CSCI-410 Python Assignment - PY-04

The primary goal of this project is to familiarize you with using command line arguments and recursing through directories. In addition, you will become familiar with the type of program specifications you will encounter in the ECS projects.

You program will process one or more files having a .txt extension. Each file contains zero or more lines. Each line will either be blank or will contain an integer constant that might be negative, zero, or positive. For file processed, the output file (which will have the same base name as the input file or directory but with a .tot extension) should contain a single line containing the filename (with extension), the total number of negative values, zero values, and positive values, the average of the negative values, the average of the positive values, and the average of all values in the file.

In addition, there should be a header line and a total summary at the bottom. The format should be similar to the following:

```
FILENAME        NEG   ZERO    POS   AVG NEG   AVG POS   AVERAGE
================================================================
input1.txt       22      7    129    -50.86    +33.84    20.55
input2.txt       22      7    129    -50.86    +33.84    20.55
================================================================
TOTAL            44     14    258    -50.86    +33.84    20.55
```

You are to implement two classes – **reader** and **writer** – and use them to implement a program that does the following:

The program takes a single, optional, command line argument that is either the name of a file having a *.txt extension (the extension is a required part of the command line argument in this case) or the name of a directory. For simplicity, use directory and file names that do not have any spaces or any periods other than prior to the txt file extension. If no command line argument is supplied, then the program should act as though the command line argument "test" was supplied.

If a filename is provided, the program should process just that one file from the present directory. If a directory name is provided, the program should process ALL of the *.txt files in that directory (the directory itself should exist in the present directory).

The program will instantiate a new instance of the **reader** class for each input file that is processed, but only a single instance of the **writer** class.

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The **reader** class should support the following functions:

Function: Constructor
Arguments: filename (no extension)
Returns: None
Description: Opens the file filename.txt for reading and performs any housekeeping tasks to prepare for parsing the file.

Function: hasMoreLines()
Arguments: None
Returns: Boolean
Description: Returns True if there is more data to process.

Function: advance
Arguments: None
Returns: None
Description: Makes the next line the current line. Should be called only if hasMoreLines() returned True.

Function: LineType
Arguments: None
Returns: V_POS, V_ZERO, or V_NEG
Description: Returns the appropriate constant depending on if the value on the line is positive, zero, or negative.
Function: value
Arguments:
Returns: Integer
Description: Returns the absolute value of the current line.

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The **writer** class should support the following functions:

Function: Constructor
Arguments: filename (no extension)
Returns: None
Description: Opens the file filename.tot for writing and performs any housekeeping tasks to prepare for writing the file.

Function: setFileName
Arguments: filename (no extension)
Returns: None
Description: Tells the writer that a new input file is being processed. The summary for the prior input file should be written to the output file.

Function: writeNEG
Arguments: value
Returns: None
Description: The writer adds the value to the accumulated total of negative constants in the input file as well as incrementing the count of positive constants.

Function: writeZERO
Arguments: None
Returns: None
Description: The writer increments the count of zero constants.

Function: writePOS
Arguments: value
Returns:
Description: The writer adds the value to the accumulated total of positive constants in the input file as well as incrementing the count of positive constants.

Function: close
Arguments: None
Returns: None
Description: The writer outputs the summary for the last file followed by the summary for all of the files.

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Submission

In a manner similar to the ECS project, place all files needed for this assignment into a directory named PY04 and zip up the entire directory into a zip file of the form:

CS410_UserID_PY_04.zip

The main script – the one that that grader needs to run – must be named **py04.py**.

Your classes must be in a separate file (or files) and imported into your main script. You may declare additional classes as you see fit.

GRADING RUBRIC – 20 pts

    5 pts Effort
    5 pts Can process a single file properly.
    5 pts Can process all files in a directory properly.
    5 pts Output is correct and correctly formatted.

    -1 pt Incorrect header comments in Python script.
    -1 pt Incorrect submission (filename, etc).