- widgetsnbextension
 - 3.6.1 ->
 - 3.6.2
- pydantic
 - 1.10.4 ->
 - 1.10.5
- zipp
 - 3.12.0 ->
 - 3.13.0
- numpy
 - 1.21.6 ->
 - 1.22.4
- drivefs
 - 66.0 ->
 - 69.0
- gdal 3.0.4
 - > 3.3.2
 - [GitHub issue](#)
- Added libudunits2-dev for smoother R package installs [GitHub issue](#)

2023-02-03

- Improved tooltips for pandas series to show common statistics about the series object
- Made the forms dropdown behave like an autocomplete box when it allows input
- Updated the nvidia driver from 460.32.03 to 510.47.03
- Python package updates:
 - absl-py
 - 1.3.0 ->
 - 1.4.0

- bleach
5.0.1 ->
6.0.0
- cachetool
5.2.1 ->
5.3.0
- cmdstanp
1.0.8 ->
1.1.0
- dnspython
2.2.1 ->
2.3.0
- fsspec
2022.11.0
->
2023.1.0
- google-
cloud-
bigquery-
storage
2.17.0 ->
2.18.1
- holidays
0.18 ->
0.19
- jupyter-
core 5.1.3
-> 5.2.0
- packaging
21.3 ->
23.0
- promethe
client
0.15.0 ->
0.16.0
- pyct 0.4.8
-> 0.5.0
- pydata-
google-
auth 1.5.0
-> 1.6.0
- python-
slugify
7.0.0 ->
8.0.0
- sqlalchemy
1.4.46 ->
2.0.0
- tensorflow
io-gcs-
filesystem
0.29.0 ->
0.30.0
- tiffle
2022.10.1
->
2023.1.23
- zipp
3.11.0 ->
3.12.0
- Pinned
sqlalchemy
to version
1.4.46

2023-01-12

- Added support for @-mention and email autocomplete in comments
- Improved errors when GitHub notebooks can't be loaded
- Increased color contrast for colors used for

syntax
highlighting in
the code editor

- Added terminal
access for
custom GCE VM
runtimes
- Upgraded
Ubuntu from
18.04 LTS to
20.04 LTS
([GitHub issue](#))
- Python package
updates:
 - GDAL
2.2.2 ->
2.2.3.
 - NumPy
from
1.21.5 to
1.21.6.
 - attrs
22.1.0 ->
22.2.0
 - chardet
3.0.4 ->
4.0.0
 - cloudpickle
1.6.0 ->
2.2.0
 - filelock
3.8.2 ->
3.9.0
 - google-
api-core
2.8.2 ->
2.11.0
 - google-
api-
python-
client
1.12.11 ->
2.70.0
 - google-
auth-
httplib2
0.0.3 ->
0.1.0
 - google-
cloud-
bigquery
3.3.5 ->
3.4.1
 - google-
cloud-
datastore
2.9.0 ->
2.11.0
 - google-
cloud-
firestore
2.7.2 ->
2.7.3
 - google-
cloud-
storage
2.5.0 ->
2.7.0
 - holidays
0.17.2 ->
holidays
0.18
 - importlib-
metadata
5.2.0 ->
6.0.0
 - networkx
2.8.8 ->


```

3.0
◦ opencv-
python-
headless
4.6.0.66 -
> 4.7.0.68
◦ pip 21.1.3
-> 22.04
◦ pip-tools
6.2.0 ->
6.6.2
◦ prettytabl
3.5.0 ->
3.6.0
◦ requests
2.23.0 ->
2.25.1
◦ termcolor
2.1.1 ->
2.2.0
◦ torch
1.13.0 ->
1.13.1
◦ torchaudi
0.13.0 ->
0.13.1
◦ torchtext
0.14.0->
0.14.1
◦ torchvision
0.14.0 ->
0.14.1

```

2022-12-06

- Made fallback runtime version available until mid-December ([GitHub issue](#))
- Upgraded to Python 3.8 ([GitHub issue](#))
- Python package updates:
 - jax from 0.3.23 to 0.3.25, jaxlib from 0.3.22 to 0.3.25
 - pyarrow from 6.0.1 to 9.0.0
 - torch from 1.12.1 to 1.13.0
 - torchaudi from 0.12.1 to 0.13.0
 - torchvision from 0.13.1 to 0.14.0
 - torchtext from 0.13.1 to 0.14.0
 - xlrld from 1.1.0 to 1.2.0
 - DriveFS from 62.0.1 to 66.0.3

- Made styling of markdown tables in outputs match markdown tables in text cells
- Improved formatting for empty interactive table rows
- Fixed syntax highlighting for variables with names that contain Python keywords ([GitHub issue](#))

2022-11-11

- Added more dark editor themes for Monaco (when in dark mode, "Editor colorization" appears as an option in the Editor tab of the Tools → Settings dialog)
- Fixed bug where collapsed forms were deleted on mobile ([GitHub issue](#))
- Python package updates:
 - rpy2 from 3.4.0 to 3.5.5 ([GitHub issue](#))
 - notebook from 5.5.0 to 5.7.16
 - tornado from 5.1.1 to 6.0.4
 - tensorflow from 0.16.0 to 0.17.0
 - pandas-gbq from 0.13.3 to 0.17.9
 - protobuf from 3.17.3 to 3.19.6
 - google-api-core[grpc] from 1.31.5 to 2.8.2
 - google-cloud-bigquery from 1.21.0 to 3.3.5

- google-cloud-core from 1.0.1 to 2.3.2
- google-cloud-datastore from 1.8.0 to 2.9.0
- google-cloud-firestore from 1.7.0 to 2.7.2
- google-cloud-language from 1.2.0 to 2.6.1
- google-cloud-storage from 1.18.0 to 2.5.0
- google-cloud-translate from 1.5.0 to 3.8.4

2022-10-21

- Launched a single-click way to get from BigQuery to Colab to further explore query results ([announcement](#))
- Launched [Pro](#), [Pro+](#), and [Pay As You Go](#) to 19 additional countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, Greece, Hungary, Latvia, Lithuania, Norway, Portugal, Romania, Slovakia, Slovenia, and Sweden ([tweet](#))
- Updated jax from 0.3.17 to 0.3.23, jaxlib from 0.3.15 to 0.3.22, TensorFlow from 2.8.2 to 2.9.2, CUDA from 11.1 to 11.2, and cuDNN from 8.0

to 8.1 ([backend-info](#))

- Added a readonly option to [drive.mount](#)
- Fixed bug where Xarray was not working ([GitHub issue](#))
- Modified Markdown parsing to ignore block quote symbol within MathJax ([GitHub issue](#))

2022-09-30

- Launched [Pay As You Go](#), allowing premium GPU access without requiring a subscription
- Added vim and tcclib to our runtime image
- Fixed bug where open files were closed on kernel disconnect ([GitHub issue](#))
- Fixed bug where the play button/execution indicator was not clickable when scrolled into the cell output ([GitHub issue](#))
- Updated the styling for form titles so that they avoid obscuring the code editor
- Created a GitHub repo, [backend-info](#), with the latest apt-list.txt and pip-freeze.txt files for the Colab runtime ([GitHub issue](#))
- Added [files.upload](#) to upload a file from the browser to the runtime with a specified filename

2022-09-16

- Upgraded pymc from 3.11.0 to 4.1.4, jax from 0.3.14 to 0.3.17, jaxlib from 0.3.14 to 0.3.15, fsspec from 2022.8.1 to 2022.8.2

- Modified our save flow to avoid persisting Drive filenames as titles in notebook JSON
- Updated our [Terms of Service](#)
- Modified the Jump to Cell command to locate the cursor at the end of the command palette input (Jump to cell in Tools → Command palette in a notebook with section headings)
- Updated the styling of the Drive notebook comment UI
- Added support for terminating your runtime from code:
`python from google.colab import runtime
runtime.unass`
- Added regex filter support to the Recent notebooks dialog
- Inline `google.colab.files.upload()` JS to fix `files.upload()` not working ([GitHub issue](#))

2022-08-26

- Upgraded PyYAML from 3.13 to 6.0 ([GitHub issue](#)), drivefs from 61.0.3 to 62.0.1
- Upgraded TensorFlow from 2.8.2 to 2.9.1 and ipywidgets from 7.7.1 to 8.0.1 but rolled both back due to a number of user reports ([GitHub issue](#), [GitHub issue](#))
- Stop persisting inferred titles in notebook JSON ([GitHub issue](#))
- Fix bug in background execution which affected some Pro+ users ([GitHub issue](#))

- Fix bug where Download as .py incorrectly handled text cells ending in a double quote
- Fix bug for Pro and Pro+ users where we weren't honoring the preference (Tools → Settings) to use a temporary scratch notebook as the default landing page
- Provide undo/redo for scratch cells
- When writing ipynb files, serialize empty multiline strings as [] for better consistency with JupyterLab

2022-08-11

- Upgraded ipython from 5.5.0 to 7.9.0, fbprophet 0.7 to prophet 1.1, tensorflow-datasets from 4.0.1 to 4.6.0, drivefs from 60.0.2 to 61.0.3, pytorch from 1.12.0 to 1.12.1, numba from 0.51 to 0.56, and lxml from 4.2.0 to 4.9.1
- Loosened our requests version requirement ([GitHub issue](#))
- Removed support for TensorFlow 1
- Added Help → Report Drive abuse for Drive notebooks
- Fixed indentation for Python lines ending in []
- Modified styling of tables in Markdown to left-align them rather than centering them
- Fixed special character replacement when copying interactive tables as Markdown
- Fixed ansi 8-bit color parsing ([GitHub issue](#))

- Configured logging to preempt transitive imports and other loading from implicitly configuring the root logger
- Modified forms to use a value of None instead of causing a parse error when clearing raw and numeric-typed form fields

2022-07-22

- Update scipy from 1.4.1 to 1.7.3, drivefs from 59.0.3 to 60.0.2, pytorch from 1.11 to 1.12, jax & jaxlib from 0.3.8 to 0.3.14, opencv-python from 4.1.2.30 to 4.6.0.66, spaCy from 3.3.1 to 3.4.0, and dlib from 19.18.0 to 19.24.0
- Fix Open in tab doc link which was rendering incorrectly ([GitHub issue](#))
- Add a preference for the default tab orientation to the Site section of the settings menu under Tools → Settings
- Show a warning for `USE_AUTH_EPHE` usage when running `authenticate_us` on a TPU runtime ([code](#))

2022-07-01

- Add a preference for code font to the settings menu under Tools → Settings
- Update drivefs from 58.0.3 to 59.0.3 and spacy from 2.2.4 to 3.3.1
- Allow [display_data](#) and [execute_result](#) text outputs to wrap, matching behavior of

JupyterLab
(does not affect
stream

outputs/print
statements).

- Improve LSP handling of some magics, esp. `%%writefile` ([GitHub issue](#)).
- Add a [FAQ entry](#) about the mount Drive button behavior and include link buttons for each FAQ entry.
- Fix bug where the notebook was sometimes hidden behind other tabs on load when in single pane view.
- Fix issue with inconsistent scrolling when an editor is in multi-select mode.
- Fix bug where clicking on a link in a form would navigate away from the notebook
- Show a confirmation dialog before performing Replace all from the Find and replace pane.

2022-06-10

- Update drivefs from 57.0.5 to 58.0.3 and tensorflow from 2.8.0 to 2.8.2
- Support more than 100 repos in the GitHub repo selector shown in the open dialog and the clone to GitHub dialog
- Show full notebook names on hover in the open dialog
- Improve the color contrast for links, buttons, and the `ipywidgets.Ac` widget in dark mode

2022-05-20

- Support URL params for linking to some common pref settings:

[force_theme=da](#)

[force_corgi_mon](#)

[force_font_size=](#)

Params forced by URL are not persisted unless saved using

Tools →

Settings.

- Add a class `markdown-google-sans` to allow Markdown to render in Google Sans
- Update monaco vim from 0.1.19 to 0.3.4
- Update drivefs from 55.0.3 to 57.0.5, jax from 0.3.4 to 0.3.8, and jaxlib from 0.3.2 to 0.3.7

2022-04-29

- Added `□` mode (under Miscellaneous in Tools → Settings)
- Added "Disconnect and delete runtime" option to the menu next to the Connect button
- Improved rendering of filter options in an interactive table
- Added git-lfs to the base image
- Updated torch from 1.10.0 to 1.11.0, jupyter-core from 4.9.2 to 4.10.0, and cmake from 3.12.0 to 3.22.3
- Added more details to our [FAQ](#) about unsupported uses (using proxies, downloading torrents, etc.)
- Fixed [issue](#) with apt-get dependencies

2022-04-15

- Add an option in the file browser to show hidden files.
- Upgrade gdown from 4.2.0 to 4.4.0, google-api-core[grpc] from 1.26.0 to 1.31.5, and pytz from 2018.4 to 2022.1

2022-03-25

- Launched [Pro/Pro+](#) to 12 additional countries: Australia, Bangladesh, Colombia, Hong Kong, Indonesia, Mexico, New Zealand, Pakistan, Philippines, Singapore, Taiwan, and Vietnam
- Added [google.colab.](#) to support using [Service Account keys](#)
- Update jax from 0.3.1 to 0.3.4 & jaxlib from 0.3.0 to 0.3.2
- Fixed an issue with Twitter previews of notebooks shared as Github Gists

2022-03-10

- Launched [Pro/Pro+](#) to 10 new countries: Ireland, Israel, Italy, Morocco, the Netherlands, Poland, Spain, Switzerland, Turkey, and the United Arab Emirates
- Launched support for [scheduling notebooks for Pro+ users](#)
- Fixed bug in interactive datatables where filtering by number did not work
- Finished removing the python2 kernelspec

2022-02-25

- Made various accessibility improvements to the header
- Fix bug with [forms run:auto](#) where a form field change would trigger multiple runs
- Minor updates to the [bigquery example notebook](#) and snippet

- Include background execution setting in the sessions dialog for Pro+ users
- Update tensorflow-probability from 0.15 to 0.16
- Update jax from 0.2.25 to 0.3.1 & jaxlib from 0.1.71 to 0.3.0

2022-02-11

- Improve keyboard navigation for the open dialog
- Fix issue where nvidia-smi stopped reporting resource utilization for some users who were modifying the version of nvidia used
- Update tensorflow from 2.7 to 2.8, keras from 2.7 to 2.8, numpy from 1.19.5 to 1.21.5, tables from 3.4.4 to 3.7.0

2022-02-04

- Improve UX for opening content alongside your notebook, such as files opened from the file browser. This includes a multi-pane view and drag-drop support
- Better Twitter previews when sharing example Colab notebooks and notebooks opened from GitHub Gists
- Update pandas from 1.1.5 to 1.3.5
- Update openpyxl from 2.5.9 to 3.0.0 and pyarrow from 3.0.0 to 6.0.0
- Link to the release notes from the Help menu

2022-01-28

- Add a copy button to [data tables](#)

- Python LSP support for better completions and code diagnostics. This can be configured in the Editor Settings (Tools → Settings)
- Update [gspread examples](#) in our documentation
- Update gdown from 3.6 to 4.2

2022-01-21

- New documentation for the [google.colab package](#)