Parallel and Distributed Computing (Fall-2022)

Course Project Deadlines:

Wednesday 30th Nov. 11:59PM (no extension possible)

Late policy: Late for max 30 minutes: 30% Deduction of Marks
Late for max 2 Hours: 60% Deduction of Marks
Late more than 2 Hours: ZERO MARKS

Project Group size: Min. 3 Students [all group members should be listed in the submitted document (a MS Word or PDF file). Any name not mentioned in a group will not be awarded marks]. In case of any group formation issue consult your Instructor by 23rd November.

You will use MPI for this project.

Input/Initialization

Your program should read in a file containing the dimensions of 5 to 7 matrices. The dimensions should be between 20 and 50. All matrices' dimensions should be unique i.e. no matrices should have same dimensions. You can initialize those matrices with random values. No square matrices are allowed

Example input:

20 X 30
30 X 32
32 X 21
21 X 50
50 X 41

a) Find the optimal order of multiplying (considering the most suited loop permutations) the matrices by calculating the scalar multiplications.

b) After finding the optimal order, multiply the matrices through blocking and non-blocking calls. The blocking code can be found here for your help

https://gist.github.com/AshanthaLahiru/bfa1a631f6af05af93e98538eeca3018

c) Then multiply same matrices by Strassens matrix multiplication method through blocking calls. An implementation of Strassens MM method by non blocking send/receive can be found here for your help. https://github.com/karthikVenkataramana/Strassens

d) Compare the implementation w.r.t time and processes (2,4,6,8) on 1, 2 and 3 machines (cluster setup) and submit the results/graphs in a report along with the code.