Practical Work nr. 4 – Arrays

Subjects

- Arrays
- Menu-based programs

Exercises

1. Write a program that reads a sequence of N integers (the value N should be requested from the user). N must be at least 1 and cannot be greater than 10. The program should then print the integers that were read in reverse order.

2. Write a program that reads a sequence of N integers (the value N should be requested from the user). N must be at least 1 and cannot be greater than 10. The program should then calculate the average and standard deviation of the sequence and print the values above the average.

3. Write a program that reads a sequence of positive integers. Reading should end after getting 100 numbers or when a non-positive number is entered. The program should then count the number of times a given integer, indicated by the user, appears in the sequence.

4. Design a program that reads a sequence of positive integers and allows executing a number of operations over the sequence. Reading should end after getting 50 numbers or when a zero is entered. 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 – Test if the sequence includes only even numbers
10 – End the program
Choice ->
```

5. Return to the problem 3. Modify the program so that it counts the number of times that each element occurs in the sequence. Reading should end after getting 100 numbers or when a negative number is entered.

   Consider the following example. Suppose that the input sequence is:

   ```
   a = { 4, 2, 5, 4, 3, 5, 2, 2, 4 }
   ```

   The result of the program execution must be:

   ```
   4 occurs 3 times
   2 occurs 3 times
   5 occurs 2 times
   3 occurs 1 time
   ```

6. Suppose now that you read a sequence of students' grades (integer values from 0 to 20). Write a program that calculates and draws the respective histogram (count of occurrences of each grade). The number of grades to process is requested from the user at the beginning of the program execution. Draw the histogram like shown below:

   ```
   Grades histogram
   ------------------------------------------------------
   20 | *****
   19 | *
   .
   .
   .
   01 | *
   00 | **
   ```