Hong Kong Baptist University

Department of Computer Science

COMP 4115 Exploratory Data Analysis and Visualization (2019-20)

Lab 1: Python Basics

Installation of Anaconda

Anaconda is an open source software to manage Python development environments for Windows, Linux, and Mac OS. It provides easy management of a large collection of Python libraries. Anaconda can be obtained from https://www.anaconda.com/distribution/#download-section.

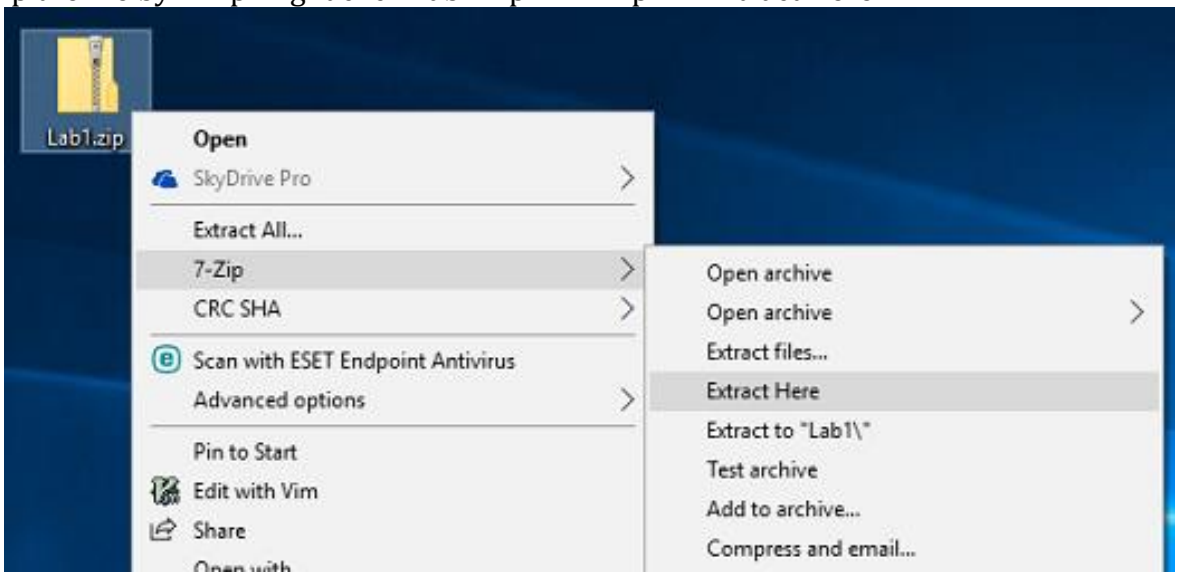
Usage of Jupyter Notebook

Jupyter Notebook is a web-based powerful tool for interactively developing and presenting data science projects. A notebook integrates codes and its output into a single document that combines visualizations, narrative text etc. Jupyter Notebook is formerly known as iPython notebook.

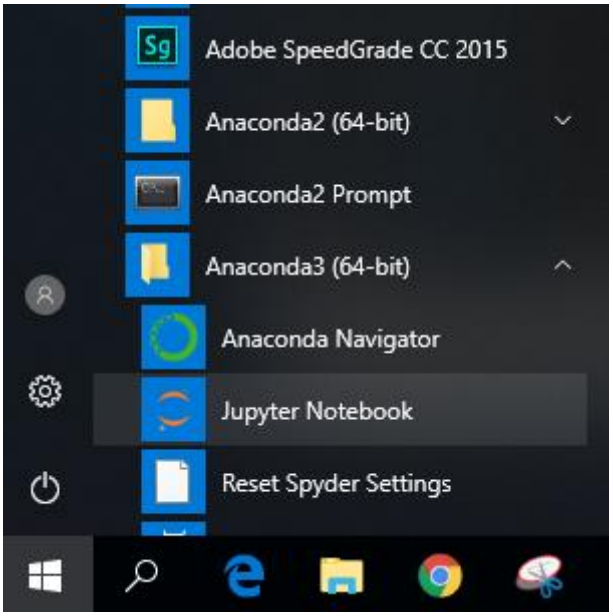
Steps to Open an Existing Jupyter Notebook

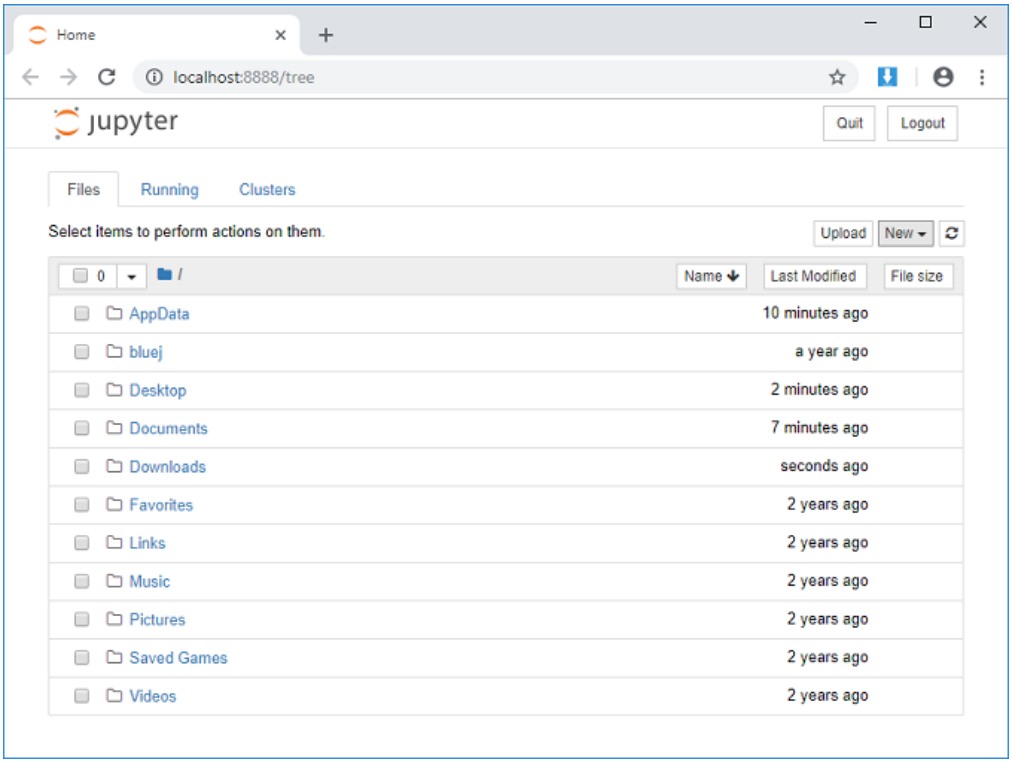
1. Download Lab1.zip from Moodle and save it on desktop (or your preferred working directory).

2. Unzip the file by 7-zip. Right click Lab1.zip --> 7-zip --> Extract Here



3. Open Jupyter Notebook. Start --> Anaconda3(64-bit) --> Jupyter Notebook



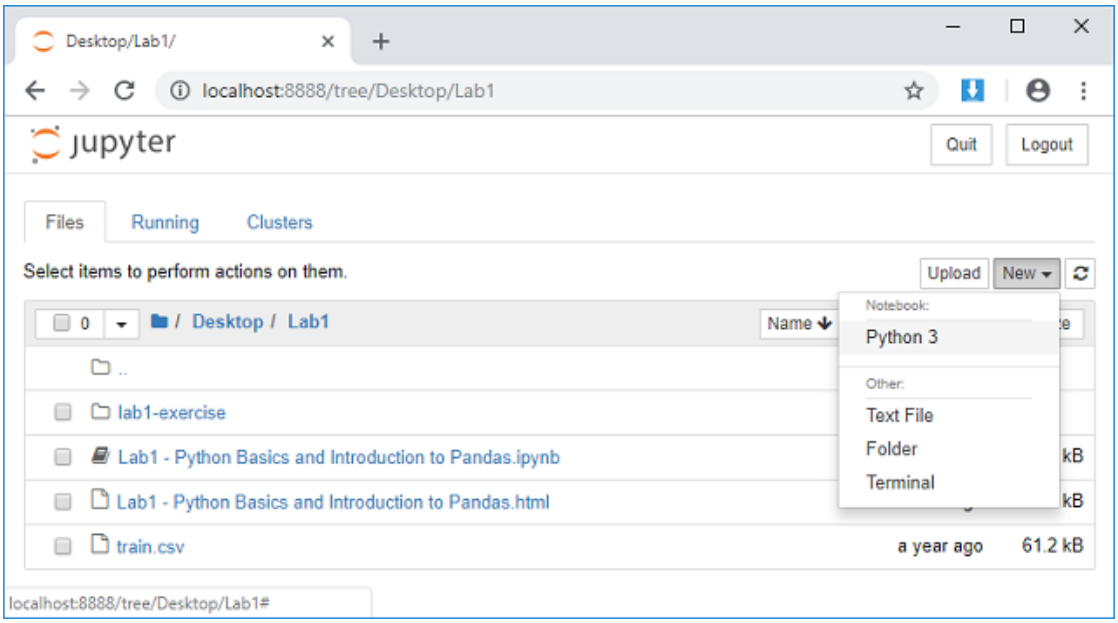


4. Click Desktop and then click inside Lab1.

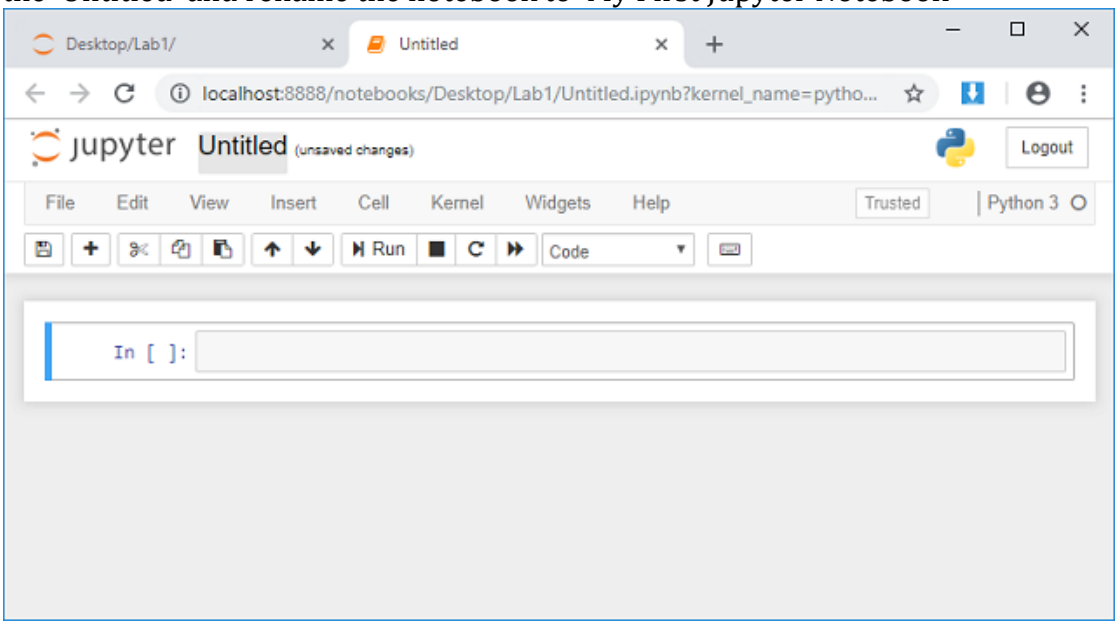
5. Click on ""COMP4115 Lab1 Tutorial Python Basics.ipynb" to open the notebook

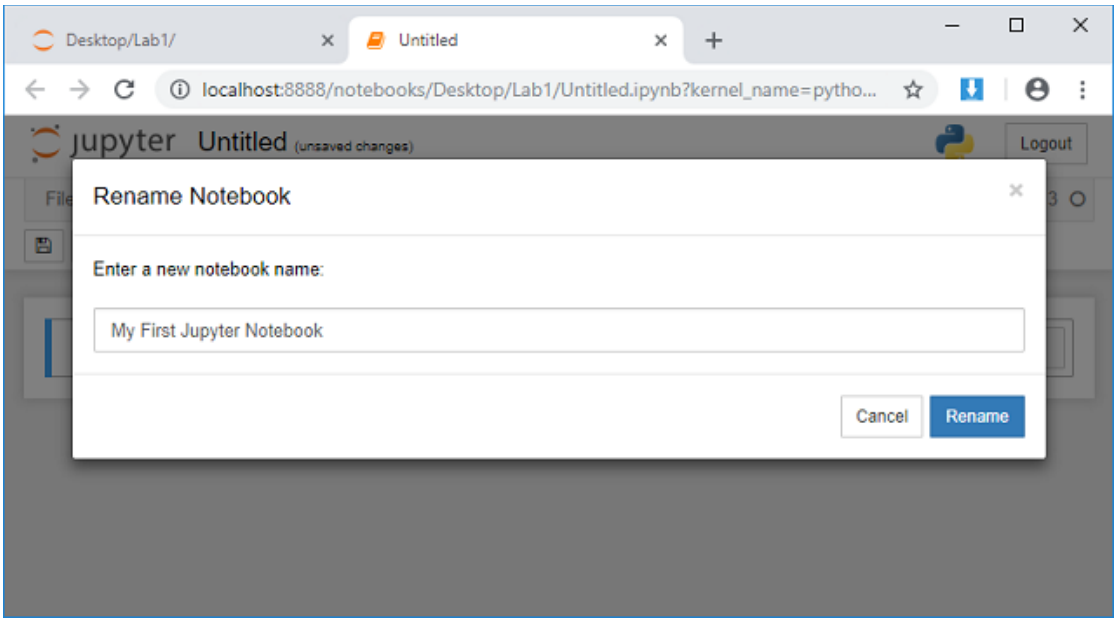
Steps to Create a New Jupyter Notebook

1. Create a Juypter Notebook. Click the 'New" button at the top right and then select 'Python 3'



2. Click on the 'Untitled' and rename the notebook to 'My First Jupyter Notebook'





Editing the Jupyter Notebook

Modal user interface
Jupyter Notebook has a modal user interface. This means that the keyboard does different things depending on which mode the Notebook is in. There are two modes: **command mode** and **edit mode**.

- **Command Mode**
  Command mode is indicated by a grey cell border with a blue left margin:

  ```
  In [1]: a = 10
  ```

  When you are in command mode, you are able to edit the notebook as a whole, but not type into individual cells. Most importantly, in command mode, the keyboard is mapped to a set of shortcuts that let you perform notebook and cell actions efficiently. For example, if you are in command mode and you press c, you will copy the current cell.

- **Edit Mode**
  Edit mode is indicated by a green cell border and a prompt showing in the editor area:

  ```
  In [1]: a = 10
  ```

  When a cell is in edit mode, you can type into the cell, like a normal text editor. Enter edit mode by pressing Enter or using the mouse to click on a cell's editor area.

Cell Types

The notebook consists of a sequence of cells. A cell is a multiline text input field, and its contents can be executed by using Shift-Enter, or by clicking either the 'Run' button in the toolbar, or 'Run Cell' in the 'Cell' menu bar.

- **Code cells**
  A code cell allows you to edit and write new code.
- **Markdown cells**
  Markdown cell displays text which can be formatted using markdown language.

After cell creation, a cell is a code cell by default.

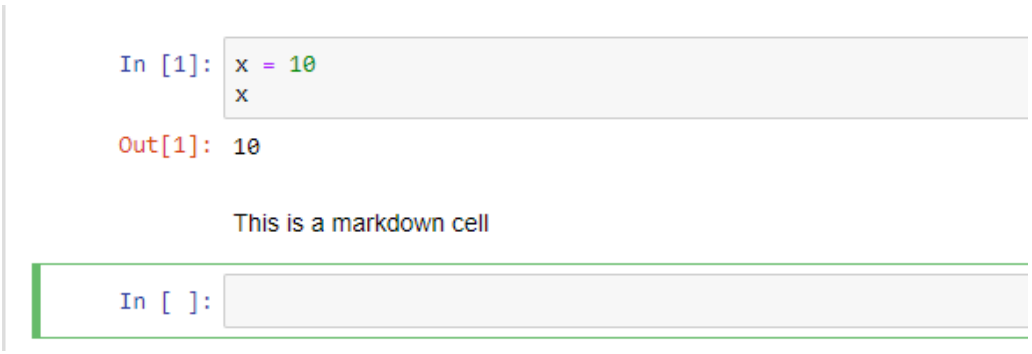
Steps to edit Jupyter Notebook:

1. Type in x = 10 in the code cell. Press Enter to move to the second line. Then type x in the second line of the same cell.

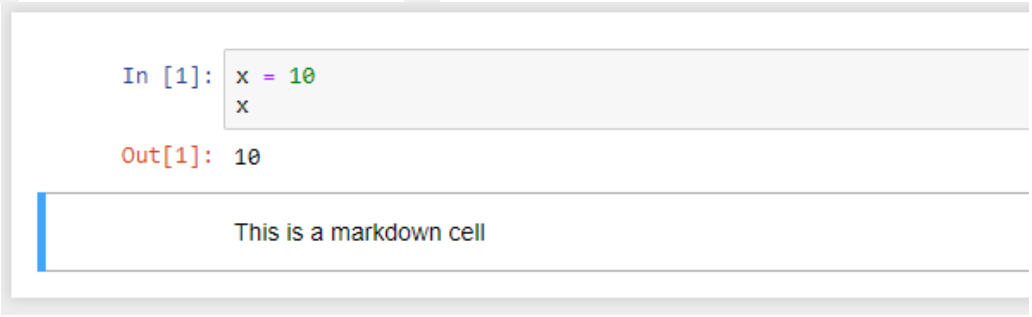
2. Press Shift-Enter to run the cell.

3. Press Esc to exit the Edit Mode. Press m to change the current cell to a markdown cell.

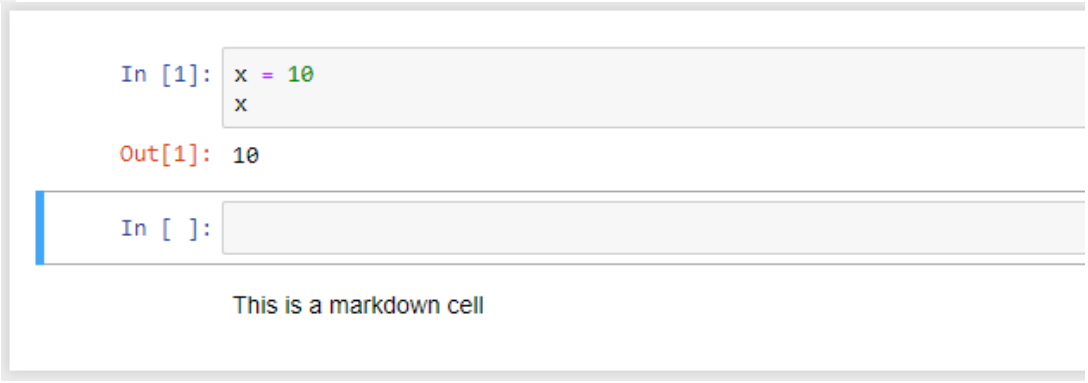
4. Press Enter to enter the Edit Mode. Type in "This is a markdown cell". Then press Shift-Enter to run the cell.



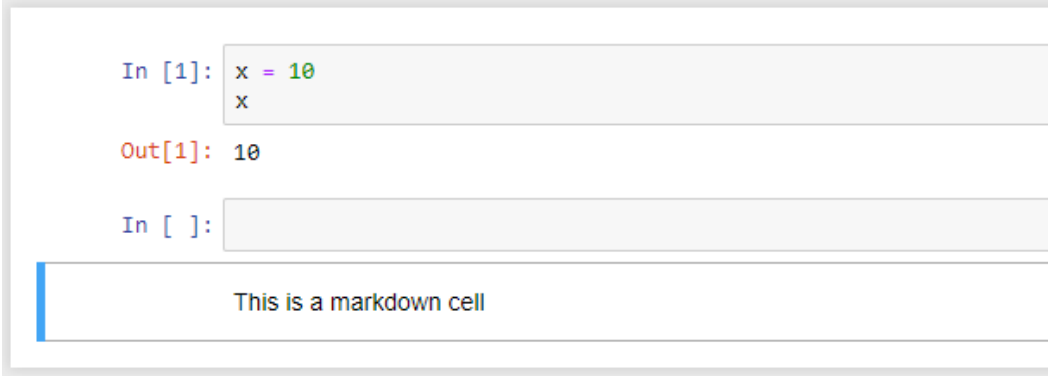
5. Press Esc to exit the Edit Mode. Press dd to delete the current cell.



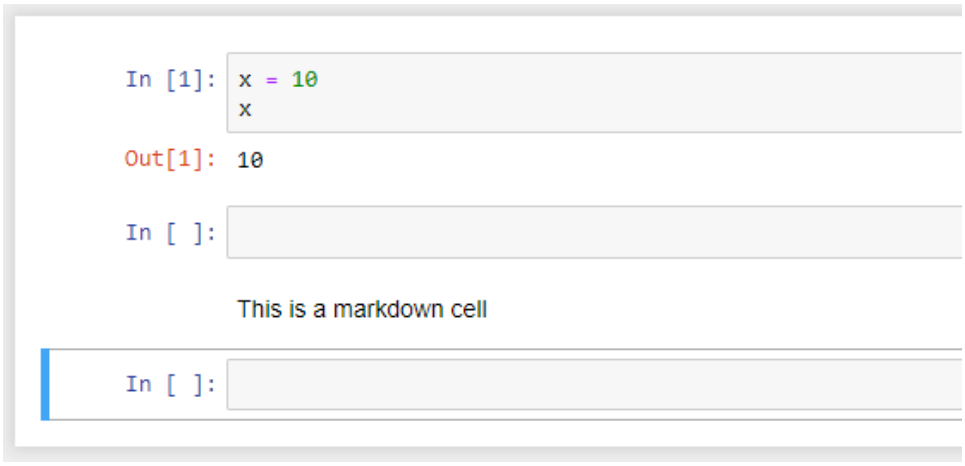
6. Press a to create a cell above the current cell.



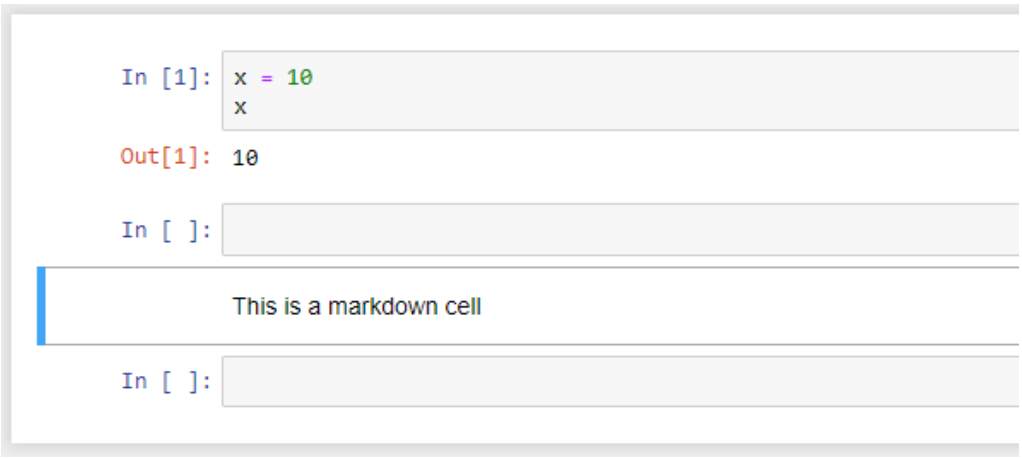
7. Press ' ↓ ' to move to the markdown cell at the bottom. Or mouse click on the markdown cell to select the cell.



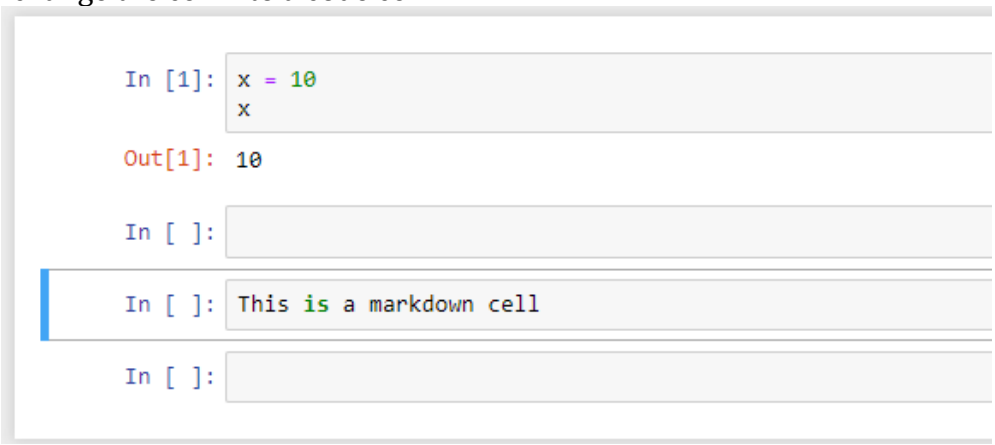
8. Press b to create a cell below the current cell.



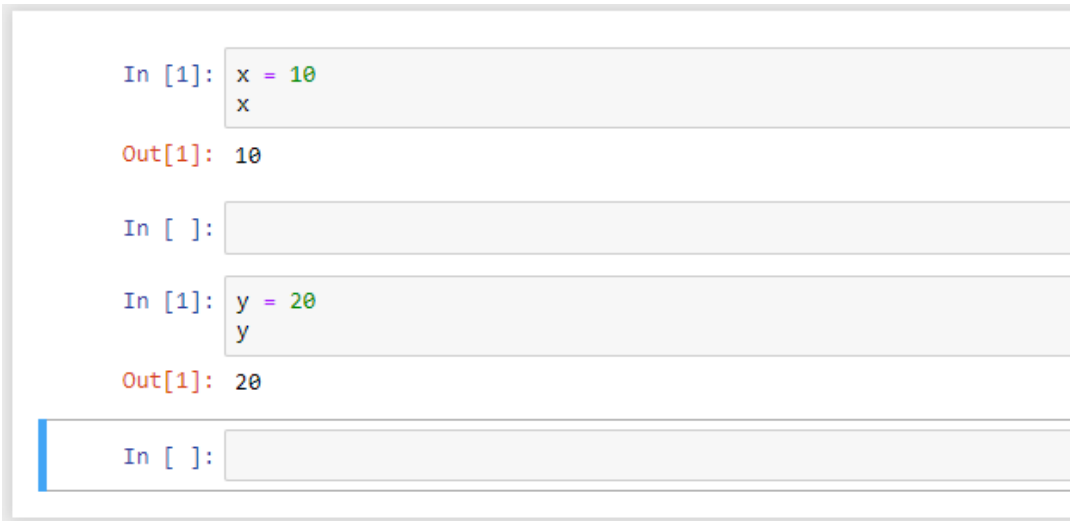
9. Press ' ↑ ' to move back to the markdown cell. Or mouse click on the markdown cell to select the cell.



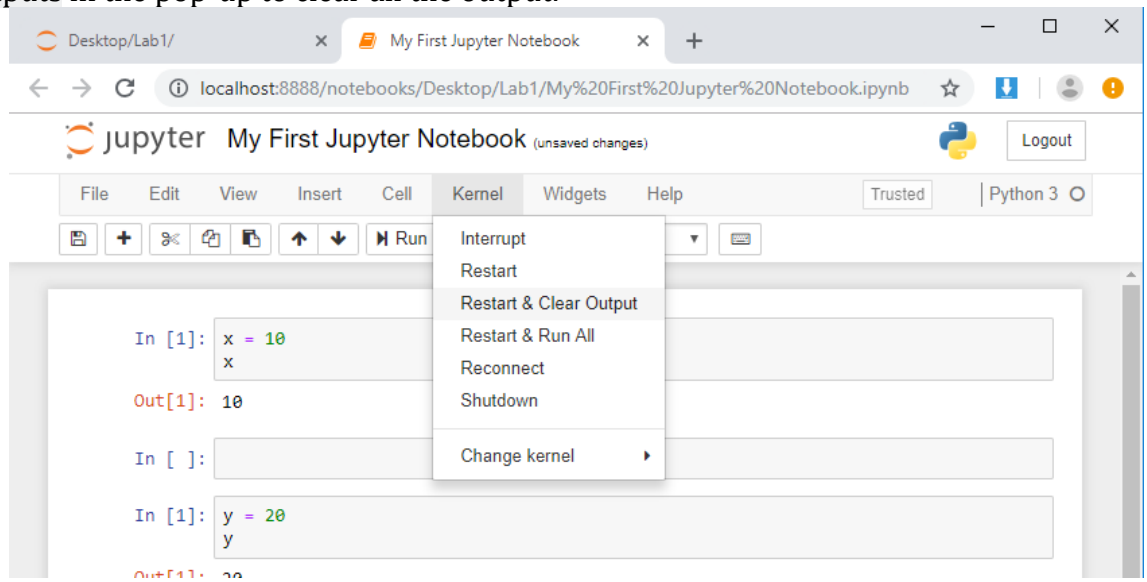
10. Press y to change the cell into a code cell.



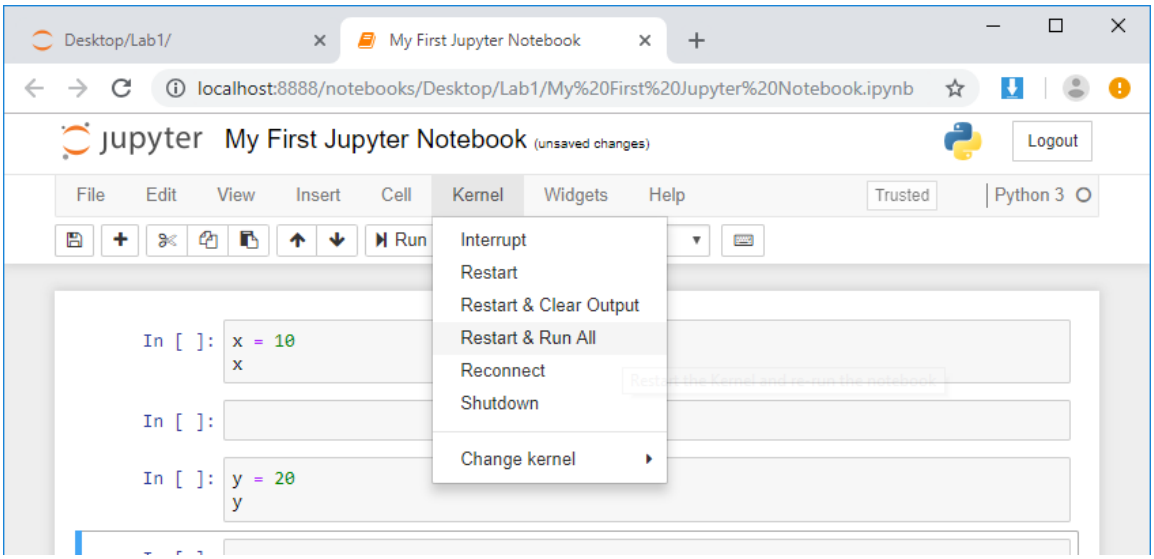
11. Press Enter to enter the edit mode. Delete the original content and type in y = 20 in the first line and y in the second line. Then press Shift-Enter.

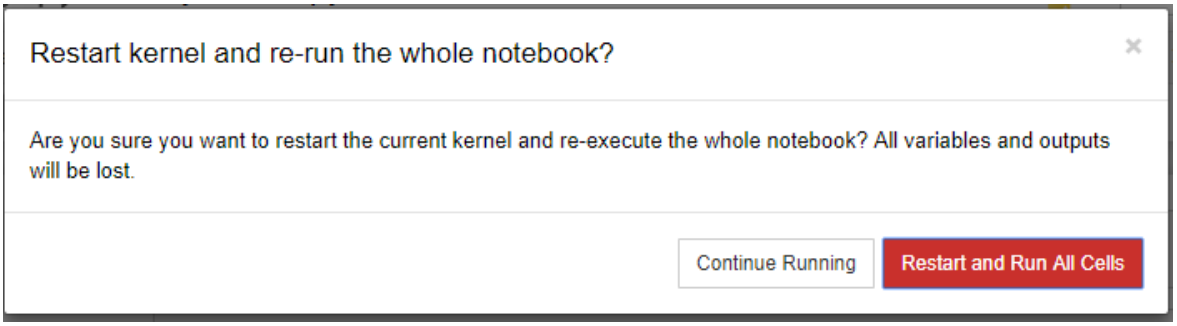


12. Click the Kernel menu and select Restart & Clear Output. Click Restart and Clear All Outputs in the pop-up to clear all the output.



13. Click the Kernel menu and select Restart & Run All. Click Restart and Run All Cells in the pop-up to run all the cells in the notebook.





Lab1 Tutorial-Python Basics

Open the "COMP4115 Lab1 Tutorial Python Basics.ipynb". It shows the sample code for the python basics.

Assignment

1. Open "Lab1 Exercise.ipynb"
2. Fill your name and student number
3. Write python code to answer the four questions in "Lab1Excercis.ipynb"
4. Submit your filled "Lab1 Exercise.ipynb" to Moodle before 6pm on Feb 14, 2020. Please make sure you submit the correct file.