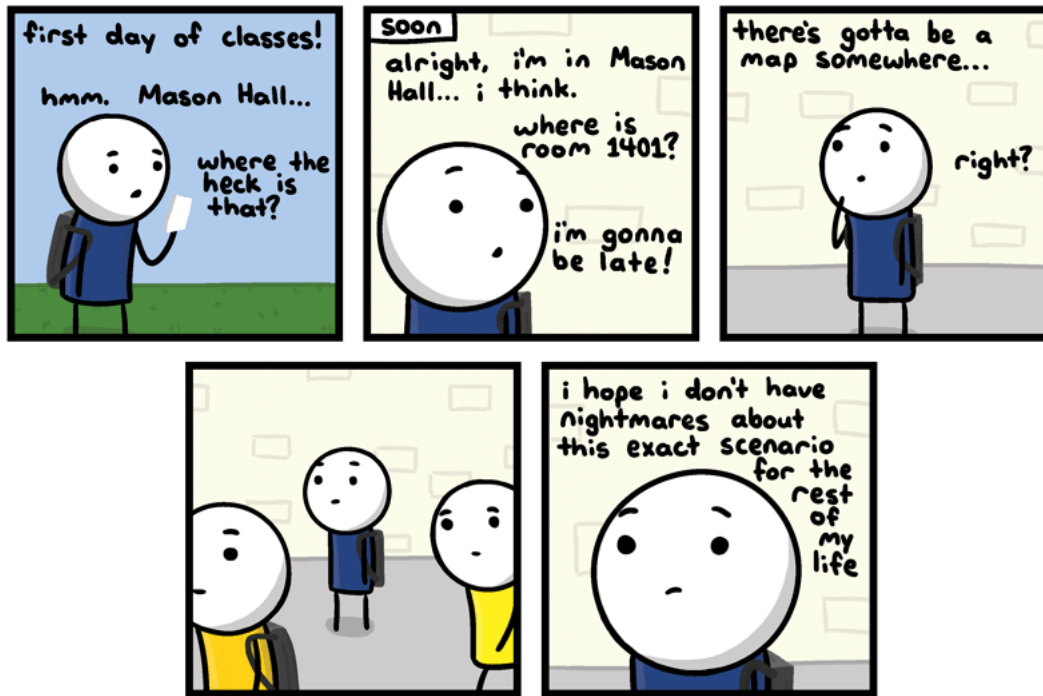


CS51A—Lab 1



invisiblebread.com

<http://joyreactor.com/post/954711>

This lab will walk you through the basics of using PyCharm, Python and GradeScope.

1 Accounts

You should have received an e-mail with your CS account information containing your username and password. Note that this CS account is different from your other campus accounts. Files that you store on these computers will not be accessible when not in the CS labs and vice versa. Come talk to me if you ever want to transfer files from your CS account (though, e-mailing them to yourself or uploading them to a cloud file service is also an easy solution). If you want to work on the lab machines, this is the account that you will use to login.

2 Some Housekeeping

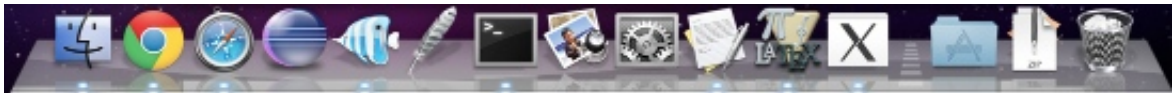
- You'll be spending a lot of time looking at the course web page, so go ahead and bookmark it in your browser at:

<https://www.cs.pomona.edu/classes/cs51a/>

- Create a new directory on your desktop called **cs51a** (or somewhere where you will remember and can store all your work for the class)
- Create a shortcut for PyCharm on the Dock at the bottom of the screen

If you're working on the lab computers:

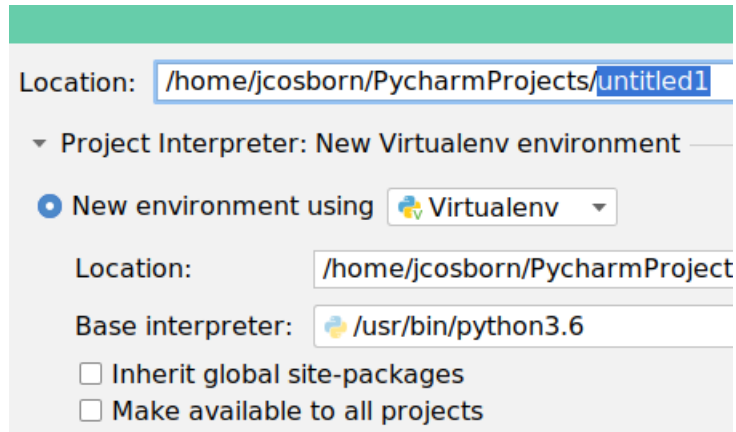
Mac includes shortcuts at the bottom of the screen called the “Dock” that allows you to launch applications, folders, etc. quickly. Below is a picture of my Dock:



We're going to add PyCharm to the dock for easy access.

To add an application to the Dock, all we need to do is find it and then drag it over the Dock where we want it. The easiest way to do this is to *search* for the application we want. Click the magnifying glass at the top right corner (or type `command + space_bar`) and then type “PyCharm”. As you start to type you should see the PyCharm icon appear. Click and drag this into your Dock at the bottom of the screen to add it.

- You can now click on the logo in the Dock (it looks like a square with “PC” inside) and it starts PyCharm. Go ahead and do this. It should bounce for a second then bug you about some initial configuration settings (for some more detail, see <https://www.cs.pomona.edu/classes/cs51a/install.html>). Click past these, then create a new Python project (“Create Project”, and make sure “Pure Python” is selected).
- Name your project! In this class it's probably best to use one project per lab. Make sure it's inside of your **cs51a** folder and then go ahead and call it **lab1**.
- We'll be using Python 3 for this class, so our PyCharm project will need to be configured for this (even if Python 3 is the default on your system, it's good to double check). Once you've started creating your new Python project, you'll have an opportunity to configure your “environment” if you click on the little triangle icon underneath the project name. Use the dropdown or the file picker to ensure that some version of Python 3 is selected as the “Base interpreter”.



3 Playing with the Python Interpreter

PyCharm has three different working sections. We'll mostly use the top right one, which is where we will edit files and the bottom one, which gives us an interactive shell or shows the results of running our programs. You can adjust these internal window sizes to make them bigger or smaller, move where they are, etc.

Try a few commands in the interactive shell (from the **Tools** menu, pick **Python Console...** or hit **Command, Shift, and A** at the same time and type "Python Console" and hit return).

```
>>>
```

is the prompt, meaning Python is ready for a command,

```
...
```

means it's a line continuation (i.e. Python is waiting for you to finish the statement) and a line without anything in front of it is generally the response from the interpreter.

- Try a few simple mathematical equations (e.g. "1+1", "2**3", "(100/20)+45*7"). Notice that Python makes for a pretty easy to use calculator.
- 22/7 is an approximation for Pi. Type this in.
- Remember that we can use variables to store intermediary values. Assign 22/7 to a variable called pi. Use that variable to calculate the area of a circle with radius 15 (remember, the area of a circle is π times the radius squared).
- In 2011, Pomona built a new parking structure. For a variety of reasons, the college decided to put a field on top of the parking structure (pretty cool, right?!).



Since we're in southern California, we don't need any covering for this field. However, let's pretend that we anticipate bad weather more regularly and we decide we need to cover it with a dome (global warming, maybe?). If we make the approximating assumption that the field is a circle of radius 100 feet, what is the surface area of the dome that would cover it?

Hint: the surface area of a *sphere* is $4\pi r^2$.

In the Python shell, you can use the up and down arrow keys to revisit commands you typed previously. Use the up arrow key to get your previous statement and then edit it to get the surface area of the dome assuming that the radius is 200 feet. Discuss your answers with your neighbor and make sure you agree.

4 Your first Python program

So far, we've only been interacting with the Python shell. This is good for some situations, but eventually, you're going to want to write longer programs that you can edit easily and persist when you quit PyCharm.

- Create a new file in PyCharm
Click anywhere in the "Project" pane of PyCharm, then use the file menu (**File/New**) and select **Python File**.
- Call your new file
`lab1.py`.
From the menu, select **File/Save All** (or type **command + s**)
- Put a few statements from above in the file, save it and then run your program using the green triangle button in the top right, or by

Each line you enter in the file will be executed in the shell as if you typed it. Save the file again (this time you shouldn't have to enter the file location).

You can run your file by right-clicking anywhere in the text editor and choosing **Run File in Python Console**. After you do this once, you can just click the green arrow near the top right of the window or hold shift and press the F10 key on your keyboard.

When you do this, you'll notice that the Python shell restarts and your program is executed by a built-in Python command called `runfile`. Most likely, your program won't show anything else before giving you that friendly `>>>` prompt. *Make sure you understand why your program displays what it does!* Discuss the output with your neighbor.

- Put some `print` function calls in your program

When you are running a program (vs. interacting with the shell) the intermediary results are not shown. Instead, if you want things to be displayed you need to use the `print` statement. You can print anything that represents a value, for example:

```
print(10) # printing a number
print(22/7) # printing another number
pi = 22/7 # assign 22/7 to pi
print(pi) # print out what is stored in pi
print("Hello computer user") # printing a string
```

Add a few `print` statements to your program and run it again. You should now see some results printed out.

- Optional: If you want to add a keyboard shortcut to run the current file in the console whether or not you've run it before, you can use the **Settings** window in the **File** menu. Check out the **Keymap** section and use the little search box on the right hand side to find the command we want (**Run File in Python Console**). Double click its entry in the list and type your desired shortcut in the window that pops up (I like F5, but anything is fine).
- Optional: You may have noticed just above **Run File in Python Console** the menu item **Execute Line in Python Console**, with its key shortcut printed next to it. Give that a shot to execute just the current line of code or drag out a selection over a few lines and execute those. Once you get used to the keyboard shortcut this can be a handy way to step through a bit of code at a time.

5 Testing assignment submission

We'll be using an online mechanism for submitting assignments called Gradescope. Go to the course website and follow the link for "Assignment submission". You'll need to enter your *college* login information (not your CS). Enroll in the CS51A course and then submit your `.py` file under the link for "lab1". Once you've done this, ask the professor to double-check that your submission was received. If so, move on to the assignment!