Lab Session 5, Concurrency

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Abstract

The goal of this session is to discover the basic mechanisms of MPI. In order to realize the exercises, you will require the following documents: i) this lab session subject ii) the MPI4Lecture library available at the following location: *http://www-sop.inria.fr/members/Luc.Hogie/mpi4lectures/* iii) the course iv) the JAVADOC.

Exercise 1: Discover MPI4Lectures

Create a new JAVA project and link it to the MPI4Lecture library. Get used to the syntax through the available example. The ring. http://www-sop.inria.fr/members/Luc.Hogie/mpi4lectures/src.html/mpi/example/Ring.java.html

Exercise 2: The bubble sorter is back

Re-implement the multithreading layer of the bubble sorter(TP1 exercise 4) in a MPI fashion.

Exercise 3: Matrix multiplication

Write an MPI program that takes an input two compatible matrices (MxN) and (NxP) and the number of available nodes for computation. The program computes the matrix multiplication while efficiently using all the available nodes.
1/ Determine the rule to be followed to distribute efficiently the computations over the nodes.
2/Write the code.

Exercise 4: Broadcasting

MPI4lectures is a basic implementation of MPI. For example, the broadcasting primitive is not implemented. Let's extends the MPI interface and the MPIImplementation class to provide the broadcasting feature.
1/ What are the possible broadcasting scheme? What is the impact on the API?
2/ Try it on an example.