

Machine Learning

| Google Colab

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| Agenda

- Google Colab

| Google Colab

- Colaboratory, or “**Colab**” for short, is a product from Google Research. Colab allows anybody to write and execute arbitrary python code through the browser, and is especially well suited to machine learning, data analysis and education.
- More technically, Colab is a hosted Jupyter notebook service that requires no setup to use, while providing access free of charge to computing resources including GPUs.
- Open a web browser and visit <https://homl.info/colab3>

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- What is the difference between Jupyter and Colab?
 - Jupyter is the open source project on which Colab is based. Colab allows you to use and share Jupyter notebooks with others without having to download, install, or run anything.
- Where are my notebooks stored, and can I share them?
 - Colab notebooks are stored in Google Drive, or can be loaded from GitHub.
 - Colab notebooks can be shared just as you would with Google Docs or Sheets. Simply click the Share button at the top right of any Colab notebook

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- If I share my notebook, what will be shared?
 - If you choose to share a notebook, the full contents of your notebook (text, code, output, and comments) will be shared.
 - You can omit code cell output from being saved or shared by using **Edit > Notebook settings > Omit code cell output when saving this notebook.**
 - The virtual machine you're using, including any custom files and libraries that you've setup, will not be shared.
 - So it's a good idea to include cells which install and load any custom libraries or files that your notebook needs.

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- How can I search Colab notebooks?
 - You can search Colab notebooks using Google Drive. Clicking on the Colab logo at the top left of the notebook view will show all notebooks in Drive. You can also search for notebooks that you have opened recently using File > Open notebook.

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- Where is my code executed? What happens to my execution state if I close the browser window?
 - Code is executed in a virtual machine private to your account. Virtual machines are deleted when idle for a while, and have a maximum lifetime enforced by the Colab service.
- What types of GPUs are available in Colab?
- How much memory is available in Colab?
- <https://research.google.com/colaboratory/faq.html>

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Open notebook

Examples >

Recent >

Google Drive >

GitHub >

Upload >

Enter a GitHub URL or search by organization or user

☐ Include private repos

ageron

Repository: [🔗](#)
ageron/handson-ml3

Branch: [🔗](#)
main

Path

 [01_the_machine_learning_landscape.ipynb](#)

 [02_end_to_end_machine_learning_project.ipynb](#)

 [03_classification.ipynb](#)

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- A **malicious person** could create a **notebook** that tries to trick you into entering your **Google credentials** so they can access your personal data, so before you run a notebook, always make sure you **trust** its author (or double-check what each code cell will do before running it)
- **Runtime**: this is a free virtual machine located on Google's servers that contains a bunch of tools and Python libraries, including everything you'll need for most chapters (in some chapters

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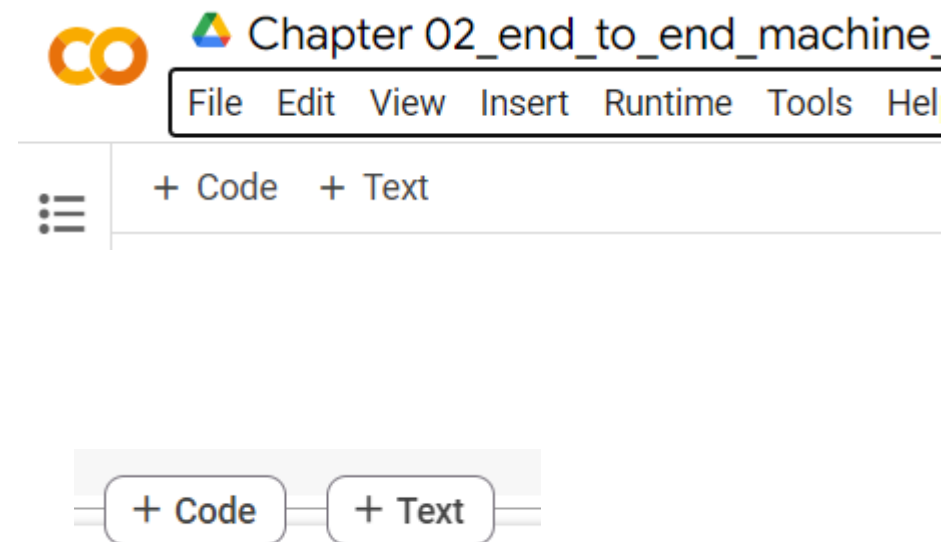
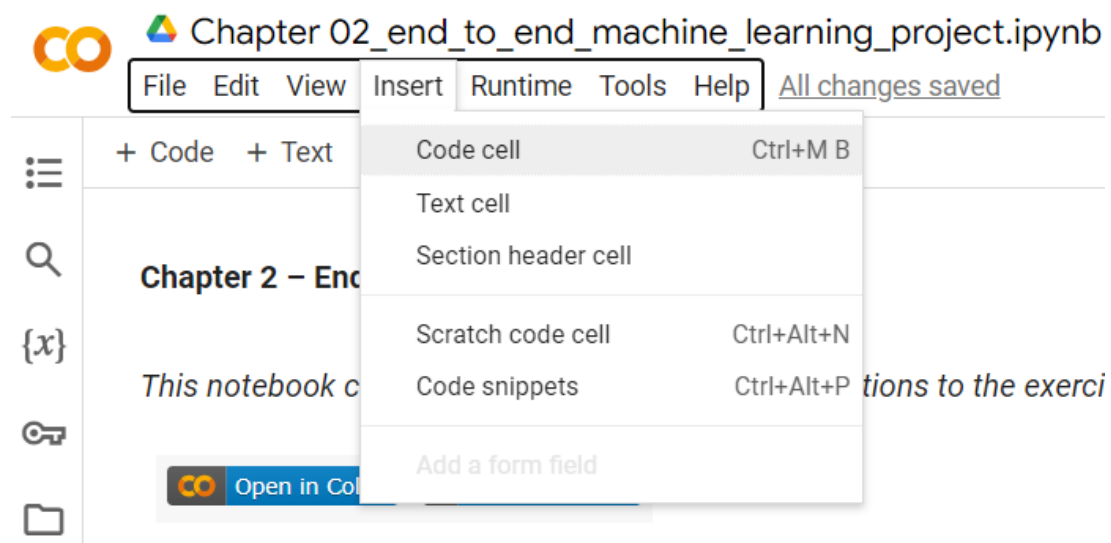
- To insert a new code cell, you can also type **Ctrl-M** followed by **A** (to insert above the active cell) or **B** (to insert below).
- There are many other keyboard shortcuts available: you can view and edit them by typing **Ctrl-M** then **H**.
- If you choose to run the notebooks on Kaggle or on your own machine using JupyterLab or an IDE such as Visual Studio Code with the Jupyter extension - Runtimes are called **kernels**

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- A **Jupyter** notebook is composed of a list of cells.
- Each cell contains either **executable code or text**
- Jupyter notebooks use **Markdown** syntax for formatting
 - ****bold****,
 - ***italics***,
 - **# Title**,
 - **[url](link text)**.
- Try modifying this text, then press **Shift-Enter** to see the result.

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■ How to Add Cell



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- How to Execute a Cell
 - Shift + Enter
 - Ctrl + Enter

```
 print("Welcome to Machine Learning!")
```

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Saving Your Code Changes and Your Data

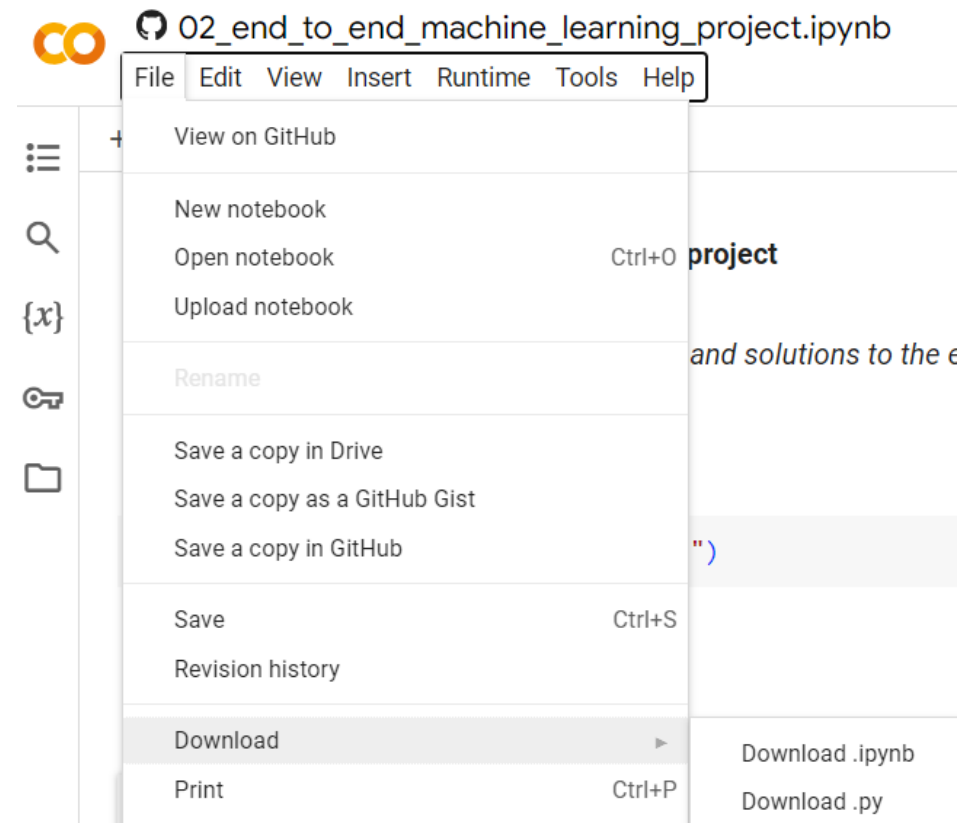
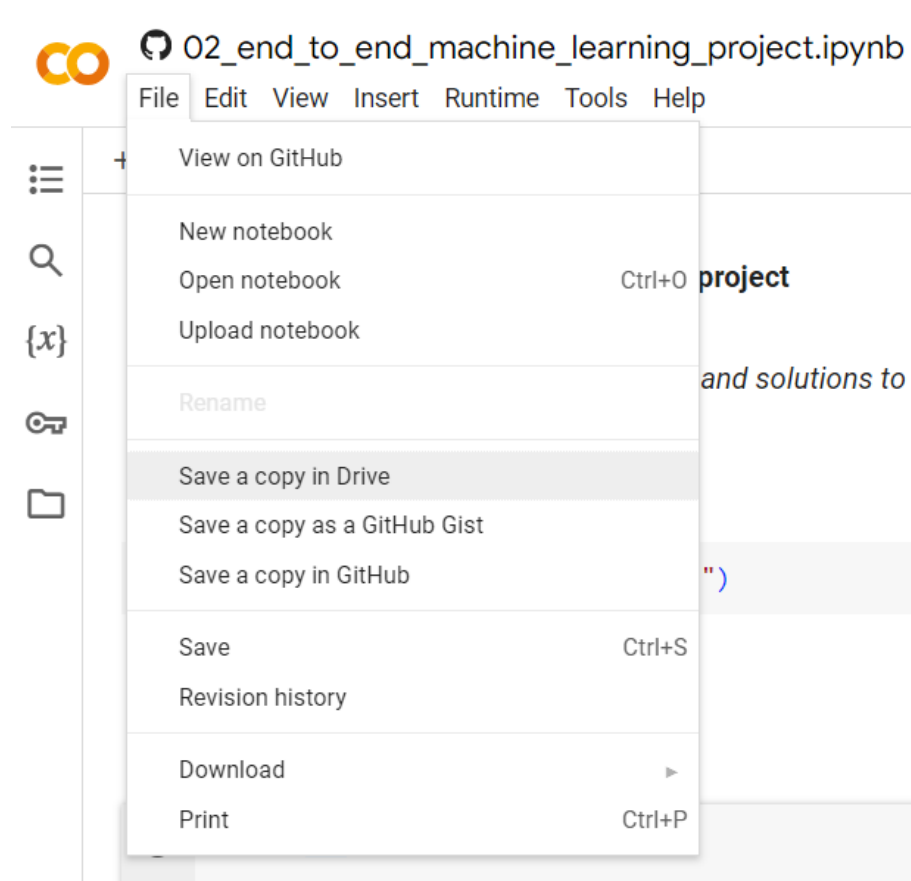
- You can **make changes** to a Colab notebook, and they will persist for as long as you keep your browser tab open.
- But once you **close it**, the changes will be **lost**.

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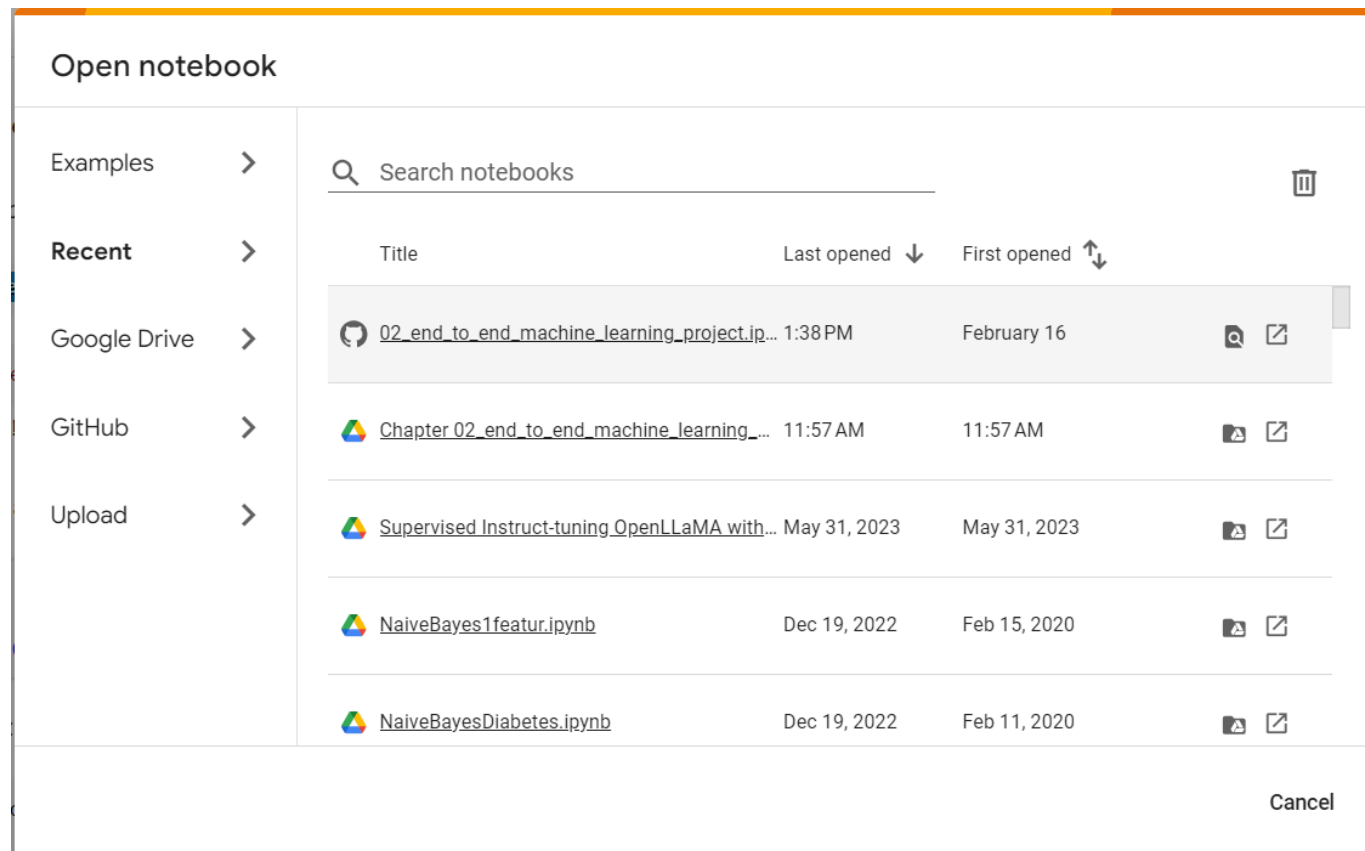
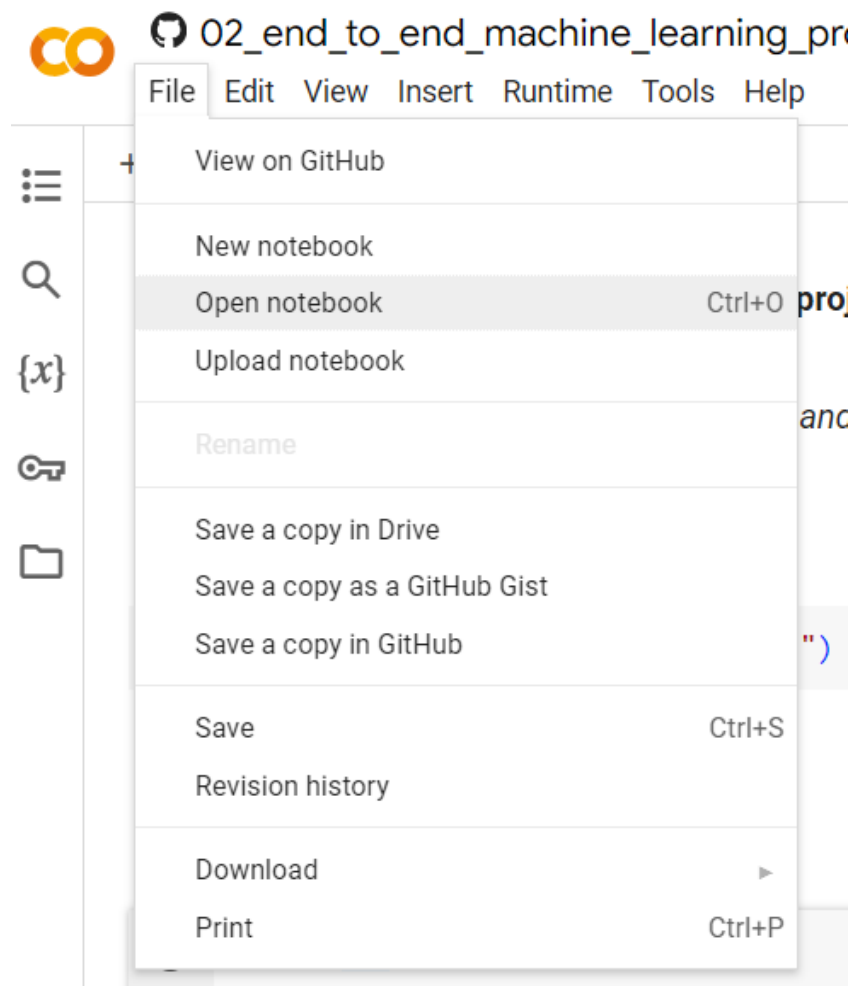
Saving Your Code Changes and Your Data

- To avoid this, make sure you **save a copy** of the notebook to your **Google Drive**
- Download the notebook to your computer - then you can later visit <https://colab.research.google.com> and open the notebook again

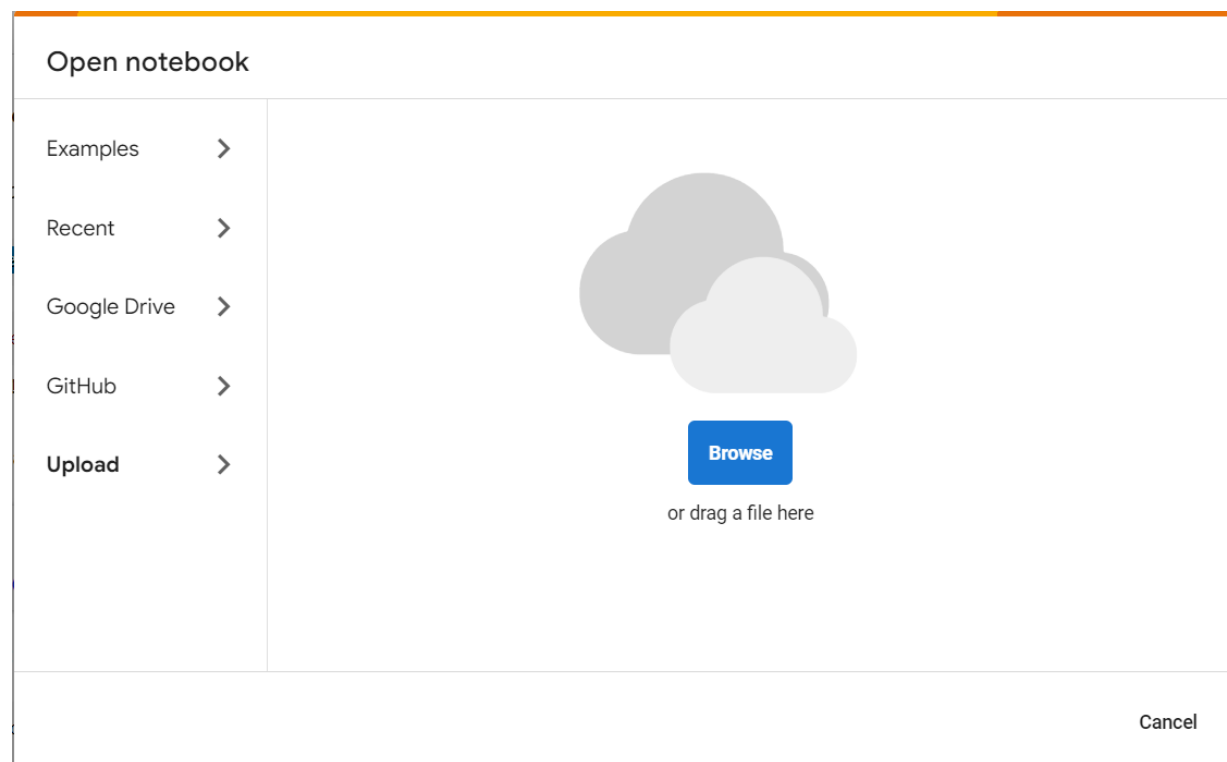
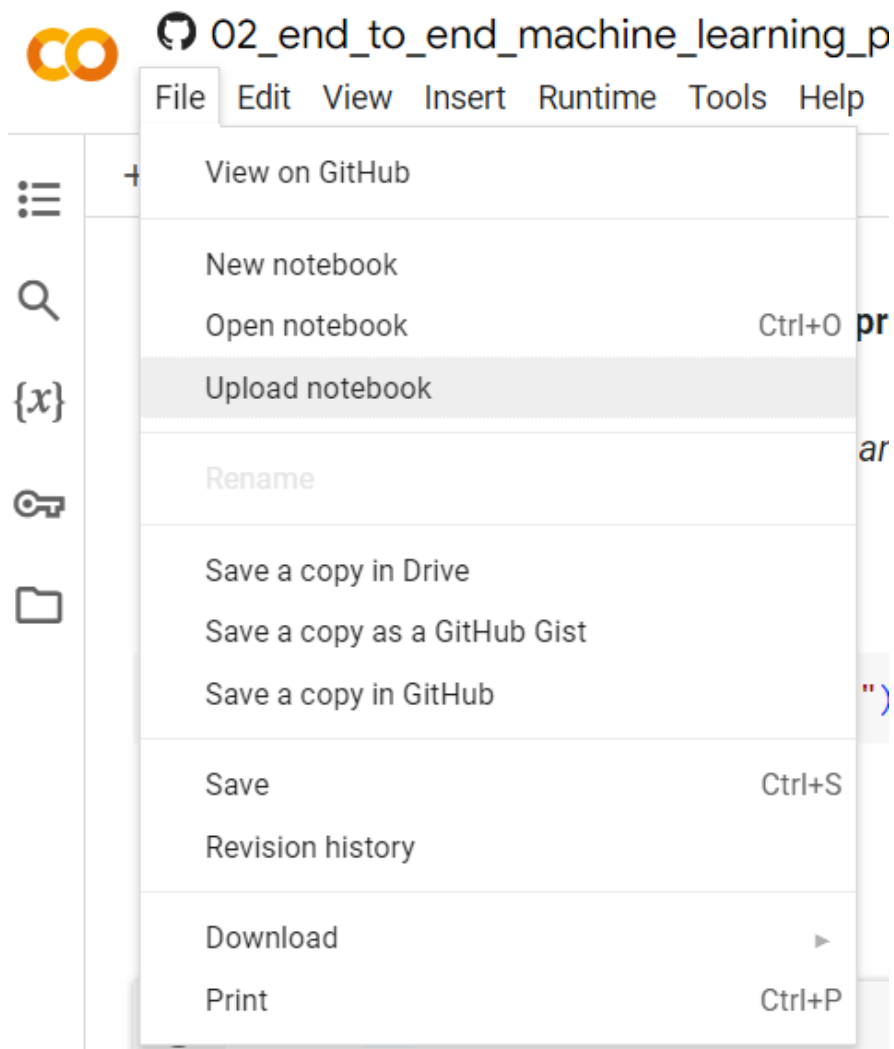
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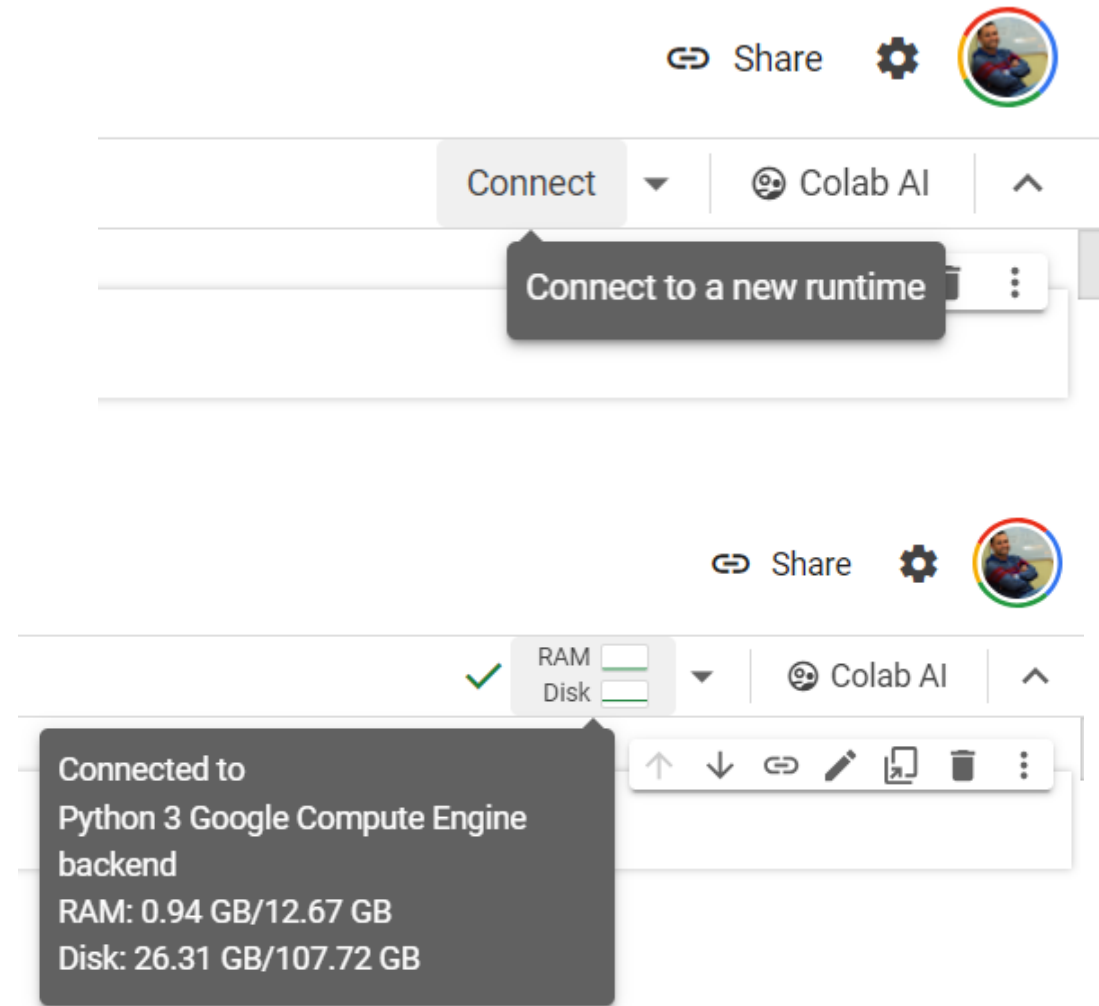


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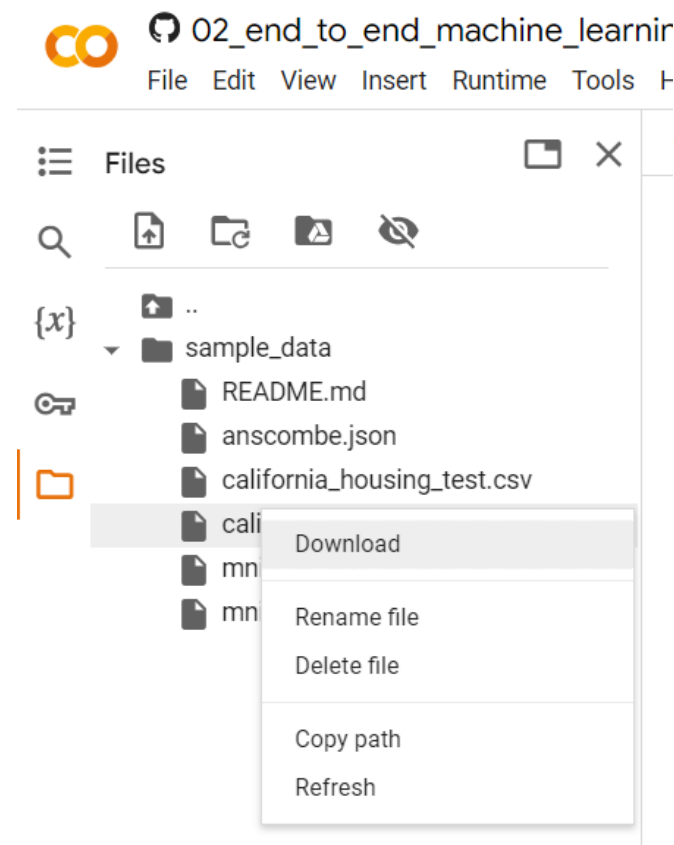
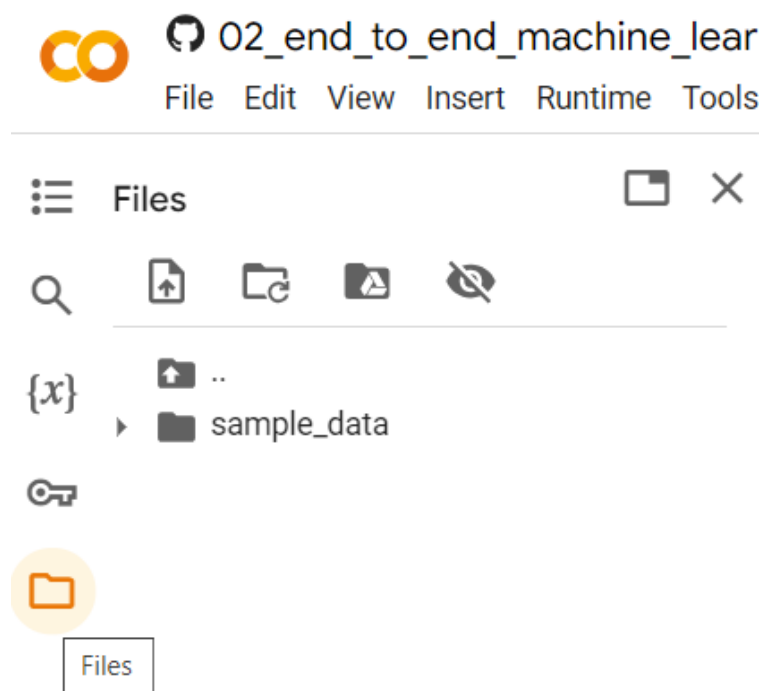
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- **Google Colab** is meant only for **interactive use**: you can play around in the notebooks and tweak the code as you like, but you cannot let the notebooks **run unattended for a long period of time**, or else the **runtime** will be shut down and all of its data will be lost.



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- If the notebook generates data that you care about, make sure you download this data before the runtime shuts down



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- you can mount your Google Drive on the runtime, allowing the notebook to read and write files directly to Google Drive as if it were a local directory.

The image displays two side-by-side screenshots of the Google Colab interface, illustrating the process of mounting Google Drive.

Left Screenshot: Shows the 'Files' pane. A tooltip labeled 'Mount Drive' is visible over the 'Mount Drive' button in the top toolbar. The file list shows a folder named 'sample_data' containing files: README.md, anscombe.json, california_housing_test.csv, california_housing_train.csv, mnist_test.csv, and mnist_train_small.csv.

Right Screenshot: Shows the same 'Files' pane, but the files are now mounted. The file list shows the same files as the left screenshot. A code cell is visible with the following code:

```
from google.colab import drive
drive.mount('/content/drive')
```

A blue tooltip is displayed over the code cell, containing the text: "Run this cell to mount your Google Drive. [Learn more](#)". Below the tooltip are two buttons: "Open in Colab" and "Open in Kaggle".

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- If you want to back up a data file, simply copy it to this directory by running
- **!cp** /content/my_great_model /content/drive/MyDrive.
- Any command starting with a bang (!) is treated as a shell command, not as Python code
- **Cp** is the Linux shell command to copy a file from one path to another.
- Note that **Colab runtimes run on Linux** (specifically, **Ubuntu**).