

14BHD COMPUTER SCIENCES, 2020/2021

Laboratory 9

Goals

Review and consolidate:

- The use of conditional constructs to make decisions within a program;
- The use of loops for repeated execution of instructions;
- Definition of lists and tables;
- Manipulation and execution of calculations on lists and tables.

Technical Contents

- Definition of lists and operations on elements;
- Definition of tables and manipulation of its elements;
- While and for loops.

To be solved in the laboratory

Exercise 1. Write **functions** that carry out the following tasks for a list of integers. For each function, provide a test program.

- Swap the first and last elements in the list.
- Shift all elements by one to the right and move the last element into the first position. For example, 1 4 9 16 25 would be transformed into 25 1 4 9 16.
- Replace all even elements with 0.
- Replace each element except the first and last by the larger of its two neighbors.
- Remove the middle element if the list length is odd, or the middle two elements if the length is even.
- Move all even elements to the front, otherwise preserving the order of the elements.
- Return the second-largest element in the list.
- Return true if the list is currently sorted in increasing order.
- Return true if the list contains two adjacent duplicate elements.
- Return true if the list contains duplicate elements (which need not be adjacent).

[P6.4]

Exercise 2. A theater seating chart is implemented as a table of ticket prices, like this:

[illegible]

10	10	20	20	20	20	20	20	10	10
10	10	20	20	20	20	20	20	10	10
10	10	20	20	20	20	20	20	10	10
20	20	30	30	40	40	30	30	20	20
20	30	30	40	50	50	40	30	30	20
30	40	50	50	50	50	50	50	40	30

Write a program that prompts users to pick either a seat or a price. Mark sold seats by changing the price to 0. When a user specifies a seat, make sure it is available. When a user specifies a price, find any seat with that price. [P6.27]

To solve at home:

- Exercise 3. A supermarket wants to reward its best customer of each day, showing the customer's name on a screen in the supermarket. For that purpose, the customer's purchase amount is stored in a list and the customer's name is stored in a corresponding list. Implement a function *nameOfBestCustomer(sales, customers)* that returns the name of the customer with the largest sale. Write a program that prompts the cashier to enter all prices and names, adds them to two lists, calls the function that you implemented, and displays the result. Use a price of 0 as a sentinel. [P6.33]
- Exercise 4. Write a function *removeMin* that removes the minimum value from a list **without** using the *min* function or *remove* method. [P6.7]