**1. PROBLEM DESCRIPTION**

Implement the hot potato test for measuring communication time using MPI on the Stampede. Use N number of processors and S data size (your program should run with any N and any S). Use 100 repetition to increase accuracy.

Measure the communication time, using N = 2, 4, 8 and 16 and S = 64 integers, and draw a curve. Repeat the same and draw another curve using N = 2, 4, 8 and 16 and S = 512 integers. Submit your source code and data curves.

**See Task1.c**

|  |  |  |
| --- | --- | --- |
| **n** | **time(64)** | **time(512)** |
| 2 | 0.000005 | 0.000006 |
| 4 | 0.000001 | 0.000007 |
| 8 | 0.000001 | 0.000001 |
| 16 | 0.000001 | 0.000001 |

**2. PROBLEM DESCRIPTION**

Implement the program for measuring the all-to-all exchange collection communication operation (from the MPI library) using MPI on the Stampede. Use N number of processors and S data size (your program should run with any N and any S). Use 100 repetition to increase accuracy. Submit your source code and data curves. Measure the collective communication time, using N = 2, 4, 8 and 16 and S = 64 integers, and draw a curve. Repeat the same and draw another curve using N = 2, 4, 8 and 16 and S = 128 integers.

**See Task2.c**

|  |  |  |
| --- | --- | --- |
| **N** | **time(64)** | **time(512)** |
| 2 | 0.000016 | 0.000017 |
| 4 | 0.000034 | 0.000035 |
| 8 | 0.000428 | 0.000507 |
| 16 | 0.003109 | 0.003342 |