

## Problem Set 6 - Lists

Hello student,

the goal of this problem-set is to familiarize with **lists** and how to manipulate them.

### Assignment 6.1 - Vector Multiplication (3 points)

Write a program that asks the user for a vector, multiplies it by a number inserted by the user and store it in a new variable. The program should then print the multiplied vector and the original one.

The output should look like this:

```
Multiplication value: 2

Multiplied vector:
4
2
0

Original vector:
2
1
0
```

### Assignment 6.2 - Sum and mean (3 points)

Write a program that asks the user for a repetitive input of integer numbers. The request should stop when the user inserts the number **0**.

Then the program should calculate:

- The sum of all the numbers
- The mean of all the numbers
- The quantity of positive and negative numbers
- The percentage of positive and negative numbers

The output should be like this:

```
Number:1
Number:-4
Number:2
Number:-3
Number:0

Sum: -4
Mean: -1.0

Positive numbers: 2 (50%)
Negative numbers: 2 (50%)
```

### Assignment 6.3 - Remove duplicate (3 points)

Write a program that asks the user for 5 numbers between 10 and 100 included.

The number must be stored in a list only if it is not a duplicate of an already saved number and only if it is in the required range. At the end print the 5 stored number.

The output should look like this:

```
Insert a number: 34
Insert a number: 42
Insert a number: 99
Insert a number: 3
3 is invalid. Insert a number: 32
Insert a number: 99
99 is invalid. Insert a number: 56

Numbers:
[34.0, 42.0, 99.0, 32.0, 56.0]
```

### Assignment 6.4 - Find the word (optional)

Write a program that asks the user for 10 words that should be stored in a list. At the end the program should look, inside the list, for a word chosen by the user.

The output should look like this:

```
Word 1 = ant
Word 2 = tiger
Word 3 = Elephant
Word 4 = Rat
Word 5 = horse
Word 6 = cat
Word 7 = Dog
Word 8 = Lion
Word 9 = maMMuT
Word 10 = Panda

Insert the word to find: maMMuT

The word found is the number 9 and is at the index 8 of the list.
```

## Assignment 6.5 - Mean (optional)

Write a program that asks the user for 7 positive numbers and store them in a list. If an invalid value is inserted the program should print an error message and the request must be repeated. The program must then determinate the biggest and smallest number and compute the mean.

The output should look like this:

```
Insert a number = 3
Insert a number = 5
Insert a number = 6
Insert a number = -1
Invalid number! Insert a number = -5
Invalid number! Insert a number = 32
Insert a number = 34
Insert a number = -23
Invalid number! Insert a number = 10
Insert a number = 0

Minimum: 0
Maximum: 34
Mean: 12
```

## Assignment 6.6 - List manipulation (optional)

Write a program that asks the user for 10 words and store them in a list.

The program must then print the list in the same order as inserted, in reverse order, in alphabetical order both ascending and descending.

At the end, the program must print for each unique word in the list how many time it was inserted.

For example:

```
Word: Ant
Word: Lion
Word: Elephant
Word: Rat
Word: Horse
Word: Rat
Word: Dog
Word: Lion
Word: Panda
Word: Panda
```

The output should look like:

```
Original order:
['Ant', 'Lion', 'Elephant', 'Rat', 'Horse', 'Rat', 'Dog', 'Lion', 'Panda', 'Panda']

Reversed order:
['Panda', 'Panda', 'Lion', 'Dog', 'Rat', 'Horse', 'Rat', 'Elephant', 'Lion', 'Ant']

Alphabetical order:
['Ant', 'Dog', 'Elephant', 'Horse', 'Lion', 'Lion', 'Panda', 'Panda', 'Rat', 'Rat']

Reversed alphabetical order:
['Rat', 'Rat', 'Panda', 'Panda', 'Lion', 'Lion', 'Horse', 'Elephant', 'Dog', 'Ant']

Count:
Rat: 2
Panda: 2
Lion: 2
Horse: 1
Elephant: 1
Dog: 1
Ant: 1
```