Lab n° 1 : OpenMP

The objective of this lab is to build some understanding of the *OpenMP* library. You should write your code using the C language.

Exercise 1. Environment

In this exercise, the goal is to get familiar with the compilation and execution of *OpenMP* program.

In order to change the number of process associated with the execution of the program you can change the shell variable *OMP_NUM_THREADS*.

Run and check the program *display_omp*.

Exercise 2. Scalar product

In this exercise you will manipulate various *OpenMP* directives.

1. Check the influence of the directive *pragma omp parallel* ***for*** on the for loops.
2. Try to use the clause *schedule* in order to distribute differently the workload between the processes.
3. Comment on the performances of you program when you change the number of processes.
4. In place of letting the distribution being done automatically, it may be more efficient to specify the workload for each process manually. In the code provided, replace the *reduction* by *single* or *atomic*.
5. Compare the various implementations.

Exercise 3. FFT

The goal of this exercise is to write a parallel version of the fast Fourier transform.

1. Study the behavior of the given program.
2. Study the structure of the program by studying the parts of the code that could benefit from parallelism.
3. Write a parallel version of the fast Fourier transform using *OpenMP*.
4. Study the performances of your implementation.

Bibliography :

[1] `http://openmp.org/wp/`