



Worksheet #4

Higher order functions
Lambda functions
Comprehension
Generators

1. Create a lambda function that squares a number
2. Considering the list `l1 = [74, 19, 105, 20, -2, 67, 77, 124, -45, 38]` ,
 - 2.1. Construct a list with values from list `l1` that are between 0 and 100 using:
 - 2.1.1.higher order functions
 - 2.1.2.List comprehension
 - 2.1.3.Generator
 - 2.2. Construct a list with negative values from list `l1` using:
 - 2.2.1.higher order functions
 - 2.2.2.List comprehension
 - 2.2.3.Generator
 - 2.3. Construct a list with the squares of the values in list `l1` using:
 - 2.3.1.Higher order function + lambda function from exercise 1
 - 2.3.2.Higher order function + `square(x)` function
 - 2.3.3.List comprehension
 - 2.3.4.Generator
 - 2.4. Obtain the average of the values in the list using:
 - 2.4.1.Cycle
 - 2.4.2.Higher order function + `media(list)` function
3. Considering the code snippet

```
numbers = []  
for i in range(1,1001):  
    numbers.append(i)
```

- 3.1. Rewrite the code using:
 - 3.1.1.List comprehension
 - 3.1.2.Generator
- 3.2. Construct a list with multiple values of 8 from the list using:
 - 3.2.1.higher order functions
 - 3.2.2.List comprehension
 - 3.2.3.Generator
- 3.3. Construct a list with 20% of the even values in the list using:
 - 3.3.1.Higher order functions + functions
 - 3.3.2.List comprehension
 - 3.3.3.Generator



4. Considering the string ¹:

```
phrase = "The quick brown fox jumps over the lazy dog"
```

Using the methods covered in this sheet

- 4.1. Count the number of spaces in the string
- 4.2. Count the consonants in the string, using the result from the previous point
- 4.3. Build a list of words in the sentence that contain less than 5 characters

5. Considering the dictionary with the notes of 20 students and using dictionary comprehension:

```
grades = {  
    38549: 13, 37205: 14, 37343: 8, 34550: 8, 31132: 20,  
    33116: 17, 34794: 16, 35443: 16, 39820: 15, 32908: 18,  
    34117: 12, 30463: 7, 30404: 17, 32912: 17, 33200: 18,  
    36861: 19, 33017: 16, 31966: 10, 34307: 16, 32255: 15  
}
```

- 5.1. Obtain a dictionary with the elements that correspond to the approved students
 - 5.2. Get the number of failed students
 - 5.3. Obtain a dictionary with the elements that correspond to students with higher than average grades
 - 5.4. Get the number of students with grades below average
 - 5.5. Students with grades between 8 and 10 are entitled to take an oral test. Get a dictionary with the elements that correspond to these students.
6. Taking into account the fruit list and using list comprehension:

```
fruits = ['mango', 'kiwi', 'strawberry', 'guava', 'pineapple',  
          'clementine']
```

- 6.1. Get the list ['MANGO', 'KIWI', 'STRAWBERRY', 'GUAVA', 'ANANAS', 'CLEMENTINE']²
- 6.2. Get the list ['Mango', 'Kiwi', 'Strawberry', 'Guava', 'Ananas', 'Clementina']³
- 6.3. Get the list of fruits with more than two vowels
- 6.4. Get the number of fruits with exactly two vowels
- 6.5. Get the list of fruits with more than 5 letters
- 6.6. Get list of fruit name lengths
- 6.7. Get the list of fruits that contain the letter 'a' in their name

¹ **Fun fact** : The sentence presented in English is a *pangram* , because it contains all the letters of the alphabet. An example in Portuguese is "Fútil banks paid him cheese, whiskey and chess."

²upper() function : https://www.w3schools.com/python/ref_string_upper.asp

³capitalize() function : https://www.w3schools.com/python/ref_string_capitalize.asp