

11 Checkpoint: Functional Programming

Purpose

Reinforce in your mind the concept that a function can be passed as an argument into another function.

Problem Statement

Phone numbers in the U.S. are often stored as ten digits and two dashes in this format: "ddd-ddd-dddd" where each *d* is a digit. The first three digits are called the area code. For example, for many years, 208 was the area code for all phone numbers in the state of Idaho and 801 and 435 were the two area codes for phone numbers in the state of Utah. Some people, when entering their phone number, will not enter the area code and assume that other people will know the correct area code.

Helpful Documentation

- [This article](#) explains how to setup VS Code so that your Python program can read from text files.
- The [prepare content](#) for lesson 9 explains how to read the contents of a text file into a list.
- The [prepare content](#) for this lesson explains higher-order functions, nested functions, lambda functions, and how to call the [map function](#).

Assignment

Write a program named `add_area_code.py` that reads phone numbers from a text file named `phone_numbers.txt`. Your program must add the area code "208-" to all phone numbers that don't have an area code. Do the following:

1. Download these two files: [phone_numbers.txt](#) and [add_area_code.py](#) and save them in the same folder.
2. Open the `phone_numbers.txt` file in VS Code and examine the phone numbers. Notice that some of the phone numbers do not have an area code and contain only seven digits.
3. Open the `add_area_code.py` file in VS Code. Read the comments in the program and then add code to the program so that it does the following:
 - a. Read the phone numbers in `phone_numbers.txt` into a list.
 - b. Add the area code "208-" to the phone numbers that do not have an area code.
 - c. Print the list with the corrected phone numbers.

Testing Procedure

Verify that your program works correctly by following each step in this testing procedure:

1. Download, examine, and run this Python file named [test_add_area_code.py](#) that contains `pytest` test functions. Verify that all the test functions pass. If they don't pass, fix the mistakes in your code in `add_area_code.py` until they pass.
2. Run your program, which should print the list of corrected phone numbers as shown below. Examine the corrected phone numbers printed by your program and verify that all of them have an area code.

```
> python add_area_code.py
['208-318-1623', '208-384-7712', '986-314-1378', '307-377-4921',
'208-671-7536', '986-228-7414', '208-693-6706', '208-274-2098',
'208-854-3221', '208-361-9817', '208-422-3492', '208-631-1374',
'986-533-9667', '208-158-9497', '208-892-9830', '208-477-5323',
'406-204-8756', '208-805-2538', '208-913-9942', '208-216-9589',
'406-138-9226', '801-644-6761', '208-814-4444', '208-822-6738',
'208-892-1093', '208-936-6389', '435-656-5821', '435-605-8294',
'208-271-1868', '208-894-6391', '208-232-4118', '208-132-2121',
'208-515-8227', '208-848-2334', '208-426-1557', '208-952-4330',
'208-998-2171', '208-743-9219', '208-944-4381', '208-589-7767',
'208-407-3555', '208-928-9293', '208-957-5808', '208-940-6629',
'208-825-9259', '208-123-7580', '208-374-8128', '208-847-4807',
'986-159-8293', '208-515-9963', '406-241-6676', '208-907-1851',
'208-297-6367', '208-936-8173', '208-376-7010', '208-681-1558',
'208-800-4436', '208-590-8866', '208-788-1866', '208-163-7631',
'208-928-8793', '406-595-2898', '208-330-3155', '208-884-7294',
'208-120-4949', '801-343-8776', '208-362-3779', '208-482-2107',
'208-366-5618', '435-957-8250', '208-441-5628', '307-494-6001',
'208-571-5297', '208-366-7389', '801-730-8010', '208-134-6240',
'208-402-3658', '208-151-9828', '208-485-7973', '208-506-2683',
'208-518-9635', '208-769-7551', '208-776-1574', '208-604-4304',
'208-119-9734', '208-917-6174', '208-773-1167', '307-749-5991',
'208-334-8971', '208-995-8602', '208-193-5073', '208-345-4015',
'208-367-8633', '208-289-6515', '208-265-8998', '208-800-3565',
'208-211-2706', '208-408-3950', '208-928-3119', '208-691-9409']
```

Ponder

In the `main` function, look at the line of code that calls the `map` function. Think about the fact that the `map` function will call the `add_area_code` function once for each element in the `phone_numbers` list, and the `add_area_code` function will add the area code "208-" at the beginning of each phone number if necessary.

Sample Solution

When your program is finished, view the [sample solution](#) [↗] for this assignment to compare your solution to that one. Before looking at the sample solution, you should work to complete this checkpoint program. However, if you have worked on it for at least an hour and are still having problems, feel free to use the sample solution to help you finish your program.

Submission

When complete, report your progress in the associated I-Learn quiz.