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CptS 411

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Homework 3

Analysis

Similar to the previous homework, I followed the rules of what causes a cell to live or die when there is underpopulation, overpopulation and reproduction. This was not too difficult as I was able to properly accomplish it with a few, 'if' and 'else' statements. I created a matrix with randomized numbers, 1 and 0s, printed the original matrix and the matrix after the cell value was updated.

I created the code without using any parallel commands. I then added the OpenMP commands such as, 'pragma omp parallel' for the loop that checks whether the cells will live or die (where the cell value is updated). This was pretty simple, and then I did the same with a the MPI part of the assignment. I used the previous homework assignment as reference, but I still find using MPI a bit more complicated than OMP. The program updated the cell value 5 times (T's value) and I recorded the time it took for the program to run.

Below, you can see the graph of the times taken when changing the number of processes for each program compilation. I was surprised to see the drastic difference in timing between the OMP program versus the MPI one. As the number of processes increase, the MPI time decreases which demonstrates a good scalability for the MPI program. On the other hand, the OpenMP time was less clear. The time was the greatest when using 1 process, it then decreased and slowly began increasing after the second process. It was interesting to see the difference in timings of these two programs since they both do the same thing, use the same amount of processors to run the program but yet, have such different results. All in all, this was an interesting homework assignment to work on.

Graph

