CS698 Selected Topics: GPU Cluster Programmi

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CS698 GPU Cluster Programming MPI+CUDA - Homework 3

Homework 3 on Matrix multiplicaiton with MPI one-sided communication

This homework is the same as HW1, except you use only one-sided communicaiton.

Using the template template.c, write an MPI program to multiply two matrices A and B to produce C, where all matrices are of the same dimension. Use the following variables:

- n as the matrix dimension, where n is a power of two number
- num_procs is the number of processes, where num_procs is a power of two number
- master is the root process in charge
- my_rank is the position of a process in a single communication world.
- my_work = num_procs/n, again a power of 2 number

You may use different variables to your liking but you are nonetheless strongly suggestged to use the ones above to keep it simple.

The master randomly generates both A and B. Matrix A will be equally distributed to num_procs processes while matrix B will be broadcast. In other words, my_work rows of A will be distributed to each and every process while n rows of B will be distributed to each and every process.

For each process, perform matrix multiply on nprocs/n rows.

The master collects my_work rows from num_procs processes.

Now on the master, perform nxn matrix multiply.

Compare the results from the pareallel version with the serial version.

They must match. Otherwise, all futile. You wasted a lot of electrons. Do it again until you match the two.