

## 9 September 2011 -- Computer Architectures -- part 1/2

Name, Matricola .....

Let us assume to have a signal, and to have obtained a number of samples  $n$  of this signal with  $30 \leq n \leq 60$ . Each sample is an unsigned binary integer value stored in a 16-bit cell of memory. All cells are arranged as an array with the name SAMPLES.

It is required to compute the overall “area” of the signal and to provide this value (on a suitable number of bits and with maximum precision as possible) to further computations. The overall area has to be computed assuming:

Zero-order interpolation (max points 24)

or

First-order interpolation (max points 30)

The running version of the program should handle the data input (i.e. filling of vector SAMPLES), either from keyboard or from a file, as well as the data output on the screen. Overflows have to be considered and avoided, as well as maximum precision has to be guaranteed.

It is not required to provide the optimal (shortest, most efficient, fastest, ...) solution, but a working and clear solution. The input-output part is not necessary in the class developed solution, but its implementation is mandatory to be discussed at oral exam.

*Please use carbon copy and retain one copy for home implementation and debug. Please provide your classroom submitted solution with several explanatory and significant comments. When coming to oral discussion, please mark on your “classroom” copy all modifications. Please also provide an error-free and running release of the solution, as well as with its printed list of instructions. Please consider that the above are necessary but not sufficient requirements to success the exam, since the final evaluation will be based on a number of parameters.*

**FAILURE TO ACCOMPLISH ALL PREVIOUS NECESSARY REQUIREMENTS WILL CAUSE NO-QUESTION-ASKED AND IMMEDIATE REJECTION.**