Problem # 8 – The maximum values of the signal

1D signal processing is one of the basic operations of any information processing system. A signal is usually represented as a vector of real values. Typical signal processing involves the processing of these values, with the objective, for example, to improve the useful information via filtering.

Requirement

Having a 1D signal that holds up to 200 real values, make a program that enables automatic determination of the maximum values of that signal. A value is maximum only if both, the previous value and the next value are strictly lesser than it. If there is no previous or next value, these are considered implicitly as 0. Store the maximum values, determined in this way, in a new vector and then determine the arithmetic mean of this vector, denoted further as *mean*. Please display on the screen the number of the values from the original vector which are strictly higher than *mean*.

Input data

The program will receive, from the keyboard (*stdin* stream), the following data:

- an integer value for the number of the elements of the vector, followed by *newline* (*Enter* key);
- the vector values, as one value on a line followed by *newline* (*Enter* key).

Output data

The program will display, on the output screen, a single integer value representing the number of vector values strictly greater than *mean*, followed by *newline* character (\n).

WARNING to the compliance of the problem requirement: displaying the results should be EXACTLY on the indicated way! In other words, the standard output stream will not show anything in addition to the requirement of the problem; as a result of automatic evaluation, any additional character displayed, or viewed other than that indicated, will lead to a false result and therefore obtain a Rejection of the program.

Restrictions and specifications

1. The size of the vector is a positive integer value, greater or equal to 3. The vector values are real values.
2. **Warning**: Depending on the chosen programming language, the file containing the code must have one of the following extensions .c, .cpp, .java, or .m. The web editor **will not automatically add an extension** and its absence leads to the impossibility of compiling the program!
3. **Warning**: The source file must be named, by the candidate, in the following form: <name>.<ext>, where name is the surname of the candidate and the extension is chosen according to the previous point. Pay attention to the limitations of the Java language, related to the class name and file name!

Example

Input	Output
10 4.3 3.1 5.2 4.3 2.6 7.6 5.8 6.1 2.2 3.1	3
Explanation: Signal=[4.3 3.1 5.2 4.3 2.6 7.6 5.8 6.1 2.2 3.1], Maximum values =[4.3 5.2 7.6 6.1 3.1], Artihmetic mean=5.26, Number of values strictly greater than mean =3.	

Working time: 120 minutes