Preparation Project 4

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Tasks

1. Work plan:
   (Partners Jack Jiang Shaan Chudasama) Our main plan for this project will be to complete the cope by the 22nd and then complete the analysis by the following Thursday. We plan to complete all of the code by the first meeting and then combine it during the meeting and then complete all of the analysis by the second meeting. If anyone falls behind or needs help we will meet as appropriate.

   (Partner work allocation - should be identical to other partners)

   Mason:
   Fix Makefile, remove Open Np/add it, SLRUM Script, paralelize function for computing error norm, update timing code, Create Readme for how to run code
   Shaan:
   Tasks 3-4: Modifying our structure to operate in a domain decomposed environment, and Halo Exchange for domain-decomposed grid. - will probably need some help from both Jack and Mason at specific points
   Jack:
   Primary Tasks left include Task 5 and Task 7.

2. (a) Load imbalance for:
   For: $N = 1001$ and $P = 1000$ it has a low load imbalance
   For: $N = 1999$ and $P = 1000$ it has a high load imbalance

   (b) Using the formula from below we get:
   999 processors get assigned 2 of N objects 1 processor gets assigned 1 of N objects

   (c) The formula for the distribution of work is:

   N/(P-1) objects to work on for P-1 of the processors

and then the last processor gets assigned N%(P-1) points

3. 4 bytes$*100001 * 100001 = 40000800004$ bytes which converts to 40GB

4. (a) 460 seconds converts to 0.1278 hours * 512 processors = 65.4336 hours
   (b) 1.25 seconds converts to 0.0003472222 hours * 512 processors = 0.1778 hours
   (c) 0.3 seconds converts to 0.0000833334 hours * 1024 processors = 0.0853 hours
   (d) 26 seconds converts to 0.00722222 hours * 1024 processors = 7.396 hours

5. (a) Halo padding would be (size of the array -1) assuming that the size of the array was odd
   (b) The Y dimension should be padded.
   (c) The necessary information to map the internal data to the global grid coordinate system would be: the number of processors, rank of processor, the size of 2D Array, the number of non-border grid points.
   (d) Some other useful things would be mx, my, n, nt, alpha.