Assignment 1. OpenMP. Finding the maximum value of a vector

Write a parallel OpenMP program that finds the maximum value of a vector (one-dimensional array). Each thread should only store its maximum value; concurrent access to a shared variable that stores the maximum value is not allowed.

Study the dependence of the runtime on the number of threads used (from 1 to 10) for a vector that contains at least 1,000,000 elements (the more, the better).

Check the correctness of the program on 10 elements.

The program should display on the screen: the number of threads, the execution time.

Transfer the size of the vector through the argv [1] parameter.

Hint1: You can use the atoi function to convert the argv value to an int. To use the function, you need to connect the <cstdlib> library.

Example:

int N = atoi (argv [1]);

Compile the program with the -fopenmp switch. Compilation example:

gcc -o 2.o 2.c -fopenmp

g++ -o 2.o 2.cpp -fopenmp

Startup example:

./2.o array_size

Hint2: To find the maximum number, you may need the option

reduction (max:max_element);