Tutorial No. 1
Multithreading
C++11 Standard Thread Library & Intel TBB

Exercise 1.1

Using the *C++11 Standard Thread Library*, write a `Semaphore` class.

Exercise 1.2

In a field, p lettuce producers fill a n slots carriage with lettuces. Meanwhile, r rabbits eat the lettuces in the carriage. This goes on forever as long as there are rabbits and lettuce producers.

Write a C++ program using the *C++11 Standard Thread Library* to model this problem, taking into account the following constraints:

- A producer must be put on hold if there is no room left in the carriage;

- Each carriage slot may contain one lettuce only;

- Each lettuce is eaten by only one rabbit;

- Rabbits must be put on hold if there is no lettuce to eat.

Exercise 1.3

Using the *Intel Threading Building Blocks*, write a parallel program to compute the dot product of two vectors of `double` floating-point numbers. Discuss the possible drawbacks of the implementation.

Exercise 1.4

Using the *Intel Threading Building Blocks*, write a parallel version of the Eratosthenes sieve to find the prime numbers smaller than 100,000,000.