

Laboratory Work No. 4

C++ Vectors

This laboratory work covers the following concepts in C++ programming language:

- the vector class

⇒ Create a Win32 Console application and an empty C++ source file in Visual Studio IDE to be able to start typing programs.

Task-1: Write a C++ program that lets a user enter decimal integers for calculating some statistics. Values entered should be stored in a vector object. The program should present a menu-driven approach in which the inputting process should continue as long as the user wants. The program should calculate the minimum, maximum, mean, median, and standard deviation. The program should first sort the list in increasing order to calculate the median.

* The mean formula: $\bar{x} = \frac{1}{n} (\sum_{i=1}^n x_i)$

* The standard deviation formula: $s = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}}$

* For sorting the values entered, you should use the insertion-sort algorithm shown below.

```
Insertion-Sort(a)
for j ← 2 to a.length do
    hold ← a[j]
    i ← j-1
    while i > 0 and a[i] > hold do
        a[i+1] ← a[i]
        i ← i-1
    end-while
    a[i+1] ← hold
end-for
```

Task-2: Write a C++ function for each statistic above for improving your programming skills using the vector object.