Lab 6 report

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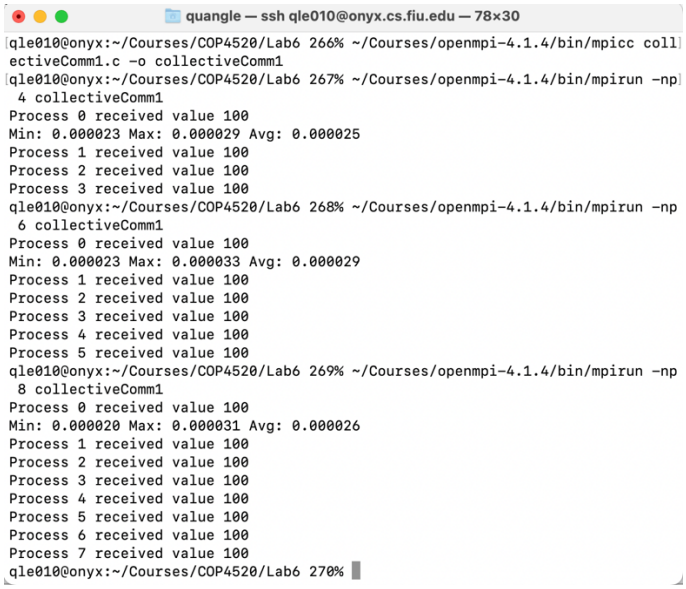
1 Task 1: Collective communication

- Change the number of MPI processes to 4, 6, and 8, and measure the execution time.

1.1 Broadcasts from MPI process 0 to all the others MPI processes. Here is the result:

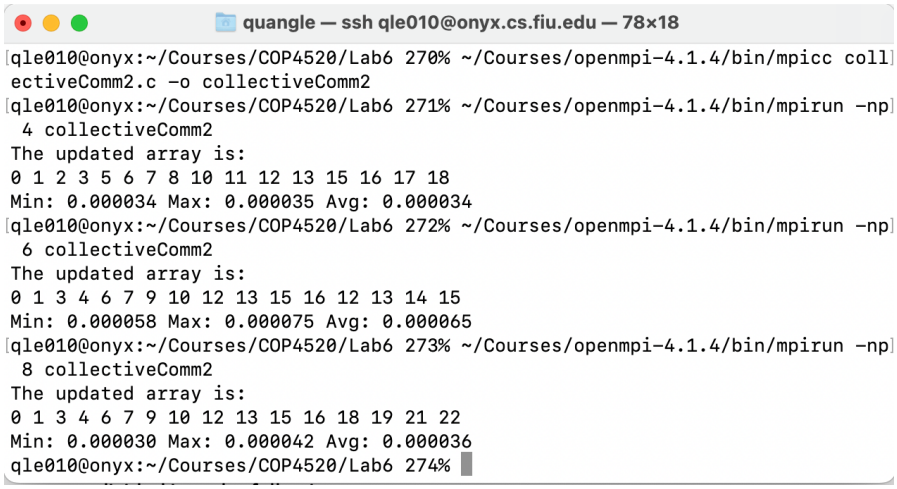
Number of processes	Min time (s)	Max time (s)	Average time (s)
4	0.000023	0.000029	0.000025
6	0.000023	0.000033	0.000029
8	0.000020	0.000031	0.000026



1.2 Using scatter and gather, here is the result:

Number of processes	Min time (s)	Max time (s)	Average time (s)
4	0.000034	0.000035	0.000034
6	0.000058	0.000075	0.000065

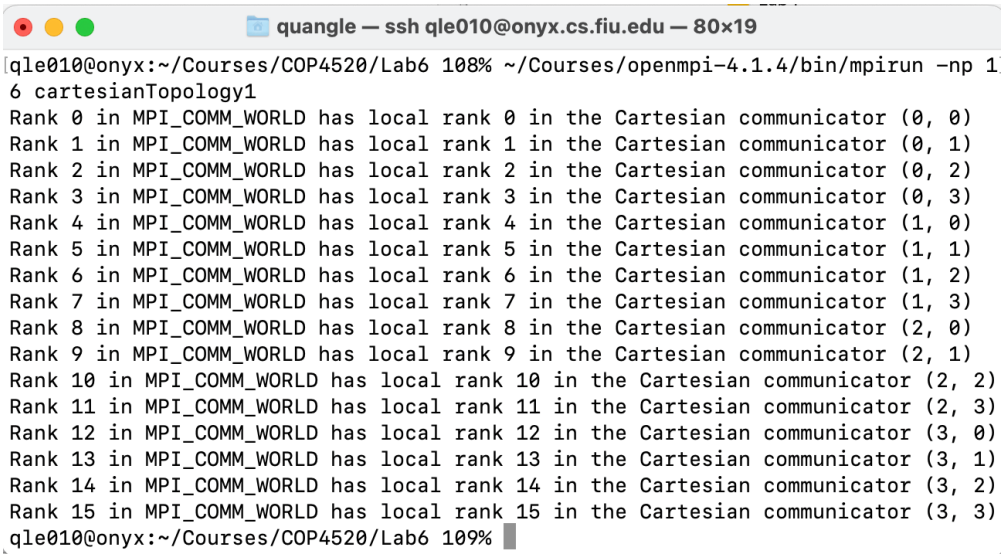
8	0.000030	0.000042	0.000036



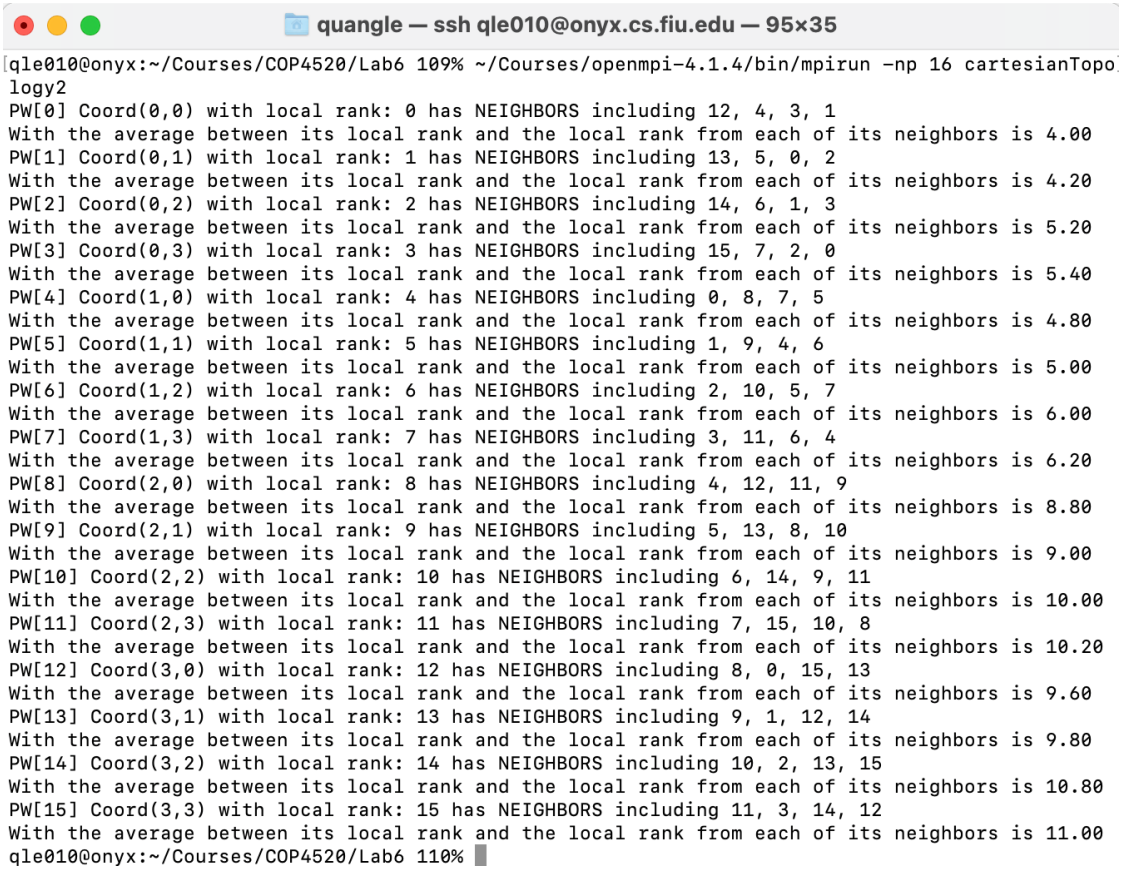
2 Task 2: Cartesian topology

- 2D Cartesian topology (4x4)

1) From my result, the local rank with the global MPI_COMM_WORLD rank are the same number. Here is the result:



2) Here is the result of calculating on each MPI process the average between its local rank and the local rank from each of its neighbors in periodic Cartesian:



3 Task 3: MPI I/O

- Here is the result when I follow the steps. The io.bin file has the content as requirements.