Homework 8 – MPI 2D Heat Equation

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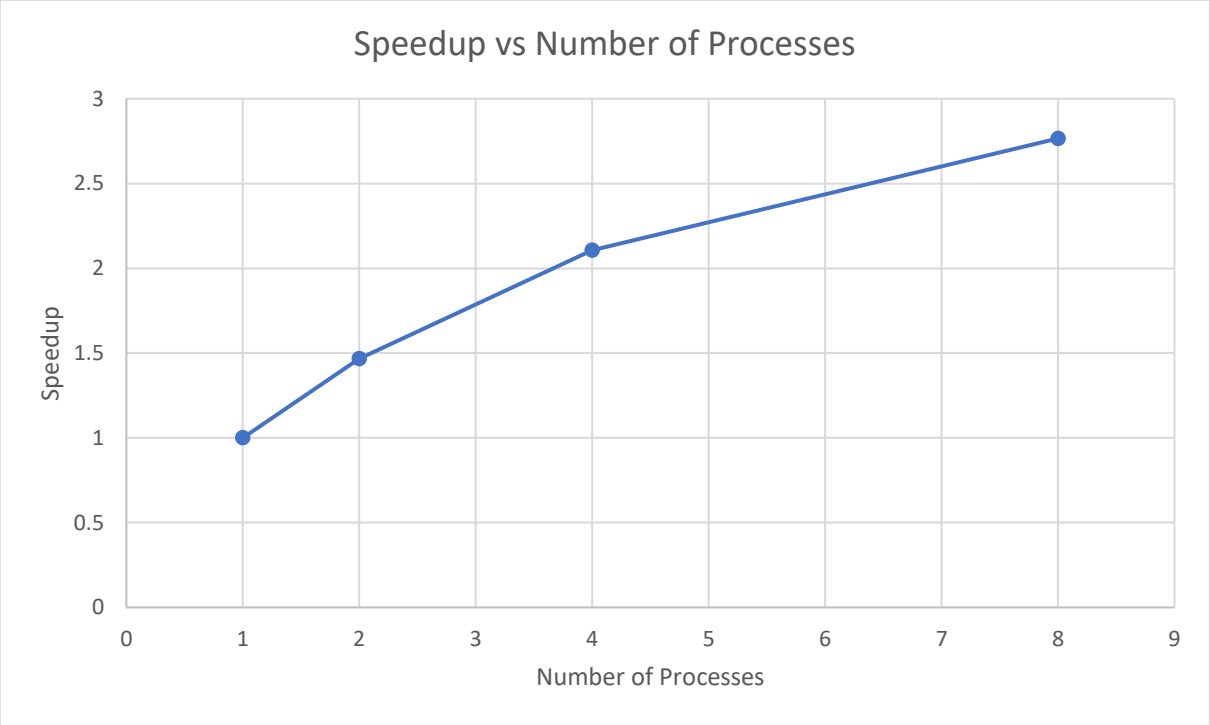
1. Object of the project:
    a. Solve the 2D heat equation using MPI protocols.
2. Details:
    a. Take advantage of MPI functions such as MPI_Scatterv, MPI_Gatherv, and MPI_Sendrecv to parallelize and aid in the communication of data between processes which is required to solve this problem.
3. Results:
    a. Number of Processes: [1, 2, 4, 8]
    b. Time Elapsed (s): [12.0859, 8.23745, 5.73727, 4.36958]
    c. Speedup: [1, 1.303, 1.499, 1.560]



4. Performance Improvements:
    a. To improve the performance, I believe I can implement the methods on the original code provided to us that used cartesian topology to solve the problem instead of iterating through the rows.
5. Bugs Encountered:
    a. For certain values of M/N, there are more 0 values than expected leading to a large ‘brick’ in the contour plot for those values.