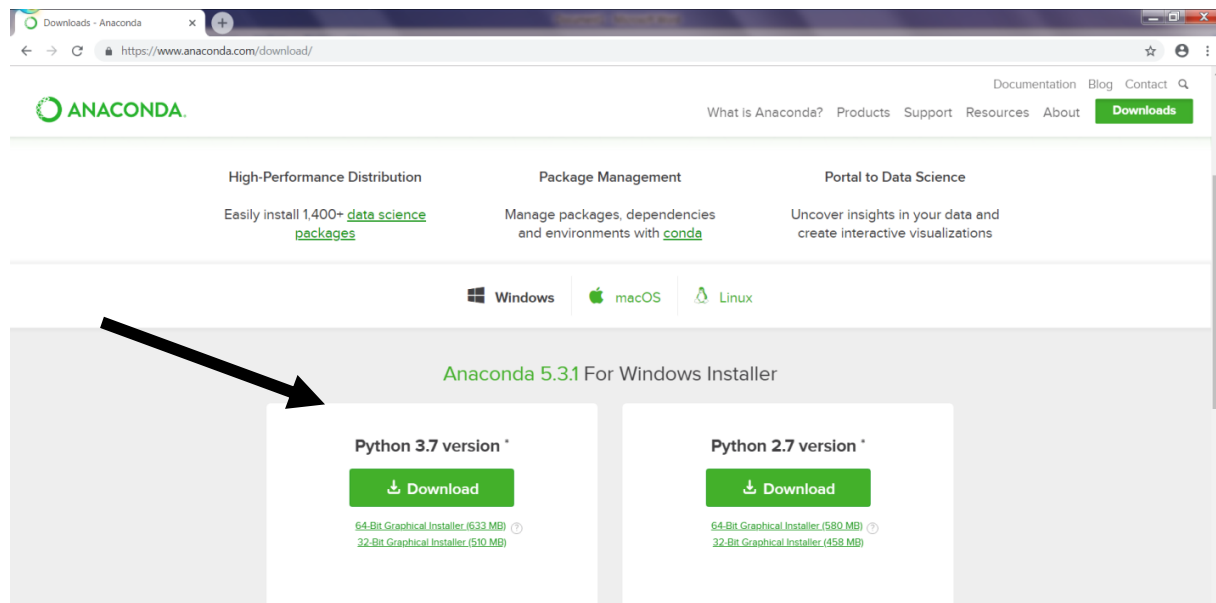
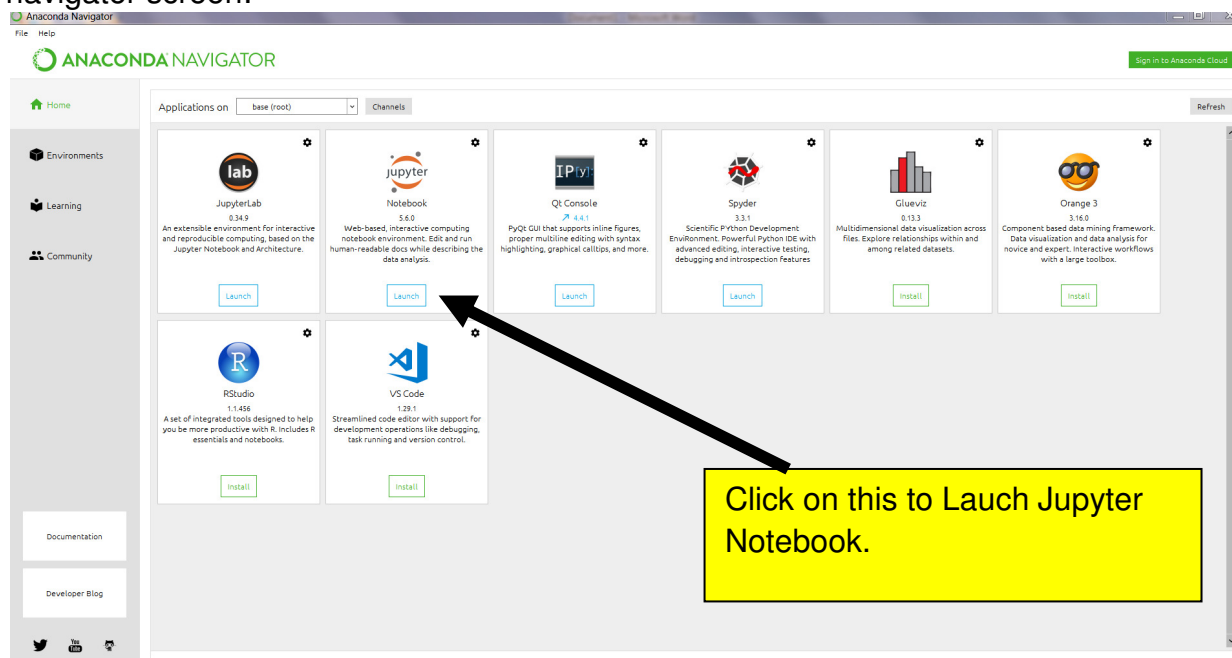


## Math 195 Python Project – Some Useful Tips for Jupyter Notebooks

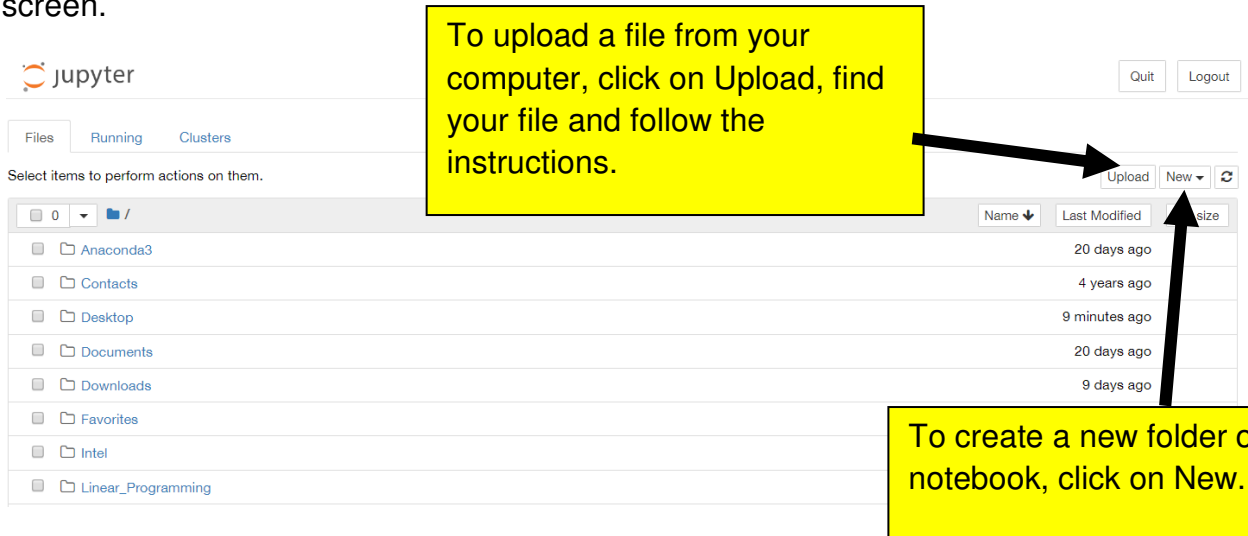
For this project, we will be using Anaconda as our **Python program editor**. Click on the link <https://www.anaconda.com/download/> and choose Python 3.7 version to download. (If you are not using Windows, click on the links given and download the version for the operating system that you are using.) Instructions that I give in this document are in Windows environment. If you are using Mac or Linux, you may need to modify these. In addition, these instructions are prepared assuming that you have no coding experience. So, if you already know it, you may skip the parts that you know.



1. After you download Anaconda, click on it and follow the instructions for the installation.
2. Once you installed Anaconda, open the program and you should see Anaconda navigator screen:

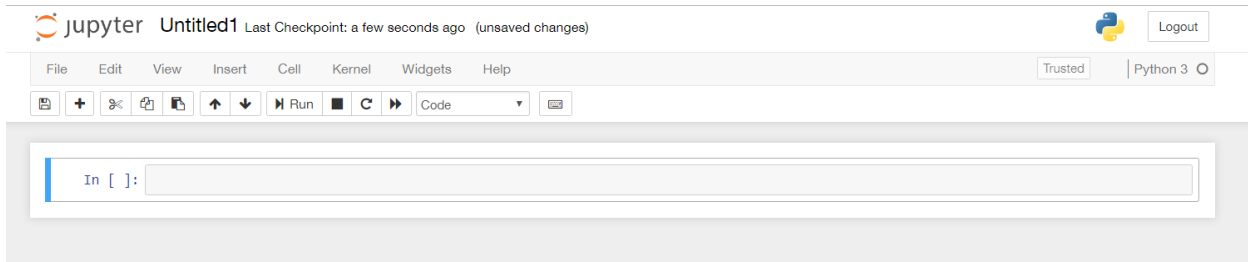


3. You should see the home screen for the Jupyter Notebook: Get familiar with this screen.



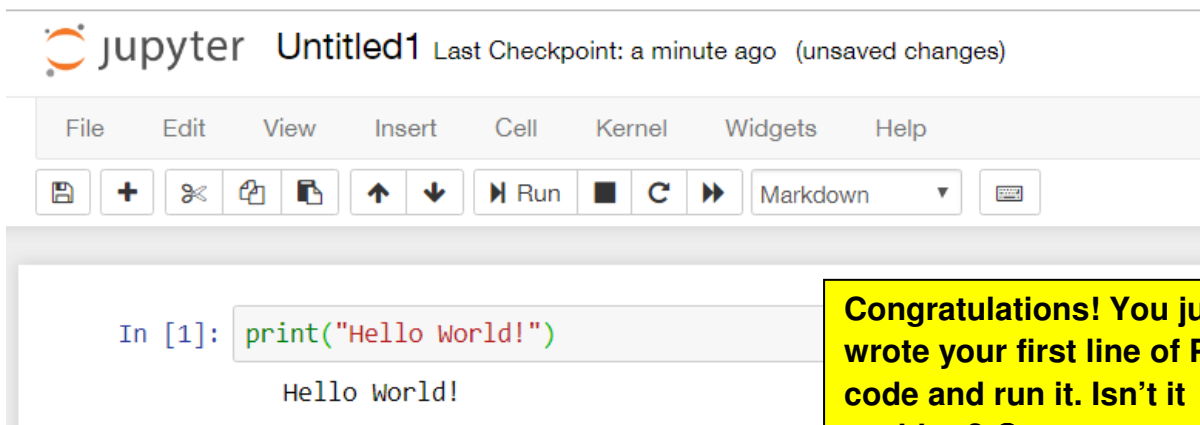
The screenshot shows the Jupyter Notebook home interface. At the top, there's a 'jupyter' logo and 'Quit'/'Logout' buttons. Below are tabs for 'Files', 'Running', and 'Clusters'. A message says 'Select items to perform actions on them.' The main area displays a file browser with a list of folders: Anaconda3, Contacts, Desktop, Documents, Downloads, Favorites, Intel, and Linear\_Programming. On the right, there's a table with columns 'Name', 'Last Modified', and 'Size'. Above this table are buttons for 'Upload', 'New', and a refresh icon. A yellow callout box with an arrow pointing to the 'Upload' button contains the text: 'To upload a file from your computer, click on Upload, find your file and follow the instructions.' Another yellow callout box with an arrow pointing to the 'New' button contains the text: 'To create a new folder or a new notebook, click on New.'

4. If you want to create a new file, click on New and choose Python 3 from the drop down menu. A new notebook should pop-up as a new tab and you should see something like this.



The screenshot shows a new Jupyter Notebook titled 'Untitled1'. The top bar includes the 'jupyter' logo, the title 'Untitled1', and a status message 'Last Checkpoint: a few seconds ago (unsaved changes)'. There are 'Python' and 'Logout' buttons. Below the top bar is a menu bar with 'File', 'Edit', 'View', 'Insert', 'Cell', 'Kernel', 'Widgets', and 'Help'. Under the menu bar is a toolbar with icons for saving, creating new files, opening recent files, undo, redo, running, and a dropdown menu currently set to 'Code'. The main area is a large text input field with a prompt 'In [ ]: '.

5. Each cell is a code block. Once you write your code, press Shift+Enter and it will run. For example, Write `print("Hello World!")` into the first code cell. To write string like this, it is important to use quotation marks " ", we will see more of that in detail later.

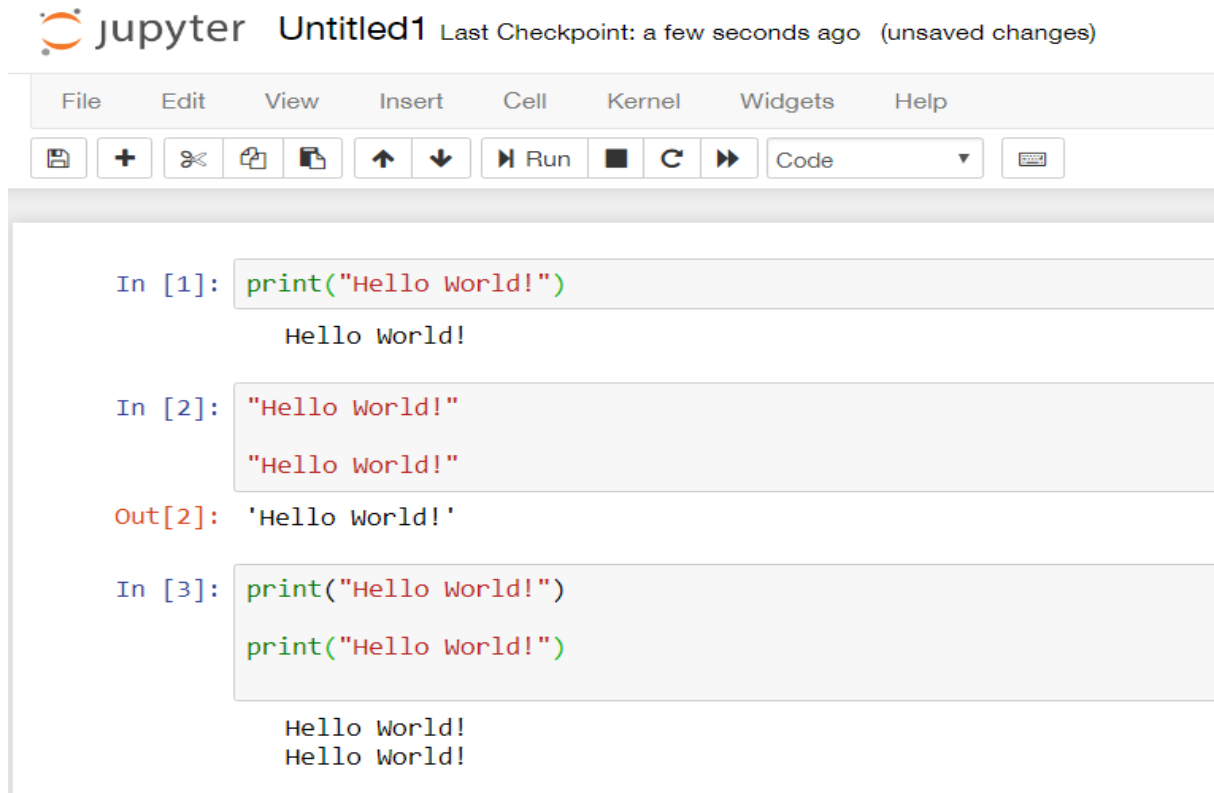


The screenshot shows the Jupyter Notebook interface after running a code cell. The title bar now says 'Untitled1' and the status message is 'Last Checkpoint: a minute ago (unsaved changes)'. The menu bar and toolbar are the same. The toolbar dropdown menu is now set to 'Markdown'. The main area shows a code cell with the prompt 'In [1]: ' followed by the code `print("Hello World!")`. Below the code, the output 'Hello World!' is displayed.

**Congratulations! You just wrote your first line of Python code and run it. Isn't it exciting? 😊**

## Remarks:

1. Unlike other editors, in Jupyter notebooks, you don't have to write `print()` to see the output. That is, if you write "Hello World" and run the cell, you will still see the output. But it will be the last one that the computer runs. If you want to see more than one output, you could use multiple print statements. An example is given below.

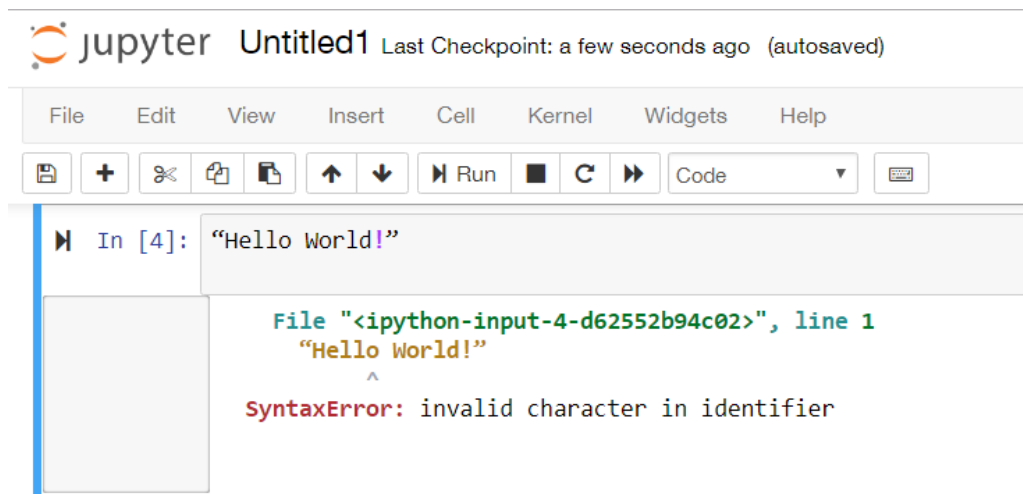


```
In [1]: print("Hello World!")
Hello World!

In [2]: "Hello World!"
"Hello World!"
Out[2]: 'Hello World!'

In [3]: print("Hello World!")
print("Hello World!")
Hello World!
Hello World!
```

2. Please don't copy and paste "Hello World!" from this document. Write it from scratch. Otherwise, it will give you a **SyntaxError** as given on the right.

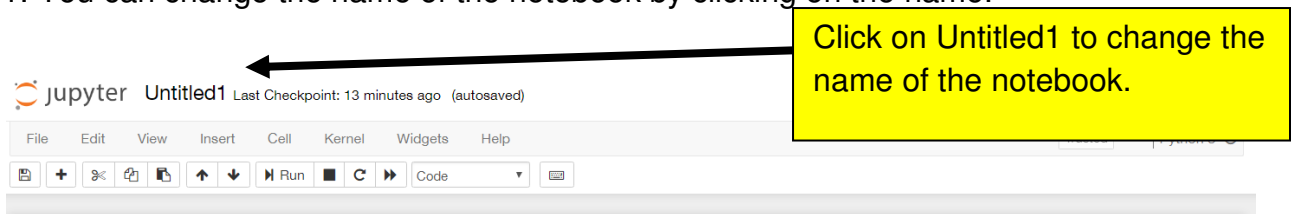


```
In [4]: "Hello World!"

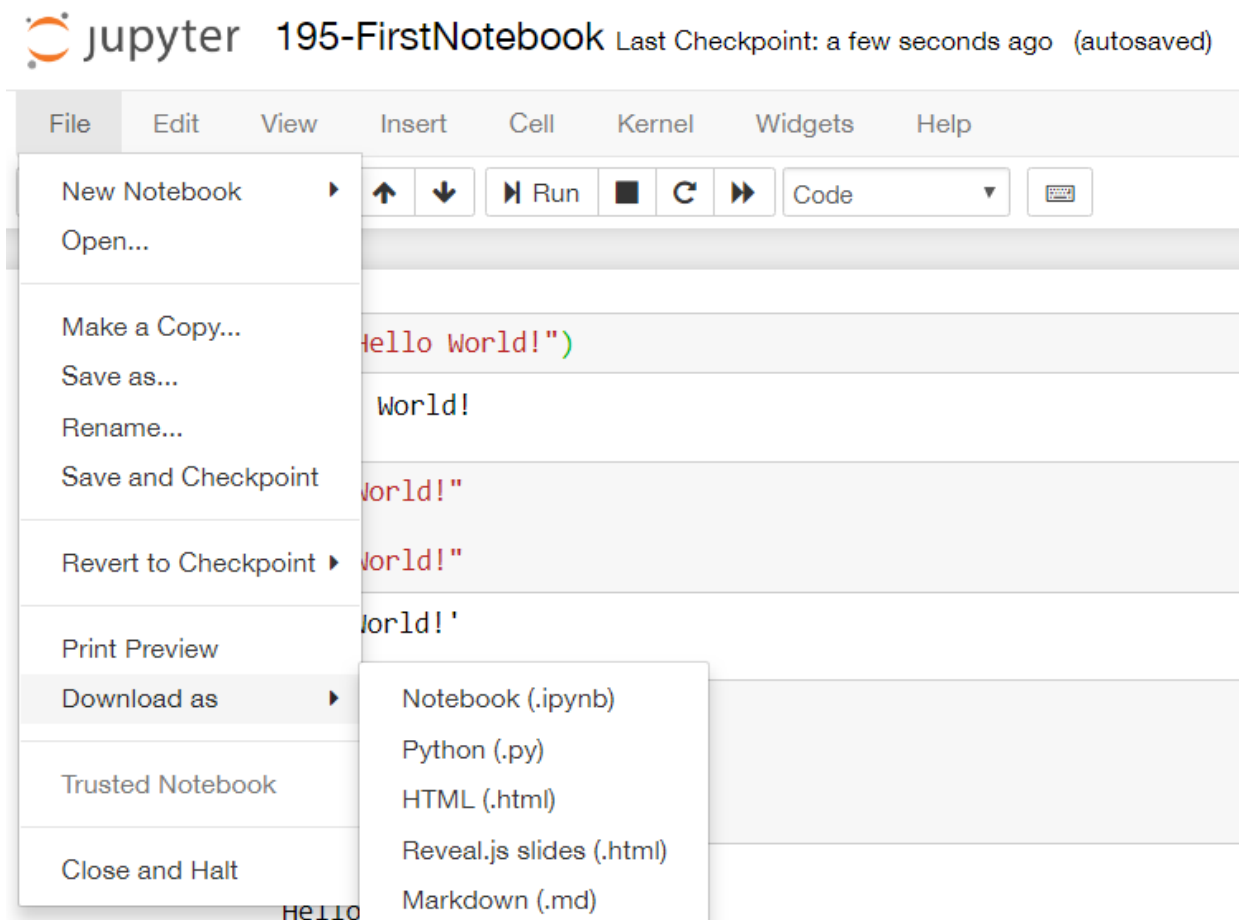
File "<ipython-input-4-d62552b94c02>", line 1
"Hello World!"
^
SyntaxError: invalid character in identifier
```

## Some Useful Notebook Features

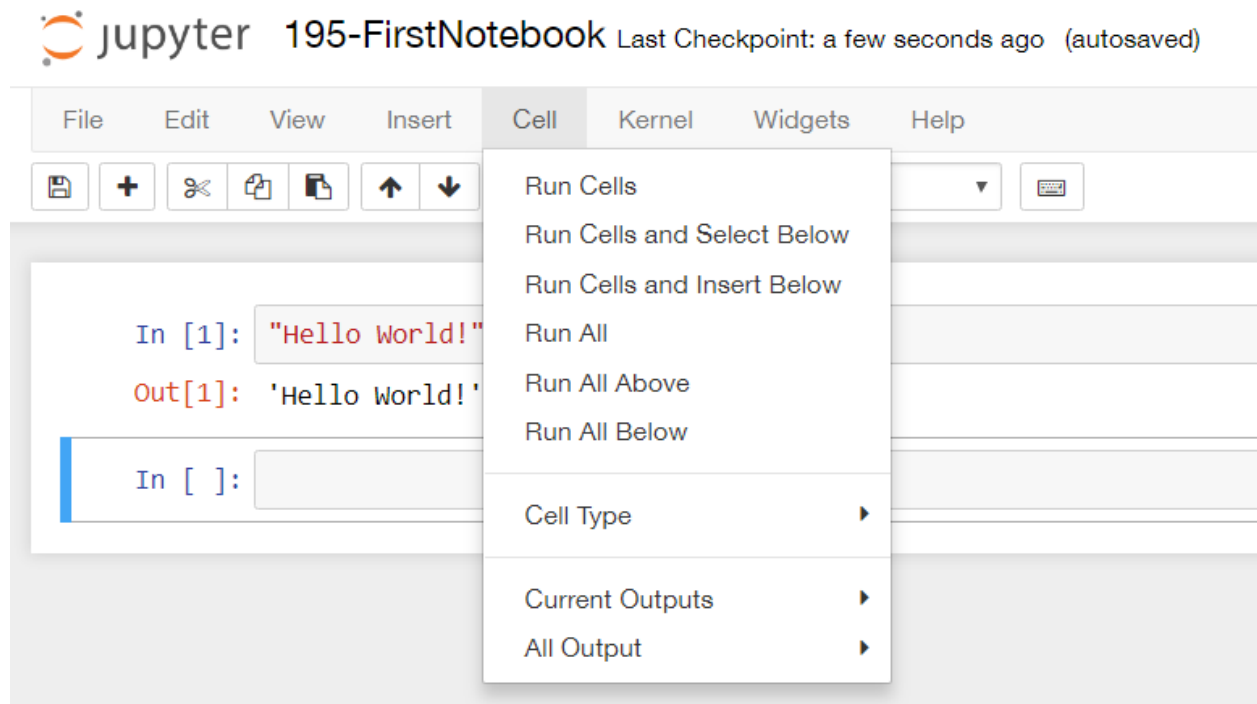
1. You can change the name of the notebook by clicking on the name.



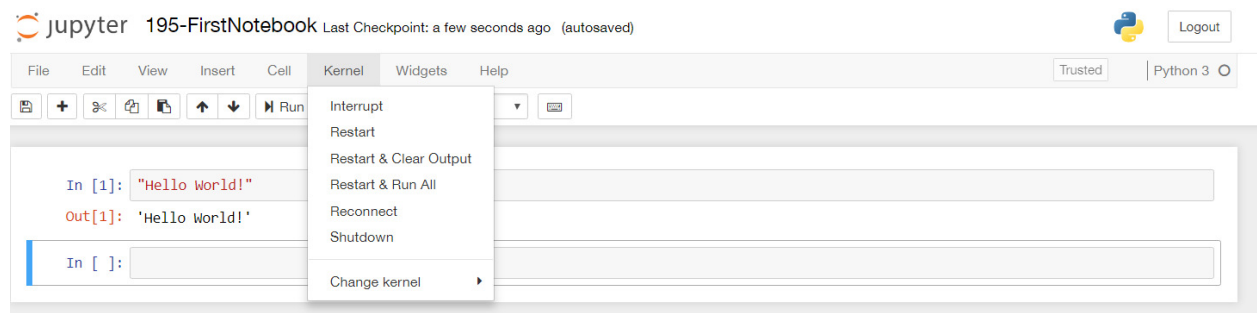
2. If you want to download your notebook on your computer, click on File, then choose the version you want from the Download As menu. Notebook(.ipynb) works with Jupyter notebook. If you want to work on your code by using other editors (e.g., atom.io etc.), please download it as Python (.py) file.



3. Sometimes, you may want to save your Jupyter notebook and continue working on it at a later time. Let's say you have already written code on 10 cell blocks and you will continue working on the 11<sup>th</sup> cell block. Let's say the code that you will be writing uses a code that you have written earlier. So, you have to run all cells so that the computer will know what you will be referring to in the 11<sup>th</sup> code block. To run all cells, go to Cell menu and click on Run All. Otherwise, you will receive a NameError saying that what you are using is not defined.



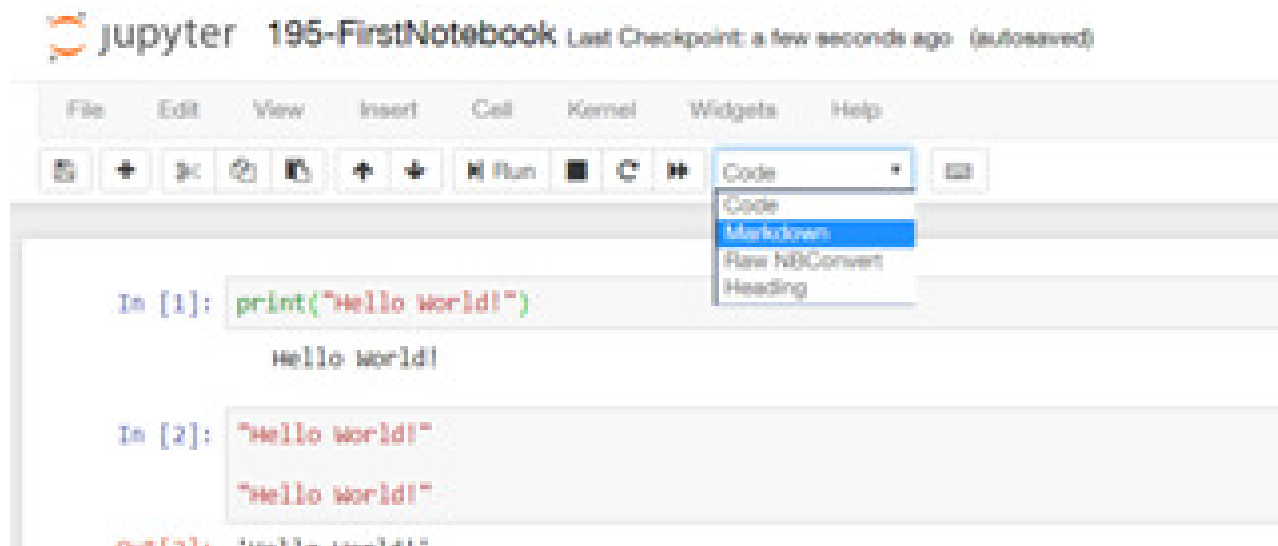
4. In some cases, the code that you write does not work efficiently and give some unexpected results. In those instances it might be a good idea to click on Restart & Clear output from the Kernel Menu. Sometimes, you may want to interrupt the code that is running. You can use Interrupt from Kernel menu to do that, too.



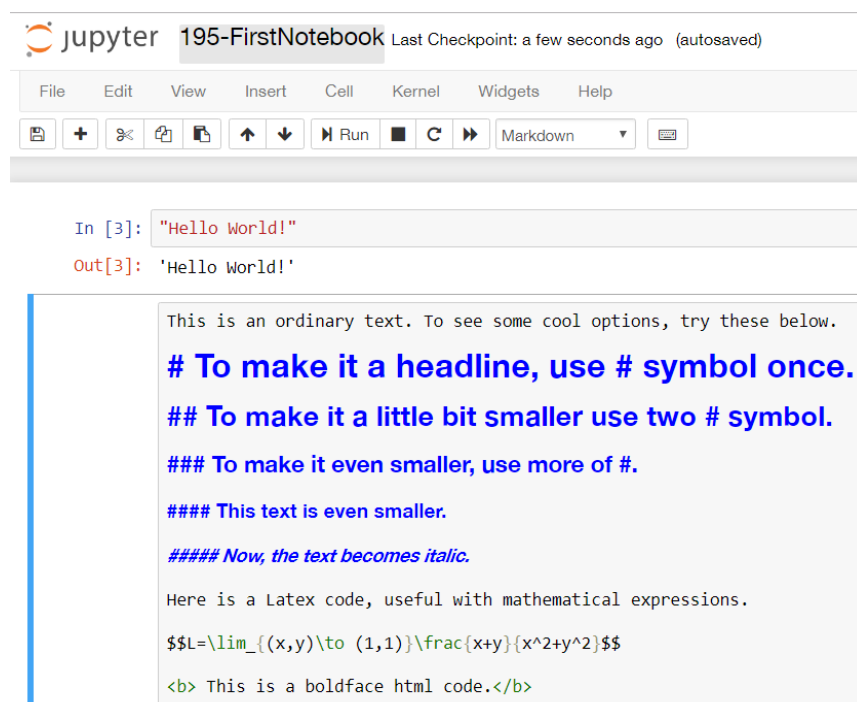
5. If you want to prepare a document involving descriptions or ordinary text along with your code, you may want to change the cell type to Markdown from the drop-down menu shown below. That will change the code cell type to Markdown. After you write your text and press Shift+Enter, you will get an ordinary text instead of a code.

If you know, HTML or Latex, they work well in the Markdown mode.

If you want to modify a markdown block at a later time, double click on it and it will show the cell so that you can update your text.



Here are some cool examples:



Once you run these, it will be like the following:

Jupyter 195-FirstNotebook Last Checkpoint: a few seconds ago (autosaved)

File Edit View Insert Cell Kernel Widgets Help

Run

In [3]: "Hello world!"

Out[3]: 'Hello world!'

This is an ordinary text. To see some cool options, try these below.

**To make it a headline, use # symbol once.**

**To make it a little bit smaller use two # symbol.**

**To make it even smaller, use more of #.**

**This text is even smaller.**

*Now, the text becomes italic.*

Here is a Latex code, useful with mathematical expressions.

$$L = \lim_{(x,y) \rightarrow (1,1)} \frac{x+y}{x^2+y^2}$$

**This is a boldface html code.**