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Foundations of Programming, Python
Assignment 06

CD Inventory Program using Functions

Introduction

In this module, I learned about the importance of functions. Functions are a way of grouping statements and making this group available via a programmer-defined name. Any repetitive part of the code could be written into a function for easier management of the code. Thus, applying this knowledge to assignment 6, I have created the following program using functions.

Step-by-Step

In our program I have 2 classes:

1. DataProcessor - consists of functions for processing data in the memory;
2. FileProcessor - consists of functions for processing data to and from the file;
3. IO - consists of functions for handling inputs and outputs.

Under DataProcessor I have 2 functions:

1. newCD_processing() - a function that processes input data into the list of dictionaries. It has 4 arguments: ID, Title, Artist, and table. This function has no return value, as it simply processes the data without a need to return any value to the user.

```
20      def newCD_processing(ID, Title, Artist, table):
21          """Function to process input data into list of dictionary.
22
23          Args:
24              ID, Title, Artist - new data, entered by the user that needs to be
25              as list of dictionary in the memory.
26
27          Returns:
28              None.
29          """
30          intID = int(ID)
31          dicRow = {'ID': intID, 'Title': Title, 'Artist': Artist}
32          table.append(dicRow)
33
34      def delete_data(del_val, table):
```

Figure 1 - newCD_processing() function

2. delete_data() - a function that deletes a record from the memory. intRowNR and blnCDRemoved are the local variables, that are defined inside a function and its scope is limited to this function only.

```
34      def delete_data(del_val ,table):
35          """Function to delete data from list of dictionary.
36
37          Args:
38              del_val - row that needs to be deleted,
39              table - list of dictionary from where the data should be deleted.
40
41          Returns:
42              None.
43          """
44          intRowNr = -1
45          blnCDRemoved = False
46          for row in table:
47              intRowNr += 1
48              if row['ID'] == del_val:
49                  del table[intRowNr]
50                  blnCDRemoved = True
51                  break
52          if blnCDRemoved:
53              print('The CD was removed')
54          else:
55              print('Could not find this CD!')
56
```

Figure 2 - delete_data() function

Under FileProcessor I have 2 functions that have a similar structure: 2 arguments and no return value.

```
64      def read_file(file_name, table):
65          """Function to manage data ingestion from file to a list of dictionarie
66
67          Reads the data from file identified by file_name into a 2D table
68          (list of dicts) table one line in the file represents one dictionary ro
69
70          Args:
71              file_name (string): name of file used to read the data from
72              table (list of dict): 2D data structure (list of dicts) that holds
73
74          Returns:
75              None.
76          """
77          table.clear()  # this clears existing data and allows to load data from
78          objFile = open(file_name, 'r')
79          for line in objFile:
80              data = line.strip().split(',')
81              dicRow = {'ID': int(data[0]), 'Title': data[1], 'Artist': data[2]}
82              table.append(dicRow)
83          objFile.close()
84
85      @staticmethod
86      def write_file(file_name, table):
87          """Function to manage data ingestion from list of dictionaries to a fil
88
89          Reads the data from file dictionary by table and save line by line into
90          file_name.
91
92          Args:
93              file_name (string): name of file where data is saved to
94              table (list of dict): 2D data structure (list of dicts) that holds
95
96          Returns:
97              None.
98          """
99          # TODone Add code here
100         objFile = open(file_name, 'w')
101         for row in table:
102             lstValues = list(row.values())
103             lstValues[0] = str(lstValues[0])
104             objFile.write(','.join(lstValues) + '\n')
105         objFile.close()
106
107         pass
108
```

Figure 3 - read_file() and write_file() functions

Under IO I have added the add_data() function, which has no arguments as we are not processing any data, we just getting the data from the user. It returns a collection of variables, that later on I will unpack and use in another function as arguments.

```
164     # TODone add I/O functions as needed
165     def add_data():
166         """Gets user input new CD
167
168
169         Args:
170             none
171
172         Returns:
173             strID, strTitle, StArtist: string of the users input
174
175         """
176         strID = input('Enter ID: ').strip()
177         strTitle = input('What is the CD\'s title? ').strip()
178         stArtist = input('What is the Artist\'s name? ').strip()
179         return (strID, strTitle, stArtist)
180
```

Figure 4 - add_data() functions

Let's move to the main code of the program. I will go over TODOs that I have completed for this assignment.

In row 210 I am unpacking a Tuple, so that return values from the add_data() function: strID, strTitle, and stArtist are assigned to addID, addTitle, and addArtist. This way I can use these unpacked values as arguments for newCD_processing() function.

```
206         # 3.3 process add a CD
207         elif strChoice == 'a':
208             # 3.3.1 Ask user for new ID, CD Title and Artist
209             # TODone move IO code into function
210             addID, addTitle, addArtist = IO.add_data()
211             # 3.3.2 Add item to the table
212             # TODone move processing code into function
213             DataProcessor.newCD_processing(addID, addTitle, addArtist, lstTbl)
214             IO.show_inventory(lstTbl)
215             continue  # start loop back at top.
```

Figure 5 - functions in use

Next, I use the delete_data() function with the first argument being a global variable intIDDel, which is not defined inside any function and has a global scope. intIDDel variable we defined before calling a function.

```
221         elif strChoice == 'd':
222             # 3.5.1 get Userinput for which CD to delete
223             # 3.5.1.1 display Inventory to user
224             IO.show_inventory(lstTbl)
225             # 3.5.1.2 ask user which ID to remove
226             intIDDel = int(input('Which ID would you like to delete? ').strip())
227             # 3.5.2 search thru table and delete CD
228             # TODone move processing code into function
229             DataProcessor.delete_data(intIDDel, lstTbl)
230             IO.show_inventory(lstTbl)
231             continue  # start loop back at top.
```

Figure 6 - functions in use

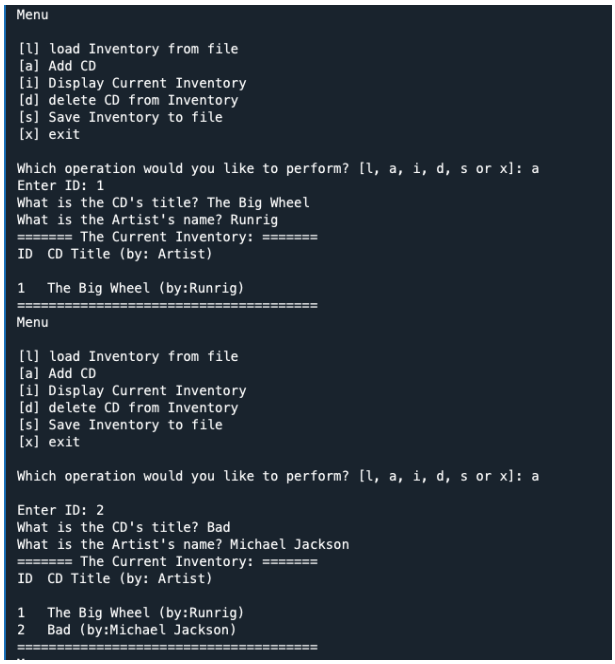
The last TODO was to use the write_file() function that I defined earlier with the first argument being strFileName, which is a data storage file, and lstTbl - a list of lists to hold the data.

```
237             # 3.6.2 Process choice
238             if strYesNo == 'y':
239                 # 3.6.2.1 save data
240                 # TODone move processing code into function
241                 FileProcessor.write_file(strFileName, lstTbl)
```

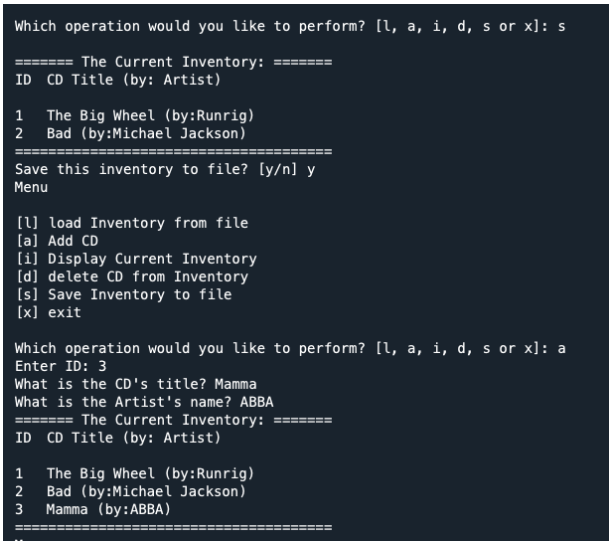
Figure 7 - functions in use

Results

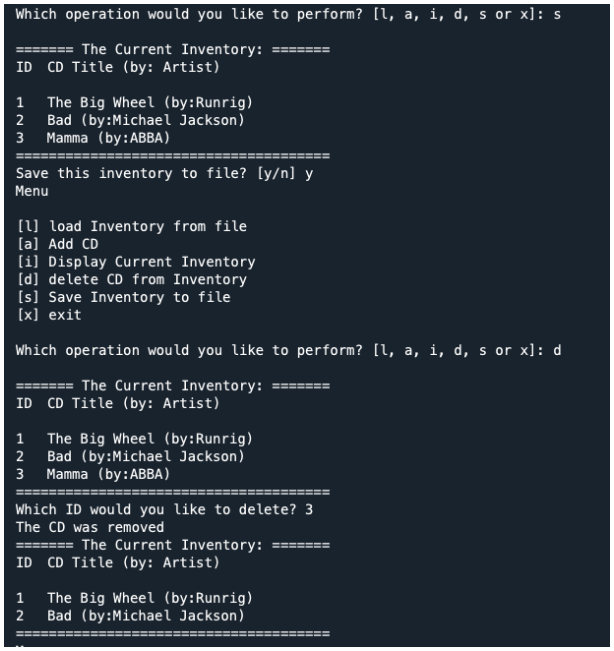
Here are some results from running this program in Spyder and Terminal.



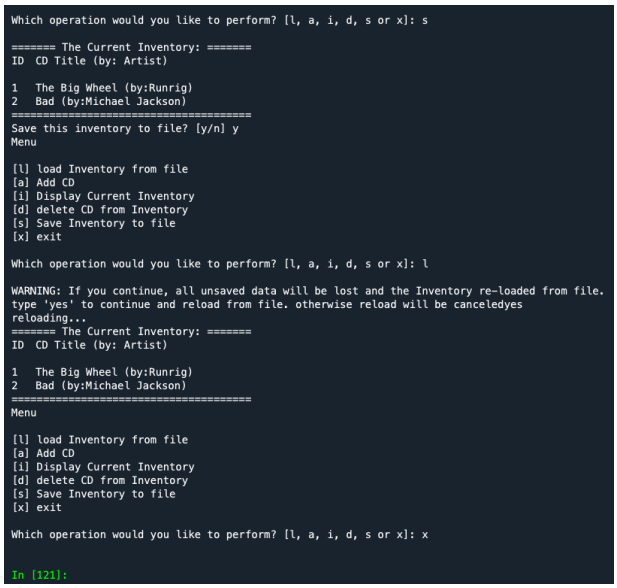
```
Menu

[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: 1
What is the CD's title? The Big Wheel
What is the Artist's name? Runrig
======= The Current Inventory: =======
ID  CD Title (by: Artist)

1   The Big Wheel (by:Runrig)
==================================
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: 2
What is the CD's title? Bad
What is the Artist's name? Michael Jackson
======= The Current Inventory: =======
ID  CD Title (by: Artist)

1   The Big Wheel (by:Runrig)
2   Bad (by:Michael Jackson)
==================================
```



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

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

1   The Big Wheel (by:Runrig)
2   Bad (by:Michael Jackson)
==================================
Save this inventory to file? [y/n] y
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: 3
What is the CD's title? Mamma
What is the Artist's name? ABBA
======= The Current Inventory: =======
ID  CD Title (by: Artist)

1   The Big Wheel (by:Runrig)
2   Bad (by:Michael Jackson)
3   Mamma (by:ABBA)
==================================
```



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

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

1   The Big Wheel (by:Runrig)
2   Bad (by:Michael Jackson)
3   Mamma (by:ABBA)
==================================
Save this inventory to file? [y/n] y
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 Big Wheel (by:Runrig)
2   Bad (by:Michael Jackson)
3   Mamma (by:ABBA)
==================================
Which ID would you like to delete? 3
The CD was removed
======= The Current Inventory: =======
ID  CD Title (by: Artist)

1   The Big Wheel (by:Runrig)
2   Bad (by:Michael Jackson)
==================================
```



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

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

1   The Big Wheel (by:Runrig)
2   Bad (by:Michael Jackson)
==================================
Save this inventory to file? [y/n] y
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]: 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 Big Wheel (by:Runrig)
2   Bad (by:Michael Jackson)
==================================
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]: x


In [121]:
```

```
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: 1
What is the CD's title? The Big Wheel
What is the Artist's name? Runrig
======= The Current Inventory: =======
ID      CD Title (by: Artist)

1       The Big Wheel (by:Runrig)
=====================================
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]: s

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

1       The Big Wheel (by:Runrig)
=====================================
Save this inventory to file? [y/n] y
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: 2
What is the CD's title? Bad
What is the Artist's name? Michael Jackson
======= The Current Inventory: =======
ID      CD Title (by: Artist)

1       The Big Wheel (by:Runrig)
2       Bad (by:Michael Jackson)
=====================================

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

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

1       The Big Wheel (by:Runrig)
2       Bad (by:Michael Jackson)
=====================================
Save this inventory to file? [y/n] y
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]: x

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

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

1       The Big Wheel (by:Runrig)
2       Bad (by:Michael Jackson)
=====================================
Save this inventory to file? [y/n] y
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]: x
```

Summary

In this assignment, I have worked with functions and understood how to use arguments, return values, and pack and unpack Tuples within functions. I also explored and wrote DocStrings, an explanatory header at the beginning of a function.

My GitHub: https://github.com/mustbekot/Assignment06