

Homework #3: OOP.

Note:

Please, run your code before submitting. If you get an error, try to fix it before submitting your homework. If you get help from anyone, please, make sure that you actually understand the solution.

Task 1

Ask the user to type some text that must consist of at least two sentences and each sentence must have at least two words. If the user does not comply, ask the user to do it again. If the user does not comply 3 times in a row, the program displays an error message and exits.

Task 2

Create a class Text. The objects of the class are basically strings. Create the following instance methods for this class (notice that there should be seven separate methods):

1. calculates the number of sentences in a Text object
2. calculates the number of words
3. calculates the average number of words per sentence
4. calculates the average number of characters per word
5. creates a dictionary of all words in text and how often they are used (a word is a key; the number of times used is a value).
6. displays the statistics from methods 1-4 for the user
7. displays the dictionary information (from method 5) for the user

Task 3

What does the following code do?

```
[x for x in range(2, 1000) if all(x % y != 0 for y in range(2, x))]
```

Explore and experiment with the function `all()` in detail. Why is `all([1,2,3])` True, while `all([0, 1, 2, 3])` False?

Task 4

Create a function that checks if a integer is a prime.

Task 5

Create a list of prime numbers from 2 to 1000 using your function from Task 4 and `filter()` function.

Task 6

Explore which approach is faster: (a) list comprehension from Task 3, or (b) the user-defined function with `filter()` (from Tasks 4 and 5).

Task 7

Modify your function from Task 4 to check if the argument is actually an integer. Does this affect the speed of your code execution?