14BHD Computer Sciences, AA 2020 /2021

Laboratory exercise 7

Goals

- Define lists
- Manipulate and perform calculations on lists

Technical contents

- Definition of lists and operations on elements
- Definition of tables and manipulation of its elements

To be solved in the laboratory

Exercise 1. Write a program that initializes a list of eleven random integers and then display in four lines the following information:

a. All elements of even index.

b. All items of equal value.

c. All elements in reverse order.

d. The first and the last element. [P6.1]

Exercise 2. Write a program that calculates the alternating sum of the elements of a list. For example, if the program reads the data `1 4 9 16 9 7 4 9 11`, it must calculate and display 1 - 4 + 9 - 16 + 9 - 7 + 4 - 9 + 11 = –2 . [P6. 8]

Exercise 3. Write the function `def equals(a, b)` that checks whether two lists `a` and `b` contain the same elements in the same order. [P6. 11]

Exercise 4. Write the function `def sameSet(a,b)` that checks if two lists contain the same elements, regardless of the order and ignoring the presence of duplicates. For example, the two lists `1 4 9 16 9 7 4 9 11` and `11 11 7 9 16 4 1` must be considered equal. You will probably find it useful to design auxiliary functions. [P6. 12]

Exercise 5. Write a program that generates a sequence of 20 random values between 0 and 99, then displays the generated sequence, orders it, and displays it again, sorted. Use the `sort` method. [P6.17]

To be solved at home

Exercise 6. Write a function which reverses the sequence of the elements of a list. For example, if the function is invoked with the list `1 4 9 16 9 7 4 9 11` , it must modify its content so that it becomes `11 9 4 7 9 16 9 4 1` . [P6. 9]

Exercise 7. Write the `sumWithoutSmallest` function that calculates, with a single loop, the sum of all the values of a list, excluding the minimum value. In the loop, update the sum and the minimum value; at the end, print the difference between these two values on the terminal. [P6.6]

Exercise 8. Often the values collected during an experiment need to be corrected to remove part of the measurement noise. A simple approach to this problem is to replace, in a list, each value with the average between the same value and the two adjacent values (or a single adjacent one if the value under consideration is at one end of the list). Build a program that does this, without creating another list. [P6. 36]