

# **CS217: Computer Programming Language**

Lab01-Getting started  
Instructor: Jakramate Bootkrajang



# Outline

- Python distribution
- Programming environments
- Google colaboration
  - Some exercises
- Interesting websites



# About Python

- Python 2.xx
  - Older version of Python
  - Still being used in legacy programs
- Python 3.xx
  - Newer version
  - We will use Python 3.xx in this class

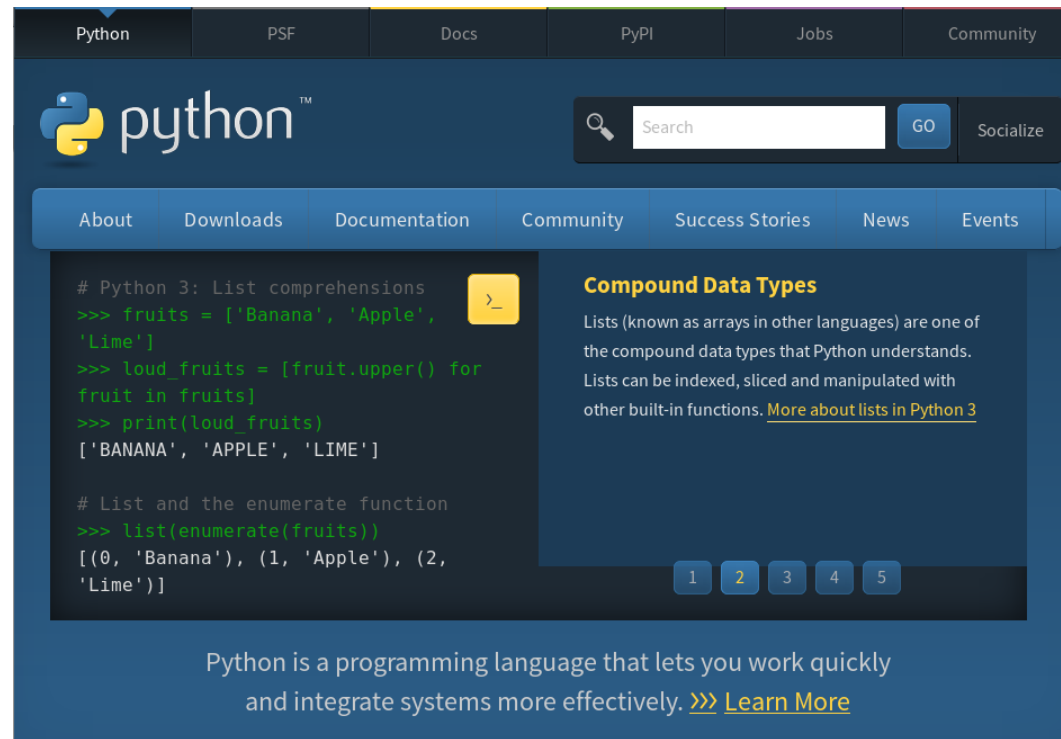


# Python distribution

- A distribution is
  - A set of Python interpreter + additional packages
- The most widely used ones are
  - CPython distribution (standard)
  - Anaconda distribution (CPython + packages for data science)

# CPython distribution

- Standard distribution
- Can be downloaded from [www.python.org](http://www.python.org)



The screenshot shows the Python.org website. At the top, there are navigation links for Python, PSF, Docs, PyPI, Jobs, and Community. Below this is the Python logo and a search bar. A secondary navigation bar includes links for About, Downloads, Documentation, Community, Success Stories, News, and Events. The main content area features a code editor with Python 3 code examples for list comprehensions and the enumerate function. To the right of the code is a section titled "Compound Data Types" with text explaining lists and a link to "More about lists in Python 3". At the bottom of the code editor are page numbers 1 through 5. Below the code and text is a blue banner with the text: "Python is a programming language that lets you work quickly and integrate systems more effectively. >>> [Learn More](#)".

## Get Started

Whether you're new to programming or an experienced developer, Python is a language that's easy to learn and use.

## Download

Python source code and installers are available for Windows, macOS, Linux, and BSD.

## Docs

Documentation for Python's standard library, third-party libraries, and the Python interpreter.

## Jobs

Looking for work or have a Python related position that needs to be filled? Visit [python.org/jobs](#).

# Anaconda distribution

- Standard distribution + approx. 1400 packages
- Those packages are essential for data science, data mining, machine learning, etc.
- There is a smaller version of Anaconda called miniconda
- Can be downloaded from
  - [www.anaconda.com](http://www.anaconda.com)

# Snapshot of the webpage



## Download Anaconda Distribution

Version 2018.12 | Release Date: December 21, 2018

Download For:   

### High-Performance Distribution

Easily install 1,400+ [data science packages](#)

### Package Management

Manage packages, dependencies and environments with [conda](#)

### Portal to Data Science

Uncover insights in your data and create interactive visualizations





# Benefit of using Anaconda

- Support multiple virtual environments
- Excellent package manager named **conda**
- Conflicting packages can be easily avoided
  - You can install two versions of Numpy on the same computer, but in different virtual environments.





# Running Python

- On personal computer
  - Requires installation of python distribution
- On cloud computing service
  - Does not require software installation
  - Your codes are with you all the time
  - Usually free

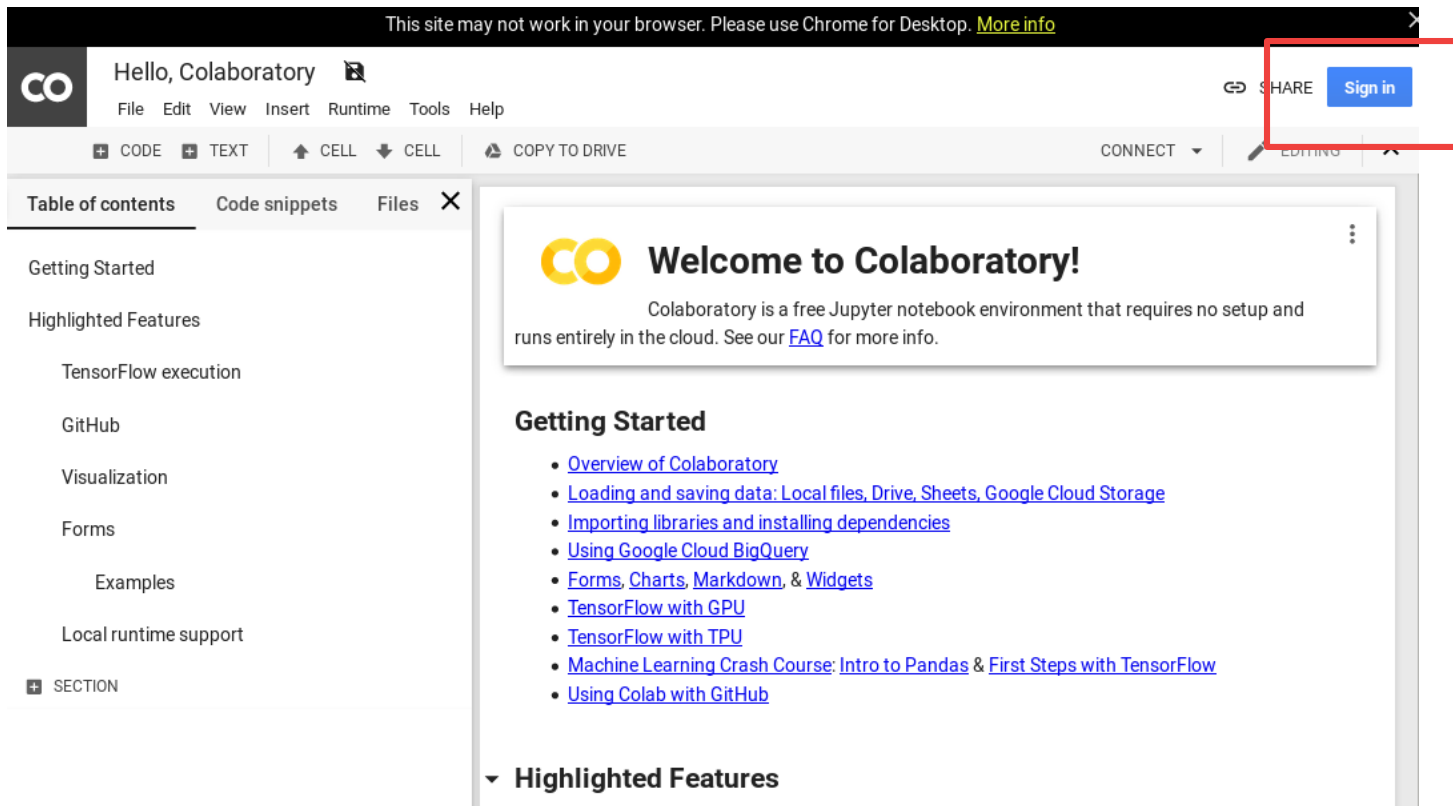


# Cloud computing service

- Microsoft Azure
  - Available for CMU students for free
- Google Colaboration (colab in short)
  - Free
  - Requires Google's account (gmail)
  - Automatically links to Google drive

# Google Colaboration

- Visit <https://colab.research.google.com>
- And sign in with your Google's credential













The screenshot shows the Google Colaboratory website interface. At the top, there is a warning banner: "This site may not work in your browser. Please use Chrome for Desktop. [More info](#)". Below this is the "Hello, Colaboratory" header with a "Sign in" button highlighted by a red box. The main navigation bar includes "File", "Edit", "View", "Insert", "Runtime", "Tools", and "Help". Below the navigation bar are tabs for "CODE", "TEXT", "CELL", and "COPY TO DRIVE". The left sidebar contains a "Table of contents" with links to "Getting Started", "Highlighted Features", "TensorFlow execution", "GitHub", "Visualization", "Forms", "Examples", and "Local runtime support". The main content area features a "Welcome to Colaboratory!" message and a "Getting Started" section with a list of links: "Overview of Colaboratory", "Loading and saving data: Local files, Drive, Sheets, Google Cloud Storage", "Importing libraries and installing dependencies", "Using Google Cloud BigQuery", "Forms, Charts, Markdown, & Widgets", "TensorFlow with GPU", "TensorFlow with TPU", "Machine Learning Crash Course: Intro to Pandas & First Steps with TensorFlow", and "Using Colab with GitHub".

# After signing in

This site may not work in your browser. Please use Chrome for Desktop. [More info](#)

EXAMPLES RECENT GOOGLE DRIVE GITHUB UPLOAD

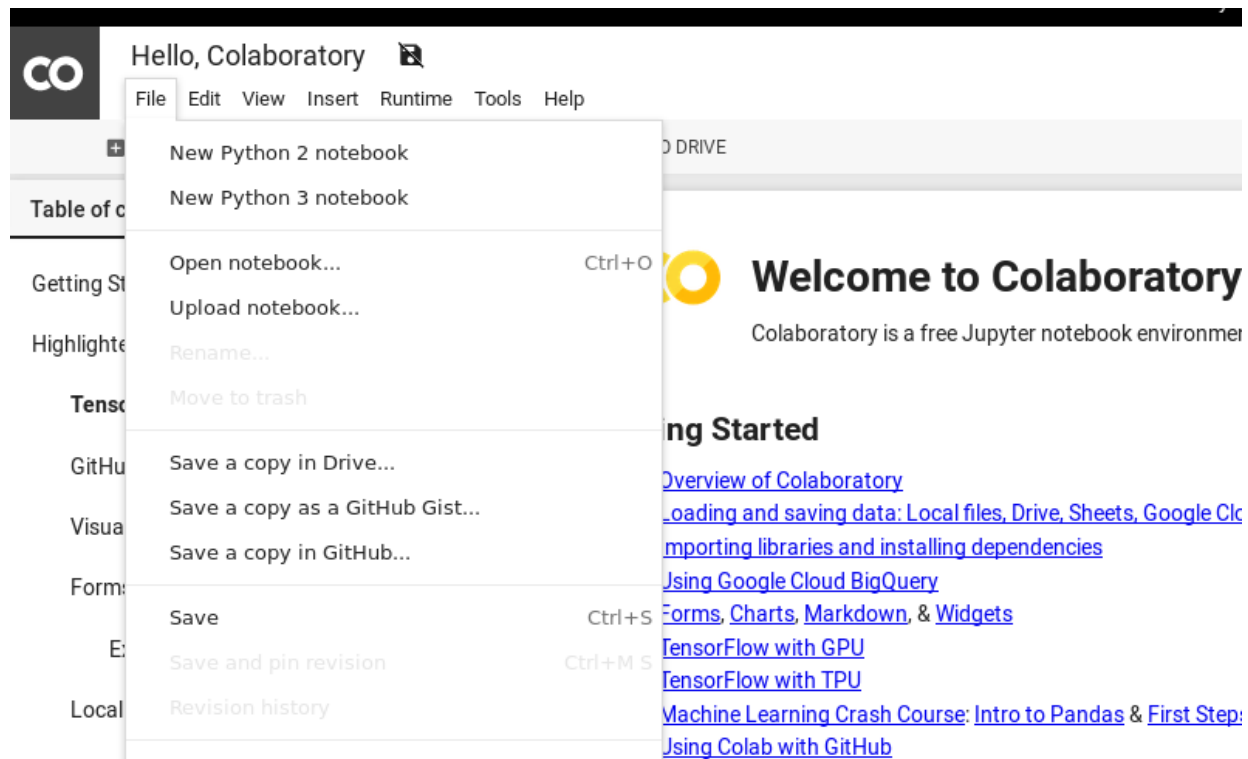
Filter notebooks

Title	First opened	Last opened	
 Hello, Colaboratory	Dec 4, 2018	0 minutes ago	
 229223_v1.ipynb	1 day ago	43 minutes ago	
 Untitled1.ipynb	Dec 4, 2018	45 minutes ago	
 csv_import_lab.ipynb	Dec 4, 2018	2 days ago	
 Hello, TPU in Colab	Dec 4, 2018	Dec 4, 2018	

**Click to create new file** NEW PYTHON 3 NOTEBOOK CANCEL

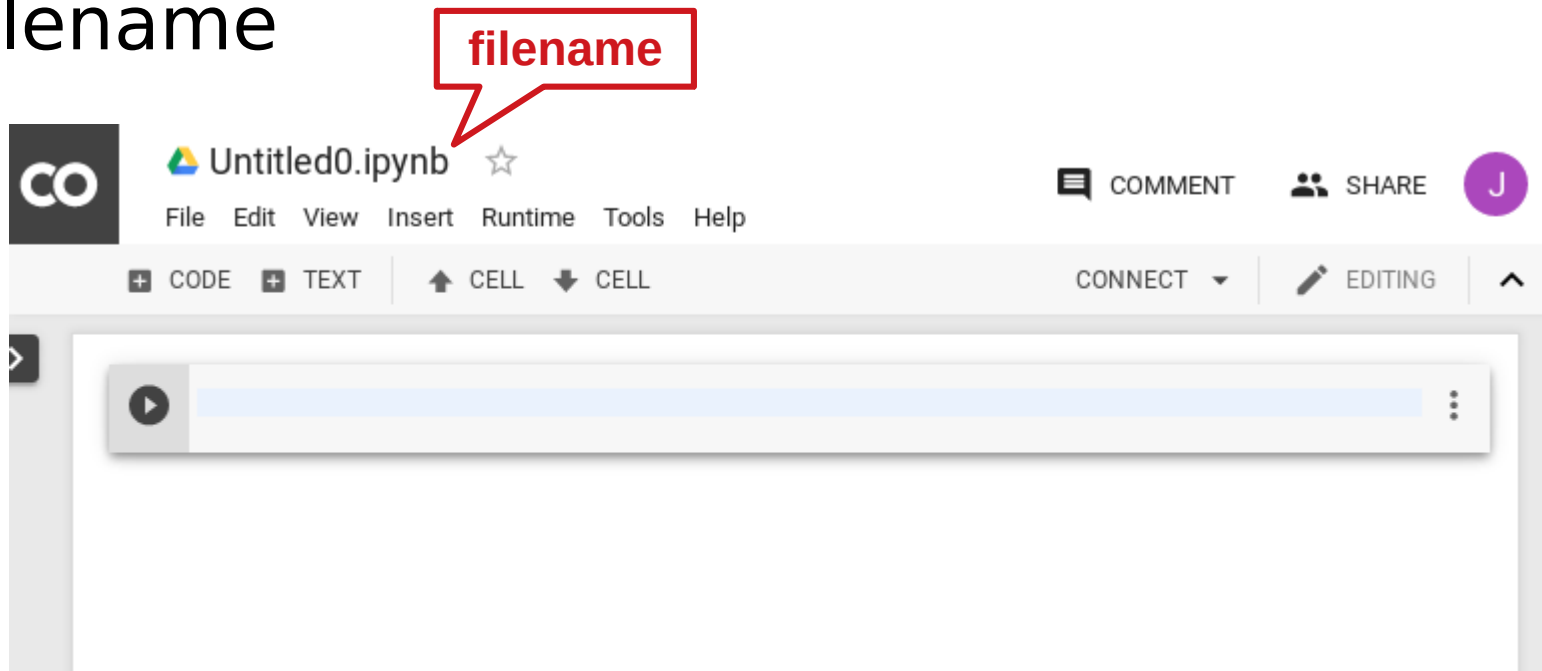
# Alternatively

- You can create new file by choosing file menu on the top-left corner
  - File → New Python 3 notebook

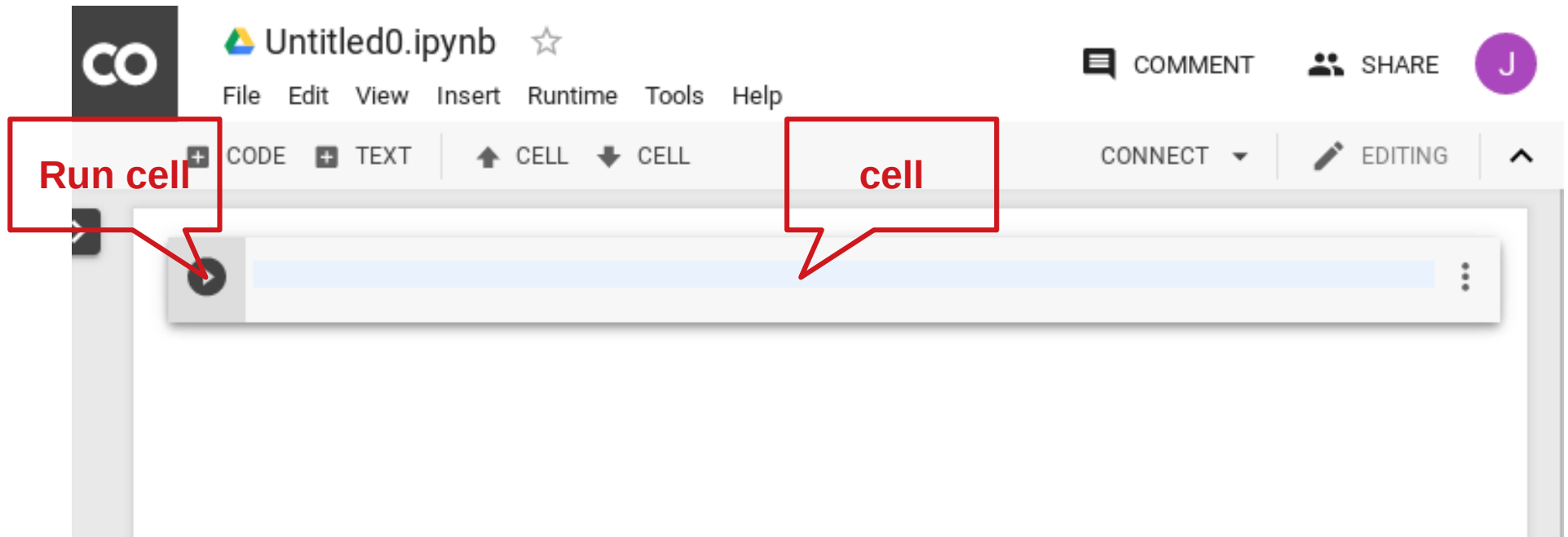


# Your new Python file

- A Python sourcecode is called **a notebook**
- You can rename the file by double click filename



# What's in a notebook ?



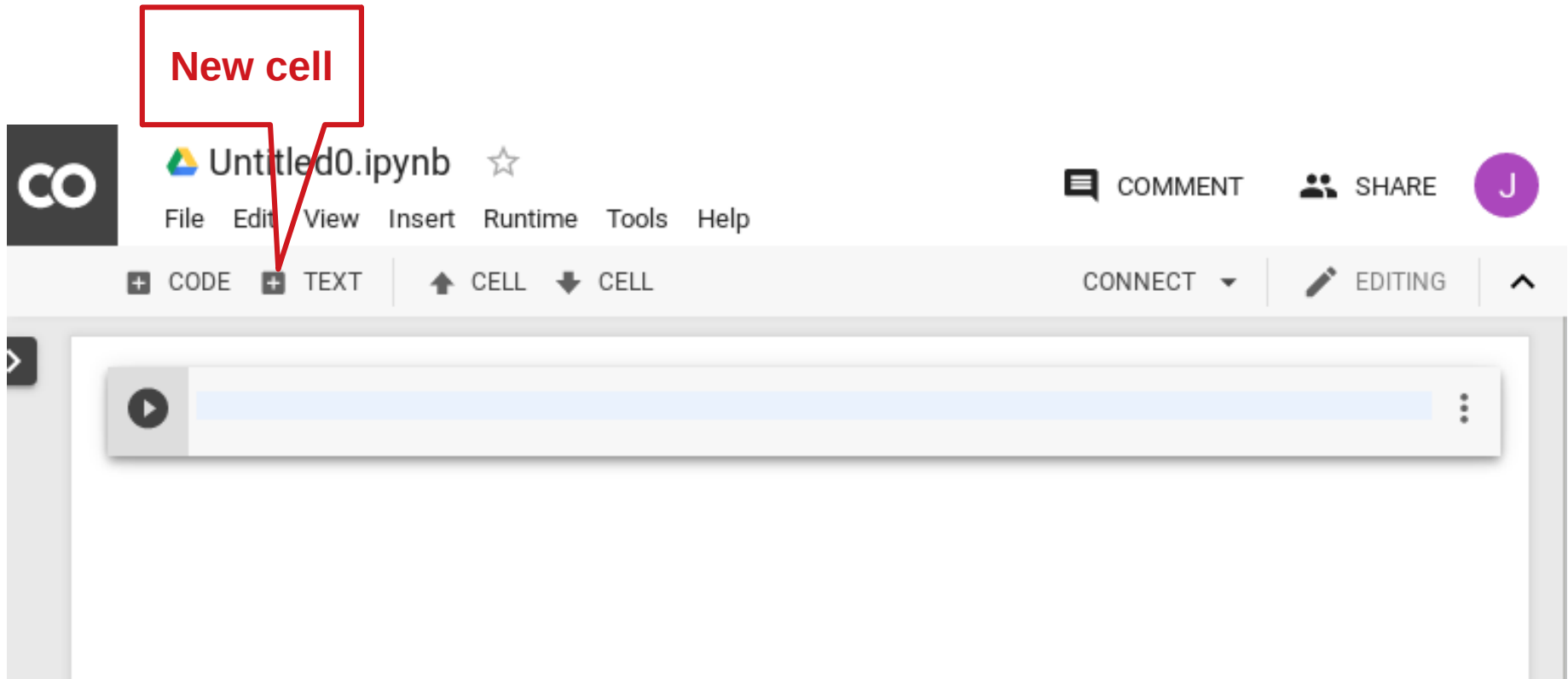
# Adding new code cell

New cell

The screenshot displays the Jupyter Notebook interface for a file named "Untitled0.ipynb". The top navigation bar includes a "CO" logo, the file name, a star icon, and buttons for "COMMENT" and "SHARE". A user profile icon with the letter "J" is also visible. Below the navigation bar is a menu with options: "File", "Edit", "View", "Insert", "Runtime", "Tools", and "Help". The main toolbar contains buttons for "+ CODE", "+ TEXT", "↑ CELL", and "↓ CELL". The "CONNECT" dropdown and "EDITING" status are also present. The main workspace shows a single code cell with a play button on the left and a vertical ellipsis on the right.



# Adding new text cell



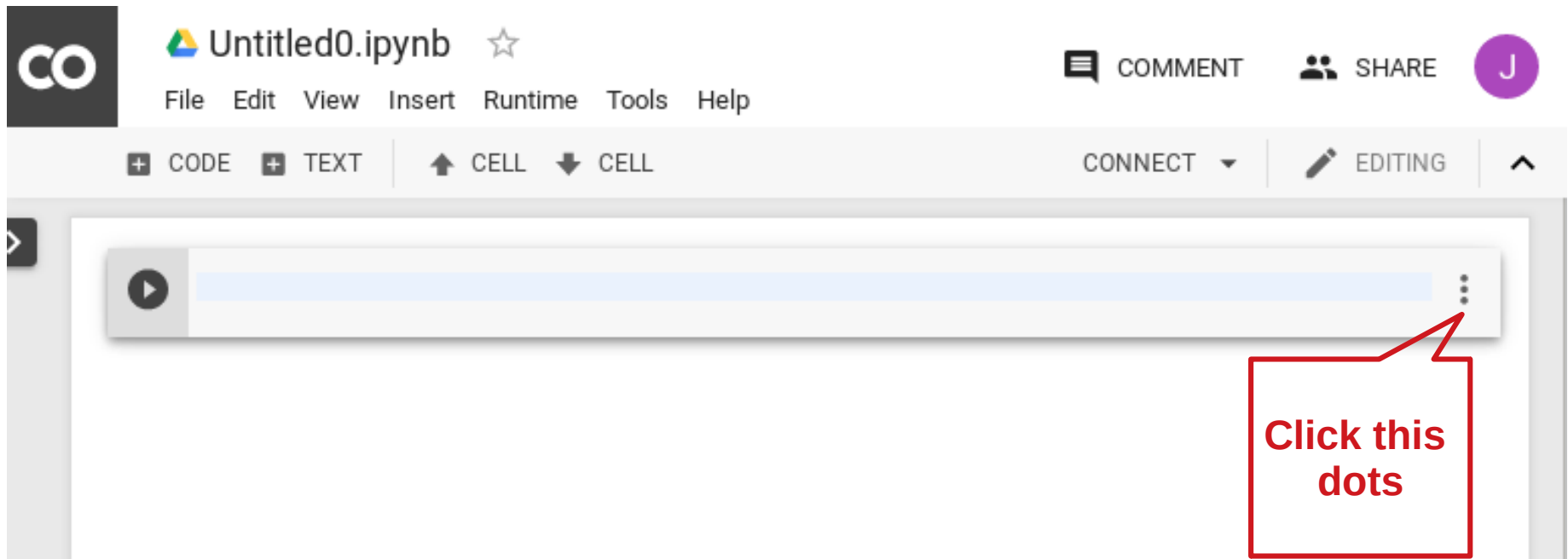
Text cell is useful for adding context to the code



# Exercise 1

- Add one code cell and one text cell

# Deleting cell



The image shows a Jupyter Notebook interface. At the top left is the 'CO' logo. The main title is 'Untitled0.ipynb' with a star icon. Below the title is a menu bar with 'File', 'Edit', 'View', 'Insert', 'Runtime', 'Tools', and 'Help'. On the right side of the top bar are 'COMMENT', 'SHARE', and a user profile icon with the letter 'J'. Below the menu bar is a toolbar with '+ CODE', '+ TEXT', '↑ CELL', and '↓ CELL'. To the right of the toolbar are 'CONNECT' and 'EDITING' buttons. The main area shows a single code cell with a play button on the left and a three-dot menu icon on the right. A red callout box with the text 'Click this dots' points to the three-dot menu icon.

# Running a cell

- Click the `play` button in front of cell
- Or press `CTRL-ENTER`
- Let's try running the following code

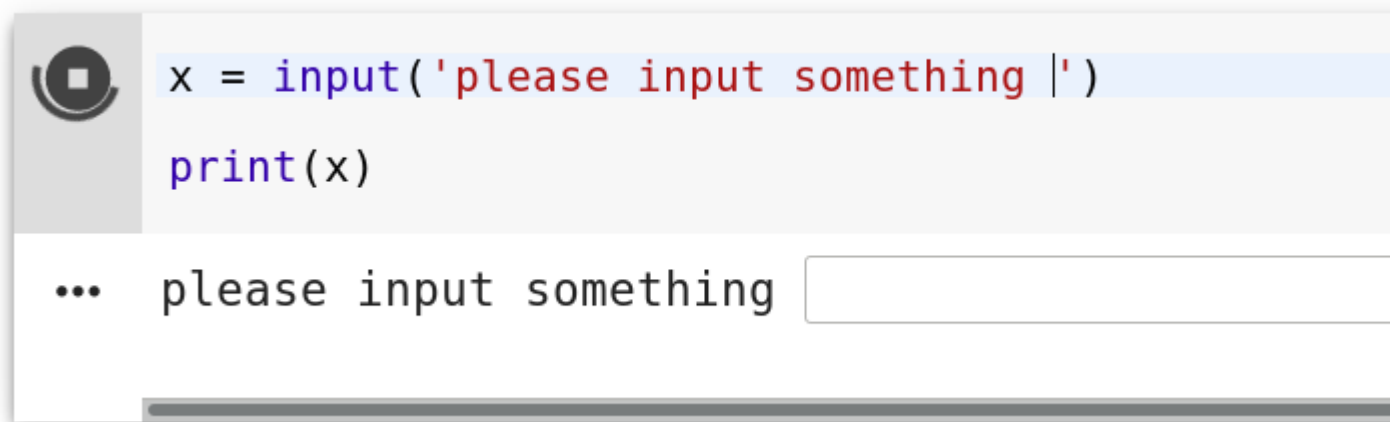
```
[1] x = 2  
    y = 5  
  
    print(x+y)
```

↪ 7

⌵

# Getting input from user

- You can get input from user in the same way you did with IDLE



```
x = input('please input something |')  
print(x)
```

... please input something

The screenshot shows a Python IDLE shell window. The top part contains two lines of Python code: `x = input('please input something |')` and `print(x)`. The first line is highlighted in blue. Below the code, the prompt `... please input something` is followed by an empty text input field, indicating that the program is waiting for user input.

- It waits for an input and will continue after you pressed ENTER



# Notes

- Once you've defined variables in a cell (and run it), the variables can be referenced in the subsequent cells.
- You can split your BIG code into multiple cells
- It will be easier to debug your code

# Example

```
[5] x = 2
```

```
[6] y = 3
```

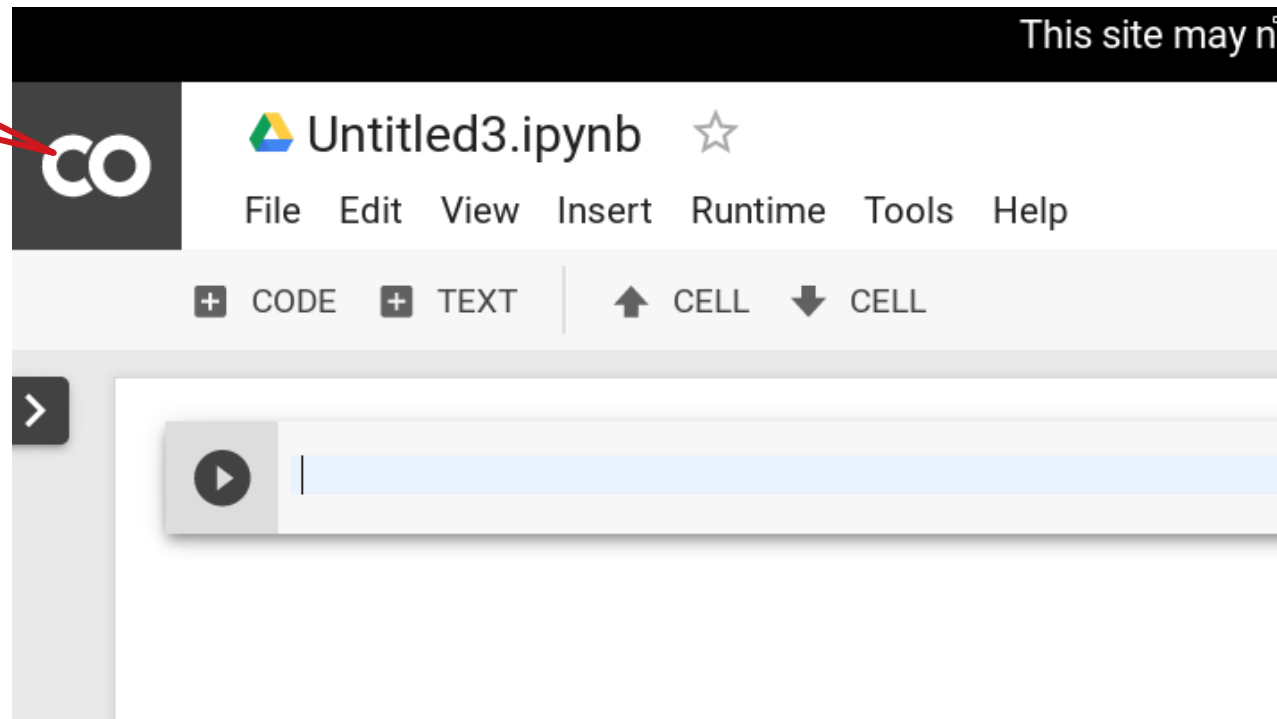
```
▶ print(x+y)
```

```
↳ 5
```

# Colab and Google drive

- Files will be saved on your Google drive
- Click Colab icon to open the drive

Go to  
Google Drive



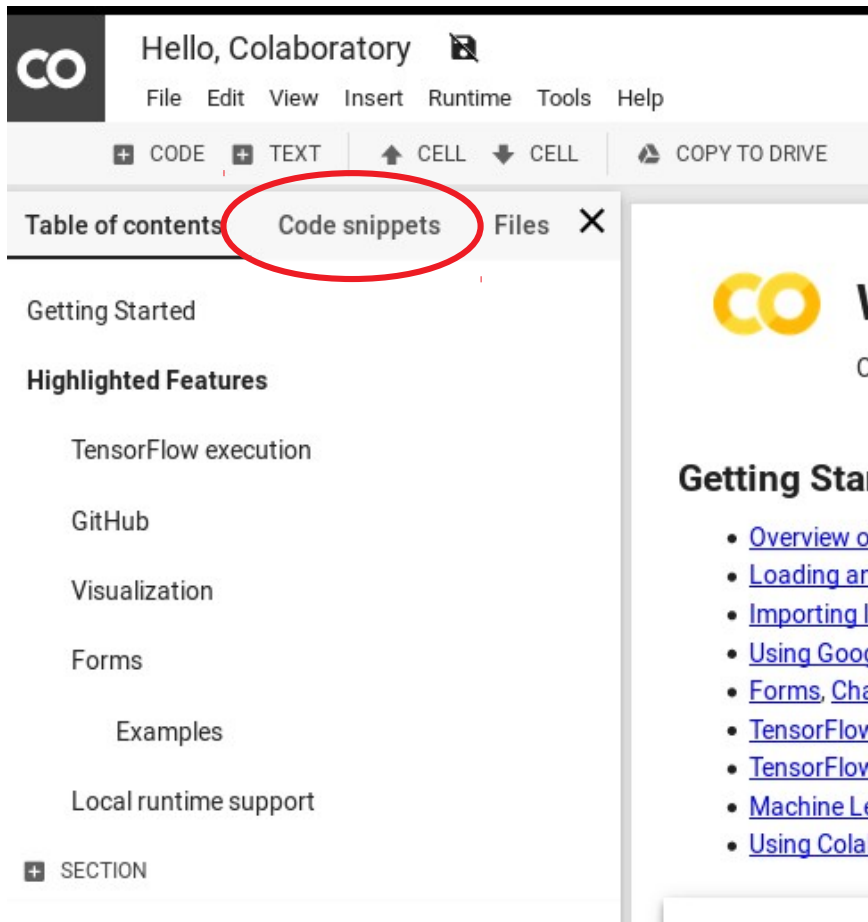




# Code snippets

- A snippet is a short code for doing some specific task
- Colab provides many useful snippets as examples
- They can be reused. (Problem solving using analogy and reduction)

# Let's try some snippet



CO Hello, Colaboratory

File Edit View Insert Runtime Tools Help

+ CODE + TEXT ↑ CELL ↓ CELL COPY TO DRIVE

Table of contents **Code snippets** Files X

Getting Started

**Highlighted Features**

- TensorFlow execution
- GitHub
- Visualization
- Forms
- Examples
- Local runtime support

SECTION

CO

**Getting Star**

- [Overview of](#)
- [Loading an](#)
- [Importing li](#)
- [Using Goo](#)
- [Forms, Cha](#)
- [TensorFlow](#)
- [TensorFlow](#)
- [Machine Le](#)
- [Using Colat](#)

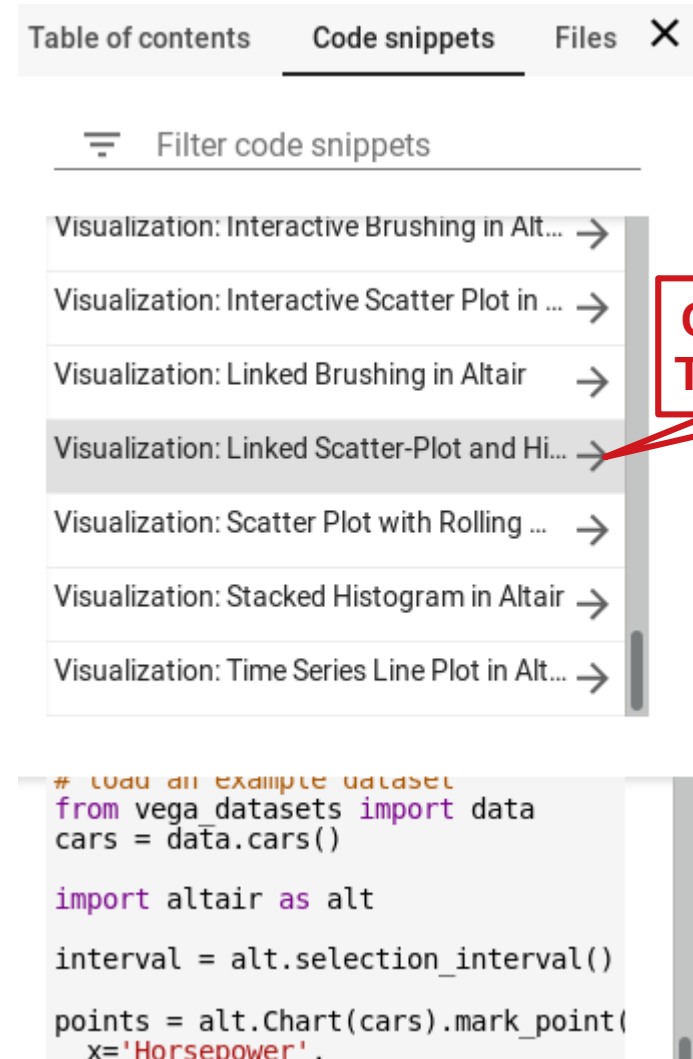


Table of contents **Code snippets** Files X

Filter code snippets

- Visualization: Interactive Brushing in Alt... →
- Visualization: Interactive Scatter Plot in ... →
- Visualization: Linked Brushing in Altair →
- Visualization: Linked Scatter-Plot and Hi... →**
- Visualization: Scatter Plot with Rolling ... →
- Visualization: Stacked Histogram in Altair →
- Visualization: Time Series Line Plot in Alt... →

```
# Load an example dataset
from vega datasets import data
cars = data.cars()

import altair as alt

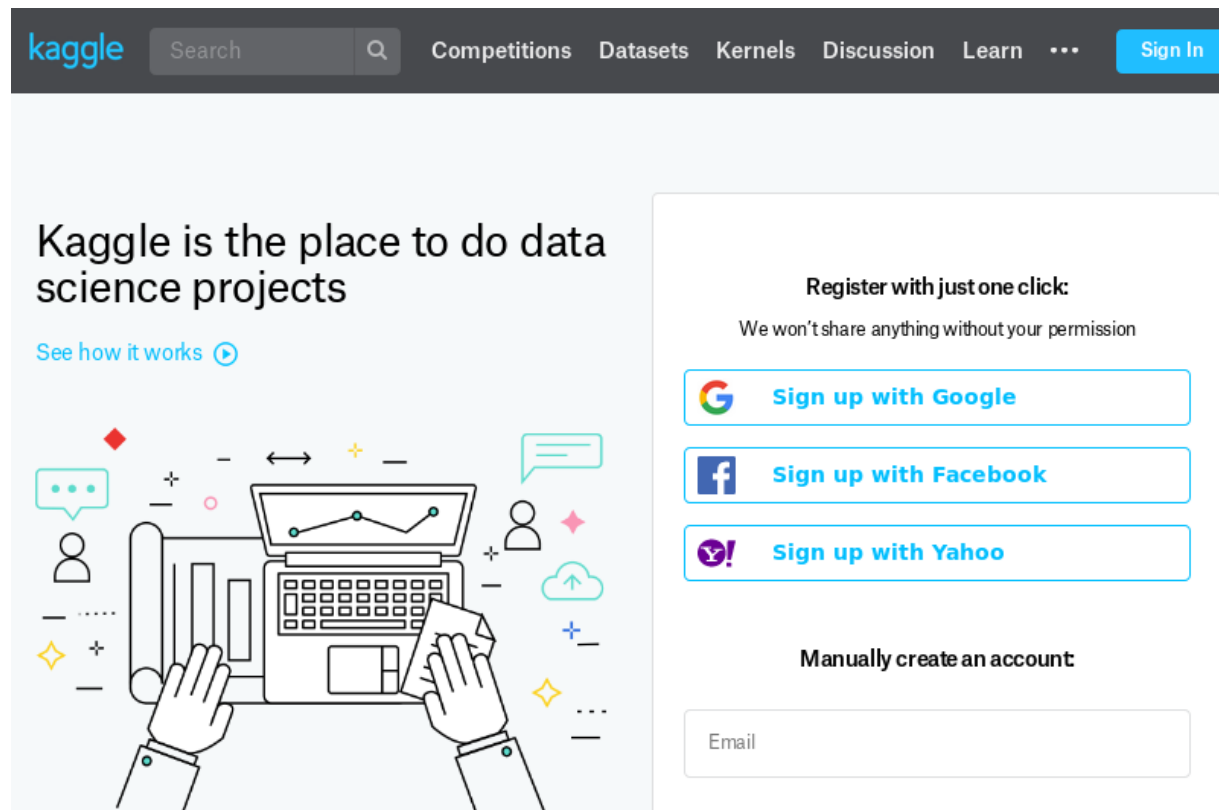
interval = alt.selection_interval()

points = alt.Chart(cars).mark_point(
    x='Horsepower',
```

Click to add  
To notebook

# Useful websites [1]

- Data science competition / learning hub
- <https://www.kaggle.com/>



# Useful websites [2]

- Data sharing webset
- <https://archive.ics.uci.edu/ml/index.php>



## Welcome to the UC Irvine Machine Learning Repository!







We currently maintain 463 data sets as a service to the machine learning community. You may [view all data sets](#) through our searchable interface. For a general overview of the Repository, please visit our [About page](#). For information about citing data sets in publications, please read our [citation policy](#). If you wish to donate a data set, please consult our [donation policy](#). For any other questions, feel free to contact the Repository librarians.



Supported By:

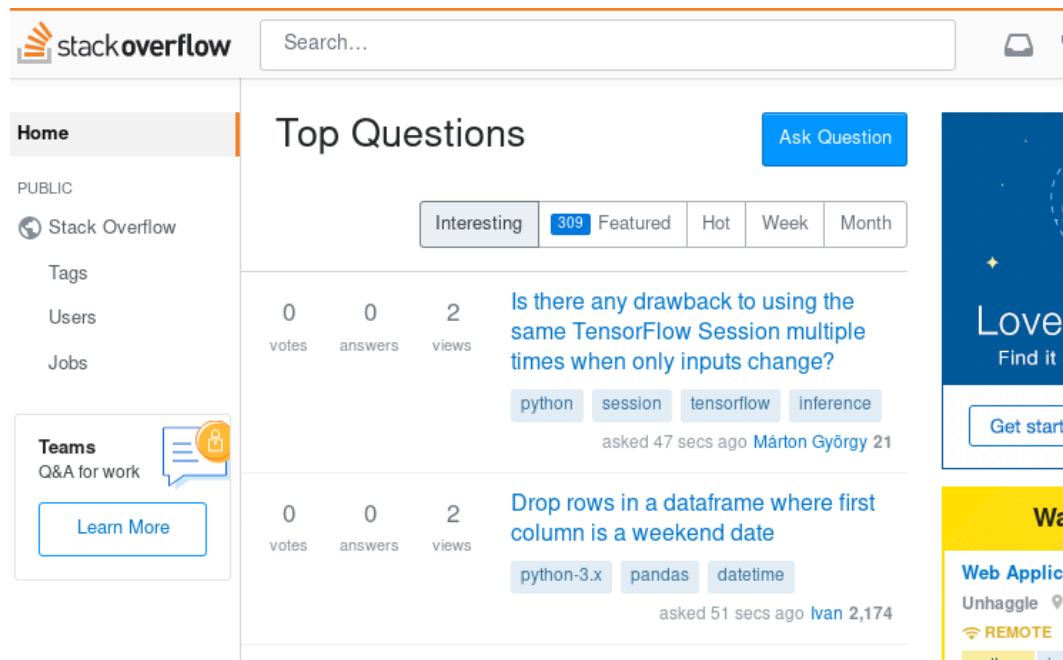
In Collaboration With:



Latest News:	Newest Data Sets:	Most Popular Data Sets (hits since 2007):
<p><b>09-24-2018:</b> Welcome to the new Repository admins Dheeru Dua and Efi Karra Taniskidou!</p> <p><b>04-04-2013:</b> Welcome to the new Repository admins Kevin Bache and Moshe Lichman!</p> <p><b>03-01-2010:</b> <a href="#">Note</a> from donor regarding Netflix data</p> <p><b>10-16-2009:</b> Two new data sets have been added.</p>	<p><b>11-30-2018:</b>  <a href="#">2.4 GHZ Indoor Channel Measurements</a></p> <p><b>11-16-2018:</b>  <a href="#">Electrical Grid Stability Simulated Data</a></p> <p><b>11-09-2018:</b>  <a href="#">BAUM-2</a></p>	<p><b>2336473:</b>  <a href="#">Iris</a></p> <p><b>1365382:</b>  <a href="#">Adult</a></p> <p><b>1047803:</b>  <a href="#">Wine</a></p>

# Useful Website [3]

- For asking programming related questions
- Or looking for solutions to problems similar to yours
- <https://stackoverflow.com/>



The screenshot displays the Stack Overflow homepage. At the top, there is a search bar and a navigation menu with 'Home' selected. Below the navigation, the 'Top Questions' section is visible, featuring a list of questions with their respective statistics (votes, answers, views) and tags. The first question is 'Is there any drawback to using the same TensorFlow Session multiple times when only inputs change?' with 0 votes, 0 answers, and 2 views. The second question is 'Drop rows in a dataframe where first column is a weekend date' with 0 votes, 0 answers, and 2 views. The right sidebar contains a 'Love' section and a 'Web Applica' section.

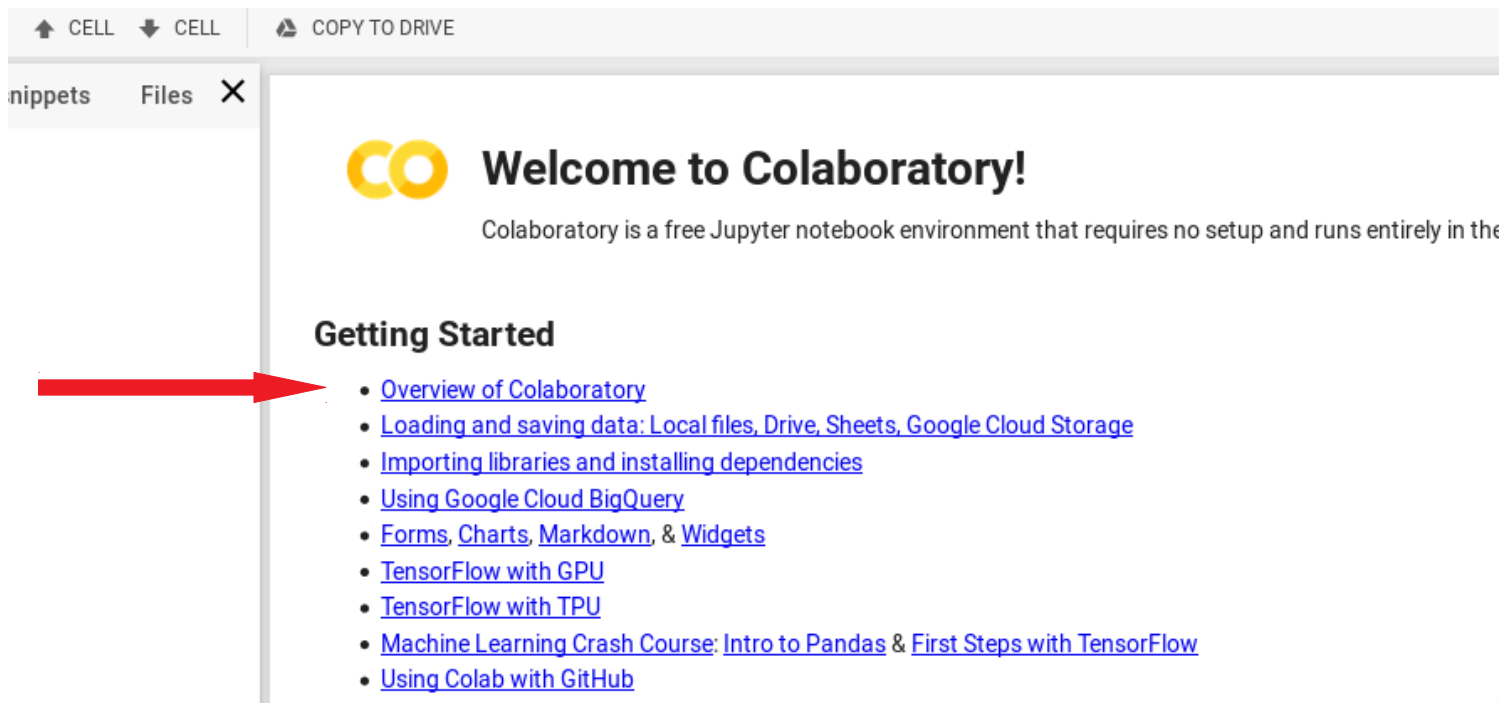


# The End

- Thank you and have fun !!

# Homework 0

- Read Overview of Colaboration



The screenshot shows the Colaboratory web interface. At the top, there are navigation buttons: 'CELL' (up arrow), 'CELL' (down arrow), and 'COPY TO DRIVE'. Below this is a sidebar with 'nippets' and 'Files' tabs. The main content area displays the Colaboratory logo and the text 'Welcome to Colaboratory!'. Below this, it states 'Colaboratory is a free Jupyter notebook environment that requires no setup and runs entirely in the'. Under the heading 'Getting Started', there is a list of links. A red arrow points to the first link, 'Overview of Colaboratory'.

↑ CELL ↓ CELL COPY TO DRIVE

nippets Files X

**CO** **Welcome to Colaboratory!**

Colaboratory is a free Jupyter notebook environment that requires no setup and runs entirely in the

**Getting Started**

- [Overview of Colaboratory](#)
- [Loading and saving data: Local files, Drive, Sheets, Google Cloud Storage](#)
- [Importing libraries and installing dependencies](#)
- [Using Google Cloud BigQuery](#)
- [Forms, Charts, Markdown, & Widgets](#)
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- [TensorFlow with TPU](#)
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- [Using Colab with GitHub](#)