Python course materials

# map()

map() is a built-in Python function that takes in two or more arguments: a function and one or more iterables, in the form:

map(function, iterable, ...)

map() returns an *iterator* - that is, map() returns a special object that yields one result at a time as needed. We will learn more about iterators and generators in a future lecture. For now, since our examples are so small, we will cast map() as a list to see the results immediately.

When we went over list comprehensions we created a small expression to convert Celsius to Fahrenheit. Let’s do the same here but use map:

def fahrenheit(celsius):  
 return (9/5)\*celsius + 32  
   
temps = [0, 22.5, 40, 100]

Now let’s see map() in action:

F\_temps = map(fahrenheit, temps)  
  
#Show  
list(F\_temps)

[32.0, 72.5, 104.0, 212.0]

In the example above, map() applies the fahrenheit function to every item in temps. However, we don’t have to define our functions beforehand; we can use a lambda expression instead:

list(map(lambda x: (9/5)\*x + 32, temps))

[32.0, 72.5, 104.0, 212.0]

Great! We got the same result! Using map with lambda expressions is much more common since the entire purpose of map() is to save effort on having to create manual for loops.

### map() with multiple iterables

map() can accept more than one iterable. The iterables should be the same length - in the event that they are not, map() will stop as soon as the shortest iterable is exhausted.

For instance, if our function is trying to add two values **x** and **y**, we can pass a list of **x** values and another list of **y** values to map(). The function (or lambda) will be fed the 0th index from each list, and then the 1st index, and so on until the n-th index is reached.

Let’s see this in action with two and then three lists:

a = [1,2,3,4]  
b = [5,6,7,8]  
c = [9,10,11,12]  
  
list(map(lambda x,y:x+y,a,b))

[6, 8, 10, 12]

# Now all three lists  
list(map(lambda x,y,z:x+y+z,a,b,c))

[15, 18, 21, 24]

We can see in the example above that the parameter **x** gets its values from the list **a**, while **y** gets its values from **b** and **z** from list **c**. Go ahead and play with your own example to make sure you fully understand mapping to more than one iterable.

Great job! You should now have a basic understanding of the map() function.