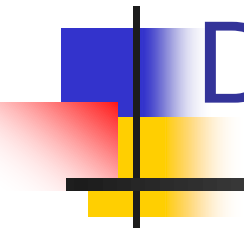
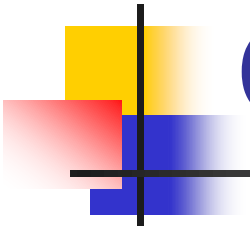
# CS501
## Introductory Computation for Scientists



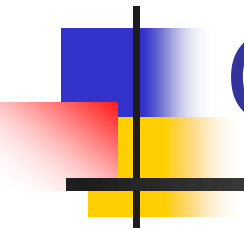
Dr. Ash Pahwa

Lesson 2.3
Google's Colab



# Outline

- Colab
  - What is Colab?
  - Cost of Colab
  - Benefits and Drawbacks of Colab
  - How to Use Colab
  - Data IO in Colab



# Google's Colab

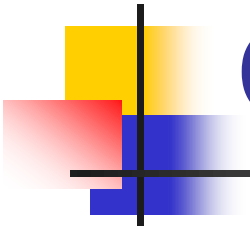
# What is Colab?

- Colaboratory or "Colab" is a Google research project created to help disseminate machine learning education and research
- It's a Jupyter notebook environment that requires no setup to use and runs entirely in the cloud

# When did Google Colab come out? 2017

- **Google** first started working with the Jupyter Development Team in 2014 to **release** an early version of the tool
- Google Colab is identical in Jupyter Notebook
- Google have released Colaboratory: a web IDE for python, to enable Machine Learning with storage on the cloud
- This internal tool had a quiet public release in late 2017 and is set to make a huge difference in the world of machine learning, artificial intelligence and data science work

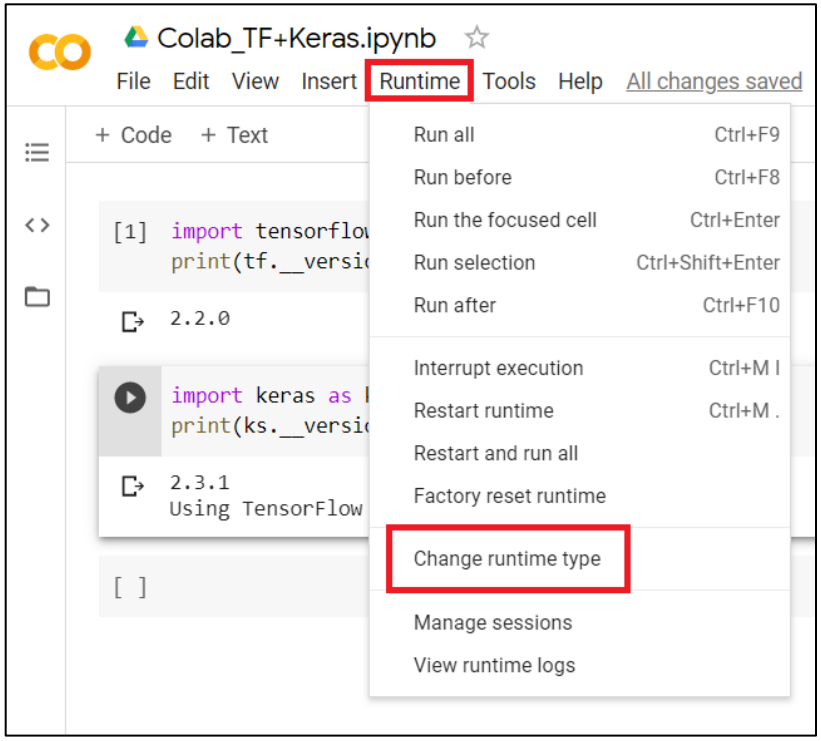
# Cost of Using Colab

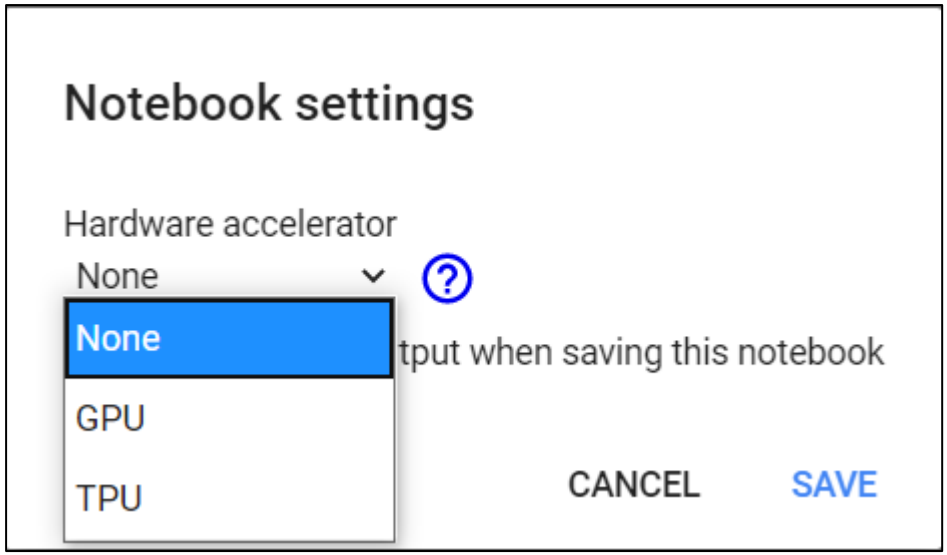


- Google Colab is a **free** to use Jupyter notebook
- Allows you to use **free** Tesla K80 GPU
- RAM of 12 GB
- You can use Colab
  - 24 hours continuously without GPU
  - 12 hours with a GPU

# GPU Access

- Runtime> Change runtime type
- Select GPU as Hardware accelerator



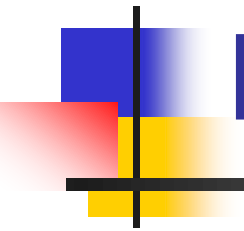
# Benefits and Drawbacks of Google's Colab

# Benefits of Colab

- **Free** virtual machines for you to use with about 12GB RAM and 50GB hard drive space, with common dependencies such as numpy, pandas, and even TensorFlow pre-installed.
- **Free** GPU access
- Supports Python 2 and Python 3
- There is integration with Google Drive, you can share, and control permissions and you'll be able to see other collaborators work instantly
- You can import an existing Jupyter/IPython notebooks

# Drawbacks of Colab

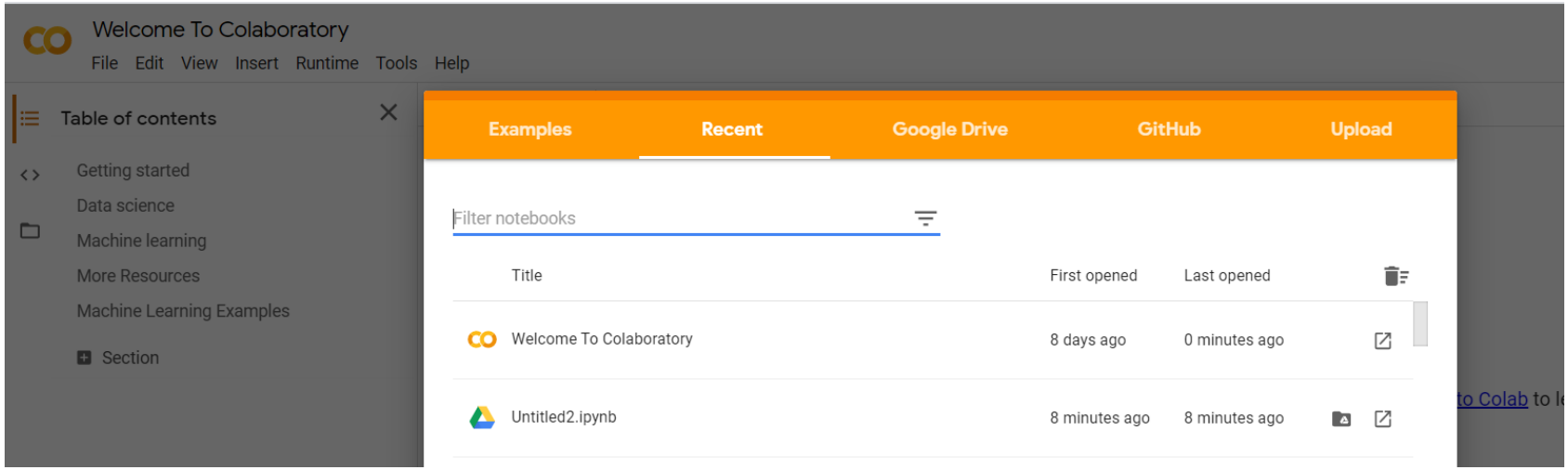
- All Colab notebooks must be stored in Google Drive — so you'll need to log into a Google account before you can access the tool
- Long-running background computations may be stopped
- You'll need to install all specific libraries which do not come with standard python (and you'll need to repeat this with every session)
- Google Storage is used with your current session, so if you have downloaded a file and want to use it later, you'd better save it before closing the session
- It can be difficult (and potentially costly) to work with bigger datasets as you must download and store them in Google drive (only **15GB** is free in Google Drive)

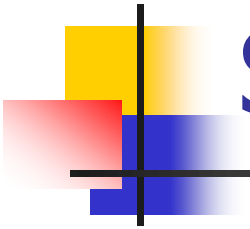


# How do I use Google Colab?

# How do I use Google Colab?

- To start working with **Colab** you first need to log in to your **google** account, then go to this link
- https://**colab**.research.**google**.com.
  - EXAMPLES: Contain a number of Jupyter notebooks of various examples.
  - RECENT: Jupyter notebook you have recently worked with.
  - **GOOGLE** DRIVE: Jupyter notebook in your **google** drive.





# Select Jupyter File

1. Start a New Jupyter File
2. Select a Jupyter file from your Computer
3. Select a Jupyter file from Google Drive

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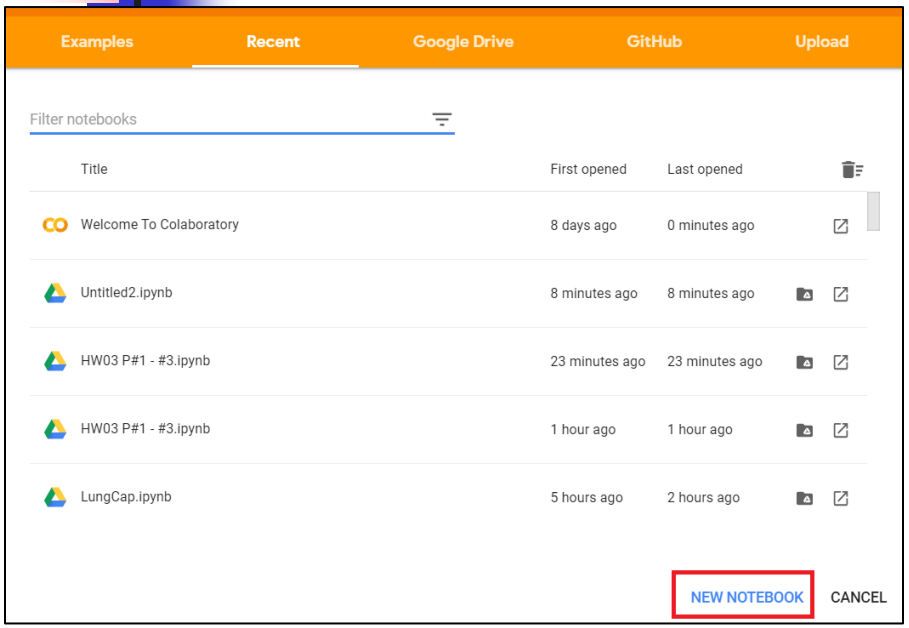
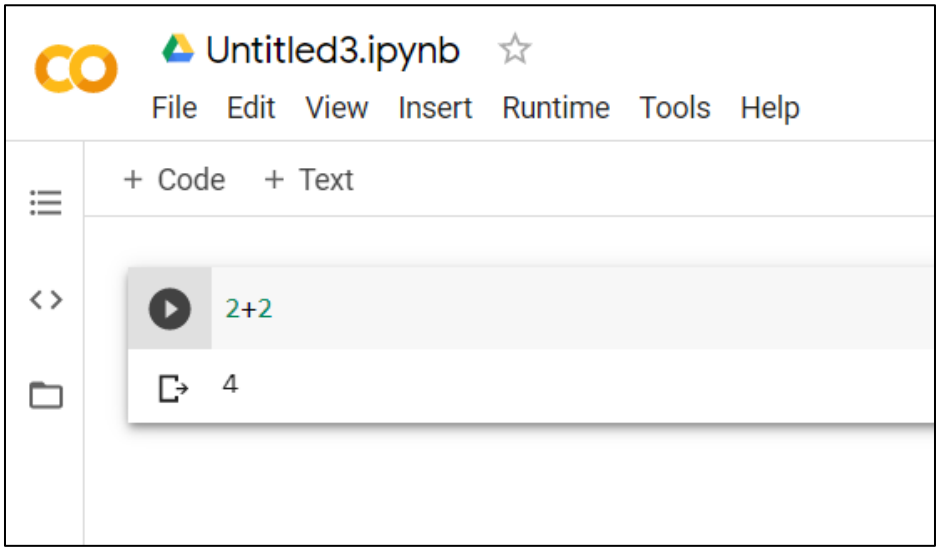
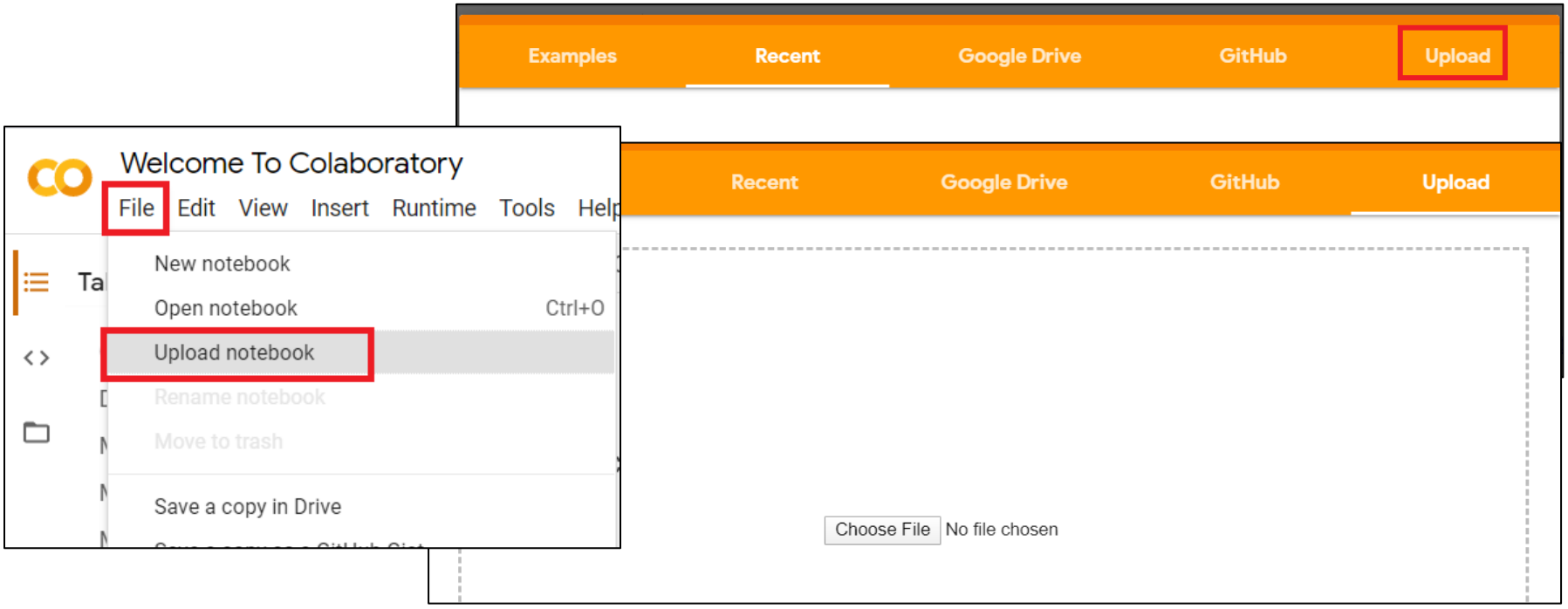
# Select: New Notebook



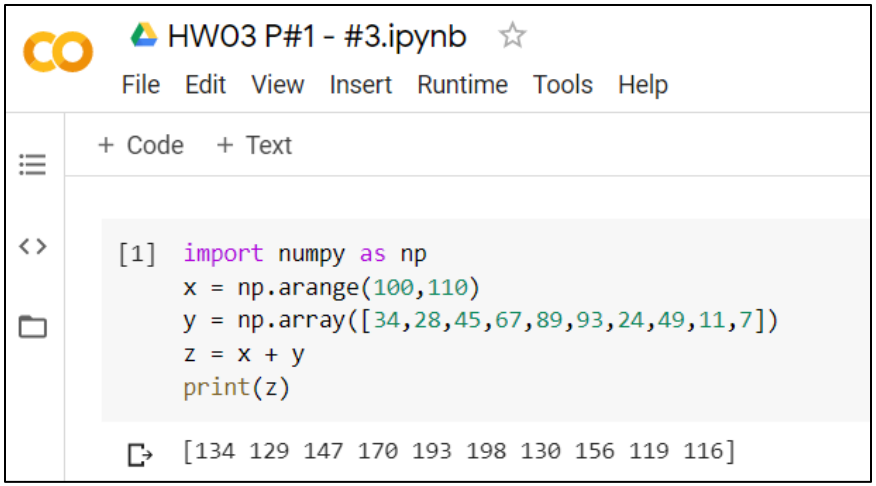



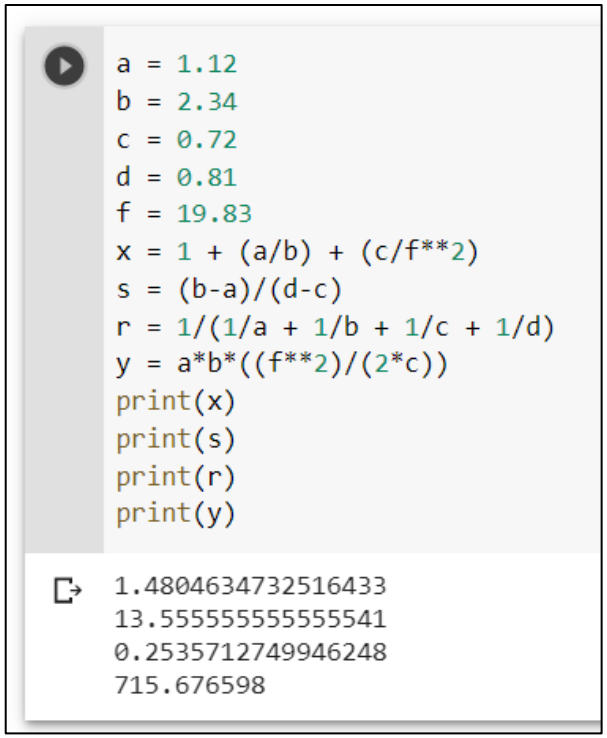
# 2. Select a Jupyter file from your Computer

- Upload: Select a file from your computer



# Run Python Code in Colab



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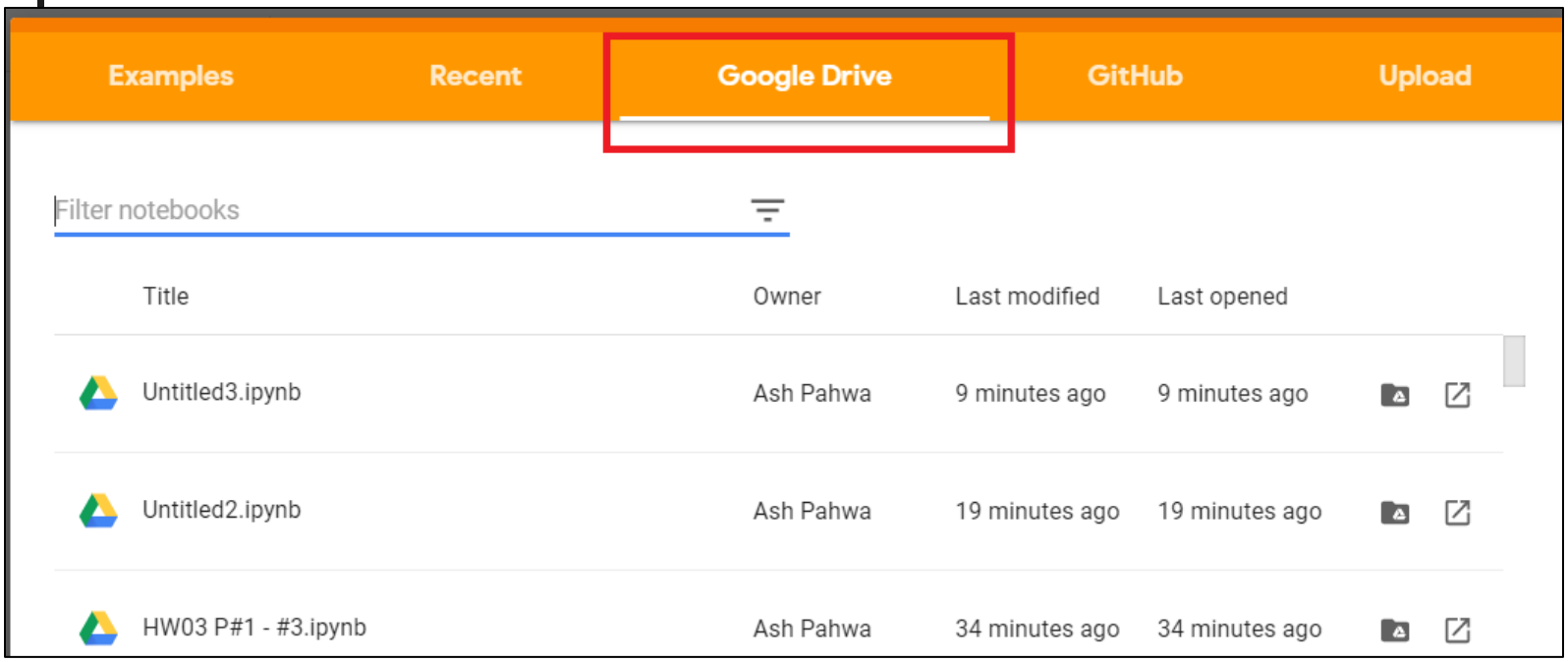
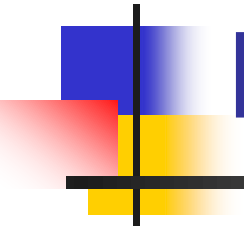
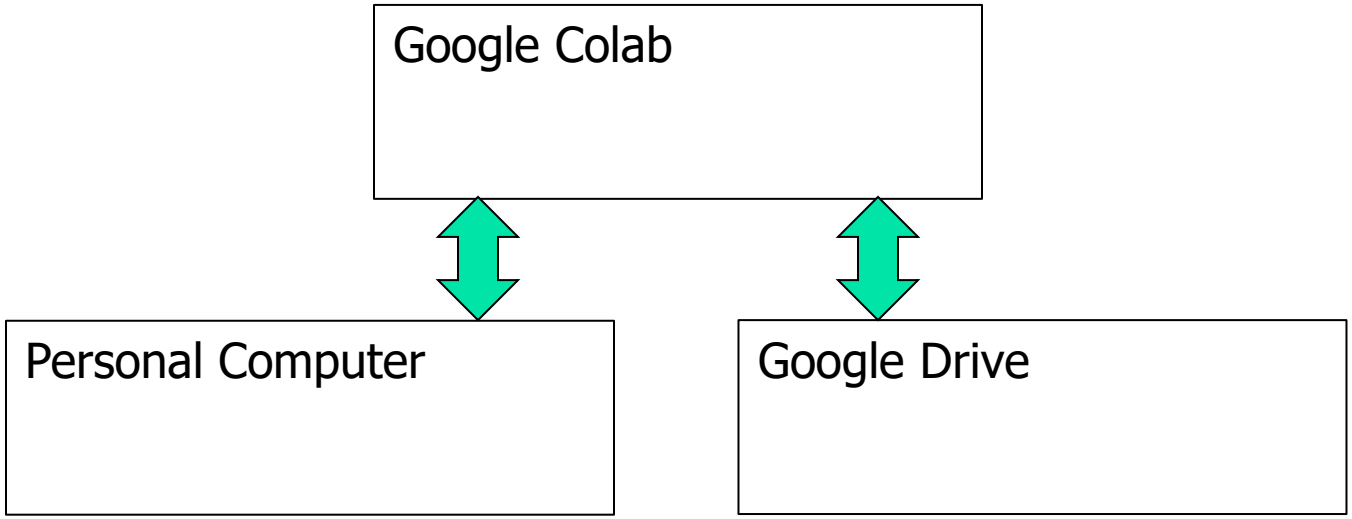




# Data IO in Colab

# Data (I/O) File in Colab
# Load Data, Save Data

- From Personal Computer
- From Google Drive



# Loading Data From Personal Computer

# Loading Data From Personal Computer

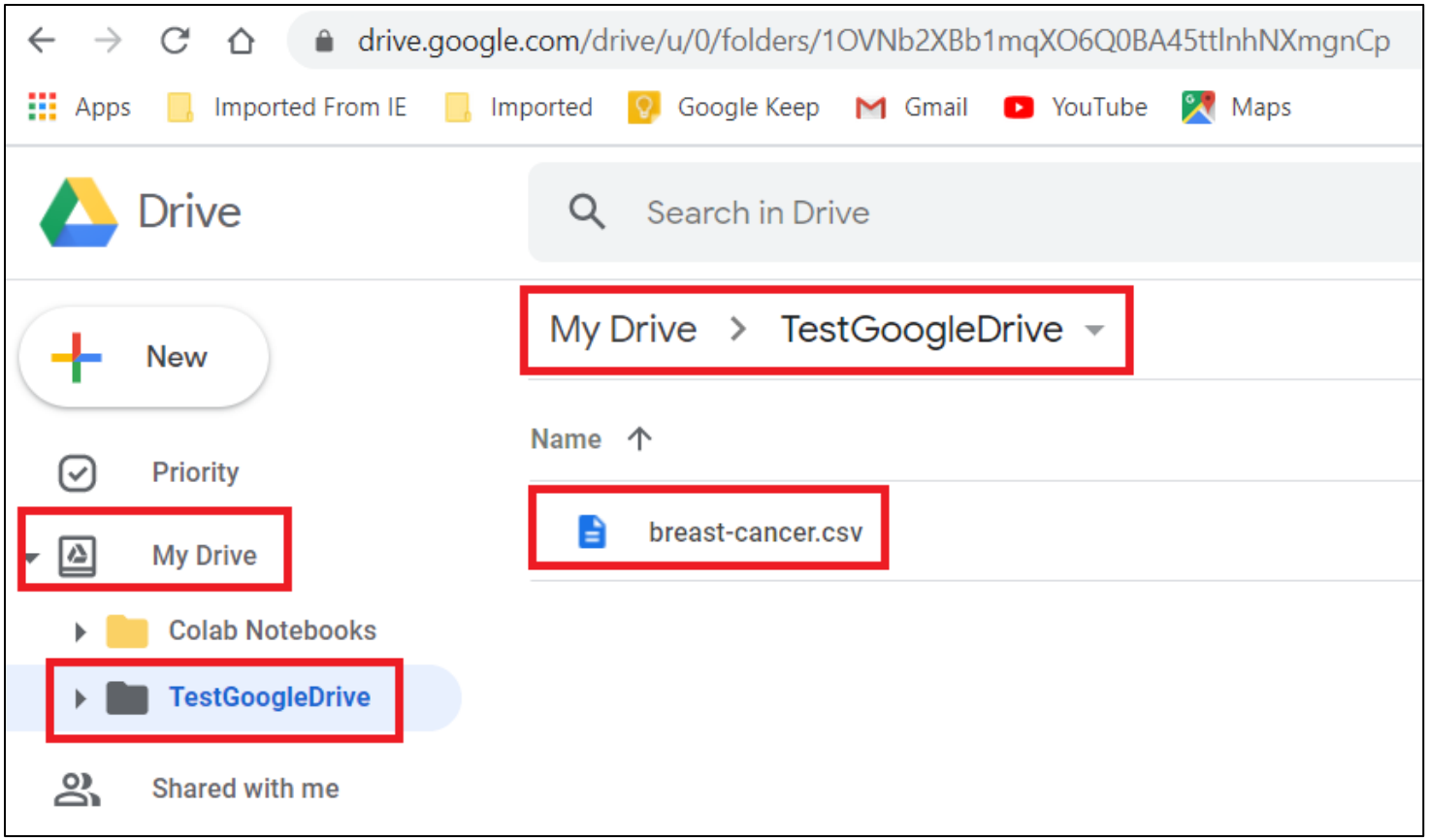
```
[5] import io
    data = pd.read_csv(io.StringIO(uploaded['Lung_Capacity_AP_1091.csv'].decode('utf-8')))
```

```
data = pd.read_csv("Lung_Capacity_AP_1091.csv")

print(data.head())
print(data.tail())
data.shape
```

```
   Age  LungCap  Height  Gender Smoke
0    9    3.124    57.0  female    no
1    8    3.172    67.5  female    no
2    7    3.160    54.5  female    no
3    9    2.674    53.0    male    no
4    9    3.685    57.0    male    no
      Age  LungCap  Height  Gender Smoke
1086   12    8.557    65.5  female    no
1087   13   10.696    70.5    male    no
1088   10    6.310    62.0    male    no
1089   12    8.023    65.5  female    no
1090   10    7.270    65.0    male    no
(1091, 5)
```

# Loading Data From Google Drive



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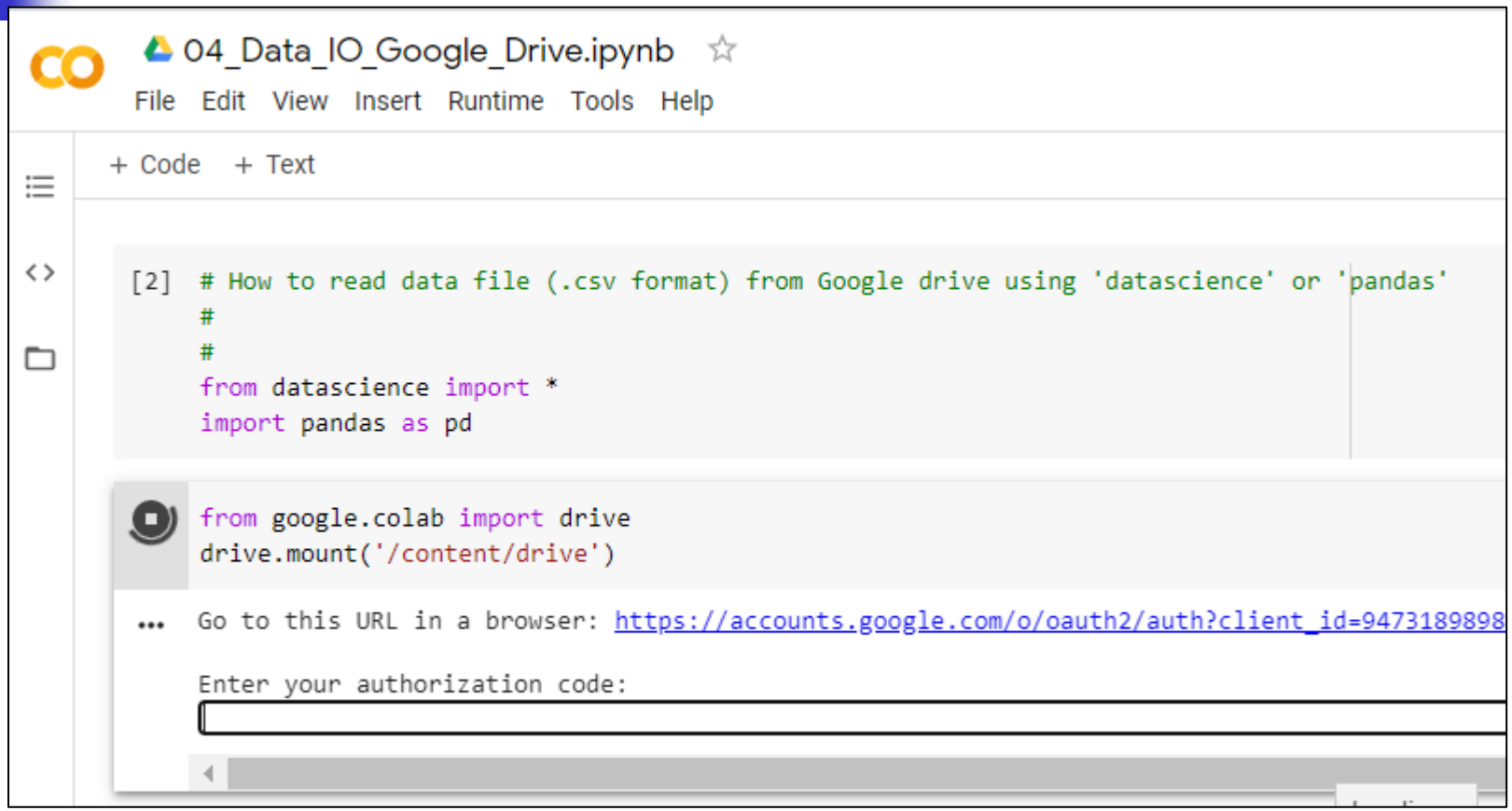
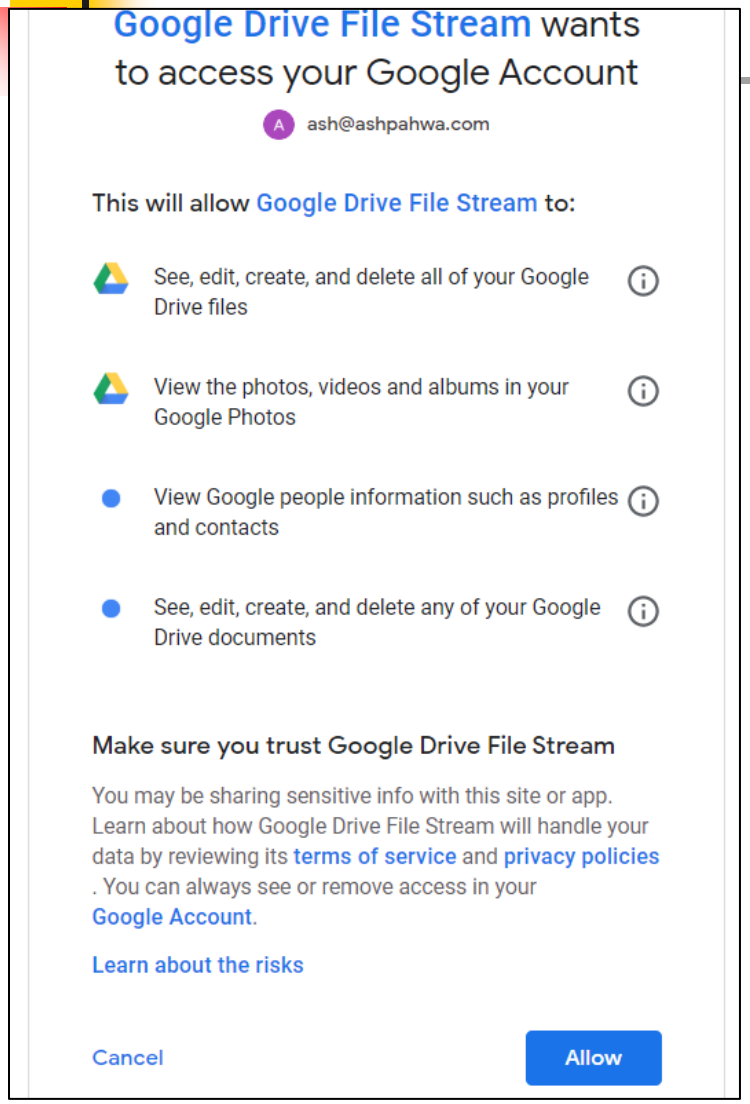
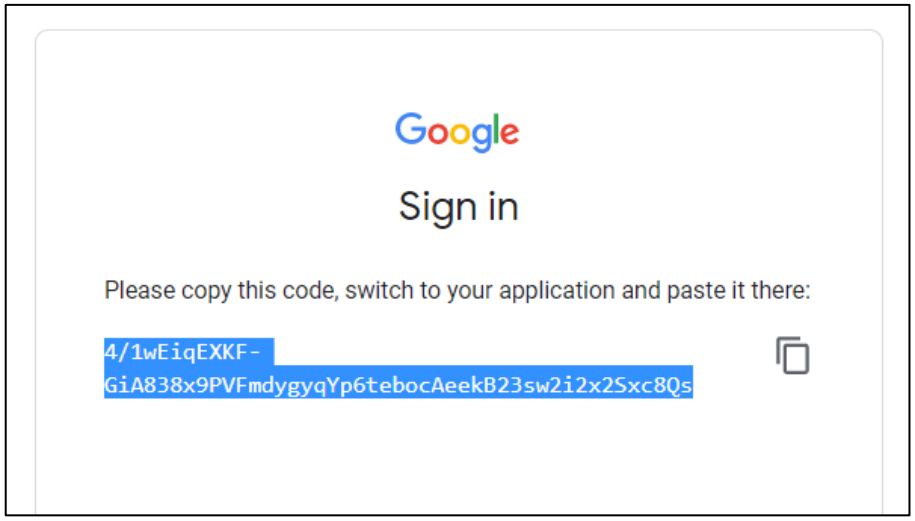
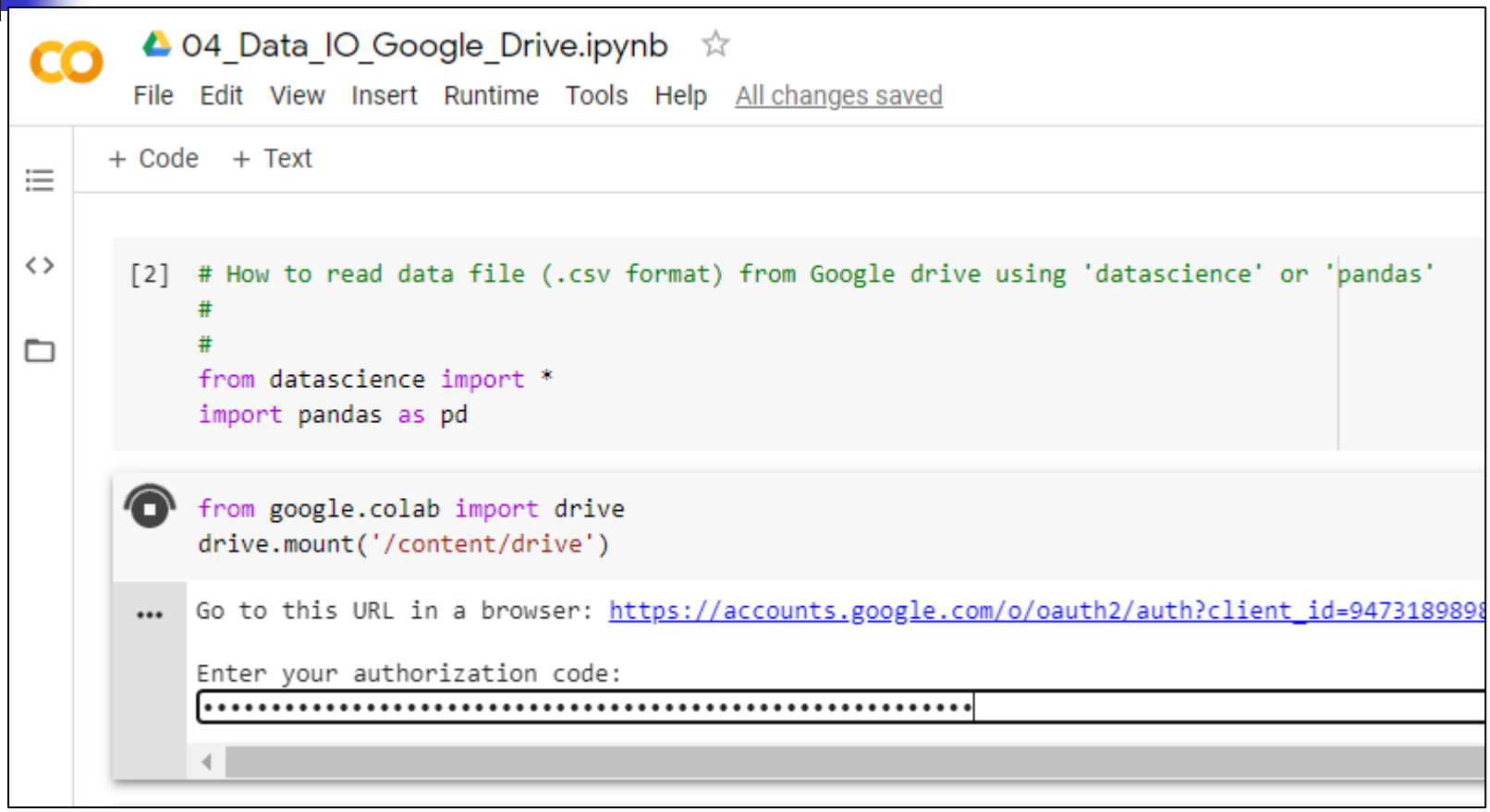


# Give Permission to Access Google Drive
## Copy the Authorization Code

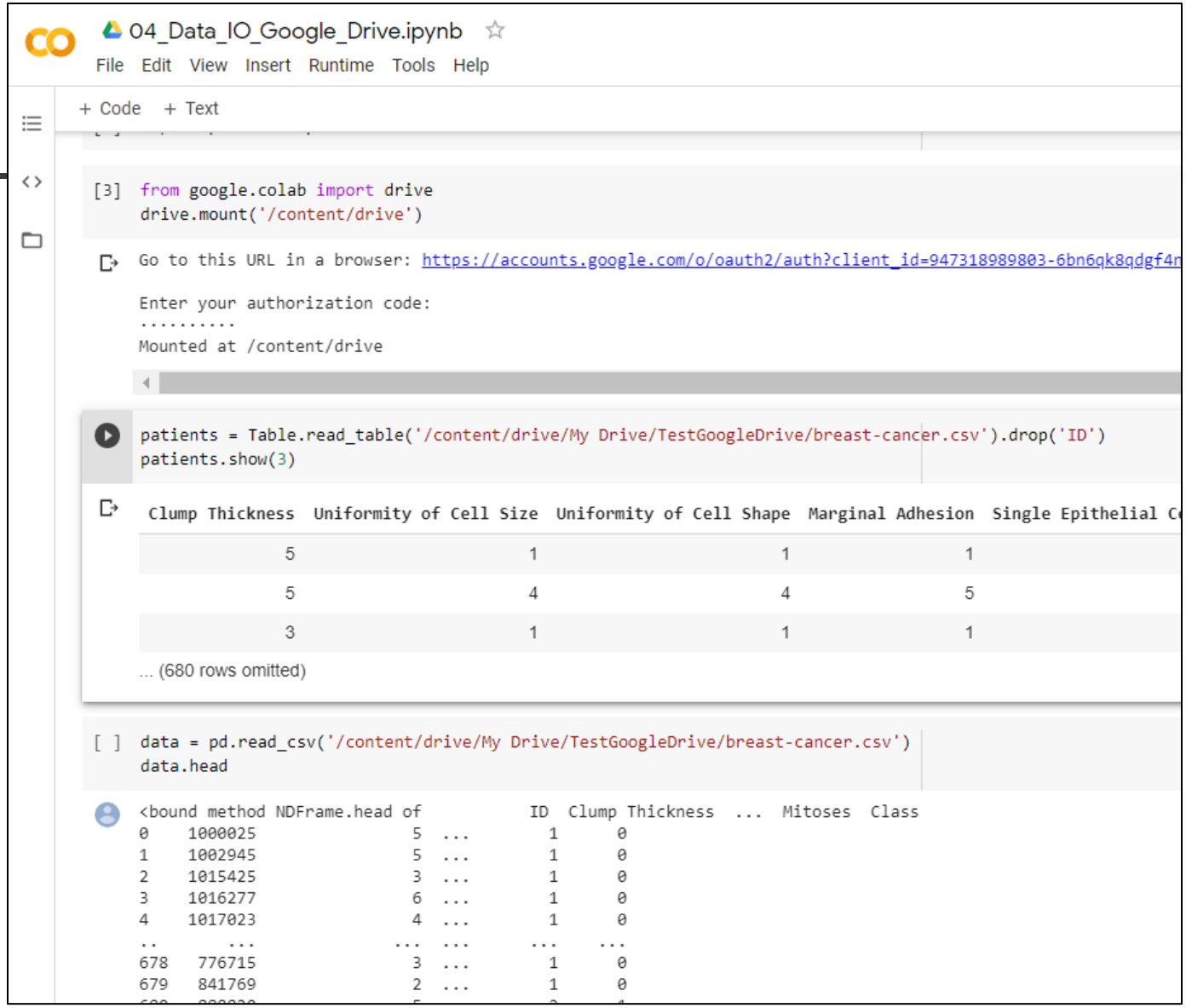


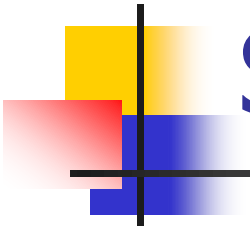



# Paste the Authorization Code



# Read File From Google Drive





# Summary

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