ICOM 6025/CIIC 4019 – High Performance Computing
Programming Assignment #5: MPI

The goal of this assignment is to learn to use MPI and to measure MPI communication latency and bandwidth.

1. The ping-pong benchmark is a way to measure the communication time between two processes. Conceptually, process 0 sends a message to process 1. After process 1 receives the message, it immediately sends a message to process 0. This is called a "ping-pong." The time for sending a message is half the time for a ping-pong. Write a code that performs this ping-pong benchmark. It should have the following features: 1) the message length can be set by the user, 2) two ping-pongs are performed simultaneously (started by each of process 0 and process 1), which is more like realistic applications. It may be difficult to measure the time for a single ping-pong, so be sure to measure the time for multiple ping-pongs together.

2. The NAS Parallel Benchmarks (NPB) is a small set of programs designed to help evaluate the performance of parallel supercomputers. In this assignment you will be using two pseudo applications: BT (Block Tri-diagonal solver) and SP (Scalar Penta-diagonal solver). You will be using the MPI benchmarks of BT and SP. Run each benchmarks for different problem sizes (Class A, B, C). Compare the performance of the benchmarks and discuss how the communication patterns affect the performance

Deliverables (parallel code & report)