

Brainhack Magdeburg

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Introduction to Python

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About me

Education: Master's student in Integrative Neuroscience at OvGU

Current position: Research assistant at OvGU

Work experience:

- In a Data Science field since 2018
- 1.5 years of experience in teaching Python programming

Interests:

- Decisions, beliefs and emotions
- Affective disorders
- Bayesian statistics

Twitter: [@ruslan_kl](https://twitter.com/ruslan_kl)

Objectives

- How to get started with learning Python
- What are the best educational resources
- Some basic coding guidelines

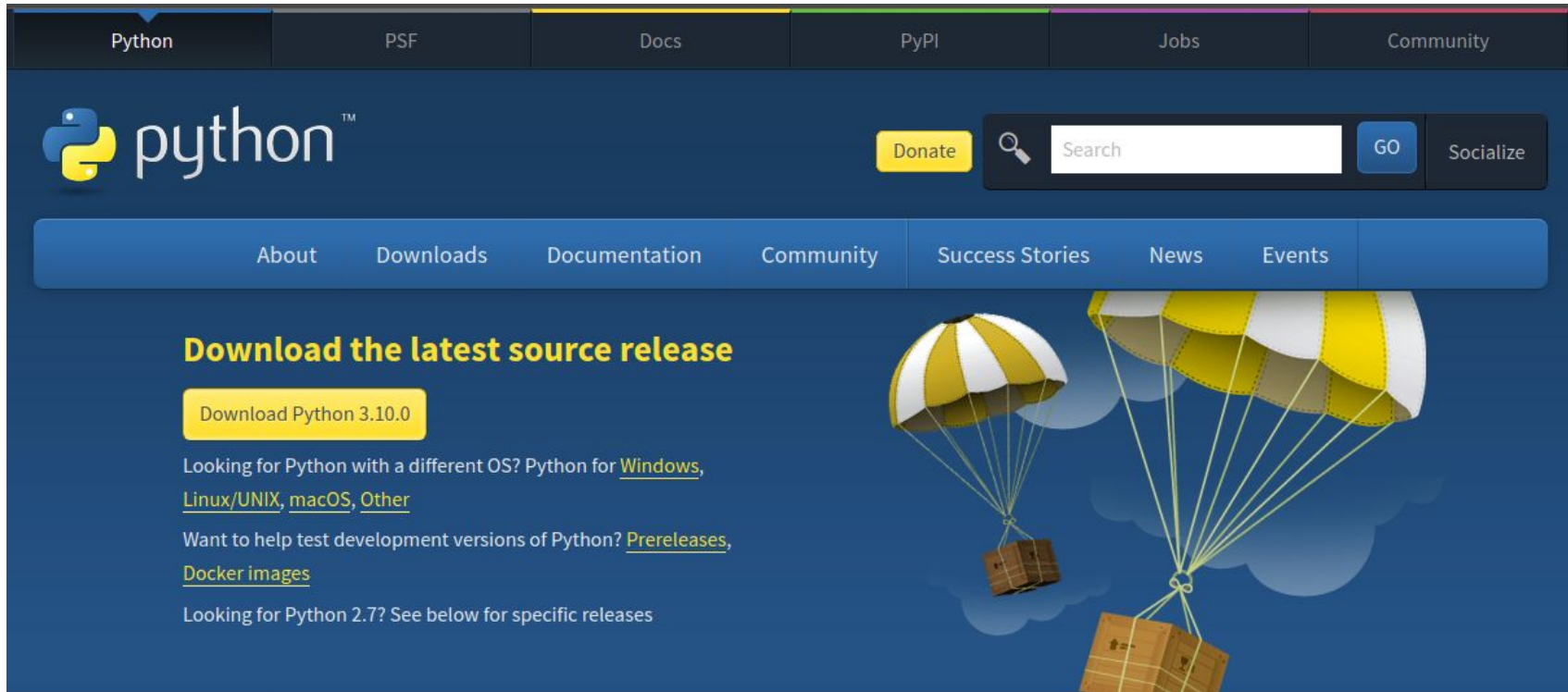
Why Python?



- English-like syntax
- General-purpose programming language
- Open-source
- Interpreted language

How to install Python? (1/2)

Official Python Website: <https://python.org>



The image shows the official Python website homepage. At the top, there is a navigation bar with links for Python, PSF, Docs, PyPI, Jobs, and Community. Below this is the Python logo and a search bar with a 'GO' button and a 'Socialize' button. A secondary navigation bar contains links for About, Downloads, Documentation, Community, Success Stories, News, and Events. The main content area features a prominent yellow button labeled 'Download Python 3.10.0' under the heading 'Download the latest source release'. Below the button, there are links for 'Python for Windows, Linux/UNIX, macOS, Other', 'Prereleases', and 'Docker images'. A note at the bottom of this section says 'Looking for Python 2.7? See below for specific releases'. On the right side of the page, there is an illustration of two yellow and white striped parachutes carrying cardboard boxes against a blue sky with clouds.

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Download the latest source release

Download Python 3.10.0

Looking for Python with a different OS? Python for [Windows](#), [Linux/UNIX](#), [macOS](#), [Other](#)

Want to help test development versions of Python? [Prereleases](#), [Docker images](#)

Looking for Python 2.7? See below for specific releases

How to install Python? (2/2)

Anaconda: The World's Most Popular Data Science Platform

<https://anaconda.com>



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[Get Started](#)



Individual Edition

Your data science toolkit

With over 25 million users worldwide, the open-source Individual Edition (Distribution) is the easiest way to perform Python/R data science and machine learning on a single machine. Developed for solo practitioners, it is the toolkit that equips you to work with thousands of open-source packages and libraries.

Anaconda Individual Edition

[Download](#) 

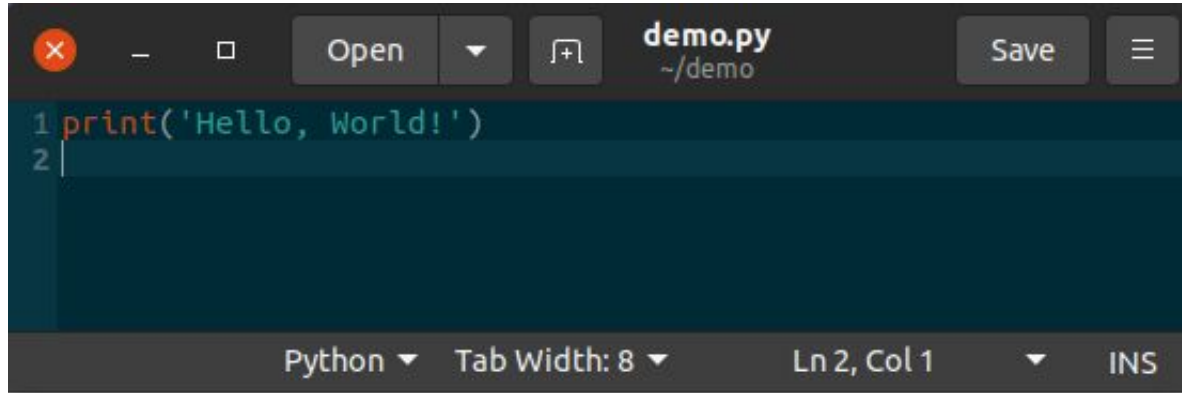
For Linux

Python 3.9 • 64-Bit (x86) Installer • 581 MB

Get Additional Installers

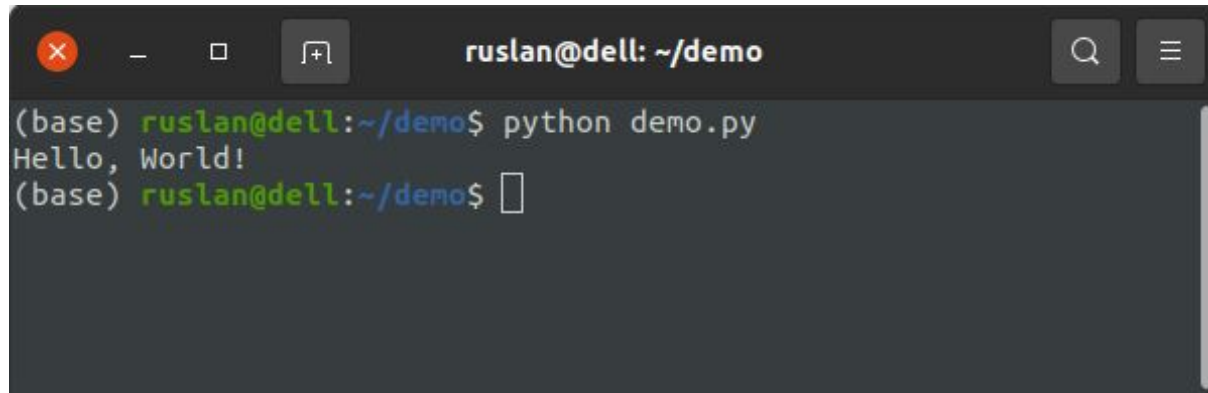


How to get started: Writing scripts



A screenshot of a code editor window. The title bar shows a close button, a maximize button, and the filename `demo.py` with the path `~/demo`. There are buttons for `Open`, `Save`, and a menu icon. The editor content shows two lines of Python code: `1 print('Hello, World!')` and `2 |`. The status bar at the bottom indicates the language is `Python`, the tab width is `8`, the cursor is at `Ln 2, Col 1`, and the mode is `INS`.

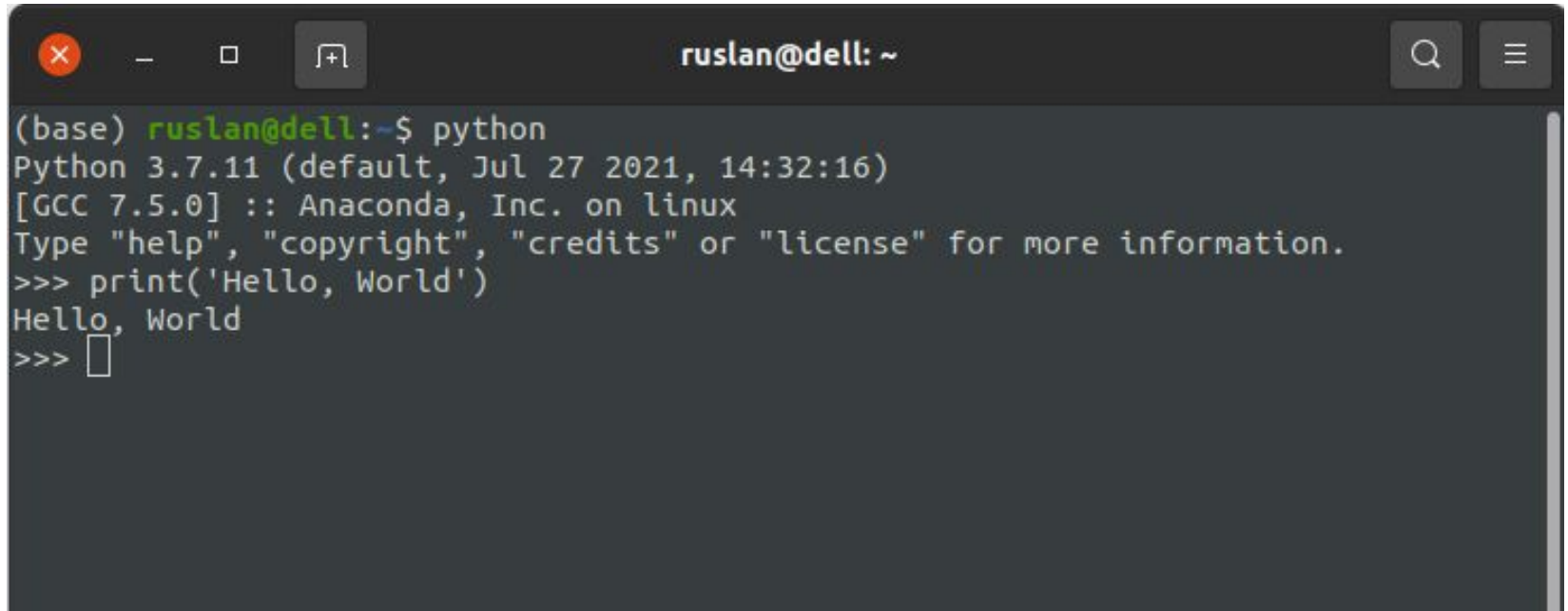
```
1 print('Hello, World!')
2 |
```



A screenshot of a terminal window. The title bar shows a close button, a maximize button, and the prompt `ruslan@dell: ~/demo`. There are search and menu icons. The terminal shows the command `python demo.py` being executed, which outputs `Hello, World!`. The prompt is then `ruslan@dell:~/demo$`.

```
(base) ruslan@dell:~/demo$ python demo.py
Hello, World!
(base) ruslan@dell:~/demo$
```

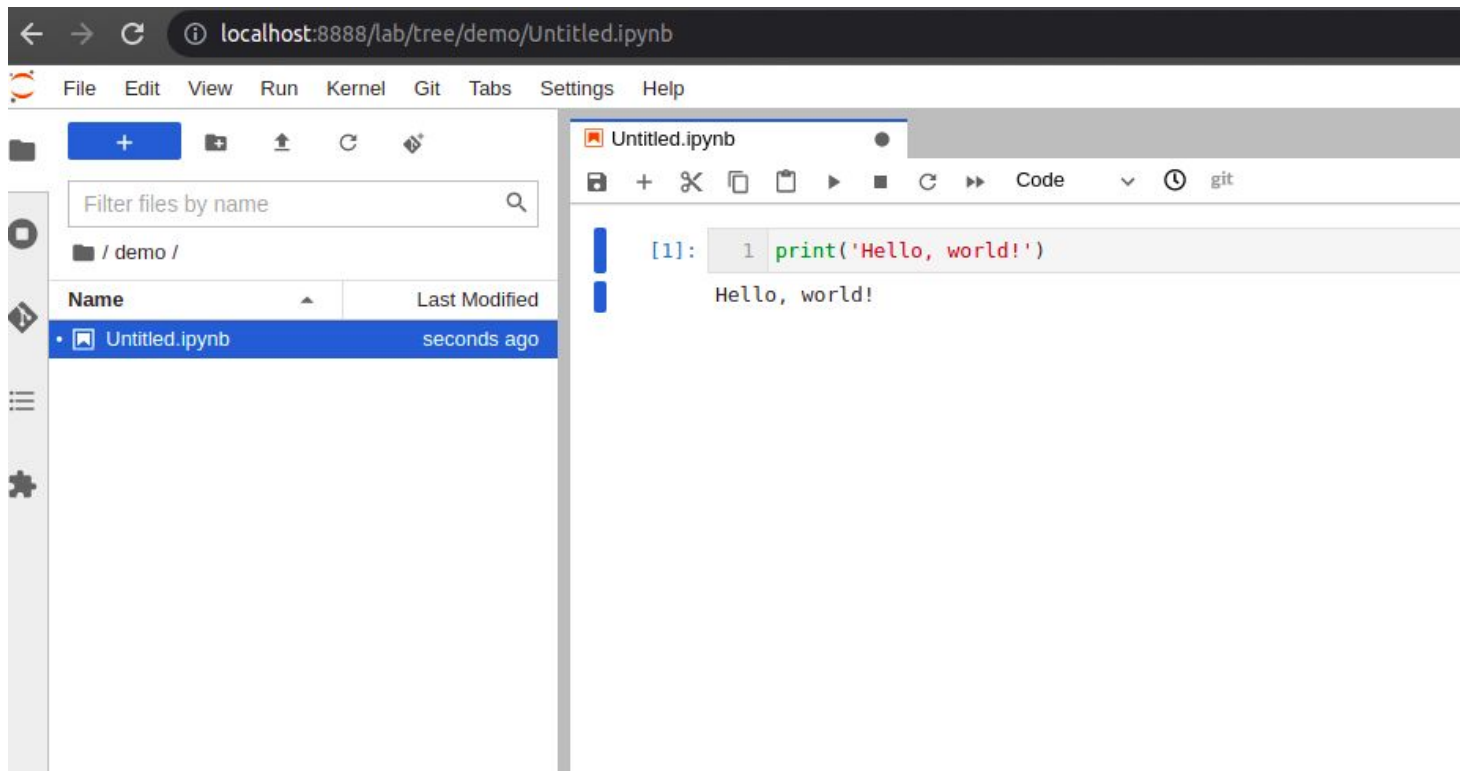
How to get started: Coding from a Terminal

A terminal window with a dark background and light text. The window title is "ruslan@dell: ~". The terminal shows the following text:

```
(base) ruslan@dell:~$ python
Python 3.7.11 (default, Jul 27 2021, 14:32:16)
[GCC 7.5.0] :: Anaconda, Inc. on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> print('Hello, World')
Hello, World
>>> █
```


How to get started: Jupyter Notebooks

<https://jupyter.org>



The screenshot displays the Jupyter Notebook interface in a web browser. The address bar shows the URL `localhost:8888/lab/tree/demo/Untitled.ipynb`. The interface includes a menu bar with options: File, Edit, View, Run, Kernel, Git, Tabs, Settings, and Help. On the left, a file browser sidebar shows a search bar labeled "Filter files by name" and a file list for the "/ demo /" directory. The file list has two columns: "Name" and "Last Modified". The file "Untitled.ipynb" is selected and highlighted in blue, with "seconds ago" listed under the "Last Modified" column. The main workspace shows a code cell titled "Untitled.ipynb" with a toolbar containing icons for save, add, delete, copy, paste, run, and refresh. The code cell contains the following code:

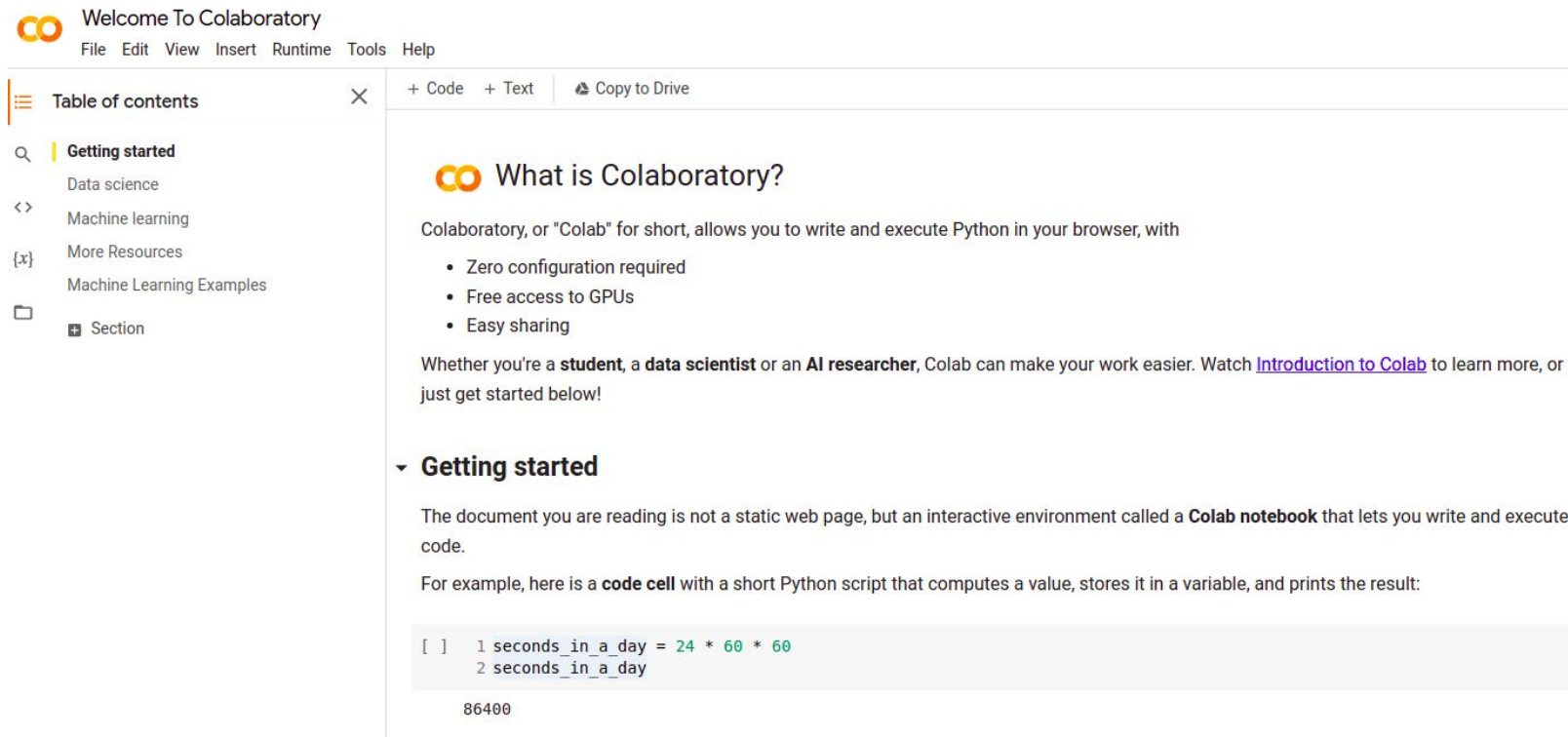
```
[1]: 1 print('Hello, world!')
```

The output of the code cell is displayed below the code:

```
Hello, world!
```

How to get started: Google Colaboratory

<https://colab.research.google.com>



The screenshot shows the Google Colaboratory interface. At the top left is the Colab logo and the text "Welcome To Colaboratory". Below this is a menu bar with "File", "Edit", "View", "Insert", "Runtime", "Tools", and "Help". A "Table of contents" sidebar is on the left, listing sections like "Getting started", "Data science", "Machine learning", "More Resources", "Machine Learning Examples", and "Section". The main content area has a header "+ Code + Text" and "Copy to Drive". The main heading is "What is Colaboratory?". The text explains that Colab allows writing and executing Python in a browser with zero configuration, free GPU access, and easy sharing. It suggests watching an "Introduction to Colab" video. A "Getting started" section follows, describing the Colab notebook environment and providing a code cell example that calculates the number of seconds in a day (24 * 60 * 60 = 86400).

CO Welcome To Colaboratory
File Edit View Insert Runtime Tools Help

Table of contents X + Code + Text Copy to Drive

CO What is Colaboratory?

Colaboratory, or "Colab" for short, allows you to write and execute Python in your browser, with

- Zero configuration required
- Free access to GPUs
- Easy sharing

Whether you're a **student**, a **data scientist** or an **AI researcher**, Colab can make your work easier. Watch [Introduction to Colab](#) to learn more, or just get started below!

▾ Getting started

The document you are reading is not a static web page, but an interactive environment called a **Colab notebook** that lets you write and execute code.

For example, here is a **code cell** with a short Python script that computes a value, stores it in a variable, and prints the result:

```
[ ] 1 seconds_in_a_day = 24 * 60 * 60
     2 seconds_in_a_day
```

86400

How to get started: DataSpell (\$*)

<https://jetbrains.com/dataspell>

Intelligent Jupyter notebooks

Tuned for high interactivity

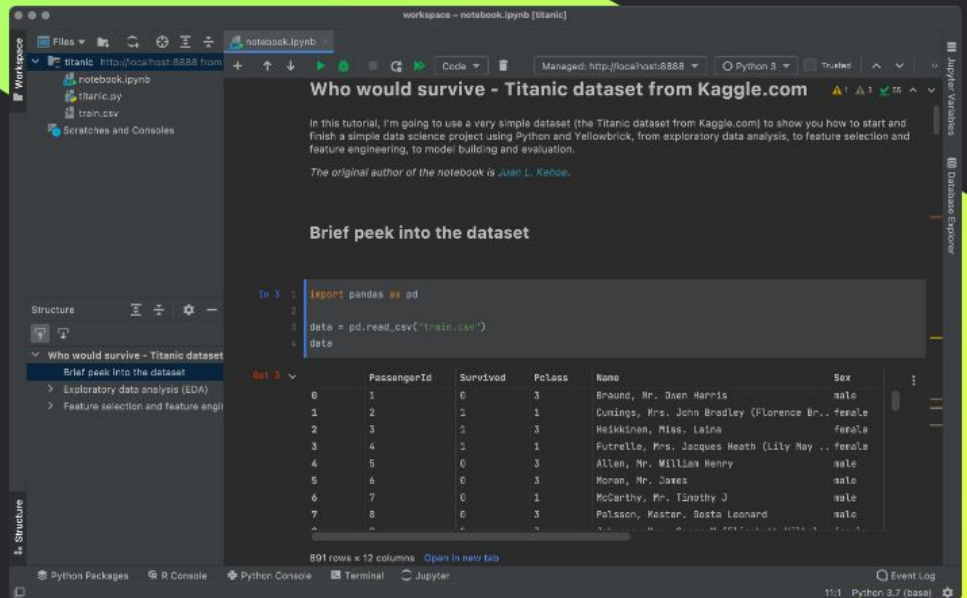
Switch between command and editor modes with a single keystroke. Navigate over cells with arrow keys. Use all of the standard Jupyter shortcuts. Enjoy fully interactive outputs – right under the cell.

Smart coding assistance

When editing code cells, enjoy smart code completion, on-the-fly error checking and quick-fixes, easy navigation, and much more.

Local and remote notebooks

Work with local Jupyter notebooks or connect easily to remote Jupyter, JupyterHub, or JupyterLab servers right from the IDE.



The screenshot displays the DataSpell IDE interface. The main window shows a Jupyter notebook with the following content:

Who would survive - Titanic dataset from Kaggle.com

In this tutorial, I'm going to use a very simple dataset (the Titanic dataset from Kaggle.com) to show you how to start and finish a simple data science project using Python and Yellowbrick, from exploratory data analysis, to feature selection and feature engineering, to model building and evaluation.

The original author of the notebook is [Justin L. Kehoe](#).

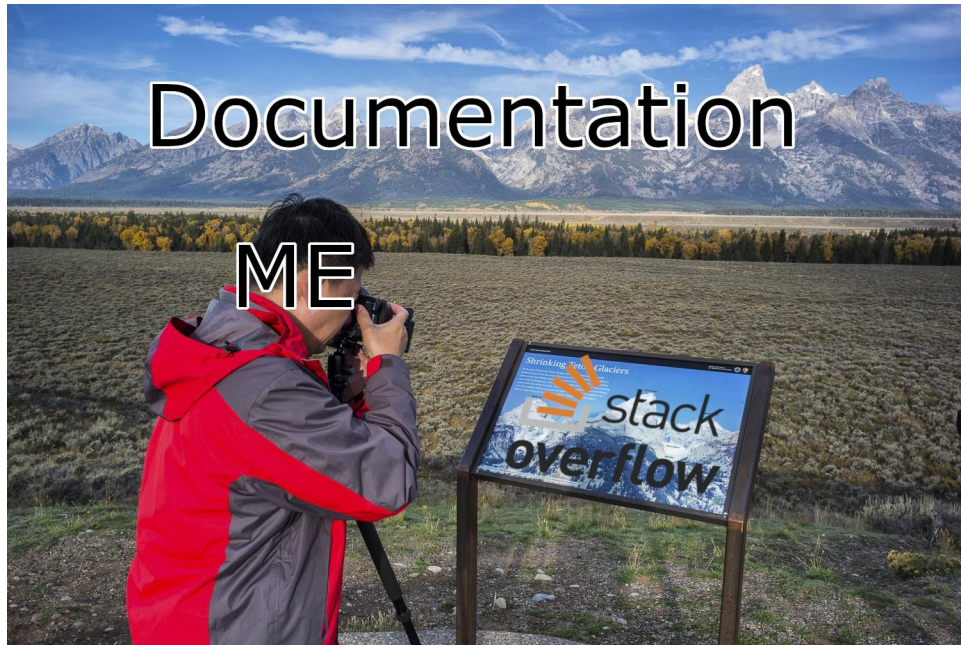
Brief peek into the dataset

```
In 3 | 1 | import pandas as pd
      | 2 | data = pd.read_csv('train.csv')
      | 3 | data
```

| | PassengerId | Survived | Pclass | Name | Sex |
|---|-------------|----------|--------|--|--------|
| 0 | 1 | 0 | 3 | Braund, Mr. Owen Harris | male |
| 1 | 2 | 1 | 1 | Cumings, Mrs. John Bradley (Florence Briggs) | female |
| 2 | 3 | 1 | 3 | Heikkinen, Miss. Laina | female |
| 3 | 4 | 1 | 1 | Futrelle, Mrs. Jacques Heath (Lily May) | female |
| 4 | 5 | 0 | 3 | Allen, Mr. William Henry | male |
| 5 | 6 | 0 | 3 | Moran, Mr. James | male |
| 6 | 7 | 0 | 1 | McCarthy, Mr. Timothy J | male |
| 7 | 8 | 0 | 3 | Palsson, Master. Gosta Leonard | male |

891 rows x 12 columns [Open in new tab](#)

Where to get help?



1. Documentation
2. Stack Overflow
<https://stackoverflow.com/>
3. Awesome Python
<https://awesome-python.com/>
4. Cheat Sheets
<https://datacamp.com/community/data-science-cheatsheets>
5. Kaggle <https://kaggle.com/>
6. ...

Resources to learn Python

1. Kaggle courses: <https://kaggle.com/learn/python>
2. Python for Neuroscience course: <https://pyforneuro.com>
3. DataCamp (\$): <https://datacamp.com/>
4. Neuromatch Academy Computational Neuroscience:
<https://compneuro.neuromatch.io/tutorials/intro.html>
5. YouTube
 - a. Jupyter Notebook Tutorial: <https://youtube.com/watch?v=HW29067qVWk>
 - b. Learning to program with Python 3 (by sentdex):
<https://youtube.com/playlist?list=PLQVvva0QuDeAams7fkdcwOGBpGdHpXln>
 - c. ...
6. ...

A cheat-sheet for all the data structures in Python!

