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Foundations of Programming, Python
Assignment 6

MODIFYING EXISTING PYTHON SCRIPT WITH FUNCTIONS

INTRODUCTION

In this paper, we will discuss some of the basics regarding the development and implementation of functions within python. Like assignment 5, we will begin with an existing python code and then replace specific portions of the code with functions which can be called and executed. For verification purposes, the script will be run in spyder and then in the anaconda terminal. The script, along with this documentation, will be posted on GitHub and made available for peer review.

FORM FOLLOWS FUNCTION

While functions are a means of grouping statements, it also improves the readability of the script and eliminates the need to repeatedly generate the same code. Understanding the purpose of script will help to define its structure and aid in the naming convention of the functions. The function itself is first generated by defining a class. We are asked to implement a `@staticmethod` for purposes that will explained in later module. Following this implement, we define our function along with the number of arguments passed into it (figure 1).

```
class FileProcessor:
    """Processing the data to and from text file"""

    @staticmethod
    def read_file(file_name, table):
        """Function to manage data ingestion from file to a list of dictionaries

        Reads the data from file identified by file_name into a 2D table
        (list of dicts) table one line in the file represents one dictionary row in table.

        Args:
            file_name (string): name of file used to read the data from
            table (list of dict): 2D data structure (list of dicts) that holds the data during runtime

        Returns:
            None.
        """
```

Figure 1: Depiction d function generation and formatting layout

The final step in the generation of a function is to determine if the function is expected to return a value. As will be seen in this paper, certain function merely performs a procedure rather than a calculation a value or values to be returned. This process is conducted simply by using the "return" keyword followed by the values or variables to be returned.

```
@staticmethod
def menu_choice():
    """Gets user input for menu selection

    Args:
        None.

    Returns:
        choice (string): a lower case sting of the users input out of the choices l, a, i, d, s or x

    """
    choice = ' '
    while choice not in ['l', 'a', 'i', 'd', 's', 'x']:
        choice = input('Which operation would you like to perform? [l, a, i, d, s or x]: ').lower().strip()
    print()  # Add extra space for layout
    return choice

@staticmethod
def show_inventory(table):
    """Displays current inventory table


    Args:
        table (list of dict): 2D data structure (list of dicts) that holds the data during runtime.

    Returns:
        None.

    """
    print('======= The Current Inventory: =======')
    print('ID\tCD Title (by: Artist)\n')
    for row in table:
        print('{}\t{} (by:{})'.format(*row.values()))
    print('======================================')
```

Figure 2: Differences in functions that return values and those that do not

As can be seen in figure 2, the `show_inventory()` function simply conducts a procedure whereas the `menu_choice()` function returns the value of the variable "`choice`". Finally, for formatting purposes, the function should include a docstring which provides details of the function's use. This should also include what data types are accepted by the function along with what values are returned.

POTENTIAL PITS TO FALL INTO

There are multiple issues that can arise when trying to generate a function, especially when attempting to implement it into an existing script. The main issue involves knowing what arguments will be required. An efficient manner to address this is, at least for this assignment, is to focus only on blocks of "`if`" or "`elif`" statements one at a time. This process made it easier to keep track of all the

arguments and ensure that the data types were being accounted for. A particular case that comes to mind would be in the script block where the user selects the option to add data to the inventory. Here the `add_inventory()` function is called, however, the next function that is called is the `DataProcesor.process_adding_data()` function. The `add_inventory()` function returns 3 data points in the form of a list which are then passed to the `DataProcesor.process_adding_data()` function as argument .

```
# 3.3.1 Ask user for new ID, CD Title and Artist
inputted_Data = IO.add_inventory()

# 3.3.2 Add item to the table
DataProcessor.process_adding_data(inputted_Data[0], inputted_Data[1], inputted_Data[2], lstTbl)

IO.show_inventory(lstTbl)
```

Figure 3: Implementation of arguments from a previous function with multiple return values

Once issues like this had been overcome, the script was run in spyder and in anaconda user terminal for verification purposes (Appendix I and II)

SUMMARY

For this week's assignment, we modified as existing code with the implementation of functions. The process of generating a function involves first defining a class then followed by using the `@staticmethod`. Next, the function name and its arguments are defined followed by docstring to provide details regarding its functionality. While not all functions are designed to return a value, understanding how to handle cases where multiple values were returned was crucial for further function implementation. Ultimately, the script was run in spyder and in the anaconda user terminal for operation verification

APPENDIX

I)

```
In [1]: Which operation would you like to perform? [l, a, i, d, s or x]: l

WARNING: If you continue, all unsaved data will be lost and the Inventory re-loaded from file.
type 'yes' to continue and reload from file. otherwise reload will be canceledyes
reloading...
======= The Current Inventory: =======
ID  CD Title (by: Artist)

1    The bad wheel (by: runrig)
2    bad (by: michael jackson)
3    rainy days (by: emeka)
======================================
Menu

[l] load Inventory from file
[a] Add CD
[i] Display Current Inventory
[d] delete CD from Inventory
[s] Save Inventory to file
[x] exit

Which operation would you like to perform? [l, a, i, d, s or x]: a

Enter ID: 4
What is the CD's title? kiss from a rose
What is the Artist's name? seal
======= The Current Inventory: =======
ID  CD Title (by: Artist)

1    The bad wheel (by: runrig)
2    bad (by: michael jackson)
3    rainy days (by: emeka)
4    kiss from a rose (by:seal)
======================================
Menu

[l] load Inventory from file
[a] Add CD
[i] Display Current Inventory
[d] delete CD from Inventory
[s] Save Inventory to file
[x] exit

Which operation would you like to perform? [l, a, i, d, s or x]: i

======= The Current Inventory: =======
ID  CD Title (by: Artist)

1    The bad wheel (by: runrig)
2    bad (by: michael jackson)
3    rainy days (by: emeka)
4    kiss from a rose (by:seal)
======================================
Menu

[l] load Inventory from file
[a] Add CD
[i] Display Current Inventory
[d] delete CD from Inventory
[s] Save Inventory to file
[x] exit
```

Figure 4: Script running in spyder

II)

```
Which operation would you like to perform? [l, a, i, d, s or x]: l

WARNING: If you continue, all unsaved data will be lost and the Inventory re-loaded from file.
type 'yes' to continue and reload from file. otherwise reload will be canceledyes
reloading...
======= The Current Inventory: =======
ID      CD Title (by: Artist)

1        The bad wheel (by: runrig)
2        bad (by: michael jackson)
3        rainy days (by: emeka)
======================================
Menu

[l] load Inventory from file
[a] Add CD
[i] Display Current Inventory
[d] delete CD from Inventory
[s] Save Inventory to file
[x] exit

Which operation would you like to perform? [l, a, i, d, s or x]: a

Enter ID: 4
What is the CD's title? kiss from a rose
What is the Artist's name? seal
======= The Current Inventory: =======
ID      CD Title (by: Artist)

1        The bad wheel (by: runrig)
2        bad (by: michael jackson)
3        rainy days (by: emeka)
4        kiss from a rose (by:seal)
======================================
Menu

[l] load Inventory from file
[a] Add CD
[i] Display Current Inventory
[d] delete CD from Inventory
[s] Save Inventory to file
[x] exit

Which operation would you like to perform? [l, a, i, d, s or x]: d

======= The Current Inventory: =======
ID      CD Title (by: Artist)

1        The bad wheel (by: runrig)
2        bad (by: michael jackson)
3        rainy days (by: emeka)
4        kiss from a rose (by:seal)
======================================
Which ID would you like to delete? 2
The CD was removed
======= The Current Inventory: =======
ID      CD Title (by: Artist)

1        The bad wheel (by: runrig)
3        rainy days (by: emeka)
4        kiss from a rose (by:seal)
======================================
```

Figure 5: Script running in anaconda user terminal