Practical Work nr. 10 – Dynamic memory management and modular programming

Subjects

- Structures
- Dynamic memory management
- Modular programming

Exercises

1. Write a program that reads a sequence of N real numbers (the value N should be requested from the user). Allocate array space dynamically after the user enters a valid (i.e. positive) value N. The program should then calculate the average and standard deviation of the sequence and print the values above average. Do not forget that before ending the program you must free the previously allocated space.

   Note that this problem is based on the problem 11 of practical work 6 , so you can modify your previous program accordingly. Do not forget to include at least five functions (identify carefully the functions' arguments and return values), that are:

   a. *reading with validation of the value N;*
   b. *reading array elements;*
   c. *calculation of the average;*
   d. *calculation of the standard deviation;*
   e. *printing values greater than the average.*

2. Repeat the exercise 3 from practical work 8, reading and storing information about several students. Information about the students must be kept in an array which grows dynamically as new students are registered. Interaction with the program should be done through a menu as follows:

   a. Register a student.
   b. List information about all the students (name, entrance time, exit time).
   c. Calculate the average length of stay in the department.
   d. Terminate the program.

3. Return to the exercise 2 from practical work. 8 and create two files: *imag.cpp* and *imag.h* so that you can reuse the implemented functions (for manipulating complex numbers) in future programs.

4. Design a program that reads a sequence of integers and allows executing a number of operations over the sequence. Reading should end when a zero is entered. To calculate the histogram the number of bars should be asked to the user. Interaction with the program should be done through a menu as follows:

```
Analysis of a sequence of integers
 1 – Read a sequence
 2 – Write a sequence
 3 – Calculate the maximum value
 4 - Calculate the minimum value
 5 - Calculate the mean value
 6 – Histogram
10 – End the program
Choice ->
```