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**Date:** 24/05/23

**Course Name:** IT FDN 110 A Sp 23: Foundations Of Programming: Python

**Assignment:** Assignment06

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

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

# Structures with Functions

## Introduction

This paper is broken into two main parts: *Structures*, and *The End Product*. The first section, *Structures*, is cut into three parts: *Thoughts*, *Workflow*, and *The Code Itself*. The second section is cut into two parts: *PyCharm*, and *Terminal*.

## Structures

### Thoughts

It is considerably more difficult to write organized code that is already broken up into three parts and down into various functions with their respective parameters. The main parts were: *Data: declare variables, and constants*, *Processing*, *Presentation (Input/Output)*, and *The Main Body of Script*. However, the difficulty comes from being confronted with a logic flow that is foreign to start with but once followed becomes clearer and reveals its structure. Once seen, the structure appears more consolidated, efficient, and thought out. It also seems simpler to seek out and resolve bugs as they appear to be somewhat more isolated or contained. This exercise demonstrated following parameters and saving what has been returned so as to pass it along to another function as a parameter. It is interesting to see how structures are built from the outside working in: from general to specific. Writing script seems to be an exercise in structuring through discrete, and traceable interactions.

### Workflow

#### **Preface/Acknowledgment**

The main part of the structure and substructure has already been provided for by RRoot.

#### **Main**

The majority of the work for this assignment workflow went into understanding the logic flow already at work in the code that has been provided for. This meant, starting at the *Main Body of Script* and following through each step. In effect, this was to understand how the current of the logic as it ran through the program. This also meant, following how each parameter was called, returned, captured, and named throughout the main sections of code: *Data*, *Processing*,

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*Presentation (Input/Output), and Main Body of Script.* Throughout the coding, which was reminiscent of assignment05, it was necessary to follow the main structure folds lest one step outside the structure and create an inconsistency.

## The Code Itself

```
# -----#
# Title: Assignment 06
# Description: Working with functions in a class,
#              When the program starts, load each "row" of data
#              in "ToDoToDoList.txt" into a python Dictionary.
#              Add the each dictionary "row" to a python list "table"
# ChangeLog (Who,When,What):
# RRoot,1.1.2030,Created started script
# <David Michalove>,<05/22/23>,Modified code to complete assignment 06
# -----#

# Data -----#
# Declare variables and constants
file_name_str = "ToDoFile.txt" # The name of the data file
file_obj = None # An object that represents a file
row_dic = {} # A row of data separated into elements of a dictionary
{Task,Priority}
table_lst = [] # A list that acts as a 'table' of rows
choice_str = "" # Captures the user option selection
import os.path

# Processing -----#
class Processor:
    """ Performs Processing tasks """

    @staticmethod
    def read_data_from_file(file_name, list_of_rows):
        """ Reads data from a file into a list of dictionary rows

        :param file_name: (string) with name of file:
        :param list_of_rows: (list) you want filled with file data:
        :return: (list) of dictionary rows
        """
        if os.path.isfile(file_name) == True:
            # Returns True if file is found
```

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```
        file = open(file_name, "r")
        for row in file:
            # Loops through the content within the .txt file
            lstRow = row.split(",")
            # Splits apart data based on a comma and returns a list
            dicRow = {"Task": lstRow[0], "Priority": lstRow[1].strip()}
            list_of_rows.append(dicRow)

    else:
        file = open(file_name, "w")
        # Creates a .txt file if none is already present
        file.close()
    file.close()
    return list_of_rows

@staticmethod
def add_data_to_list(task, priority, list_of_rows):
    """ Adds data to a list of dictionary rows

    :param task: (string) with name of task:
    :param priority: (string) with name of priority:
    :param list_of_rows: (list) you want to add more data to:
    :return: (list) of dictionary rows
    """
    row = {"Task": str(task).strip(), "Priority": str(priority).strip()}
    # Creates a dictionary row
    list_of_rows.append(row)
    # Adds new dictionary row into the main table via the return function
    return list_of_rows

@staticmethod
def remove_data_from_list(task, list_of_rows):
    """ Removes data from a list of dictionary rows

    :param task: (string) with name of task:
    :param list_of_rows: (list) you want filled with file data:
    :return: (list) of dictionary rows
    """
    to_remove = task
    # Saves user's choice in what task is desired to be deleted
    for row in list_of_rows:
        task, priority = dict(row).values()
        if task == to_remove:
```

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```
        # Allows checks to see if user's choice matches a task
        # in the main table
        list_of_rows.remove(row)
        # Removes the task by removing the row it is housed in
    return list_of_rows

    @staticmethod
    def write_data_to_file(file_name, list_of_rows):
        """ Writes data from a list of dictionary rows to a File

        :param file_name: (string) with name of file:
        :param list_of_rows: (list) you want filled with file data:
        :return: (list) of dictionary rows
        """

        open(file_name, 'w').close()
        # Clears what is in the txt file so nothing will be duplicated by
        # writing the table into the .txt file
        obj_file = open(file_name, "w")
        for dicRow in list_of_rows:
            obj_file.write((dicRow["Task"] + ", " + dicRow["Priority"] + "\n"))
            # Writes main table to a .txt file
            # Separating with commas allows for .txt file to be readable
            # if code is run again
        obj_file.close()
        return list_of_rows

# Presentation (Input/Output) ----- #

class IO:
    """ Performs Input and Output tasks """

    @staticmethod
    def output_menu_tasks():
        """ Display a menu of choices to the user

        :return: nothing
        """
        print('')
        Menu of Options
        1) Add a new Task
        2) Remove an existing Task
        3) Save Data to File
```

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```
    4) Exit Program
    '''
    print() # Add an extra line for looks

    @staticmethod
    def input_menu_choice():
        """ Gets the menu choice from a user

        :return: string
        """
        choice = str(input("Which option would you like to perform? [1 to 4] -
"))).strip()
        print() # Add an extra line for looks
        return choice

    @staticmethod
    def output_current_tasks_in_list(list_of_rows):
        """ Shows the current Tasks in the list of dictionaries rows

        :param list_of_rows: (list) of rows you want to display
        :return: nothing
        """
        print("***** The current tasks ToDo are: *****")
        for row in list_of_rows:
            print(row["Task"] + " (" + row["Priority"] + ")")
        print("*****")
        print() # Add an extra line for looks

    @staticmethod
    def input_new_task_and_priority(list_of_rows):
        """ Gets task and priority values to be added to the list

        :return: (string, string) with task and priority
        """
        task = input("Enter Task: ")
        priority = input("Enter Priority: ")
        return (task, priority)

    @staticmethod
    def input_task_to_remove(list_of_rows):
        """ Gets the task name to be removed from the list

        :return: (string) with task
```

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```
    """
    print("Here are your tasks so far:")
    for objRow in list_of_rows:
        # Prints the contents of the table
        print(objRow)
    remove_task = input("Which TASK would you like removed? ")
    return remove_task

# Main Body of Script -----#

# Step 1 - When the program starts, Load data from ToDoFile.txt.
Processor.read_data_from_file( file_name=file_name_str, list_of_rows=table_lst)
# read file data

# Step 2 - Display a menu of choices to the user
while (True):
    # Step 3 Show current data
    IO.output_current_tasks_in_list(list_of_rows=table_lst) # Show current data
in the list/table
    IO.output_menu_tasks() # Shows menu
    choice_str = IO.input_menu_choice() # Get menu option

    # Step 4 - Process user's menu choice
    if choice_str.strip() == '1': # Add a new Task
        task, priority = IO.input_new_task_and_priority(list_of_rows=table_lst)
        table_lst = Processor.add_data_to_list(task=task, priority=priority,
list_of_rows=table_lst)
        continue # to show the menu

    elif choice_str == '2': # Remove an existing Task
        task = IO.input_task_to_remove(list_of_rows=table_lst)
        table_lst = Processor.remove_data_from_list(task=task,
list_of_rows=table_lst)
        continue # to show the menu

    elif choice_str == '3': # Save Data to File
        table_lst = Processor.write_data_to_file(file_name=file_name_str,
list_of_rows=table_lst)
        print("Data Saved!")
        continue # to show the menu

    elif choice_str == '4': # Exit Program
```

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```
print("Goodbye!")  
break # by exiting loop
```

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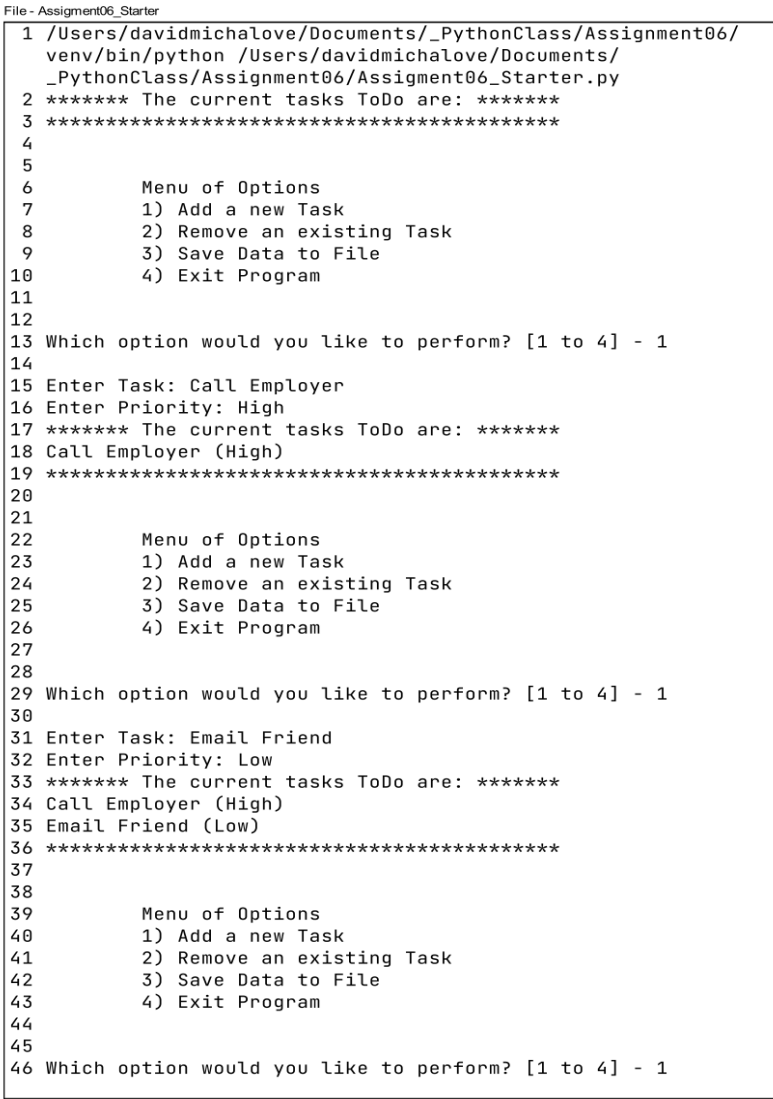
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## The End Product

### PyCharm



```
File - Assignment06_Starter
1 /Users/davidmichalove/Documents/_PythonClass/Assignment06/
  venv/bin/python /Users/davidmichalove/Documents/
    _PythonClass/Assignment06/Assignment06_Starter.py
2 ***** The current tasks ToDo are: *****
3 *****
4
5
6     Menu of Options
7     1) Add a new Task
8     2) Remove an existing Task
9     3) Save Data to File
10    4) Exit Program
11
12
13 Which option would you like to perform? [1 to 4] - 1
14
15 Enter Task: Call Employer
16 Enter Priority: High
17 ***** The current tasks ToDo are: *****
18 Call Employer (High)
19 *****
20
21
22     Menu of Options
23     1) Add a new Task
24     2) Remove an existing Task
25     3) Save Data to File
26     4) Exit Program
27
28
29 Which option would you like to perform? [1 to 4] - 1
30
31 Enter Task: Email Friend
32 Enter Priority: Low
33 ***** The current tasks ToDo are: *****
34 Call Employer (High)
35 Email Friend (Low)
36 *****
37
38
39     Menu of Options
40     1) Add a new Task
41     2) Remove an existing Task
42     3) Save Data to File
43     4) Exit Program
44
45
46 Which option would you like to perform? [1 to 4] - 1
```

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Figure 1.0: Page 1 of 3 showing the output of the code as run in PyCharm.



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File - Assignment06\_Starter

```
47
48 Enter Task: Finish Program
49 Enter Priority: Very High
50 ***** The current tasks ToDo are: *****
51 Call Employer (High)
52 Email Friend (Low)
53 Finish Program (Very High)
54 *****
55
56
57     Menu of Options
58     1) Add a new Task
59     2) Remove an existing Task
60     3) Save Data to File
61     4) Exit Program
62
63
64 Which option would you like to perform? [1 to 4] - 1
65
66 Enter Task: Clean House
67 Enter Priority: Medium
68 ***** The current tasks ToDo are: *****
69 Call Employer (High)
70 Email Friend (Low)
71 Finish Program (Very High)
72 Clean House (Medium)
73 *****
74
75
76     Menu of Options
77     1) Add a new Task
78     2) Remove an existing Task
79     3) Save Data to File
80     4) Exit Program
81
82
83 Which option would you like to perform? [1 to 4] - 2
84
85 Here are your tasks so far:
86 {'Task': 'Call Employer', 'Priority': 'High'}
87 {'Task': 'Email Friend', 'Priority': 'Low'}
88 {'Task': 'Finish Program', 'Priority': 'Very High'}
89 {'Task': 'Clean House', 'Priority': 'Medium'}
90 Which TASK would you like removed? Clean House
91 ***** The current tasks ToDo are: *****
92 Call Employer (High)
93 Email Friend (Low)
94 Finish Program (Very High)
```

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Figure 1.1: Page 2 of 3 showing the output of the code as run in PyCharm.

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File - Assignment06\_Starter

```
95 *****
96
97
98     Menu of Options
99     1) Add a new Task
100    2) Remove an existing Task
101    3) Save Data to File
102    4) Exit Program
103
104
105 Which option would you like to perform? [1 to 4] - 3
106
107 Data Saved!
108 ***** The current tasks ToDo are: *****
109 Call Employer (High)
110 Email Friend (Low)
111 Finish Program (Very High)
112 *****
113
114
115     Menu of Options
116     1) Add a new Task
117     2) Remove an existing Task
118     3) Save Data to File
119     4) Exit Program
120
121
122 Which option would you like to perform? [1 to 4] - 4
123
124 Goodbye!
125
126 Process finished with exit code 0
127
```

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Figure 1.2: Page 3 of 3 showing the output of the code as run in PyCharm.

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## Terminal

```
Last login: Wed May 24 16:22:58 on ttys000
davidmichalove@Davids-MacBook-Air-3 ~ % cd ~/Documents/_PythonClass/Assignment06
davidmichalove@Davids-MacBook-Air-3 Assignment06 % ls
Assignment06_Starter.py  mod6_lectureNotes.py
ToDoFile.txt            venv
davidmichalove@Davids-MacBook-Air-3 Assignment06 % python3 Assignment06_Starter.py
***** The current tasks ToDo are: *****
Call Employer (High)
Email Friend (Low)
Finish Program (Very High)
*****

Menu of Options
1) Add a new Task
2) Remove an existing Task
3) Save Data to File
4) Exit Program

Which option would you like to perform? [1 to 4] - 1

Enter Task: Write Letter
Enter Priority: Overdue
***** The current tasks ToDo are: *****
Call Employer (High)
Email Friend (Low)
Finish Program (Very High)
Write Letter (Overdue)
*****

Menu of Options
1) Add a new Task
2) Remove an existing Task
3) Save Data to File
4) Exit Program

Which option would you like to perform? [1 to 4] - 1

Enter Task: Write Novel
Enter Priority: Getting around to it
***** The current tasks ToDo are: *****
Call Employer (High)
Email Friend (Low)
Finish Program (Very High)
Write Letter (Overdue)
Write Novel (Getting around to it)
*****

Menu of Options
1) Add a new Task
2) Remove an existing Task
3) Save Data to File
4) Exit Program

Which option would you like to perform? [1 to 4] - 1

Enter Task: Learn to play the piano
Enter Priority: Wish I was younger
***** The current tasks ToDo are: *****
Call Employer (High)
```

Figure 2.0: Page 1 of 2 showing the output of the code as run in the Mac Terminal.

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```
Email Friend (Low)
Finish Program (Very High)
Write Letter (Overdue)
Write Novel (Getting around to it)
Learn to play the piano (Wish I was younger)
*****

Menu of Options
1) Add a new Task
2) Remove an existing Task
3) Save Data to File
4) Exit Program

Which option would you like to perform? [1 to 4] - 2

Here are your tasks so far:
{'Task': 'Call Employer', 'Priority': 'High'}
{'Task': 'Email Friend', 'Priority': 'Low'}
{'Task': 'Finish Program', 'Priority': 'Very High'}
{'Task': 'Write Letter', 'Priority': 'Overdue'}
{'Task': 'Write Novel', 'Priority': 'Getting around to it'}
{'Task': 'Learn to play the piano', 'Priority': 'Wish I was younger'}
Which TASK would you like removed? Learn to play the piano
***** The current tasks ToDo are: *****
Call Employer (High)
Email Friend (Low)
Finish Program (Very High)
Write Letter (Overdue)
Write Novel (Getting around to it)
*****

Menu of Options
1) Add a new Task
2) Remove an existing Task
3) Save Data to File
4) Exit Program

Which option would you like to perform? [1 to 4] - 3

Data Saved!
***** The current tasks ToDo are: *****
Call Employer (High)
Email Friend (Low)
Finish Program (Very High)
Write Letter (Overdue)
Write Novel (Getting around to it)
*****

Menu of Options
1) Add a new Task
2) Remove an existing Task
3) Save Data to File
4) Exit Program

Which option would you like to perform? [1 to 4] - 4

Goodbye!
davidmichalove@Davids-MacBook-Air-3 Assignment06 %
```

Figure 2.1: Page 2 of 2 showing the output of the code as run in the Mac Terminal.

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## Summary

This paper has been broken down into two main parts: *Structures* and *The End Product*. This is so because the *structure* gives way to its *product*. In other words, the end of a structure is its product or its whole as what it is built for. The two are in rapport with one another. This thought is followed throughout the paper as how the *Workflow* is related to *The Code Itself*. Finally, one sees *The End Product* as the code has been run through both PyCharm and the Mac Terminal.