

# Engineering 14100

## Python 4 PA

**Individual Assignment:** See the course syllabus for a definition of what this constitutes.

### Task 1 (of 2)

**Learning Objectives:** Utilize file I/O functions in Python; Construct files using formatted output using Python; Read in input data from a user at the keyboard in Python.

#### Background:

Engineers write formal reports for many reasons, including the documentation of experiments and designs. It can be easier to review and discuss these reports with co-workers or clients when each line corresponds to a number, similar to line numbering in Python programs.

#### Part A:

Write a main program that will prompt the user for an input file name, and then for an output file name. The input file will contain a report with an unknown number of lines, each line representing a step for a process. Your job is to create a new file with the given output file name, and then write the file such that each line of the input file is written into it with step numbers appended to the beginning of the line.

#### Example:

```
Enter the filename of the input file: Input_File.txt
Enter the filename of the output file: Output_File.txt
```

#### Contents of Input\_File.txt:

```
Find out what problems we are being asked to resolve
Determine what has been given in the problem statement
Provide graphical representation of the problem
Create a model to solve the problem
Make and document necessary assumptions
Plug the numbers given into the model
Provide convincing validation of the model
```

#### Contents of Output\_File.txt:

```
Step 1: Find out what problems we are being asked to resolve
Step 2: Determine what has been given in the problem statement
Step 3: Provide graphical representation of the problem
Step 4: Create a model to solve the problem
Step 5: Make and document necessary assumptions
Step 6: Plug the numbers given into the model
Step 7: Provide convincing validation of the model
```

#### Task 1 Files:

```
1) Py4_PA_Task1_login.py
```

## Task 2 (of 2)

**Learning Objectives:** Utilize file I/O functions in Python.

### Background:

When writing papers, it's often a good idea to avoid overusing words. Many occurrences of the same word within a short chunk of text can lead to a less engaging read.

### Part A:

Write a main program that will prompt the user for a search word. Assume that the input file is named `Text_File.txt` and that it will contain a large amount of words, likely in the form of an excerpt from a text. The program will then search the input file for the search word and compute the percentage of times the word occurs in the document, e.g. if there are 300 words and the word occurs 13 times, the percentage would be 4.33%. This number should be truncated to the hundredth place.

It is important to note that capitalization does not matter for this search, e.g. "And" is equivalent to "and". (hint: the `lower()` function of Python might be useful) In addition, words may be followed by characters including but not limited to commas, periods, and semi-colons, e.g. "And?" will count as "And". (hint: the `isalnum()` function of Python might be useful) Occurrences of the search word should not be counted if they appear inside another word. Using the same example, "android" should not be counted for "and". The search word will always be a single word that could be capitalized or not. Cases of the word being used in a contraction or a possessive are not counted as an occurrence of the word.

### Example:

Input

Enter the search word: **Love**

Contents of `Text_File.txt`:

```
O me! what eyes hath Love put in my head,  
Which have no correspondence with true sight;  
Or, if they have, where is my judgment fled,  
That censures falsely what they see aright?  
If that be fair whereon my false eyes dote,  
What means the world to say it is not so?  
If it be not, then love doth well denote  
Love's eye is not so true as all men's: no,  
How can it? O! how can Love's eye be true,  
That is so vexed with watching and with tears?  
No marvel then, though I mistake my view;  
The sun itself sees not, till heaven clears.  
O cunning Love! with tears thou keep'st me blind,  
Lest eyes well-seeing thy foul faults should find.
```

Sonnet CXLVIII - Shakespeare

Note: highlighting is used to clarify the example – there is no highlighting in the text file itself. The word "Love's" is a possessive and therefore does not count.

### Output

The search word occurred 2.36% of the time.

### Task 2 Files:

- 1) Py4\_PA\_Task2\_login.py