# HOW TO
# use the hands-on material

- ✓ Introduction to *Jupyter Notebooks*
- ✓ Introduction to *Google Colab*
- ✓ Introduction to *GitHub*



# Learning Goals

- ✓ Understand what a *Jupyter Notebook* is
- ✓ Use Jupyter Notebooks inside *Google Colab*
- ✓ Use Jupyter Notebooks to write and execute your code
- ✓ Use a *GitHub* repository

# Prerequisites

- ✓ Know  programming language

# Introduction to  Notebooks



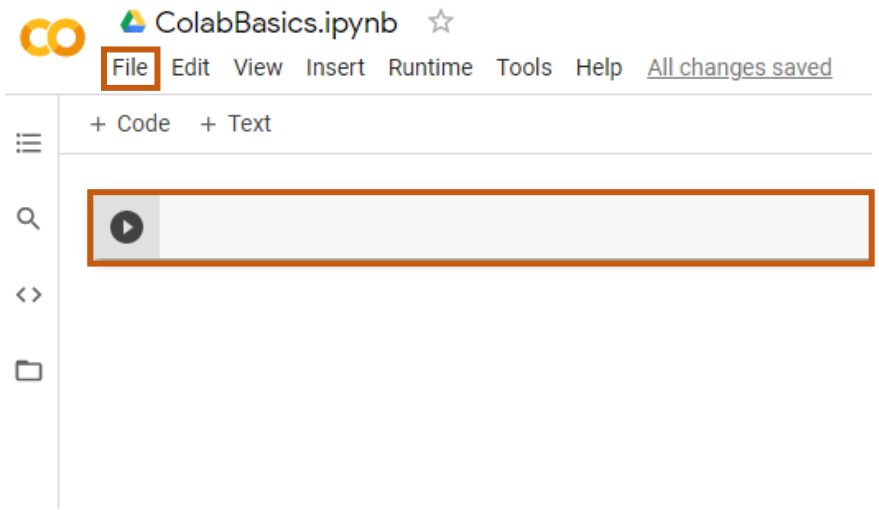
- The Jupyter Notebook is an open-source web application that allows you to create and share documents that contain **live code, equations, visualizations and narrative text**. Uses include data cleaning and transformation, numerical simulation, statistical modeling, data visualization, machine learning, and much more (1)

- During the seminars, you are going to use Jupyter Notebooks to write interactive code in **Python** programming language, but many other languages are supported.
- To use Jupyter Notebooks you can:
  - Open them online by **Google Colaboratory** (2)

(1) https://jupyter.org/
(2) https://colab.research.google.com/notebooks/intro.ipynb

# Introduction to


- Google Colaboratory (**Colab** for short) is an executable document that lets you write, run and share your code.
- **Colab is simply a Jupyter Notebook stored in Google Drive**.
- The great advantage of using Google Colab is that you do not need to install anything locally on your machine.
- Colab connects your code runtime to a cloud base runtime, enabling you to immediately use all Python libraries.



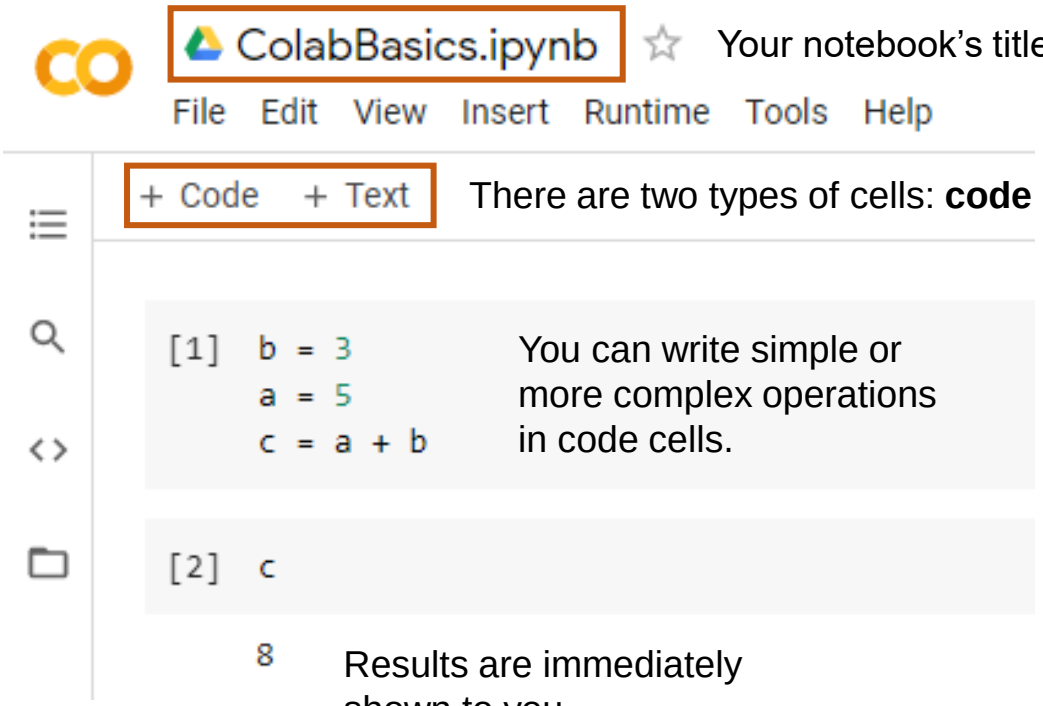

To create a new Colab notebook you can use the File menu.

This is a code cell

Now, let's see how to use it!

# Introduction to Google Colaboratory

- The document you are reading is not a static web page, but an **interactive environment**.




- To **execute** the code in a cell, select it with a click and either press the **play button** to the left of the code, or use the keyboard shortcut **"Shift+Enter"**.
- To **edit** the code, just click the cell and start editing.

# Introduction to Google Colaboratory

- Colab notebooks allow you to combine **executable code** and **rich text** in a single document, along with **images**, **HTML**, **LaTeX** and more.
- Finally, you can export your notebook to GitHub or share it through a Google Drive link.

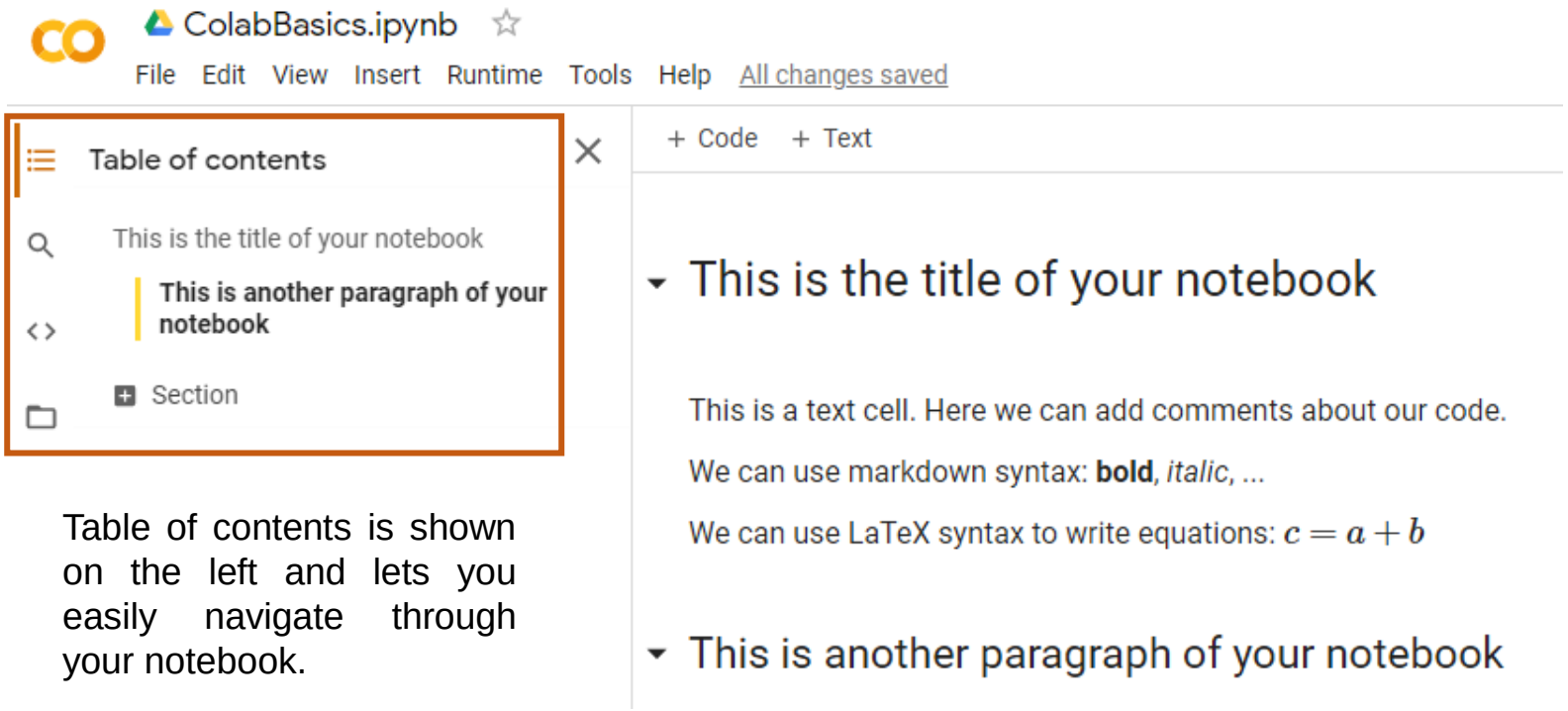



Table of contents is shown on the left and lets you easily navigate through your notebook.

# Introduction to GitHub

- Whether you're **visualizing data** or building a new game, there's a whole community and set of tools on GitHub that can help you do it even better (1).
- GitHub is a **development platform**, where you can host and review code, manage projects, and build software alongside 50 million developers (2).
- GitHub helps you to:
  - ***Write better code***
  - ***Manage a research project***
  - ***Share code with your team-mates*** (private repositories) or with the entire GitHub community (public repositories)

(1) https://lab.github.com/
(2) https://github.com/

# GitHub Basics

- Create an account on https://github.com/ (it's free!)
- Create your first repository
- Share with your collaborators

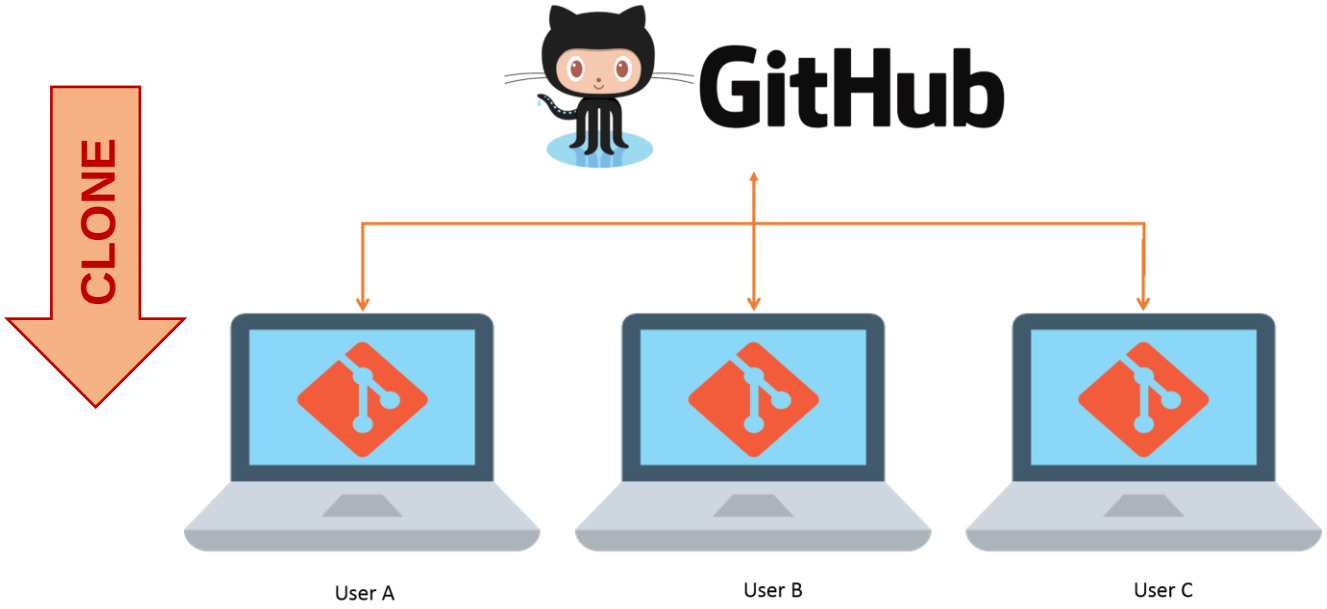
- If you are a Windows user, download **GitHub Desktop** app (1)
- If you are a Linux user, you don't need to download anything (you will update your repositories by terminal)

- There are four fundamental actions you can perform using GitHub:
  - **Clone** a repository
  - **Commit** a change inside a repository
  - **Push** the committed change to GitHub
  - **Pull** an update from GitHub

(1) https://desktop.github.com/

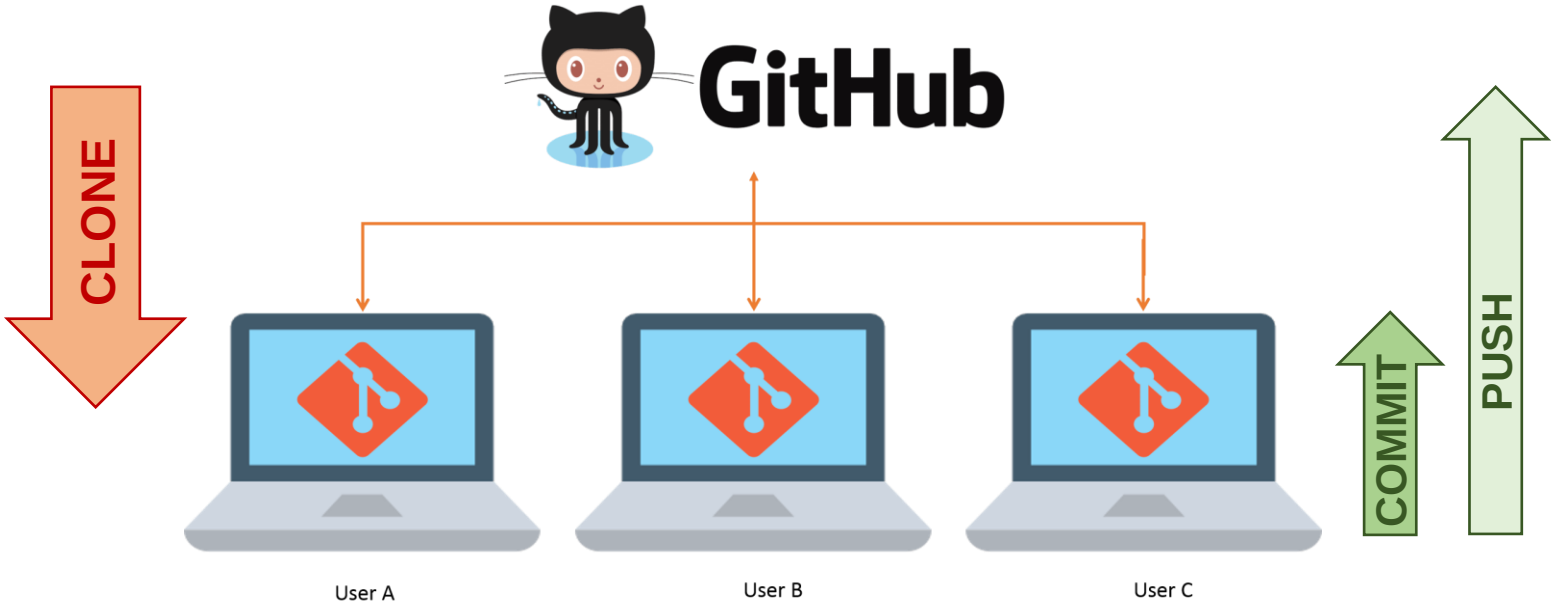
# Clone, Commit, Push & Pull

- You can create your own repository or open an existing one (e.g. shared with you by one of your team-mates)
- Once you have your own repository in GitHub, to use it on your laptop, you must **CLONE** it (*you must perform this step only once, each time you want to use a new repository*)



# Clone, Commit, Push & Pull

- Now, you have a new local folder, and you can begin to work on it
- When you finish your local work, to update changes and to share changes with other collaborators, you must **COMMIT** changes and **PUSH** them to GitHub (*you must perform this step every time you have something new to update/share*)



# Clone, Commit, Push & Pull

- Finally, if you want to update your repository with changes made by other collaborators you must **PULL** the changes from GitHub (*you must perform this step every time you have something new to download*)