

Programming Bootcamp 2015: Lab 1

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Name:

If you would like to receive points for your work, copy and paste your code into this document, save it, and send it to sarahmid@mail.med.upenn.edu with “Bootcamp Lab1” as the subject line **before midnight on 6/4**. There will be a leaderboard each week showing the top point earners!

1 Guess the output: print statement practice (1pt)

For each of the following statements, first guess what the output will be, and then run the code yourself. You can use the interpreter if you want.

Code	Predicted output	Actual output
<code>print “what’s”, “up”</code>		
<code>print “what’s” + “up”</code>		
<code>print “I have”, 5, “cats”</code>		
<code>print “I have” + 5 + “cats”</code>		
<code>print 9 - 6 * 2</code>		
<code>print (9 - 6) * 2</code>		
<code>print 24 % 6</code>		
<code>print 24 % 7</code>		
<code>print -3 ** 2</code>		
<code>print (-3) ** 2</code>		
<code>print 9 / 2</code>		
<code>print 9.0 / 2</code>		
<code>print 9 / float(2)</code>		

2 Guess the output: variables practice (1pt)

For each of the following statements, first guess what the output will be, and then run the code yourself. You can use the interpreter if you want.

Code	Predicted output	Actual output
<code>x = 5 print x * 3</code>		
<code>x = "5" print x * 3</code>		
<code>x = "5" print int(x) * 3</code>		
<code>x = "cat" y = x print y</code>		
<code>x = 5 x = 1 print x</code>		
<code>x = 5 x + 1 print x</code>		
<code>x = 5 x = x + 1 print x</code>		
<code>x = 2 y = 4 print (x * y) ** x</code>		
<code>x = "cat" y = "dog" print x + y</code>		

3 Fix the code (1pt)

There are some errors in the following code. First copy the code exactly and save the it as a .py script. Then run the code and use the error messages to help you to fix the code so that you get the desired output. Remember to **save** your script every time you make a change!

```
age = "25"
name = Wilfred
introduction = "Hello, my name is " + name + " and I am " + age + " years old."
prnt introduction
```

The output should be:

 Hello, my name is Wilfred and I am 25 years old.

Note: Python sometimes tries to guess where in the line you made the error, and indicates this with a ^ symbol. It's often wrong, so don't rely on this exclusively. Check the whole line for mistakes.

4 Variable swap (1pt)

Type the following program into a text file, save it, and run it:

```
x = "Joe"
y = "Sally"

print x
print y
```

This should have the following output:

 Joe
 Sally

Add in code in the blank space that swaps the values of x and y, so that the output now becomes:

 Sally
 Joe

Important: Do this without editing the existing code – only add in new code. The idea here is that you are swapping what's already in the variables, not manually editing their values. So changing the order of the print statements or literally reassigning x="Sally" and y="Joe" is not the answer.

Hint: To do this, you will need to create a new variable for temporary storage...

5 Math practice (1pt)

Write a script to calculate the quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Your program should output both possible values for x. The program should start by defining the values of a, b, and c. For example, the first three lines of your script might look like this:

```
a = -2
b = 2
c = 1
```

If you use these values, the answers should be -0.366 and 1.366 (check and make sure you get this). Try a few different values of these variables. Note, you will get an error message if $b^2 - 4ac$ is negative, since you can't take the square root of a negative number. This is fine for now – later we'll talk about ways to prevent bugs like that from occurring.

Hint: There are a few different ways to find the square root in Python. Try googling it.

6 Reading user input (1pt)

We'll go over this next time, but here's a head start. Type out the following script:

```
print "Enter your first name"
firstName = raw_input()
print "Enter your last name"
lastName = raw_input()
print "Welcome,", firstName, lastName
```

Run it. What happens? What does `raw_input()` do? Google it and see if you're right.

Here's another way you can use the `raw_input()` command:

```
print "Enter your name"
firstName = raw_input("First name:")
lastName = raw_input("Last name:")
print "Welcome,", firstName, lastName
```

Run this. What is different about the output?

Oftentimes we can change the behavior of a command by putting different things within the `()` braces. The values we put in these braces are called arguments. They're sort of like options that you send along with the command that make it do slightly different things. In this case, `raw_input()` only takes one parameter, which is a string that it uses as a "prompt". Different commands take different types/numbers of parameters. We're going to see this a lot in the future, so just keep it in the back of your mind.

7 Interactive quadratic formula (2pts)

Edit your code from problem 5 so that it takes the values of `a`, `b`, and `c` from the user by using `raw_input()`.

Hint: you may have noticed when you looked up `raw_input()` that it reads in everything as a string. So if you input `3` on the command line, what actually gets read is `"3"`. This will cause an error when you try to do math using these values. To use them as numbers, we must convert them from strings to integers using the `int()` function. Here are two equivalent ways to do this:

```
age = raw_input("Your age:")
age = int(age)
```

or:

```
age = int(raw_input("Your age:"))
```

Now, use this in your code from problem 5 to get input values from the user.