

Start Lab 00:45:00

Writing Low-Level TensorFlow Code

45 minutes Free ★★★★★ 1 Rate Lab

- Overview
- Setup
- Launch AI Platform Notebooks
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- Writing Low-Level TensorFlow Code
- End your lab

Overview

Duration is 1 min

In this lab, you will start by reviewing the main operations on Tensors in TensorFlow and understand how to manipulate TensorFlow Variables. We explain how these are compatible with python built-in list and numpy arrays.

Then we will jump to the problem of training a linear regression from scratch with gradient descent. The first order of business will be to understand how to compute the gradients of a function (the loss here) with respect to some of its arguments (the model weights here). The TensorFlow construct allowing us to do that is `tf.GradientTape`, which we will describe.

At last we will create a simple training loop to learn the weights of a 1-dim linear regression using synthetic data generated from a linear model.

As a bonus exercise, we will do the same for data generated from a non linear model, forcing us to manual engineer non-linear features to improve our linear model performance.

What you learn

In this lab, you will:

- Practice defining and performing basic operations on constant Tensors
- Use Tensorflow's automatic differentiation capability
- Learn how to train a linear regression from scratch with TensorFlow

Setup

For each lab, you get a new Google Cloud project and set of resources for a fixed time at no cost.

- Make sure you signed into Qwiklabs using an **Incognito window**.
- Note the lab's access time (for example, **02:00:00**) and make sure you can finish in that time block.

There is no pause feature. You can restart if needed, but you have to start at the beginning.

- When ready, click **START LAB**.
- Note your lab credentials. You will use them to sign in to the Google Cloud Console.

Open Google Console

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. [Learn more](#).

Username
google2876526_student@qwiklabs.n

Password
TG959yrKDX

GCP Project ID
qwiklabs-gcp-0855e773352d3560

[New to labs? View our introductory video!](#)

- Click **Open Google Console**.
- Click **Use another account** and copy/paste credentials for **this lab** into the prompts.

If you use other credentials, you'll get errors or **incur charges**.

- Accept the terms and skip the recovery resource page.

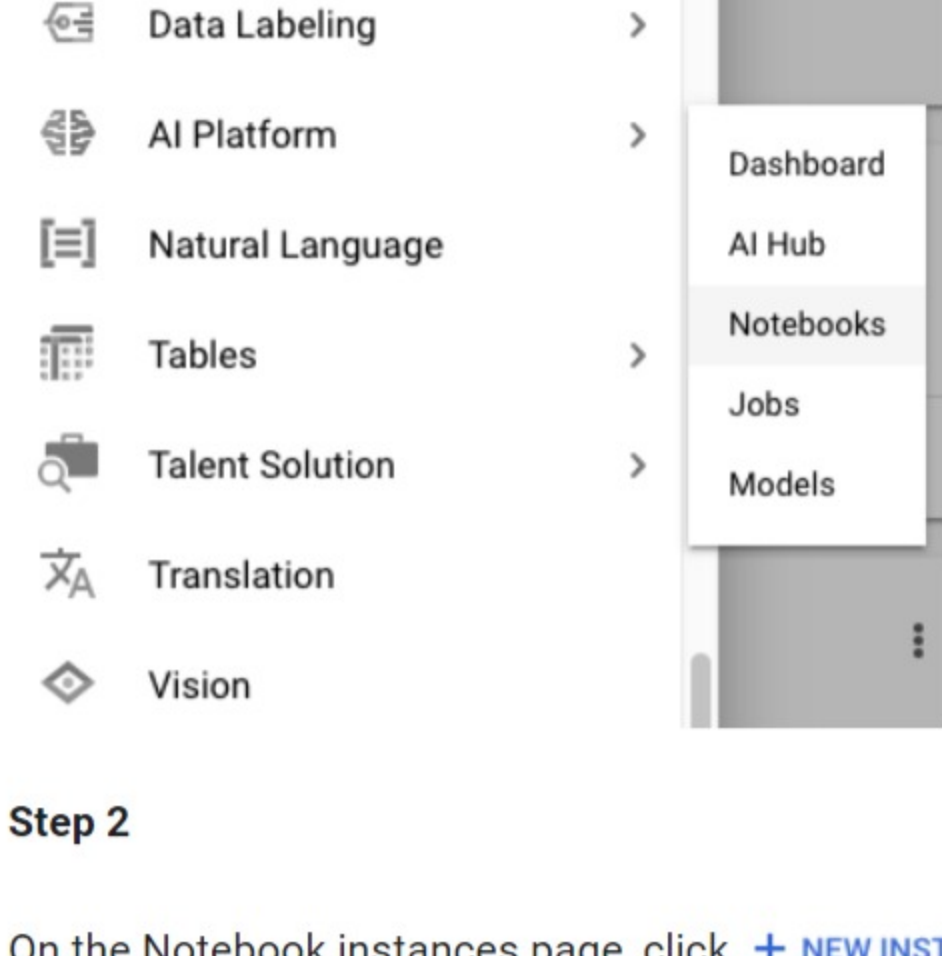
Do not click **End Lab** unless you are finished with the lab or want to restart it. This clears your work and removes the project.

Launch AI Platform Notebooks

To launch AI Platform Notebooks:

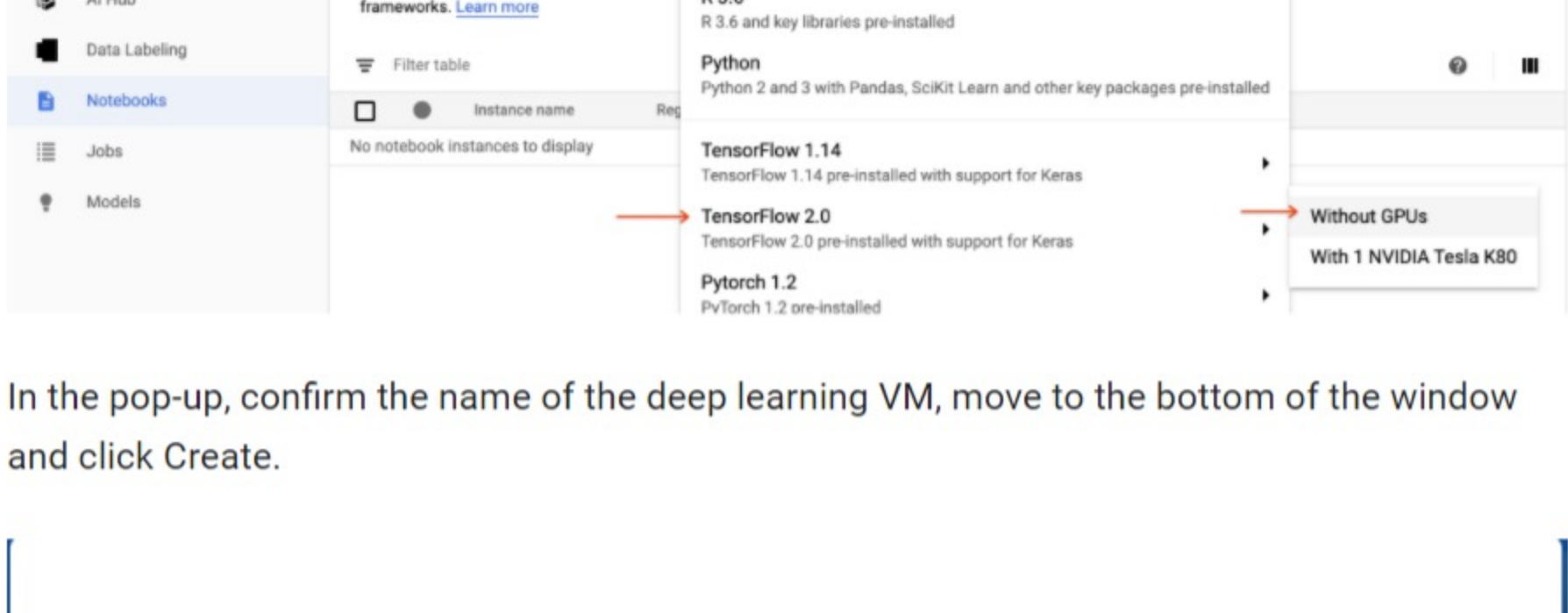
Step 1

Click on the Navigation Menu. Navigate to AI Platforms, then to Notebooks.



Step 2

On the Notebook instances page, click **+ NEW INSTANCE**. Select TensorFlow 2.x without GPUs.



In the pop-up, confirm the name of the deep learning VM, move to the bottom of the window and click Create.

New notebook instance

Instance name *

tensorflow-20191031-100408

Environment:

Image: TensorFlow 2.0 (with Intel® MKL-DNN/MKL and CUDA 10.0)

Packages: python2, python3, scikit-learn, pandas, and nltk.

Machine configurations: ?

Region and zone: us-west1-b

Machine type: 4 vCPUs, 15 GB RAM

Boot disk: 100 GB Disk

Networking:

Subnetwork *

default(10.138.0.0/20)

External IP: Ephemeral(Automatic)

Permission:

Compute Engine default service account

Estimated cost: ?

\$99.89 monthly, \$0.137 hourly

CUSTOMIZE

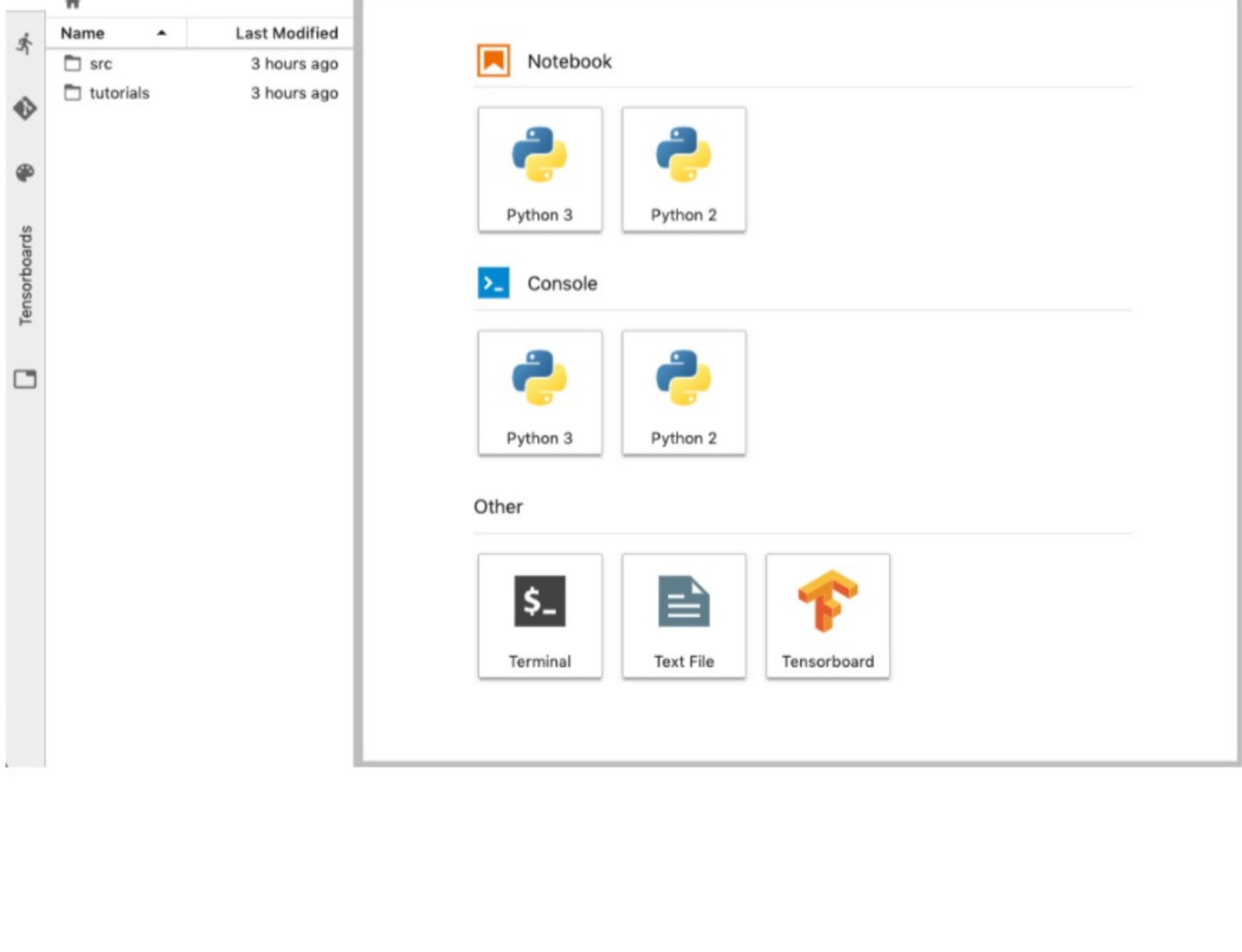
CANCEL

CREATE

The new VM will take 2-3 minutes to start.

Step 3

Click **Open JupyterLab**. A JupyterLab window will open in a new tab.

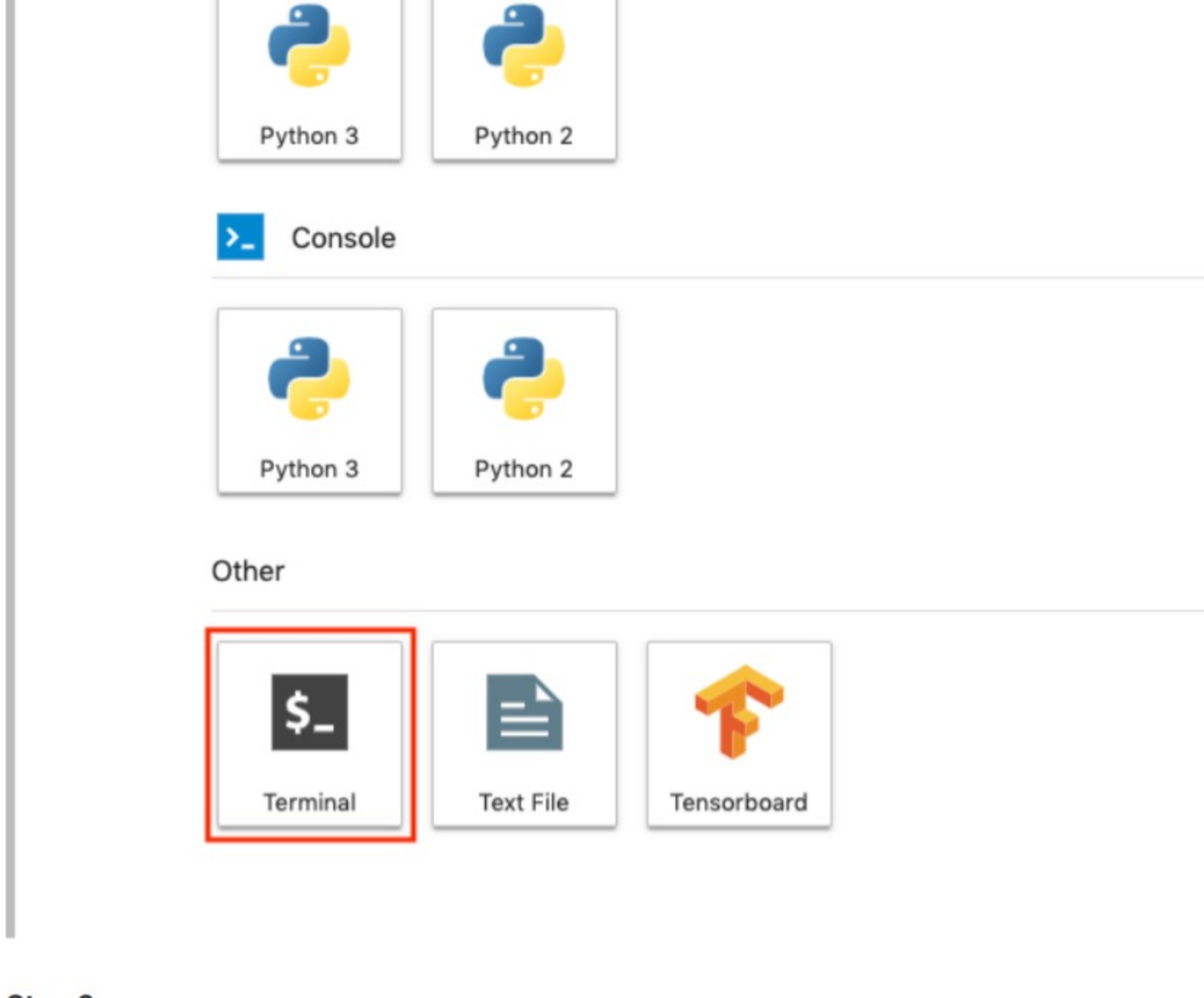


Clone course repo within your AI Platform Notebooks instance

To clone the `training-data-analyst` notebook in your JupyterLab instance:

Step 1

In JupyterLab, click the Terminal icon to open a new terminal.



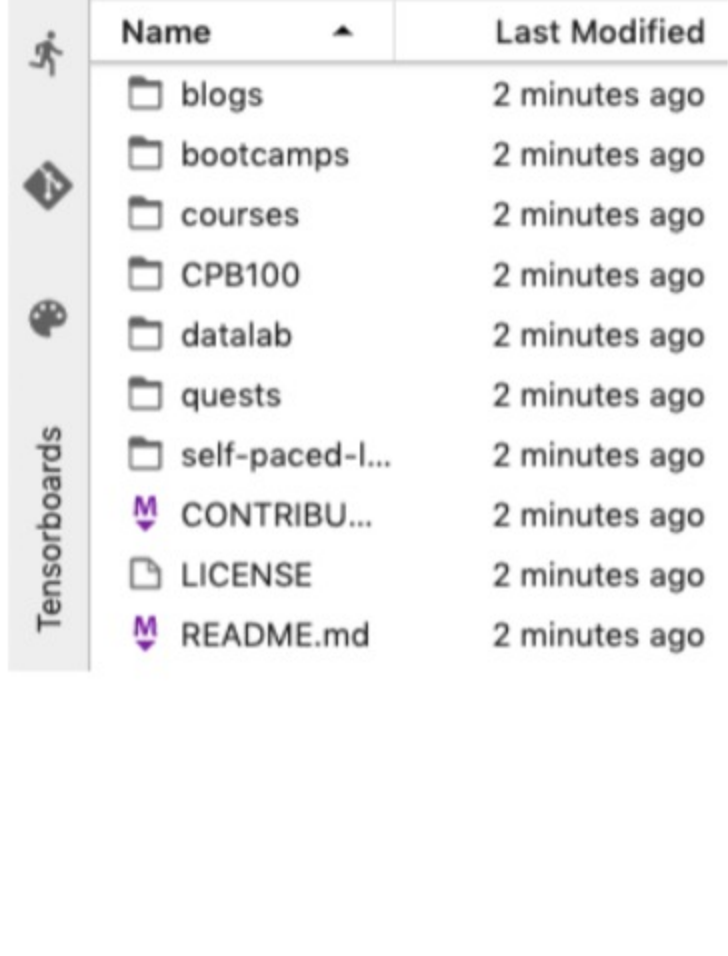
Step 2

At the command-line prompt, type in the following command and press Enter.

```
git clone https://github.com/GoogleCloudPlatform/training-data-analyst
```

Step 3

Confirm that you have cloned the repository by double clicking on the `training-data-analyst` directory and ensuring that you can see its contents. The files for all the Jupyter notebook-based labs throughout this course are available in this directory.



Writing Low-Level TensorFlow Code

Duration is 30 min

Step 1

In the notebook interface, navigate to **training-data-analyst > courses > machine_learning > deeplive2 > introduction_to_tensorflow > labs** and open **write_low_level_code.ipynb**.

Step 2

In the notebook interface, click on **Edit > Clear All Outputs** (click on Edit, then in the drop-down menu, select Clear All Outputs).

Carefully read through the notebook instructions and fill in lines marked with #TODO where you need to complete the code as needed

Tip: To run the current cell you can click the cell and hit **shift+enter**. Other cell commands are found in the notebook UI under **Run**.

- Hints may also be provided for the tasks to guide you along. Highlight the text to read the hints (they are in white text).
- If you need more help, you may take a look at the complete solution by navigating to **training-data-analyst > courses > machine_learning > deeplive2 > introduction_to_tensorflow > solutions** and open **write_low_level_code.ipynb**.

End your lab

When you have completed your lab, click **End Lab**. Qwiklabs removes the resources you've used and cleans the account for you.

You will be given an opportunity to rate the lab experience. Select the applicable number of stars, type a comment, and then click **Submit**.

The number of stars indicates the following:

- 1 star = Very dissatisfied
- 2 stars = Dissatisfied
- 3 stars = Neutral
- 4 stars = Satisfied
- 5 stars = Very satisfied

You can close the dialog box if you don't want to provide feedback.

For feedback, suggestions, or corrections, please use the **Support** tab.