Peer Review – Dirichlet–Neumann Heat Equation Project

Course Project Peer Review

DirichletNeumann.py.
It clearly maps one MPI rank per room, implements the Dirichlet–Neumann split correctly (middle room Dirichlet, outers Neumann), applies ω-relaxation, and stitches a helpful final plot with room/global means—solid baseline. My main question Does the default run match the **assignment** (10 iterations, ω=0.8, Δx=1/20 as in project03.pdf/Project3_FD.pdf) and is the flux sign (outward normal) clearly explained where you send/receive data?

solver.py.
The finite-difference assembly is very easy to read, nice work. A couple of questions: are half-edge/interface nodes documented clearly so we can see how Dirichlet traces and Neumann fluxes enter the RHS? Could you speed up the matrix build by **pre-allocating** the arrays for rows/cols/values instead of growing Python lists inside the loop?

room_layout.py.
The geometry and boundary labels are easy to follow, with heater/window/wall values matching the directions. A quick suggestion: first, a short docstring table that lists each boundary segment with its physical meaning and temperature/flux value (e.g., “north wall of room 1 → 15 °C Dirichlet”).