



Lecture 39: Beyond Cloud9

The wonderful world of computing!



Cloud9 IDE
Your code anywhere, anytime



Announcements and reminders

- Project 3 due Wednesday 24 April at 11 PM
- Project 3 Rubrics posted on Piazza
- Tony is gone Monday - Thursday this week for a conference
 - **Extra office hour:** Monday 9-9:50 (T-Th office hours cancelled because he's in Virginia...)
 - Available by Piazza/email
 - **TA Karthik** will cover lecture:
 - **Mon:** VScode/coding.csel.io/Python
 - **Wed:** Practicum 3 review



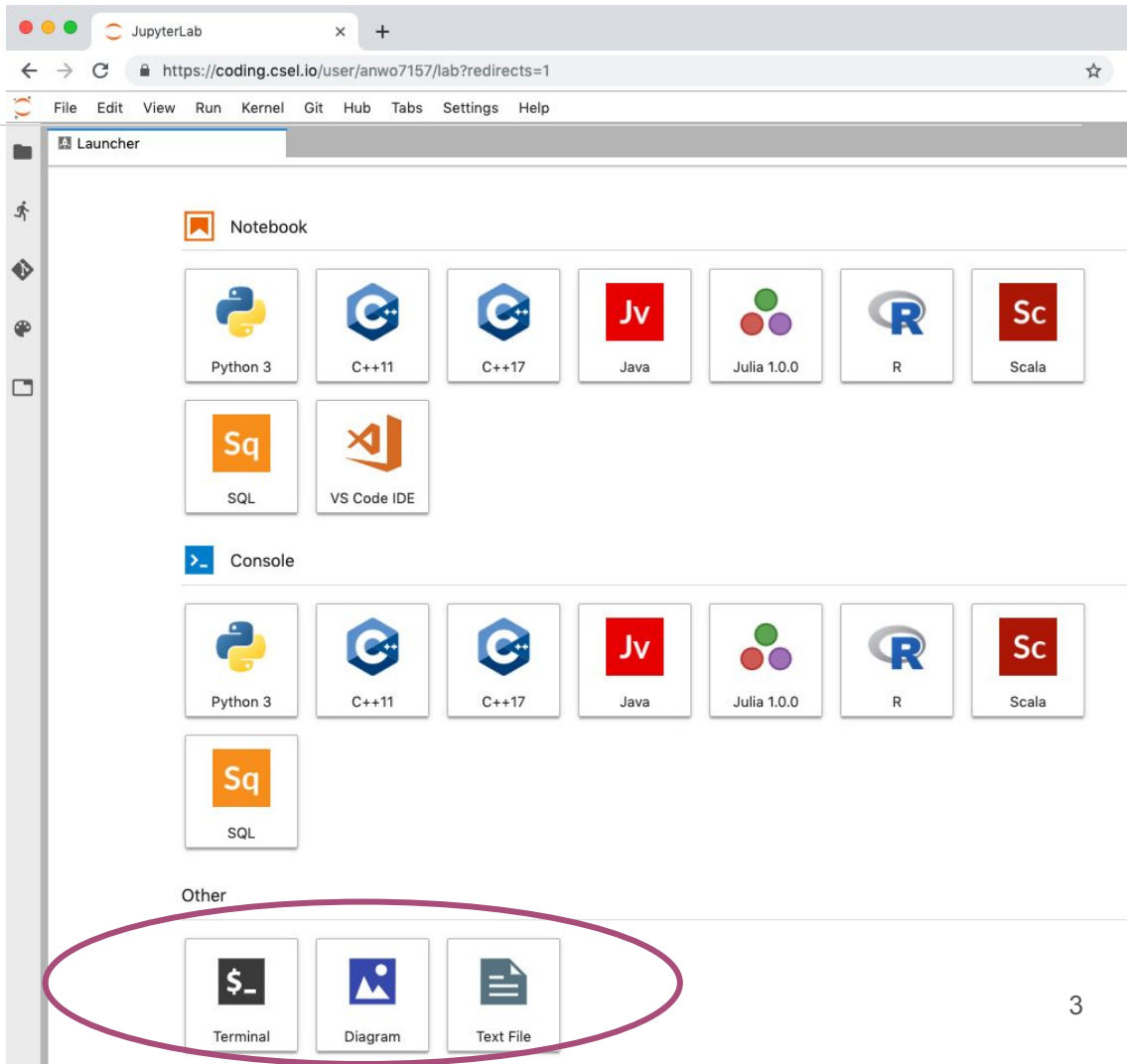
JupyterHub

Cloud9 is going away.
That makes us sad.

But! The CSEL server's instance of JupyterHub is our friend!

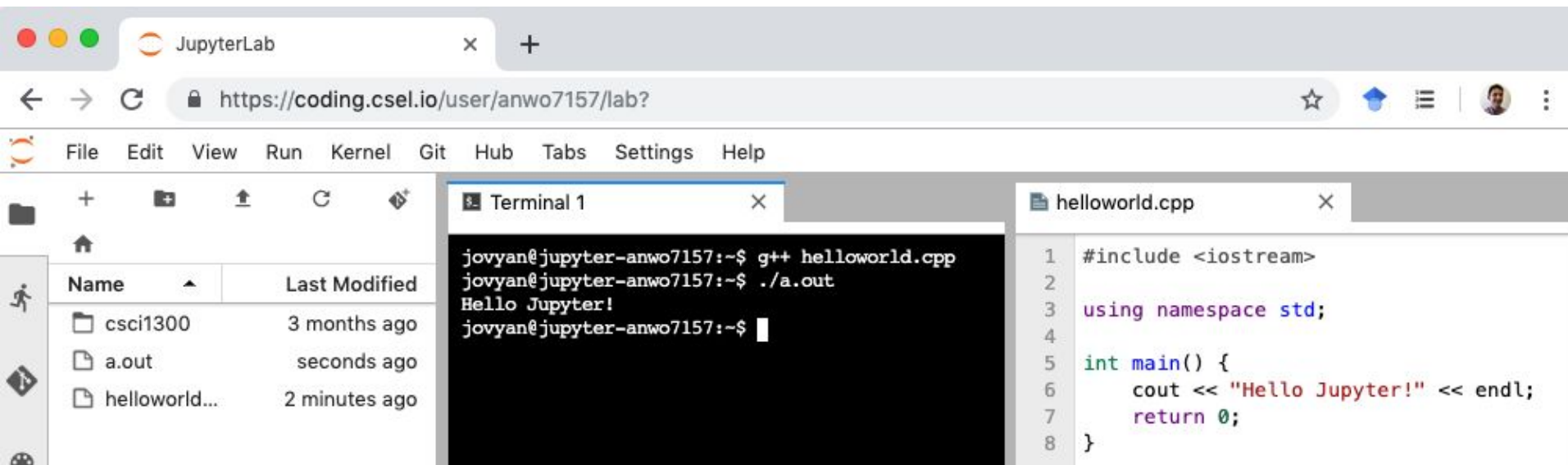
- 1) <https://coding.csel.io>
- 2) Sign in with CU Identikey credentials
- 3) "Start my server"
- 4) Open a Terminal and a Text Editor

(might need to open a New Launcher
by going to
File → Open New Launcher)



JupyterHub

Once we have a **terminal** and a **text editor** open, we can work just like in Cloud9 with **compiling from the command line**:



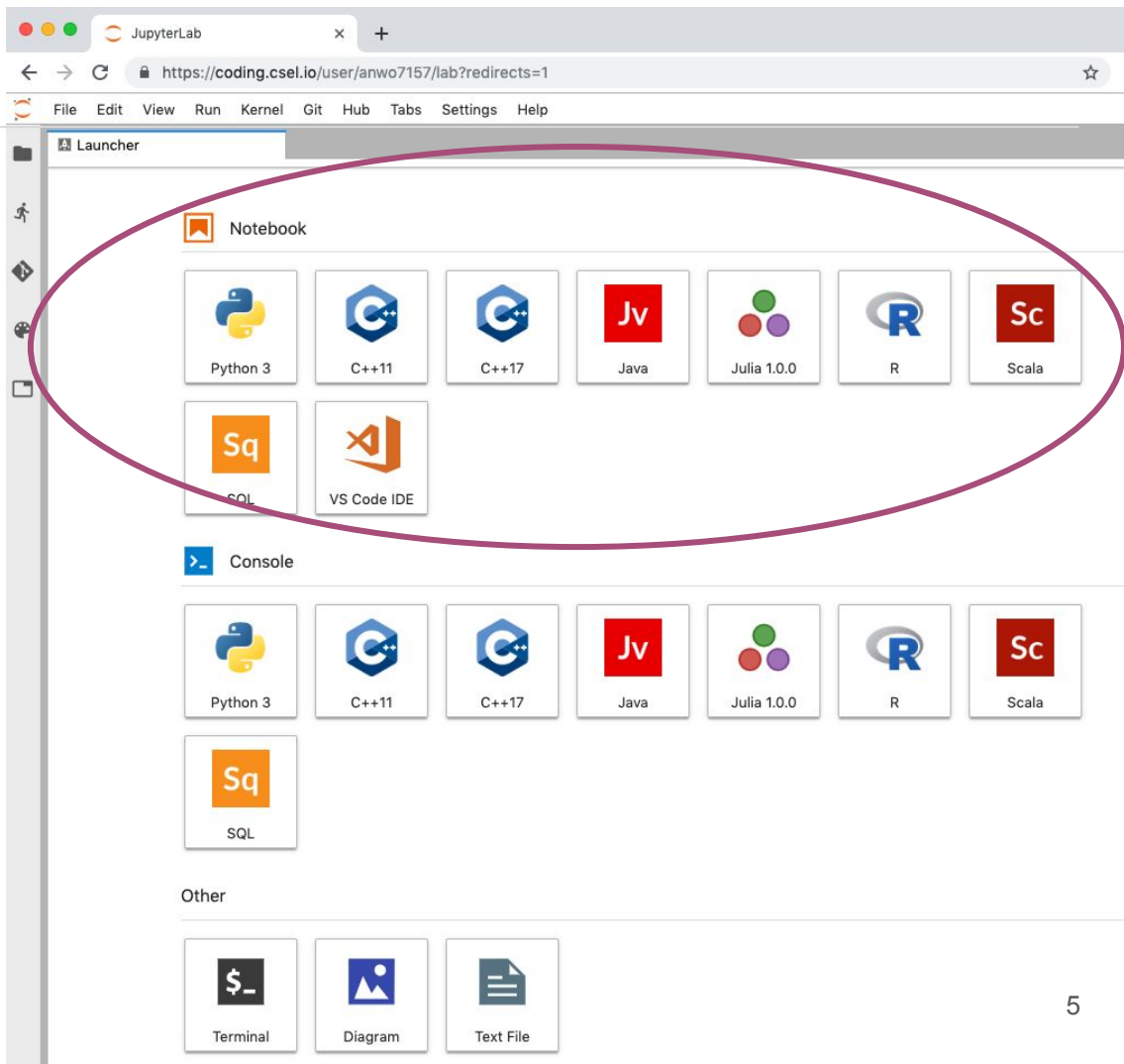
Note that we will want to save the initial text file as a **.cpp** file, and might want to create new directories.

JupyterHub

We can also open **Jupyter notebooks**

- A ubiquitous form of scientific communication,
- and a flexible and easy way to test-drive codes!

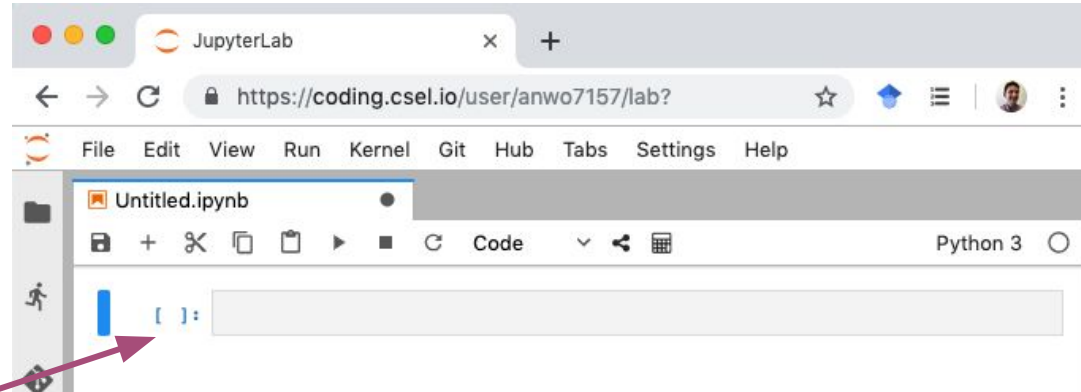
Let's open a **Python 3** notebook and see how we can map our C++ knowledge into another super common and useful programming language



A Python Jupyter Notebook

There are two types of cell in a Jupyter notebook:

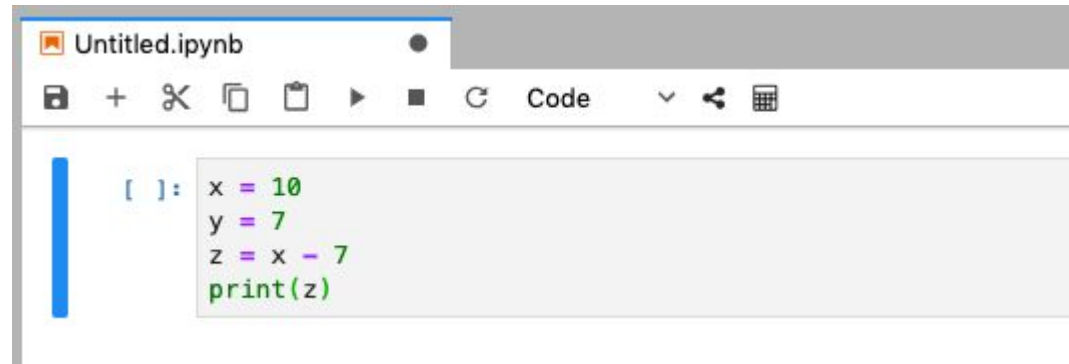
- 1) Code
- 2) Markdown



Initially, we just have a code cell, which is denoted by the execution brackets to the left

We can click in the code cell and type some simple code:

To execute the code, press **Shift+Enter**

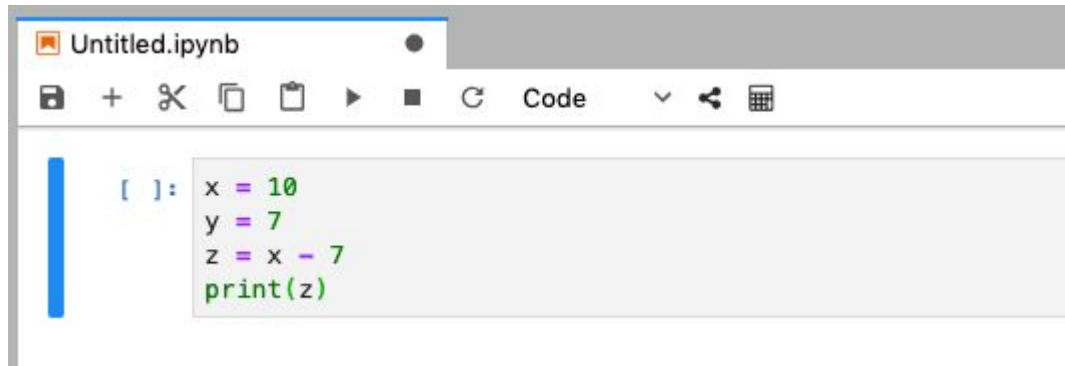


A Python Jupyter Notebook

We can click in the code cell and type some simple code:

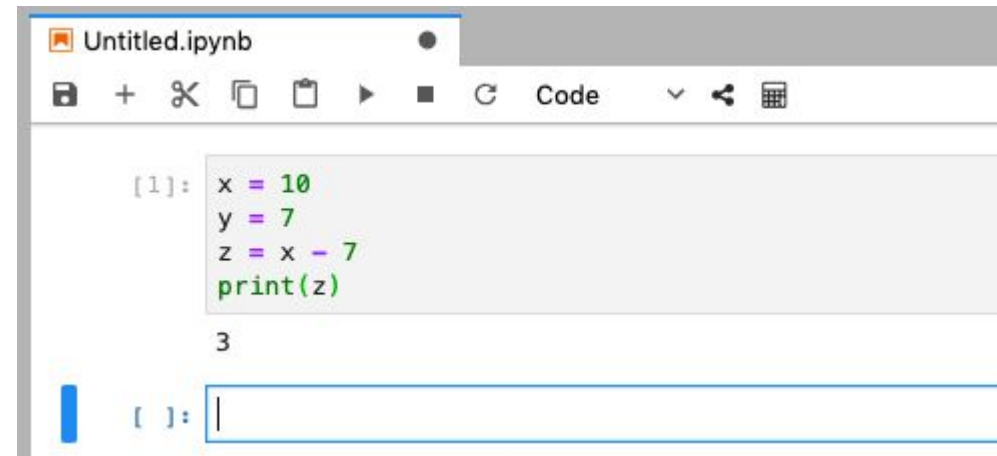
To execute the code, press **Shift+Enter**

The code will evaluate and the output will be displayed below the cell. Also note that the **execution brackets** now have a number inside them, denoting when the cell was executed.



The image shows a Jupyter Notebook window titled 'Untitled.ipynb'. The toolbar includes icons for saving, adding, deleting, copying, pasting, running, and other actions. The 'Code' tab is selected. A code cell is active, containing the following Python code:

```
[ ]: x = 10
      y = 7
      z = x - 7
      print(z)
```



The image shows the same Jupyter Notebook window after the code has been executed. The code cell now displays the output '3' below the code. The execution bracket on the left of the code cell now contains the number '1'.

```
[1]: x = 10
      y = 7
      z = x - 7
      print(z)
```

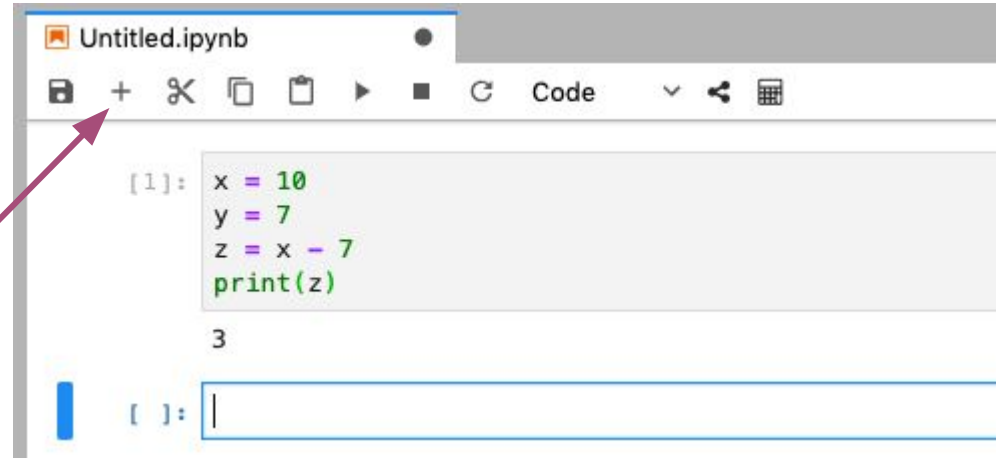
3

Below the executed cell, a new empty code cell is visible, with the execution bracket containing a vertical bar '|'.

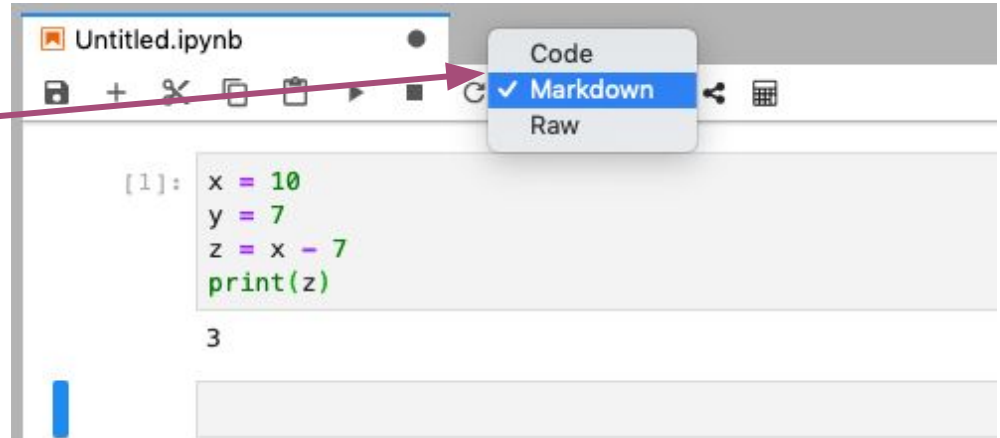
A Python Jupyter Notebook

Jupyter was also nice enough to open a new code cell below the one we just executed!

But, to create a new cell ourselves, we can click the + button in the toolbar



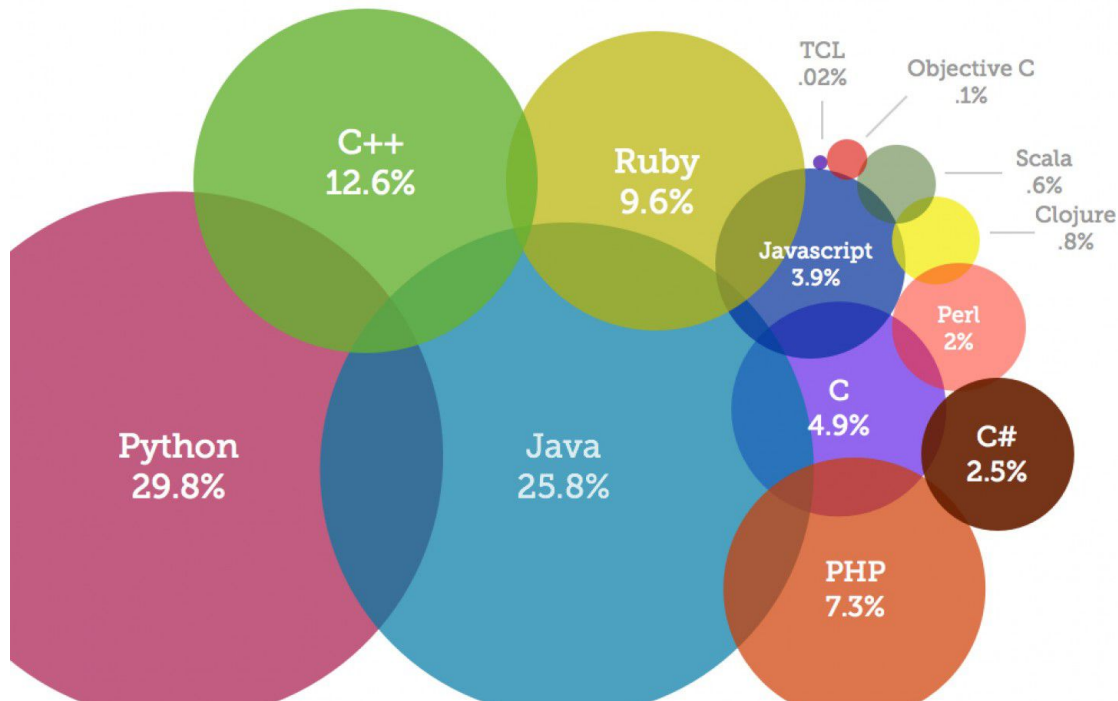
To make a **Markdown** (text and equations) cell, click the dropdown menu for cell type and change it to **Markdown** instead of **Code**



A Python example

Let's write a nice example program in our Python Jupyter notebook!

Most Popular Coding Languages of 2018



A *local* environment

JupyterHub and Cloud9 are both very nice, but there are a couple of drawbacks

- 1) Relied on internet
- 2) Relied on a service that is going away ...
- 3) ... or someone else is in charge of maintaining

Instead, we could use a **local** C++ coding environment

Visual Studio is one such environment:

→ <https://code.visualstudio.com/>

(note that the coding.csel.io server also has Visual Studio! → “VS Code IDE”)



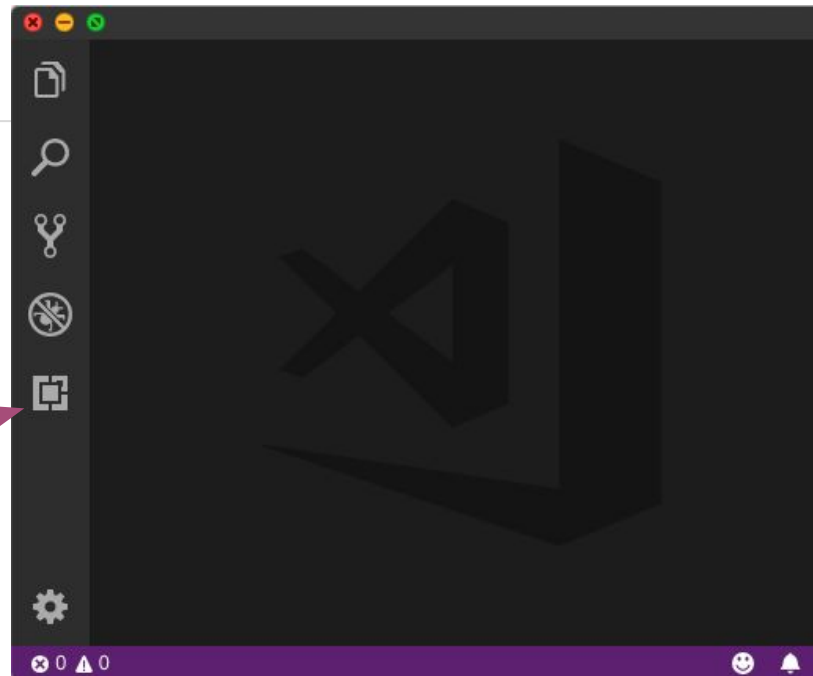
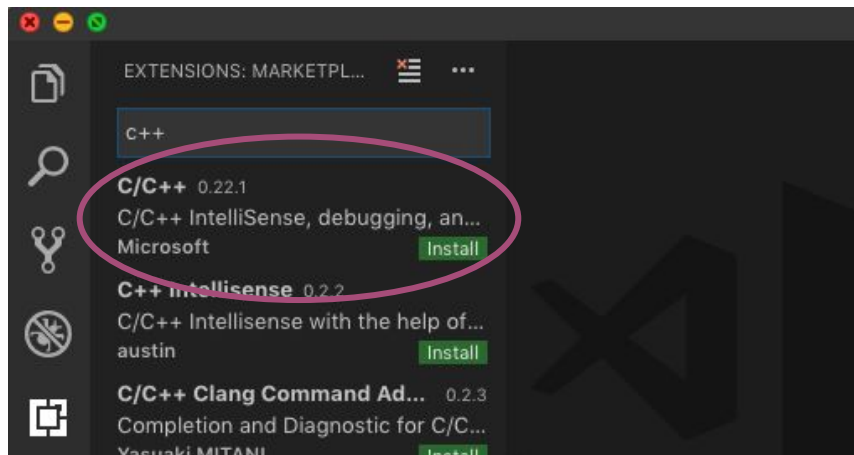
Visual Studio

Visual Studio is one such environment:

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From there: (1) download Visual Studio, and
(2) install C++ extension

Extensions tab



Visual Studio

Visual Studio is one such environment:

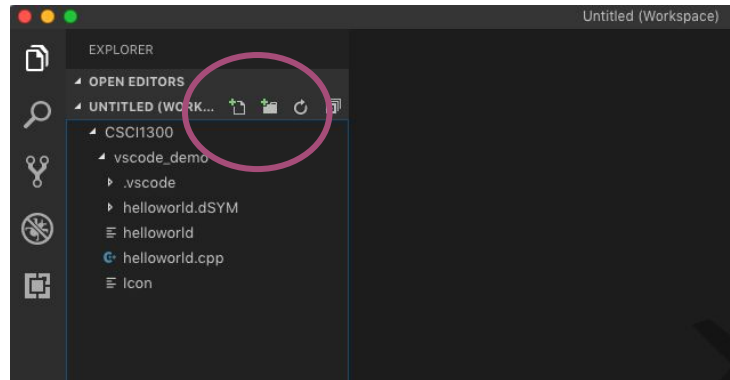
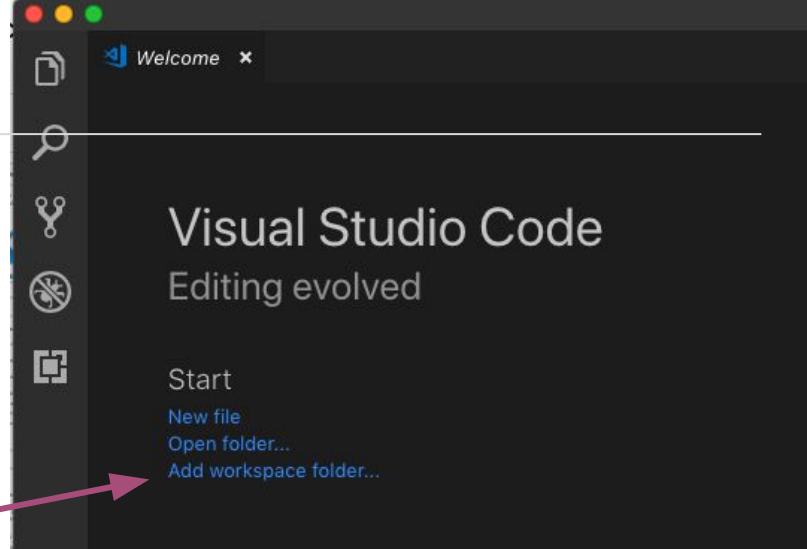
→ <https://code.visualstudio.com/>

From there: (1) download Visual Studio, and
(2) install C++ extension
(3) add a workspace/project folder

(you **could** download all your Cloud9 files and put them in there!)

From here, it's pretty similar to Cloud9:

- a) make a new folder for a particular assignment
- b) make a new .cpp file in the folder



Visual Studio

Visual Studio is one such environment:

→ <https://code.visualstudio.com/>

We have access to a nice debugger!

- Set breakpoints the same way
(click in the gutter)
- Then under Debug menu, select
“Start debugging”
- If it asks, you can select:
“g++ build and debug active file”

