MPI TP 2

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Assignment Instructions

In this programming assignment, you will write a C++ program using MPI to perform the following tasks:

a) Implement a sequential broadcast from processor 0 to all other processors.

b) Implement a ring sequential broadcast where each processor forwards the message to the next processor in a ring until it reaches all processors.

c) Implement a hypercube broadcast, distributing the message efficiently across processors in a hypercube topology.

Requirements

- You must use the MPI library for parallel programming.
- The code should be well-documented with comments.
- Ensure that your code is correct, efficient, and follows best practices in MPI programming.

Submission

1. C++ source code for the three broadcast methods.
2. A report (in PDF format) that includes:
    - A brief explanation of the algorithm used for each broadcast method.
    - Code snippets highlighting the key parts of your implementation.
    - A description of how you tested and verified the correctness of your code.
    - A discussion of any challenges or issues you encountered during implementation.
    - A comment on the performance and scalability of each broadcast method, especially when the number of processors increases.
3. A comment on the output of your program for each of the three broadcast methods.

Please submit the following by the due date:

- Your C++ source code files.
- Your report in PDF format.

Grading

Your assignment will be graded based on the correctness of your code, the quality of your report, and your comments on the output.

Resources

You can refer to the following resources for MPI programming:

- MPI Documentation: `https://www.mpi-forum.org/docs/`
- classroom presentations uploaded to moodle

Good luck, and happy programming!