

Object-Oriented Programming in Python

Introduction

In this assignment we got an introduction to Object-Oriented Programming in Python. OOP is a programming that uses objects and classes. Our program CD_Inventory.py will be little different compared to the assignment from the previous weeks, because we will use Object-Oriented Programming. We will go over creating classes for objects. We will create a constructor and initialize private attributes for an object. We will use property decorators and methods. For each property for the attributes, we will initialize setter and getter.

CD Inventory program with Object Oriented Programming

For Assignment 8, we are using our starter program Assignment_08_Starter.py. I started with renaming the file to CD_Inventory.py and creating a menu options: [i] Show Current Inventory, [a] Add CD, [s] Save Inventory to File, [l] Load Inventory, [x] Exit, with using while loop and if-else statements. Each menu option has different functionality like adding CD inventory where user inputs id, title and artist, displaying current CD inventory, saving inventory data to a cdInventory.txt, reading the saved inventory from a cdInventory.txt and exiting the program.

Next, inside the Class CD I created constructor and initialized private attributes `__cd_id`, `__cd_title` and `__cd_artist`. I used `self`-parameter that is a reference to the current instance of the class and is used to access variables that belongs to the class. Figure 1

```
29  #--- Constructor ---#
30  def __init__(self, cdid, cdtitle, cdartist):
31      """Initializing private attributes.
32
33      Private attributes:
34          cd_id (int)
35          cd_title (string)
36          cd_artist (string)
37
38      Returns:
39          None.
40
41      """
42  #--- Attributes ---#
43  self.__cd_id = cdid
44  self.__cd_title = cdtitle
45  self.__cd_artist = cdartist
```

Figure 1 – Defining constructor and attributes

I created property decorator (`@property`) for each attribute, where I used setter and getter. Setter and getter are protecting our data when creating classes. For each instance variable, a getter method returns its value while a setter method sets or updates its value. Figure 2

```

59     # Creating properties (getter and setter) for each private attribute
60     @property
61     def idCD(self):
62         return self.__cd_id
63
64     @idCD.setter
65     def idCD(self, value):
66         if str(value).isnumeric():
67             self.__cd_id = value
68         else:
69             raise Exception('Enter integer for cd_id')
70     @property
71     def titleCD(self):
72         return self.__cd_title
73
74     @titleCD.setter
75     def titleCD(self, value):
76         self.__cd_title = value
77
78     @property
79     def artistCD(self):
80         return self.__cd_artist
81
82     @artistCD.setter
83     def artistCD(self, value):
84         self.__cd_artist = value

```

Figure 2 – Defining properties

The class FileIO process data to and from text file. Next, I created two methods:

save_inventory() method save the inventory of CDs to a text file, where I created list of objects.

load_inventory() method reads a list of CD objects from a text file. Figure 3

```

98     @staticmethod
99     def save_inventory(file_name, lst_Inventory):
100         """Function to manage data ingestion from a list of lists to file
101
102         Writes the data from 2D table (list of lists) into a file,
103         one list in table represents one line in the file
104
105         Args:
106             file_name (string): name of file used to write the data
107             lst_Inventory (list): List of lists where we write data, we store the objects
108
109         Returns:
110             None.
111         """
112         # To do Add code here
113         strRow = ''
114         try:
115             objFile = open(file_name, 'w')
116             for row in lst_Inventory:
117                 for itemInRow in row:
118                     strRow += str(itemInRow) + ', '
119                 strRow = strRow[:-1] + '\n'
120             objFile.write(strRow)
121             objFile.close()
122         except IOError:
123             print('Unhadled error while reading the file!')

```

```

125     @staticmethod
126     def load_inventory(file_name, listTable):
127         """Reads table data from file file_name
128
129         Args:
130             file_name (string): name of file used to write the data
131             listTable (list): List of lists where we read data
132
133         Returns:
134             None
135         """
136
137         try:
138             objFile = open(file_name, 'r')
139             for row in objFile.readline():
140                 for itemInRow in row:
141                     data = itemInRow[:-1].strip().split(',')
142                     listTable.append(data)
143             objFile.close()
144         except FileNotFoundError:
145             print('File not found! Creating new file')
146             objFile = open(file_name, 'w')
147         except IOError:
148             print('Unhadled error while reading the file!')
149

```

Figure 3 – Methods

Running the script in Spyder

```

Displayed current Inventory!

Menu
[i] Show Current Inventory
[a] Add CD
[s] Save Inventory to file
[l] Load Inventory from file
[x] Exit

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

Enter ID: 3

What is the CD's title? Bad

What is the Artist's name? Michael Jackson
ID  CD Title  Artist Name
1   Muster of Puppets   Metallica
2   Right the Lightning  Metallica
3   Bad      Michael Jackson

```

```

Menu
[i] Show Current Inventory
[a] Add CD
[s] Save Inventory to file
[l] Load Inventory from file
[x] Exit

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

ID  CD Title  Artist Name
1   Muster of Puppets   Metallica
2   Right the Lightning  Metallica
3   Bad      Michael Jackson

```

```

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

ID  CD Title  Artist Name
1   Muster of Puppets   Metallica
2   Right the Lightning  Metallica
3   Bad      Michael Jackson

Displayed current Inventory!

Save this inventory to file? [y/n] y

```

cdInventory - Notepad

File Edit View

1, Muster of Puppets, Metallica,
2, Right the Lightning, Metallica,
3, Bad, Michael Jackson,

```

[i] Show Current Inventory
[a] Add CD
[s] Save Inventory to file
[l] Load Inventory from file
[x] Exit

Which operation would you like to perform? [l, a, i, 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...
ID  CD Title  Artist Name
1   Muster of Puppets   Metallica
2   Right the Lightning  Metallica
3   Bad      Michael Jackson

```

```

Menu

[i] Show Current Inventory
[a] Add CD
[s] Save Inventory to file
[l] Load Inventory from file
[x] Exit

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

Goodbye!

```

Running the script in terminal window

```

(base) C:\_FDProgramming\Mod_08\Assignment08>python CD_Inventory.py
File not found! Creating new file
Menu

[i] Show Current Inventory
[a] Add CD
[s] Save Inventory to file
[l] Load Inventory from file
[x] Exit

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

```

```

Menu

[i] Show Current Inventory
[a] Add CD
[s] Save Inventory to file
[l] Load Inventory from file
[x] Exit

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

Enter ID: 3
What is the CD's title? Bad
What is the Artist's name? Michael Jackson
ID      CD Title      Artist Name
1       Master of Puppets      Metallica
2       Right the Lightning    Metallica
3       Bad                  Michael Jackson

Displayed current Inventory!

```

```

Menu

[i] Show Current Inventory
[a] Add CD
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Which operation would you like to perform? [l, a, i, s or x]: i

ID      CD Title      Artist Name
1       Master of Puppets      Metallica
2       Right the Lightning    Metallica
3       Bad                  Michael Jackson

Displayed current Inventory!

```

```

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

ID      CD Title      Artist Name
1       Master of Puppets      Metallica
2       Right the Lightning    Metallica
3       Bad                  Michael Jackson

Displayed current Inventory!

Save this inventory to file? [y/n] y

```

```

Menu

[i] Show Current Inventory
[a] Add CD
[s] Save Inventory to file
[l] Load Inventory from file
[x] Exit

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

Goodbye!

```

```

[i] Show Current Inventory
[a] Add CD
[s] Save Inventory to file
[l] Load Inventory from file
[x] Exit

Which operation would you like to perform? [l, a, i, 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...
ID      CD Title      Artist Name
1      Master of Puppets      Metallica
2      Right the Lightning      Metallica
3      Bad      Michael Jackson

```

cdInventory - Notepad

File Edit View

```

1, Master of Puppets, Metallica,
2, Right the Lightning, Metallica,
3, Bad, Michael Jackson,

```

My python program contains 4 main sections: Class CD where I store cd inventory into an object, Class FileIO where data is processing to and from a cdInventory.txt, Class IO where I handle input and output data like print menu, choose menu option, display current inventory and add new cd. Lastly, the main body of my program where I call all the classes and methods.

Summary

CDInventory.py with object-oriented programming with creating objects, using methods, saving the objects to listOfObjects and writing the data to .txt file and reading the data from a .txt file.

Link to my github.com repository for Assignment 08 https://github.com/Smileski/Assignment_08/