**Sandra D Harvie**

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Foundations of Programming: Python

**MODULE 06: Functions & Classes**

**ASSIGNMENT 06: Functions & GitHub Webpages**

1. **Introduction**

This paper documents my learning from Module 6, the goal of which was to learn about creating scripts using Functions. We also covered simple Classes, the PyCharm debugger and GitHub web pages.

I have demonstrated my learning by

* Answering the questions provided in the Assignment
* Modifying the provided starter script to manage a "ToDoList" by adding Functions
* Running the script within both PyCharm and a command shell
* Adding a GitHub web page to my repository

<https://seattlethistle.github.io/seattlethistle-IntroToProg-Python-Mod06/>

* Posting my files on GitHub

<https://github.com/seattlethistle/seattlethistle-IntroToProg-Python-Mod06>

* Post my GitHub link to the message board
* Peer reviewing another student's files in GitHub and adding my comments to their post

1. **Background**

I watched the video "Mod06 Course Video" and followed along with the class notes "\_Mod6Python ProgrammingNotes.pdf". I also watched the Session 6 Q&A recording.

I read the sixth chapter of "Python Programming, 3rd Edition" entitled "Functions: The Tic-Tac-Toe Game".

I reviewed the suggested web tutorial which gave further information regarding Functions and I watched the additional YouTube video on creating functions.

I also watched both the "Starting Assignment 06" videos. I struggled this week with determining what the assignment actually consisted of since it wasn't stated in the Assignment06.pdf document.

1. **Questions**

• What is a function?

A function is a group of statements. It can then be called and ran elsewhere in the code. Calling the function executes the statements contained within it. In Python a function must be defined earlier in the code before it can called.

• What are parameters?

A parameter is defined as a variable being used by the function as a parameter. We use parameters to pass something into a function for processing.

• What are arguments?

Values being passed into a parameter are called arguments.

• What is the difference between parameters and arguments?

Arguments get passed into the parameter, and the parameter receives the arguments.

• What are return values?

After you execute a function, return values return the result.

• What is the difference between a global and a local variable?

A local variable is one that's declared in a container like a function. A global variable is a variable that's contained in the entire script (eg defined at the top of the script.) Any code outside of the function cannot "see" the local variable because that variable would be "outside of its scope!"

• How do you use functions to organize your code?

Functions contain all of the bits of action statements for things you want done. They are generally listed near the top of the script.

• What is the difference between a function and a class?

Classes are a way of grouping functions, variables, and constants. A function can be included in a Class, but not the other way around. A class is basically a definition of an Object, while a function is merely a piece of code. Functions do specific things but classes are specific things.

• How do functions help you program using the “Separations of Concerns" pattern?

Using Functions makes it easier to separate the code into 3 generally used tiers; data, processing and presentation.

In this week's assignment the tiers for processing and presentation were defined as classes and the relevant functions were organized within those classes.

• How are the debugging tools use in PyCharm?

The debugging tools are accessed in PyCharm by right-clicking any location within the script file to access the context menu, and then selecting "Debug". This then runs the code using the PyCharm debugging tools.

Breakpoints can be used to pause the code at any location to and allows you to use the controls (eg Step Over, Step Out) in the debugging window.

• What is a GitHub webpage?

GitHub webpages are used to support and enhance your GitHub repository.

1. **Assignment**

A starter script has been provided based on code completed in Assignment05. It manages a "ToDoFile.txt" csv file made up of 2 columns: Task and Priority. The starter script has taken the code, separated out the Functions, and listed them at the start of the file so they can be called later. The goal of Assignment06 is to fill in the code in the Functions so that all the menu items work properly as they did in Assignment05.

* Create a sub folder called Assignment06
* Create a new project in PyCharm within the Assignment06 folder
* Add the starter file, "Assigment06\_Starter.py," to the project
* Add code to the script to perform the task described above
* Run the script in BOTH PyCharm and an OS command/shell
* Document the knowledge gained

1. **Discussion**

**Figure 1** displays my code in the file "*Assignment06.py*" in the PyCharm IDE. I have collapsed the functions to save display space here. They can be fully seen within the .py file itself.

I started this assignment by opening the *Assignment06\_starter.py* file and immediately copying my code from *Asssignment05.py* into the "Main body of the script" Step 4. I then ran/debugged until I was happy the program ran correctly in this basic condition.

The next step was to identify which parts of the code could be extracted and put into of the 6 predefined but empty functions.

My code from Assignment05 "add a new item" was split between the functions "input new task" and "add data to list". I then called those 2 functions for menu item 1.

My code from Assignment05 "remove an existing item" was split between the functions "input task to remove" and "remove data from list". I then called those 2 functions for menu item 2.

My code from Assignment05 "save data to file" was moved to the function "write data to file". I then call this function for menu item 3.

For menu item 4 I called the function "read data from file" that was already defined within the starter script. I then also called the function "print current tasks in list" to display the contents of the reloaded file.

At this point the code works as intended. However part of this Module's material discussed removing prefixes from variable names and using snake\_casing. Because it took me quite a long time to work out the objective of this week's assignment, I have only done a small amount of the additional cosmetic renaming.

**Figure 2** displays the code after being ran in the PyCharm run window.

**Figure 3** shows me attempting to run the code in the home area of my Boeing laptop - this has worked for all previous assignments. However this time I get an error message regarding being unable to find the ToDoFile.txt, despite the fact that it is definitely saved in the Assignment06 folder.

**Figure 4** displays the code being ran at the command prompt in the Assignment06 folder. It runs here exactly as intended.

**Figure 5** displays the text file "*ToDoFile.txt*".

1. **Image Captures**

Machine generated alternative text:
AssigmentO6,py
I ---
2 # TitLe: Assignment S6
3 # Description: Working with functions in a cLass,
4 When the program starts, 1.oad each “row” of data
5 in “ToDoToDoList.txt” into a python Dictionary.
6 Add the each dictionary “row” to a python List “tab’e”
7 # ChangeLog (Who,When,What):
8 # RRoot,1.1.203@,Created started script
9 # RRoot,1,1.203&,Added code to compLete assignment 5
le # SDH,11.24.2&2@,f’lodified to inc’lude code from assignment 5 in the “main body of the script” but
11 not extracted into functions “Asignment6_code_copied_from_A5_but_not_functions.py”
12 # SDH,11.24.2Ñ2@,Modified to extract assgnment 5 code into starter functions
13 “Assigment@6_with_functions_inc_alL_comments .py”
14 # SDH,11,24.202&,Modified to remove aU comments being used to track code origin and destination
15
17 # Data 
18 # Dectare varíabl..es and constantsl
19 strFfleName = “ToDoFil..e.txt” # The name of the data fite
28 objFfle = None # An object that represents a fiLe
21 dicRow = {J- # A row of data separated into eLements of a dictionary {Task,Priority)
22 lstTable = [] # A List that acts as a ‘tabte’ of rows
23 strChoice = “ # Captures the user option setection
24 strTask = “ # Captures the user task data
25 strPriority = ““ # Captures the user priority data
26 strStatus = “ # Captures the status of an processing functions
27

Machine generated alternative text:
28 # Processing
29 class Processor:
30 ““ Performs Processing tasks “
@staticrnethod
def read_data_froin_file(file_name, list_of_rows): ...
@staticmethod
def add_data_to_list(task, priority, list_of_rows):...
@staticrnethod
def remove_data_froin_list(task, list_of_rows): ...
@staticinethod
def write_data_to_file(file_name, list_of_rows): ...

Machine generated alternative text:
85 # Presentation (Input/Output) ----
86 class 10:
87 “ Performs Input and Output tasks “
88
89 @staticmethocl
clef print_menu_TasksQ:...
@staticmethocl
clef input_menu_choIce (): ...
@statlcmethod
clef print_current_Tasks_in_list(list_of_ rows): ...
@staticmethocl
clef input_yes_no_choice(message): ...
@staticmethocl
clef input_press_to_continue(optional_message=’’):...
145
146 @staticmethocl
147 clef input_new_task_and_priorityQ: ...
157
158 @staticmethocl
159 El clef input_task_to_removeQ:...
166

Machine generated alternative text:
167 # Main Body of Script
169 # Step .1 - When the program starts, Load data from T000File.txt.
176 Processor.reacl_data_from_file(strFfleName, lstTable) # read file data
171
172 # Step 2 - Display a menu of choices to the user
173 while(True):
174 # Step 3 Show current data
175 IO.print_current_Tasks_in_Ust(l.stTable) # Show current data in the list/table
176 IO.print_nienu_Tasks() # Shows menu
177 strChoice = IO.input_menu_choice() # Get menu option
178
179 # Step 4 - Process úsci s ,ilenu choice
180 if strChoice.strip() == 1’: # Add a new Task
181 # TODO: DONE
182 # code taken from Assign5 (step 4, “add new item”)
183 # code then split between functions “input new task” and “add data to list” above
184 # 2 lines written below to then call those 2 functions
185
186 strTask, strPriority = IO.input_new_task_and_priority()
187 lstTable,strStatus = Processor.add_data_to_list(strTask, strPriority, lstTable)
188
10. input_press_to_continue(strStatus)
continue # to show the menu

Machine generated alternative text:
191
192 eUf strChoice == ‘2’: # Remove an existing Task
193 # TODO: DONE
194 # code taken from Assign5 (step 4, “remove an existing item”)
195 # code then moved to functions “input task to removed and “remove data from list” above
196 # 2 Unes written below to then call these functions
197
198 strTask = I0.input_task_to_reniove()
199 lstTable, strStatus = Processor.remove_data_froni_list(strTask, lstTable)
200
281 10. input_press_to_continue(strStatus)
202 continue # to show the menu
283
204 eUf strChoice == ‘3’: # Save Data to Fi*I
205 strChoice = I0.input_yes_no_choice(”Save this data to file? (v/n) - “)
206 if strChoiceaower() ==
207 # TODO: DONE
208 # code taken from Assign5 (step 4, “save data to file”)
209 # code then moved to the function “write data to file” above
210 # line written below to then call this function
211
212 lstTable, strStatus = Processor.write...data...to...file(strFileName, lstTable)
213
10. input...press....to...continue(strStatus)
215 else:
216 I0.input_press_to_continue(”Save CanceUed! “)
217 continue # to show the menu

Machine generated alternative text:
218
219 elif strChoice == ‘4’: # Reload Data from File
220 print(”Warning: Unsaved Data Will. Be Lost!TM)
221 strChoice = IO.input_yes_no_choice(”Are you sure you want to reload data from file? (yIn) - “)
222 if strChoice.lower() ‘y’:
223 # TODO: DONE
22 # Call the function that was alreadj defined in the starter script
225 lstTable, strStatus = Processor.read_data_from_file(strFileName, lstTabl.e) # read file data
226 IO.print_current_Tasks_în_list(lstTable) # Show current data an tue Last/table
227
228 IO.input_press_to_continue(strStatus)
229 else:
230 IO.input_press_to_continue(”File Reload Cancelled! “)
231 continue # to show the menu
232
233 elif strChoice == ‘5’: # Exit Program
23 print(”Goodbye! M)
235 break # and Exit

**Figure 1: Script file in PyCharm (Assignment06.py)**

Machine generated alternative text:
C:\Users\dq4óøe\Python39\python.exe C:/Users/dq46øe/_PythonClass/Assignmentø6/Assigment€6.py
******* The current Tasks ToDo are: *******
attend status meeting (high)
rearrange files in cabinet (low)
return phone calls (low)
read emails (low)
*******************************************
Menu of Options
1) Add a new Task
2) Remove an existing Task
3) Save Data to File
4) Reload Data from File
5) Exit Program
Which option would you like to perform? [i to 5] — 1
Enter an task name: water ptants
Give it a priority: tow
Success
Press the [Enter] key to continue.
******* The current Tasks ToDo are: *******
attend status meeting (high)
rearrange files in cabinet (low)
return phone calls (low)
read emails (low)
water plants (low)
*******************************************

Machine generated alternative text:
Menu of Options
1) Add a new Task
2) Remove an existing Task
3) Save Data to File
4) Reload Data from File
5) Exit Program
Which option would you like to perform? [1 to 5] — 2
Which Task? read emaits
Success
Press the [Enter] key to continue.
******* The current Tasks ToDo are: *******
attend status meeting (high)
rearrange files in cabinet (low)
return phone calls (low)
water plants (low)
* ** ** ** **** ********* * * * * * * * ****************

Machine generated alternative text:
Menu of Options
1) Add a new Taski
2) Remove an existing Task
3) Save Data to File
4) Reload Data from File
5) Exit Program
Which option would you like to perform? [1 to 5] — 3
Save this data to file? (y/n) -
File has been saved.
Success
Press the [Enter] key to continue.
******* The current Tasks ToDo are: *******
attend status meeting (high)
rearrange files in cabinet (1.0w)
return phone calls (low)
water plants (low)
*******************************************

Machine generated alternative text:
Menu of Options
1) Add a new Task
2) Remove an existing Task
3) Save Data to File
4) Reload Data from File
5) Exit Program
Which option would you like to perform? [1 to 5] - 4
Warning: Unsaved Data Will Be Lost!
Are you sure you want to reload data from file? (y/n) — y
******* The current Tasks ToDo are: *******
attend status meeting (high)
rearrange files in cabinet (low)
return phone calls (low)
water plants (low)
*******************************************
Success
Press the [Enter] key to continue.

Machine generated alternative text:
******* The current Tasks ToDo are: *******
attend status meeting (high)
rearrange tiles in cabinet (low)
return phone calls (low)
water plants (low)
*******************************************
Menu of Options
1) Add a new Task
2) Remove an existing Task
3) Save Data to File
4) Reload Data trom File
5) Exit Program
Which option would you like to perform? [i to 5] — 5
Goodbye!
Process finished with exit code €

**Figure 2: Script run window in PyCharm (Assignment06.py)**

Machine generated alternative text:
j Command Prompt ,1 ( — 0 X
I
: \Users\dq46øe>python “C: \Users\dq46øe\_PythonClass\Assignmentø6\Assigmentø6.py”
rraceback (most recent call last):
File “C: \Users\dq46øe\_PythonClass\Assignmentø6\Assigmentø6. py”, line 170, in <module>
Processor.read_data_from_file(strFileName, lstTable) # read file data
File “C: \Users\dq46Oe\_PythonClass\Assignmentø6\Assigmentø6.py”, line 41, in read_dataf rom_file
file open(file_name, “r”)
FileNotFoundError: [Errno 2] No such file or directory: ‘ToDoFile.txt’
L: \Users\dq46Oe>

**Figure 3: Script NOT running from a Command Shell**

Machine generated alternative text:
j Command Prompt - python C:\Users\dq46Oe\9ythonCl ass\Assig nmentO6\AssigmentO6.py
__________ . — — —
.—
U 14.

**Figure 4: Script running from a Command Shell**

Machine generated alternative text:
C:\Users\dq46Oe\j’ythonClass\AssignmentO6\ToDoFiIe.lxt - Notepad++ — Q
File Edit Search View Encoding Language Settings Macro Run Plugins Window ?
X
ToDoAle .txt
1. attend 3tatu5 zneeting,high
2 rearrange files in cabinet,low
3 return phone callz,lo
4 read emails, low
5
em Ln: 3 CoI : 23 Sel : 0 I O Dos\Windows ANSI INS

**Figure 5: Output Text File (ToDoFile.txt)**

1. **Conclusion**

In completing Module 6 I have learned how to create scripts that work with Functions defined separately at the start. I have demonstrated this by combining the answer script from Assignment05 with the given starter script in PyCharm to create a code divided into 3 organized tiers using Functions. I have also saved my files to the GitHub repository where I created a starter GitHub web page.

I found this week's assignment considerably harder than in previous weeks, mainly because it was initially unclear to me that we were to use the code we wrote in Assignment05.