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Set 4 - Diffusion equation with MPI

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If we want to spread the heat beyond a single node we need message passing. In this exercise we will parallelize the 2D diffusion equation with MPI.

- a) Parallelize the serial 2D diffusion code found in `skeleton/diffusion2d_serial.cpp` with MPI. Divide the 2D domain with an MPI cartesian grid and use appropriate MPI datatypes for the data transfer.
- b) Estimate (on paper) the communication overhead of the 2D grid decomposition compared to the horizontal strips that we used in the previous semester. Which one achieve better scaling?
- c) Make a strong scaling plot up to 48 cores.

Summary

Summarize your answers, results and plots into a short PDF document. Furthermore, elucidate the main structure of the code and report possible code details that are relevant in terms of accuracy or performance. Send the PDF document and source code to your assigned teaching assistant.