CSS 434
Lab Work 2b: MPI Java Programming

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Lab work date: See the syllabus

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1. Purpose

This laboratory work intends to mitigate your steep learning curve on MPI Java. You are to code and run an MPI Java program that includes MPI.COMM_WORLD.Send( ) and MPI.COMM_WORLD.Recv( )

2. Statement of Work

1. Code an MPI java program that executes the following square root computation:
    - **rank 0:** creates an array of 100 "double" elements, (say, dArray[100]); sends dArray[25] through to dArray[49] to rank 1, dArray[50] through to dArray[74] rank 2, and dArray[75] through to dArray[99] to rank3; thereafter computes "sqrt" of dArray[0] through to dArray[24]; and finally receives the results from the other ranks. Use MPI.COMM_WORLD.Send( ) and MPI.COMM_WORLD.Recv( ) to send and receive an array with a remote rank. (Don't try to communicate with rank0 itself, which hangs up communication.) At the very end, print out all array elements.
    - **other ranks:** creates an array of 25 "double" elements, (say, dArray[25]); receives data in dArray[0] through to dArray[24] from rank 0; thereafter computes "sqrt" of all the array elements; and finally sends the results to rank 0. Use MPI.COMM_WORLD.Recv( ) and MPI.COMM_WORLD.Send( ) to receive from and send an array to rank 0.
2. Make sure that you have set up your MPI execution envrionment first.
3. Compile and run your MPI java program by typing:

```
javac MyProgram.java
mpirun -n 4 java MyProgram
```

3. Related Materials

- To make a quick review for MPI Java, see the slides: p18-21 of MPI.ppt
- For detilas of MPI Java, refer to the following tutorial and specificatioin.
    1. http://www.hpjava.org/courses/arl/lectures/mpi.ppt
    2. http://www.hpjava.org/reports/mpiJava-spec/mpiJava-spec.pdf

4. What to Turn in

Turn in the following materials to Canvas by the due date of Program 2:

1. Your MPI java program, (i.e., MyProgram.java)
2. Your execution output, (i.e., output.txt)