

## Strings, Lists and Loops

In this set of in-class problems we'll practice some of the skills you've learned so far using the Jupyter Notebook environment. Work together in pairs on these problems, but be sure you each write your own code. In your `jupyter.swarthmore.edu` home directory, create a folder called **PSYC027/** and create a new Python 3 notebook file named **LASTNAME\_20190910\_InClass.ipynb**. Save it in your `jupyter.swarthmore.edu` home directory.

### Problem 1: Strings

In this problem you'll practice writing code in a Jupyter notebook to create and manipulate strings.

Create two variables of type string, one each for your first and last names. In the variable for your first name include several whitespace characters at the end of the string--for your last name, include several whitespace characters at the beginning of the string. Display those two strings on the same line (`print`) and then display them on separate lines but using a single command (hint: `\n`). Then, in a new cell, remove the whitespace characters and display your first and last name on a single line.

Python has methods for strings that convert them to upper and lower case: use one of these methods each on your first and last names and print out the results.

### Problem 2: Lists

Sometimes you want to store more than one piece of information in a variable--one way to do this is in a Python object called a list. In this problem you'll practice creating and manipulating lists.

Create a list of at least 4 strings of your choice (when I did this I used ingredients for a salad) Print the full list, then show how you can access the first, third, and last elements of the list, and print them as output. Next, print the length of the list to the output.

Python has a method for adding items to the end of the list--use this method to add another item to your list and show the new list in the output. Next, show how you would remove the item from the list. Store this item in a new variable. Next, show in the output a sorted version of your list. Do this both in forward and reverse alphabetical order.

We are often interested in accessing multiple items from a list. Use **slice indexing** to print multiple items from the list at once. What does the first term in the slice index refer to? What about the second?

Now, copy your list into a new variable. Change one element of your original list and show that it doesn't affect the contents of the new copy of your list.

### Problem 3:

In a new cell block print each element of your list, but perform at least one string operation on the element before printing (e.g. `.upper`, `.lower`, `.title`). In the same cell block, also print some kind of statement about the list outside of the loop (e.g. "This salad tastes best in summer.").

### Problem 4:

Next, create a new variable with a **numeric** list of at least 6 elements. Write a loop to calculate the sum of the elements in the list and store this in a new variable. Your loop should include a variable that holds the value of a running sum that is updated each time through the loop. Then, when the loop is finished running, print out the value of this running sum, which will be equal to the sum of all elements in the list.

Now show how to do this using a built-in Python function for computing the sum using just one line of code.

Write another loop that creates a new list that is the *cumulative* sum of the elements in the original list:

```
Original_List = [1, 2, 3, 4]
Cumulative_sum_list = [1, 3, 6, 10]
```

Print out both your original list and the cumulative sum list.