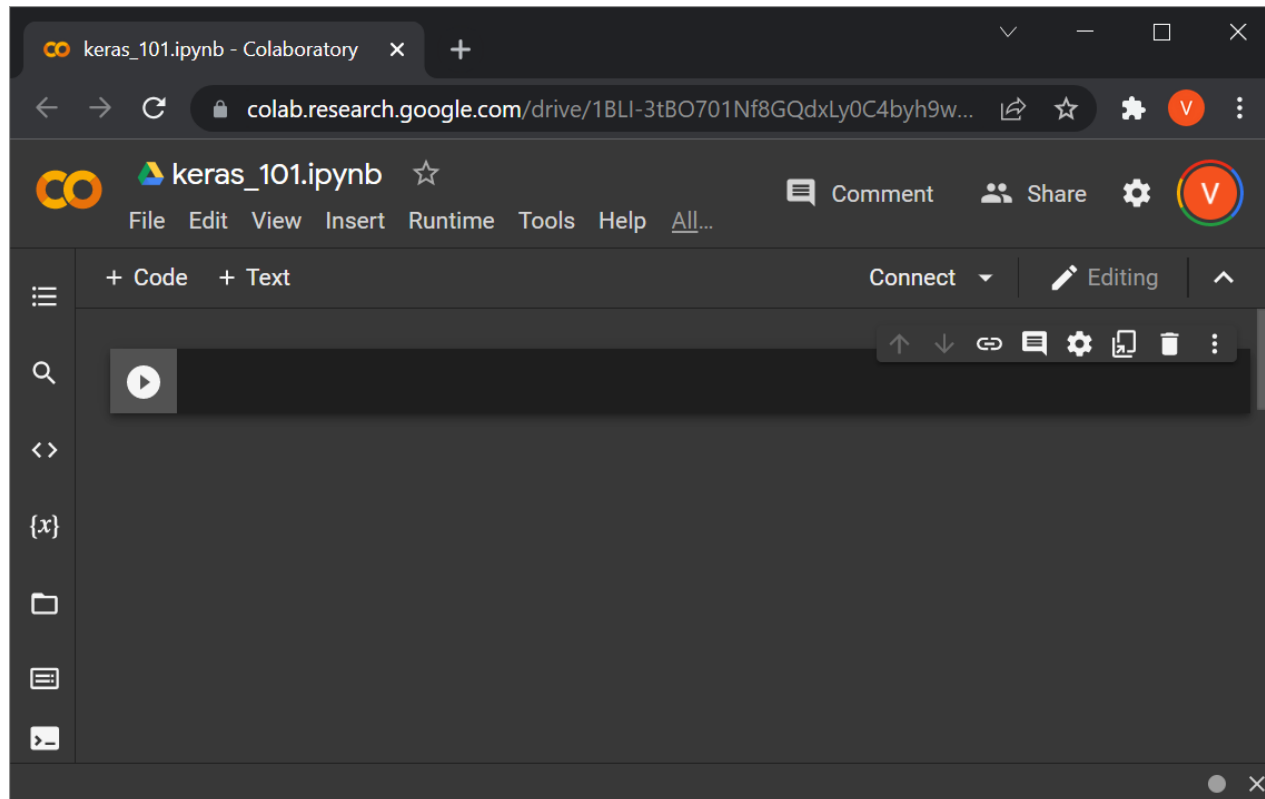


Google Colab

CSE 4311 – Neural Networks and Deep Learning
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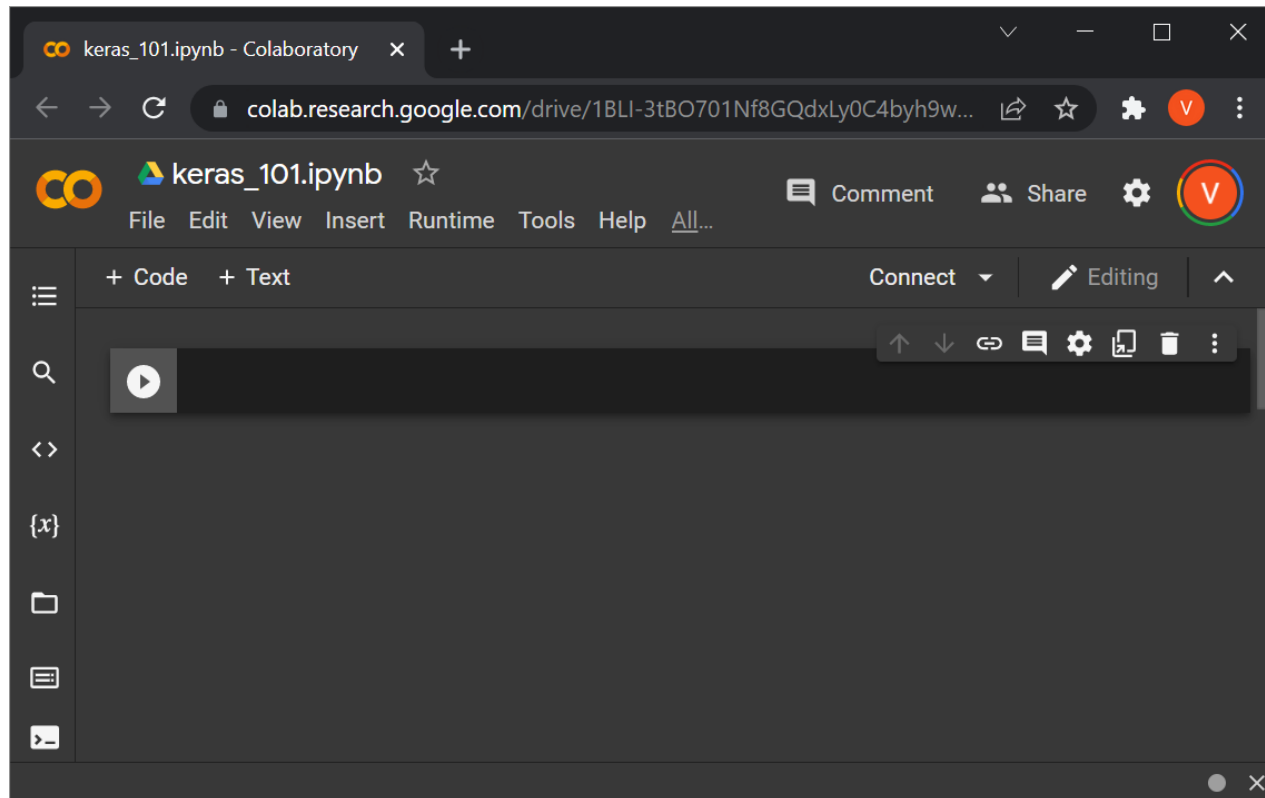
Colab Basics

- Go to Google Colab, sign in with your Google Account.
- Go to File->New notebook
- Give a name to your notebook, like keras_101.ipynb.



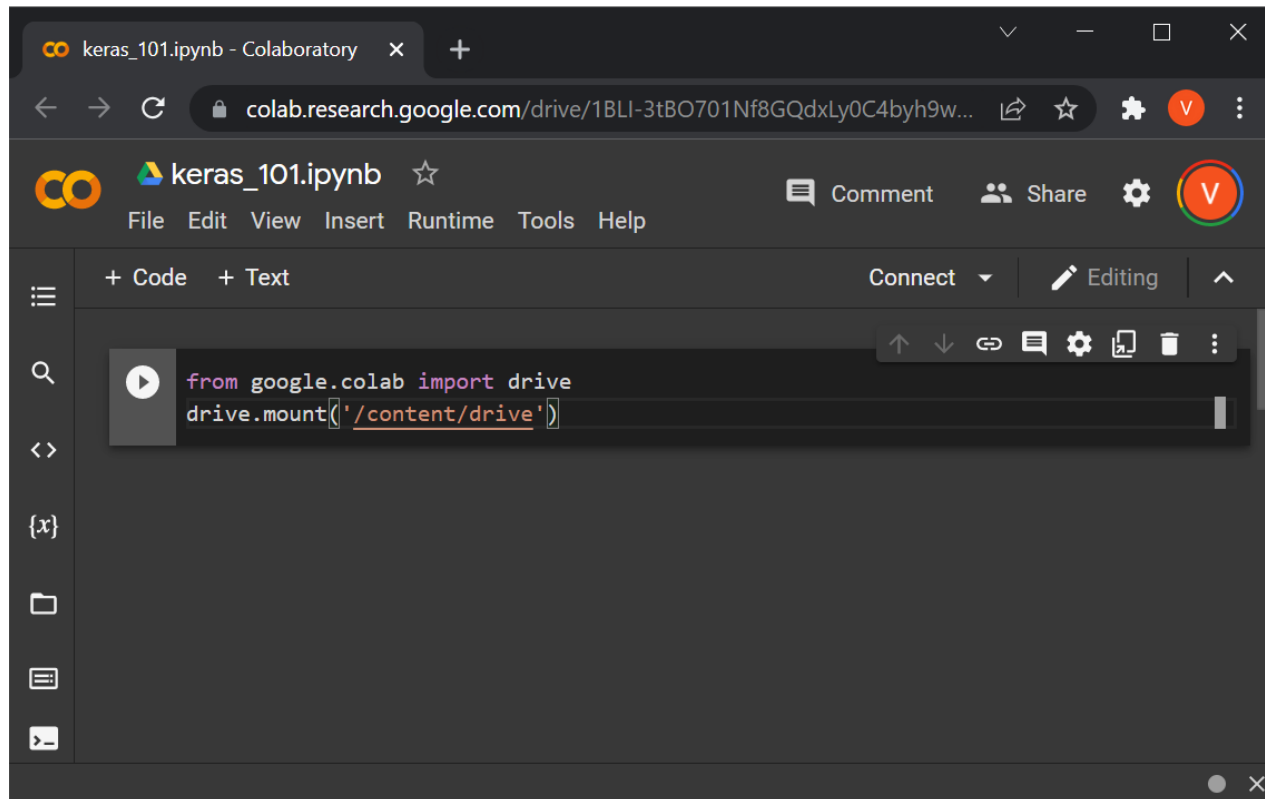
Code Cells in Colab

- To create a new code cell in Colab, click the “+ Code” button.
- To run the code on that cell, click the “play” button to the left of the cell, or press SHIFT+ENTER.



Pasting Code to Colab

- Pasting code to Colab from Powerpoint does not work for me.
- First I paste from Powerpoint to a Google Drive text file.
- Then I copy-paste from the Google Drive file to the Colab notebook.



If Using Colab, Some Prep

- On Google Drive, I created a top-level folder called cse4392.
- Then, on Google Colab:
 - Create and run a cell with this code:

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

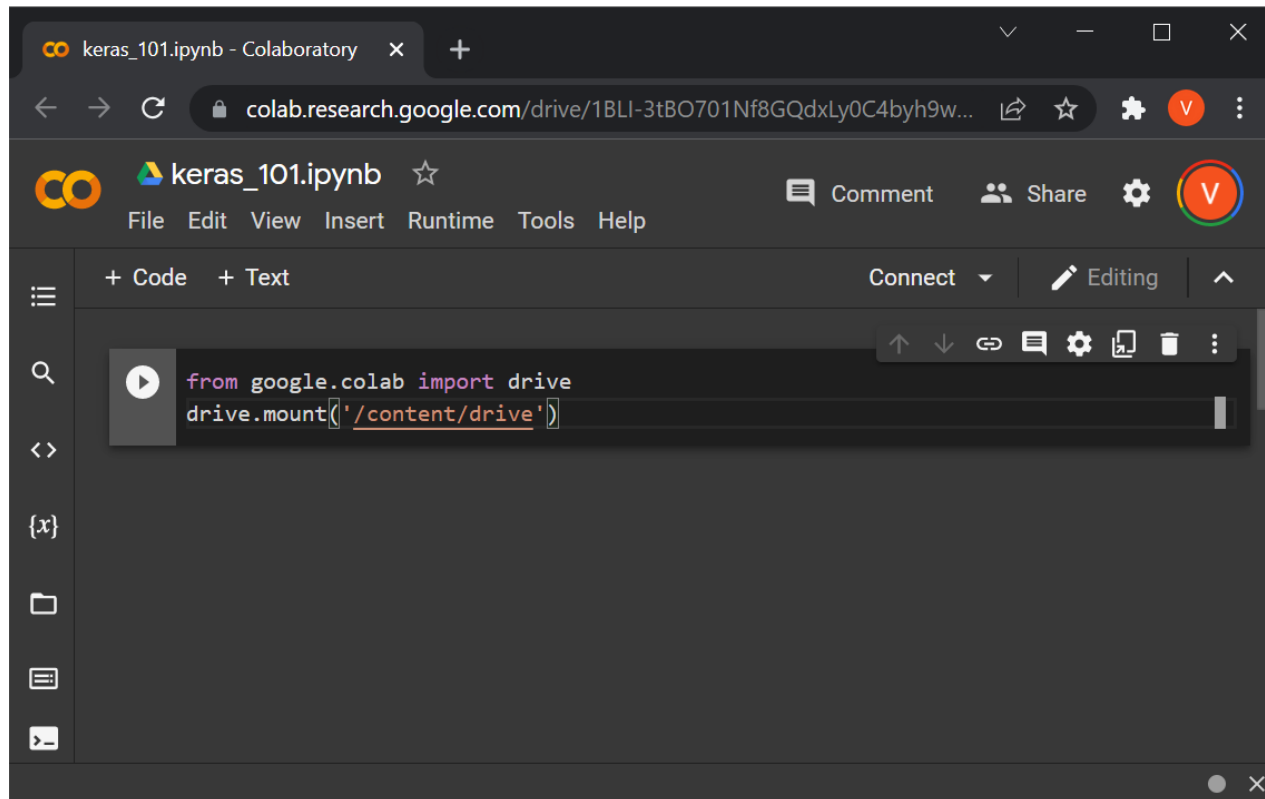
- Create and run another cell with this code:

```
cd /content/drive/MyDrive/cse4392
```

- The next slides show these steps in more detail.

Mounting Google Drive

- Put in the code that you see, and run the cell.
- You may get this prompt “Permit this notebook to access your Google Drive files?” If so, click “Connect to Google Drive”. You get a couple more prompts to connect to your account and give permissions to Google Drive.



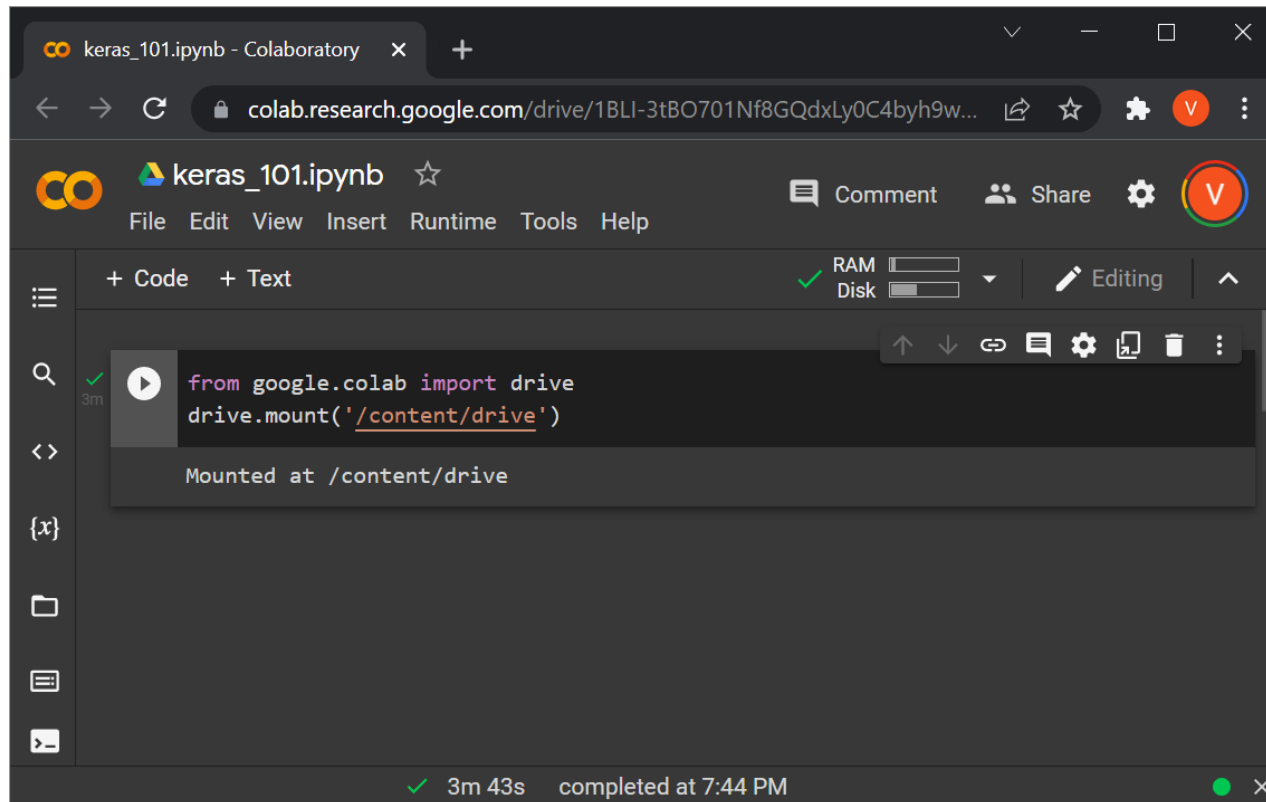
The screenshot shows a Google Colaboratory notebook titled 'keras_101.ipynb'. The browser address bar displays the URL 'colab.research.google.com/drive/1BLI-3tBO701Nf8GQdxLy0C4byh9w...'. The notebook interface includes a top menu bar with 'File', 'Edit', 'View', 'Insert', 'Runtime', 'Tools', and 'Help'. Below the menu, there are buttons for '+ Code' and '+ Text', and a 'Connect' dropdown menu. The main code cell contains the following Python code:

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

The code cell is currently in 'Editing' mode, as indicated by the 'Editing' label and the pencil icon. The left sidebar shows a file explorer view with a folder icon and a list of files.

Mounting Google Drive

- Once you deal with all the prompts, you get a confirmation that the drive is mounted.



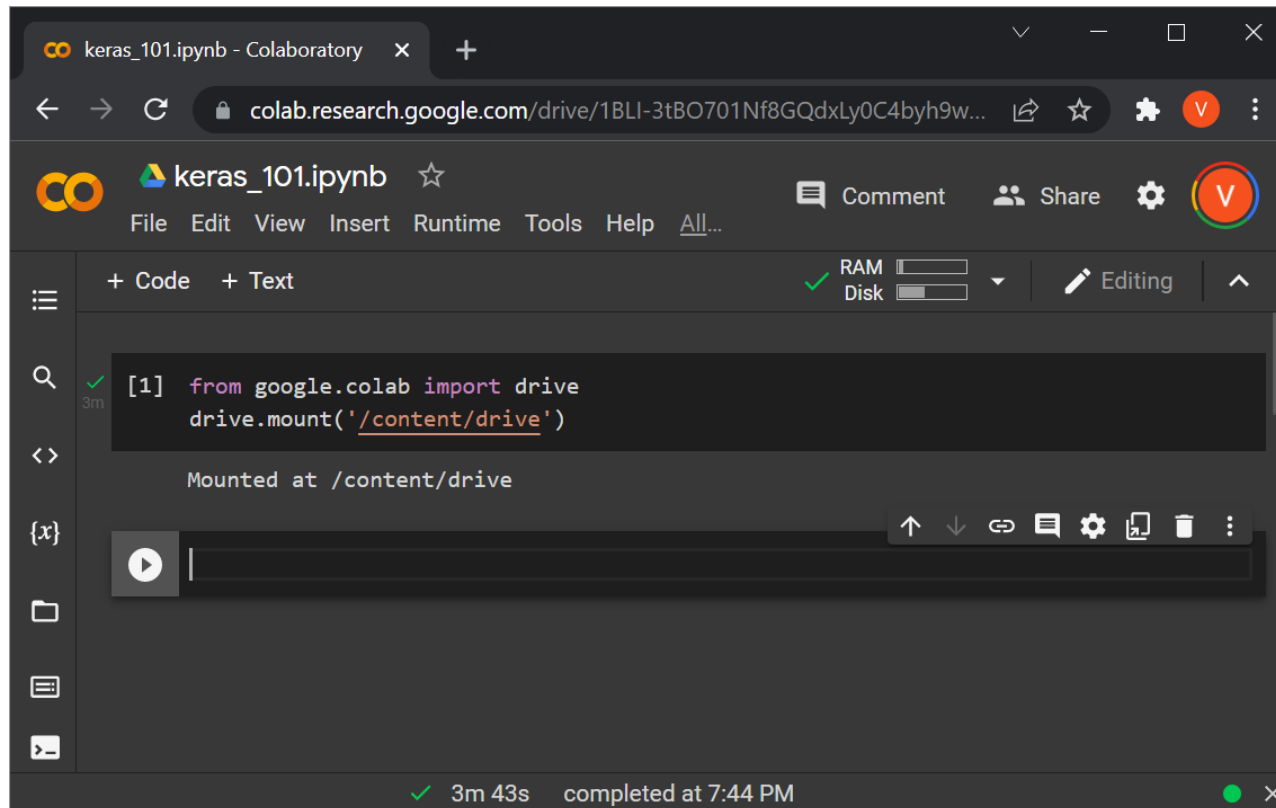
The screenshot shows the Google Colaboratory web interface. The browser tab is titled 'keras_101.ipynb - Colaboratory'. The address bar shows the URL 'colab.research.google.com/drive/1BLI-3tBO701Nf8GQdxLy0C4byh9w...'. The interface includes a menu bar with 'File', 'Edit', 'View', 'Insert', 'Runtime', 'Tools', and 'Help'. Below the menu bar, there are buttons for '+ Code' and '+ Text'. On the right side of the toolbar, there are indicators for 'RAM' and 'Disk' usage, a 'Comment' button, a 'Share' button, and a user profile icon. The main code editor area contains the following Python code:

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

Below the code, a confirmation message is displayed: 'Mounted at /content/drive'. The status bar at the bottom shows a green checkmark, the text '3m 43s', and 'completed at 7:44 PM'.

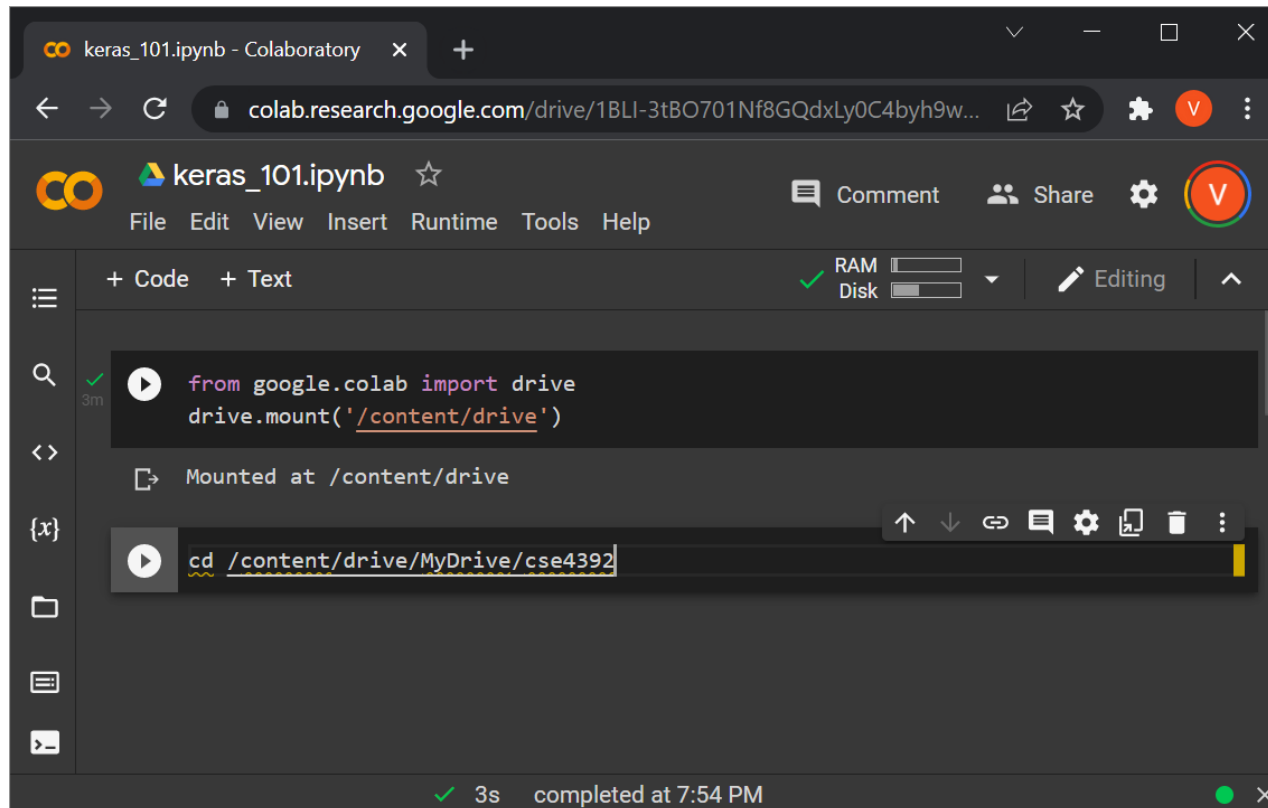
Mounting Google Drive

- Click on “+ Code” again, to add a new cell.



Mounting Google Drive

- In the new cell, type (or paste) the code that you see.



The screenshot shows a Google Colaboratory notebook interface. The browser address bar displays the URL `colab.research.google.com/drive/1BLI-3tBO701Nf8GQdxLy0C4byh9w...`. The notebook title is `keras_101.ipynb`. The menu bar includes `File`, `Edit`, `View`, `Insert`, `Runtime`, `Tools`, and `Help`. On the right, there are buttons for `Comment`, `Share`, and a settings icon. Below the menu bar, a toolbar shows `+ Code` and `+ Text` options, along with RAM and Disk usage indicators. The main workspace contains two code cells. The first cell has a play button icon and contains the code `from google.colab import drive` and `drive.mount('/content/drive')`. Below this code, the output shows `Mounted at /content/drive`. The second cell also has a play button icon and contains the code `cd /content/drive/MyDrive/cse4392`. The bottom status bar indicates that the execution was successful with a green checkmark, took 3 seconds, and completed at 7:54 PM.

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

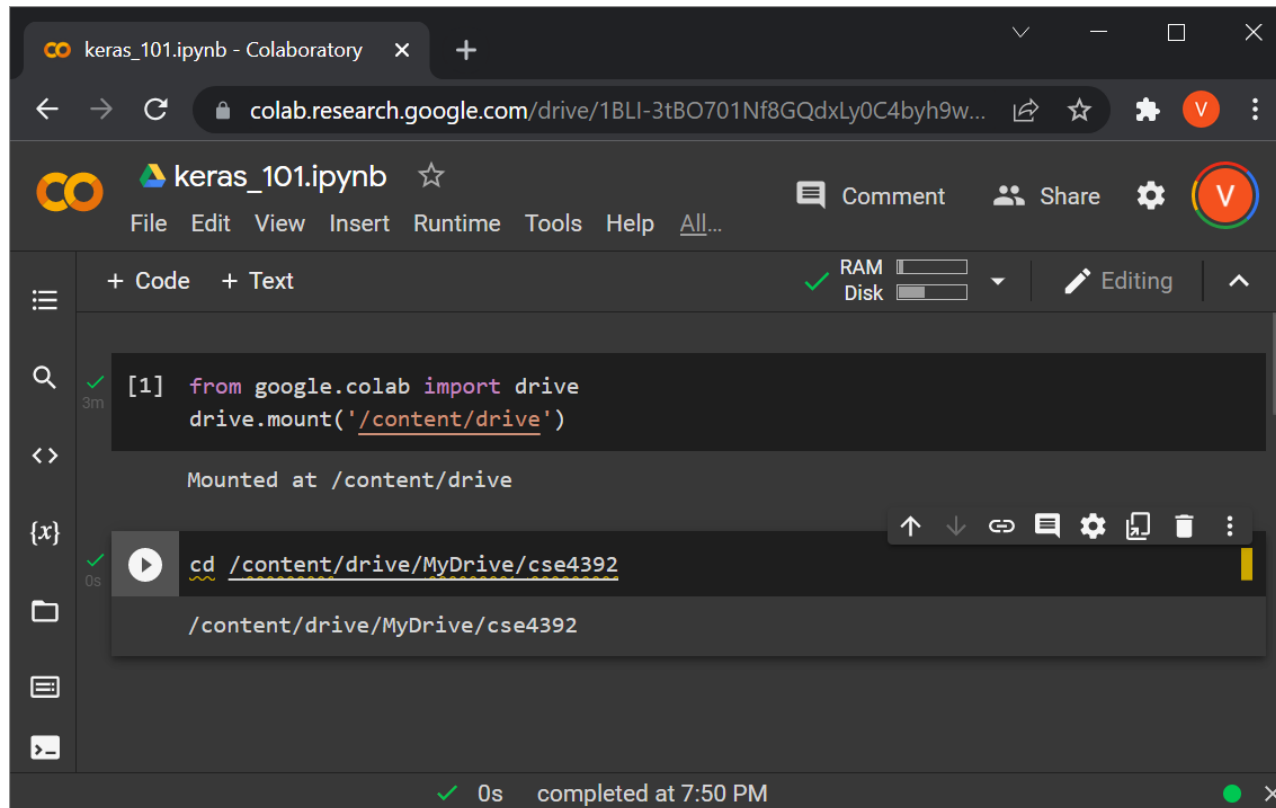
Mounted at /content/drive

```
cd /content/drive/MyDrive/cse4392
```

3s completed at 7:54 PM

Mounting Google Drive

- Execute the new cell.
- You get a confirmation that the working directory has changed.



The screenshot shows the Google Colaboratory web interface. The browser tab is titled 'keras_101.ipynb - Colaboratory'. The address bar shows the URL 'colab.research.google.com/drive/1BLI-3tBO701Nf8GQdxLy0C4byh9w...'. The Colab logo and file name 'keras_101.ipynb' are in the top left. A menu bar includes 'File', 'Edit', 'View', 'Insert', 'Runtime', 'Tools', and 'Help'. On the right, there are buttons for 'Comment', 'Share', and a settings gear. Below the menu bar, there are tabs for '+ Code' and '+ Text'. A status bar shows 'RAM' and 'Disk' usage with progress bars, and a 'V' icon in a red circle. The main code area contains two cells. The first cell, marked with a green checkmark and '3m', contains the code:

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

 Below the code, it says 'Mounted at /content/drive'. The second cell, marked with a green checkmark and '0s', contains the code:

```
cd /content/drive/MyDrive/cse4392
```

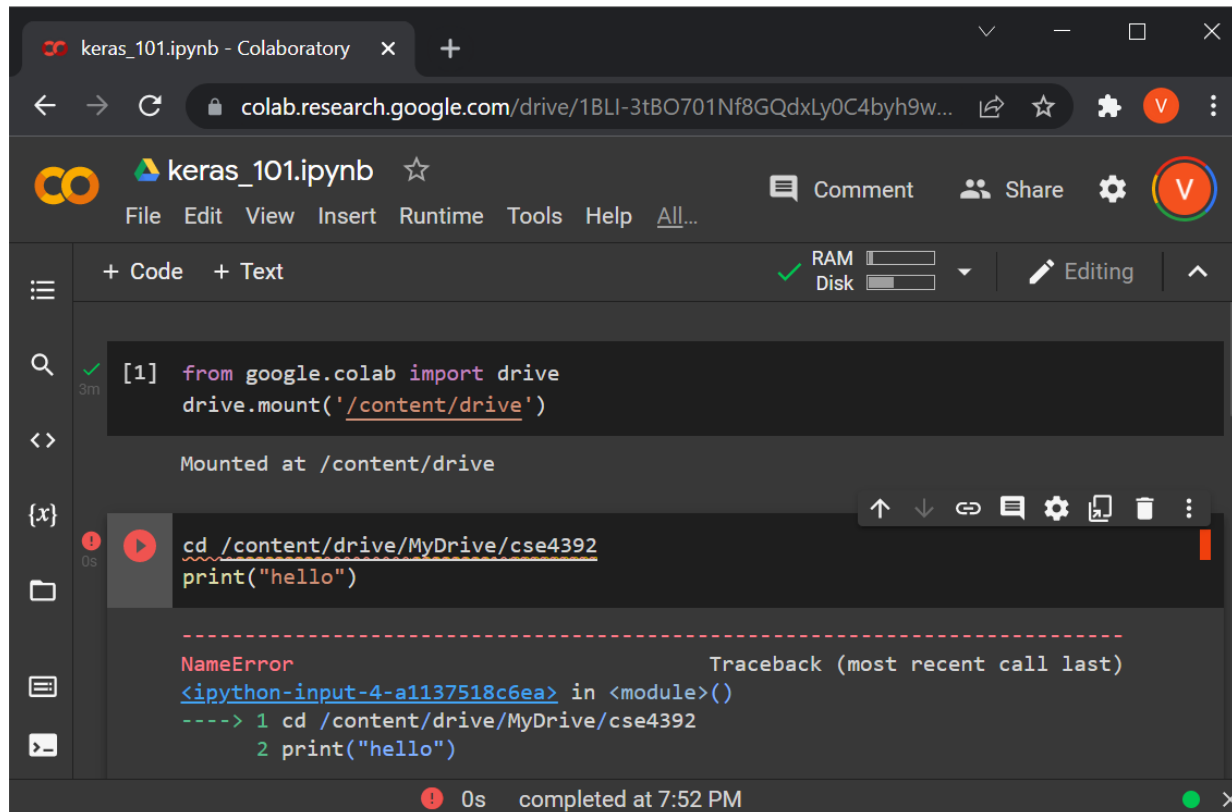
 Below the code, it shows the current directory:

```
/content/drive/MyDrive/cse4392
```

. At the bottom, a status bar shows a green checkmark, '0s', and 'completed at 7:50 PM'.

Mounting Google Drive

- For some weird reason, the `cd` command only works (for me) when it is the ONLY line in the cell.
- Here is how it fails otherwise:



The screenshot shows a Google Colaboratory notebook interface. The browser tab is titled 'keras_101.ipynb - Colaboratory'. The address bar shows the URL 'colab.research.google.com/drive/1BLI-3tBO701Nf8GQdxLy0C4byh9w...'. The notebook has a menu bar with 'File', 'Edit', 'View', 'Insert', 'Runtime', 'Tools', and 'Help'. Below the menu bar, there are tabs for '+ Code' and '+ Text', and a status bar showing 'RAM' and 'Disk' usage. The notebook contains two code cells. The first cell, labeled '[1]', contains the code 'from google.colab import drive' and 'drive.mount('/content/drive')'. Below this code, the output shows 'Mounted at /content/drive'. The second cell, labeled '[x]', contains the code 'cd /content/drive/MyDrive/cse4392' and 'print("hello")'. Below this code, the output shows a 'NameError' traceback. The traceback indicates that the 'cd' command is not found, which is a common issue when the 'cd' command is used in a Colaboratory cell that also contains other code. The error message is 'NameError: name 'cd' is not defined'. The notebook status bar at the bottom shows '0s' and 'completed at 7:52 PM'.

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

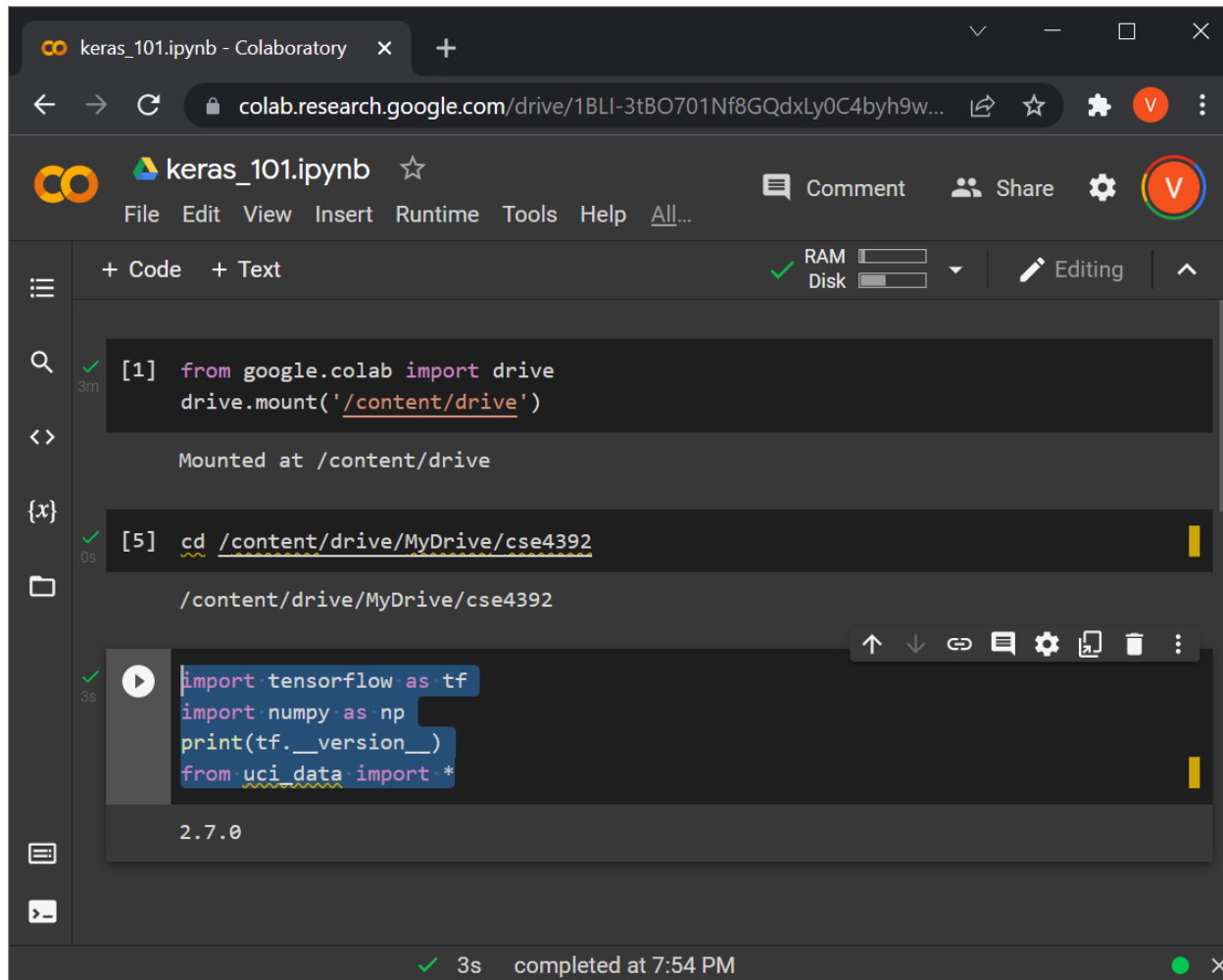
Mounted at /content/drive

cd /content/drive/MyDrive/cse4392
print("hello")

NameError                                Traceback (most recent call last)
<ipython-input-4-a1137518c6ea> in <module>()
----> 1 cd /content/drive/MyDrive/cse4392
      2 print("hello")
```

Continuing with Rest of Code

- Now you can create new cells and put in whatever code you like.



The screenshot shows a Google Colaboratory notebook titled "keras_101.ipynb". The interface includes a top navigation bar with "File", "Edit", "View", "Insert", "Runtime", "Tools", and "Help" menus. Below the navigation bar, there are tabs for "+ Code" and "+ Text", and a status bar showing "RAM" and "Disk" usage. The notebook contains three code cells:

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

Mounted at /content/drive

[5] cd /content/drive/MyDrive/cse4392

/content/drive/MyDrive/cse4392

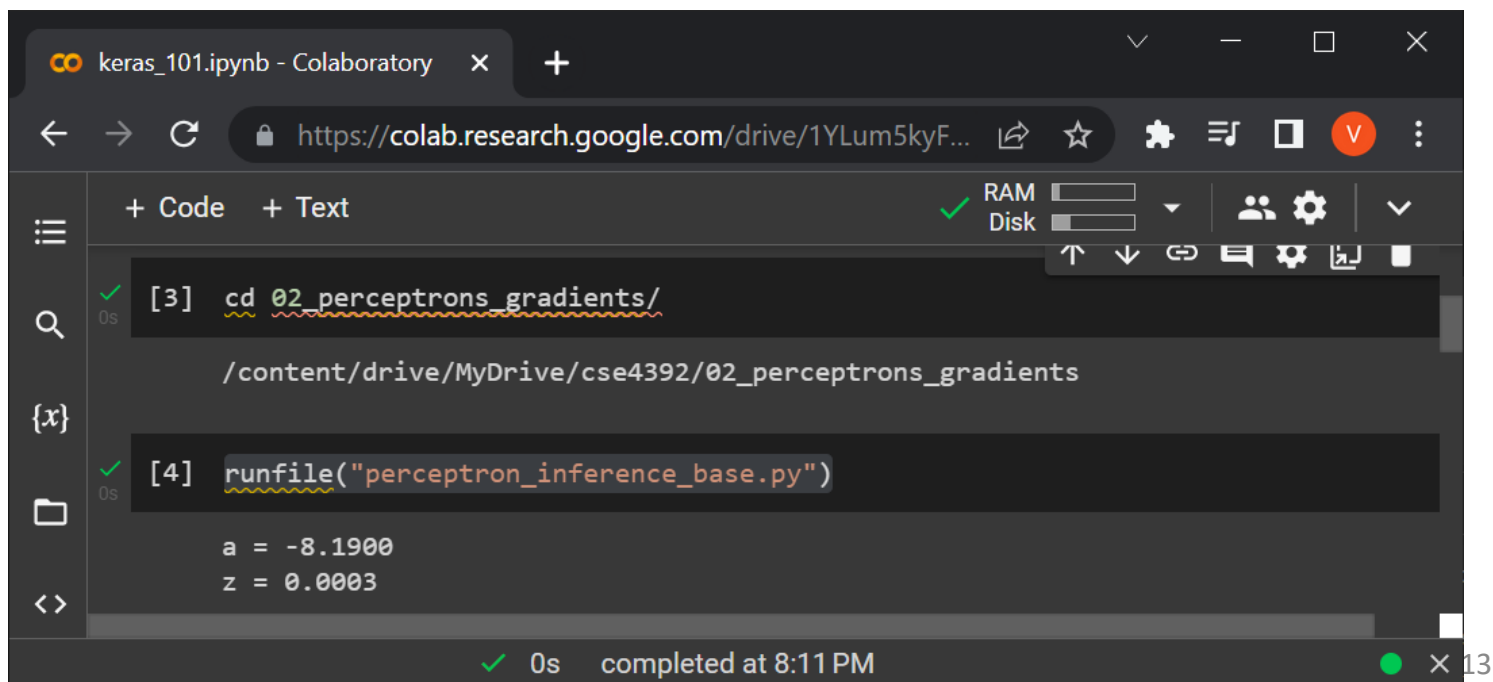
import tensorflow as tf
import numpy as np
print(tf.__version__)
from uci_data import *
```

The output of the third cell is "2.7.0". The notebook status bar at the bottom indicates "3s completed at 7:54 PM".

Testing Your Solution

- Under my cse4392 directory, I created a subdirectory called 02_perceptrons_gradients, where I copied all the files for my solution for homework 2.
- Then, I cd to that directory, and I execute, for example,

`runfile("perceptron_inference_base.py")`



The screenshot shows a Google Colaboratory notebook interface. The browser tab is titled 'keras_101.ipynb - Colaboratory'. The address bar shows the URL 'https://colab.research.google.com/drive/1YLum5kyF...'. The notebook has two code cells. The first cell, labeled '[3]', contains the command `cd 02_perceptrons_gradients/` and the output `/content/drive/MyDrive/cse4392/02_perceptrons_gradients`. The second cell, labeled '[4]', contains the command `runfile("perceptron_inference_base.py")` and the output `a = -8.1900` and `z = 0.0003`. The notebook status bar at the bottom indicates '0s completed at 8:11 PM'.

```
[3] cd 02_perceptrons_gradients/

/content/drive/MyDrive/cse4392/02_perceptrons_gradients

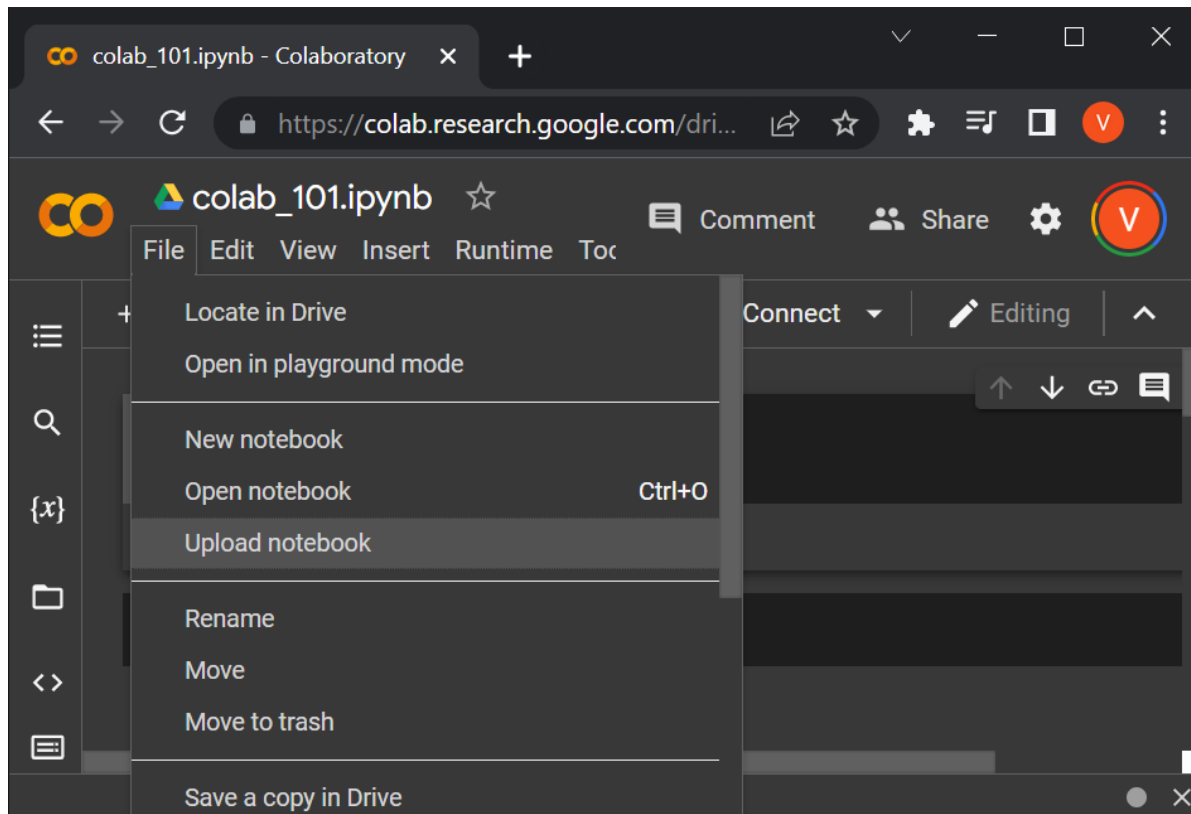
[4] runfile("perceptron_inference_base.py")

a = -8.1900
z = 0.0003
```

0s completed at 8:11 PM

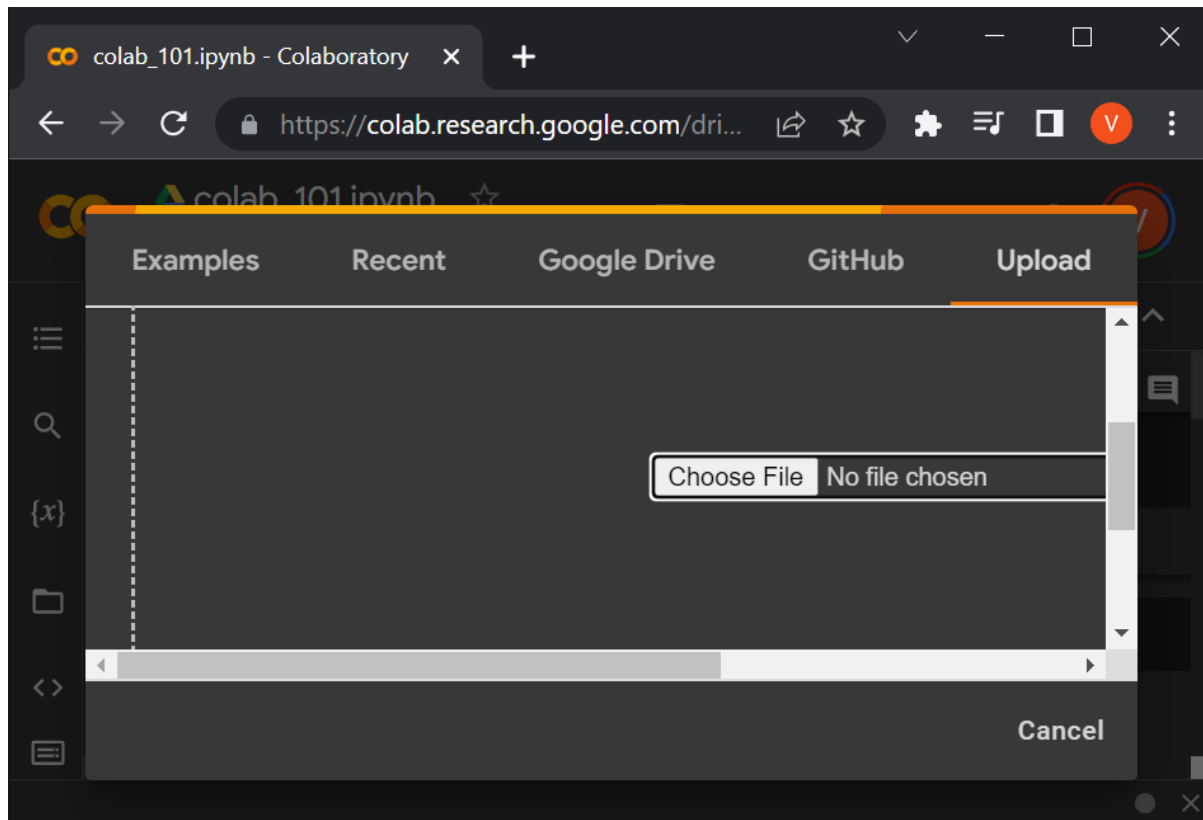
Importing a Notebook

- To import a notebook file (extension .ipynb) saved on your computer:
 - Select menu option File -> Upload notebook



Importing a Notebook

- To import a notebook file (extension .ipynb) saved on your computer:
 - Select menu option File -> Upload notebook
 - You get the window shown below.
 - You can just drag and drop the file to that window, or click on “Choose File” and use the file dialog to locate the file.



One Option: Use Anaconda

- Personally, first I use Anaconda (the Spyder editor) to develop and debug my solution.
- Once everything is ready, I move it to Google Colab to make sure it runs without any glitch.
- Obviously, you are free to use other environments.
- Or, you can develop directly in Google Colab.
- Still, at the end, you need to make sure that the code runs on Google Colab.
 - This way we make sure that everyone's code runs on the same platform, with exactly the same versions for all packages.