

**School Nova Computer Science 202**  
**Homework 2 (due 10/03/2020)**

*Save your code as lastname\_homework2.py and submit on Google Classroom*

**Task 1**

Start with the first three lines of the Zen of Python:

```
zen = "Beautiful is better than ugly. \n" \
      "Explicit is better than implicit. \n" \
      "Simple is better than complex."
```

Using list comprehension, create a list with the number of characters in each word. Your result should look like this:

```
[9, 2, 6, 4, 4, 8, 2, 6, 4, 8, 6, 2, 6, 4, 7].
```

Notice that these numbers also exclude punctuation (len("ugly") is 4; while len("ugly.") is 5!). Use string .replace() method to generate a new string without punctuation.

**Task 2**

Write a script to generate a nested list where each element of the primary list is a sentence, and each element of the secondary list is a word. Your resulting list should look like this:

```
[['Beautiful', 'is', 'better', 'than', 'ugly'], ['Explicit', 'is', 'better', 'than', 'implicit'], ['Simple', 'is', 'better', 'than', 'complex']]
```

The list has three elements. Once again notice the absence of punctuation.

**Task 3**

For this task you will need to use the nested list from Task 2. If you were not able to complete Task 2, simply copy and paste the nested list above in your code.

Using list comprehension, generate a nested list showing the length of each element (in this case, it will be the number of words in each sentence). Your result should look like this:

```
[5, 5, 5]
```

### Task 3 challenge\* (these tasks are optional but see if you challenge yourself!)

Using list comprehension, generate a nested list showing the length of each word in each sentence (that is, you need to preserve the original nested list structure). Your result should look like this:

```
[[9, 2, 6, 4, 4], [8, 2, 6, 4, 8], [6, 2, 6, 4, 7]]
```

### Task 4

Using the zen variable from task 1 and dictionary comprehension (to remind you, simply start with `your_dictionary = {key:value for ...}`), generate a dictionary where each key is the word and the value is the number of characters in the word. Your dictionary should look like this:

```
{'Beautiful': 9, 'is': 2, 'better': 6, 'than': 4, 'ugly': 4, 'Explicit': 8, 'implicit': 8, 'Simple': 6, 'complex': 7}
```

Why is the number of elements in your dictionary smaller than the total number of words in zen? (reply either using a comment `#` or `print()`).

### Task 5

Using the zen variable from task 1 and set comprehension, generate a set of all words in zen. Convert all elements of the set to lower case using `.lower()` string method. Notice the number of elements in the set (is it the same as the number of elements in the dictionary above?)

### Task 6

Generate a list of 5 random integers between 1 and 9 (included). Let's call it X. Using list comprehension, generate another list Y. Each element in Y describes whether the corresponding (index) value in X is "even" or "odd". For example, in my case X and Y were, respectively:

```
[9, 3, 4, 6, 7]
['odd', 'odd', 'even', 'even', 'odd']
```

### Task 7

Using list comprehension, generate a list Z, which includes only the "odd" numbers from X.