Problem 1

Matrix multiplication with MPI

In this assignment, you will implement a matrix multiplication program using MPI. One master node read in data from local disk and distribute to all the other slaves. You should properly design your collective communication pattern (e.g. scatter, gather) to ensure maximum load balance.

Your running program should be named `mm_mpi`, which takes two parameters, i.e., `input.txt`, `output.txt`. (See sample files)

The input file contains two matrices, separated by a blank line. Each matrix is specified as follows: the first line contains two integers, R and C, separated by `TAB`, indicating the dimension of the matrix. It is followed by R lines, each containing C floating numbers (`TAB` separated). Your program should be able to handle any compatible matrix dimensions.

The output file should be in the same format as the input file. See sample output file `output.txt`.

Follow the example given in class and write a PBS script. Test your code with input file `mm-sample.txt`. Run the code on the cluster using `mm-512.txt` as the input file using 2, 4, 8 processors. Submit a README file that indicates the location of your code, status of your implementation, any pending bugs or problems. Make some comments about the performance of your code.