

Tutorial 2

In this tutorial we will look at thread parallelism in C++. Our example problem will be the computation of the norm of a vector a :

$$\|a\| = \sqrt{\sum_{i=1}^n a_i^2}.$$

- 1.) Download the [skeleton code](#) and generate the build system using `cmake`; in a sub-directory `./build` type `cmake ..` on the command line to generate the make file or IDE project.
- 2.) Allocate an integer array `a` for storing `n` elements of type `int` on the heap using `malloc()`. Ensure that the program correctly cleans up the memory.
- 3.) Initialize the memory so that all elements of `a` have the value 1.
- 4.) Generate `num_threads` threads that compute the norm in parallel (no additional global variables should be used). Devise an appropriate parallelization strategy for this.
 - i.) Write a naïve implementation that does not consider potential synchronization issues.
 - ii.) Write a refined version where synchronization issues are avoided (note: no special primitives are needed).
- 5.) How does the performance of your code scale as a number of threads?

Please finish the implementation until next week (week of 30/10/2019).