

High Performance Computing Lab

Class: Final Year (Computer Science and Engineering)

Year: 2022-23

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Batch: B3

Practical 6

Github Link : <https://github.com/Piyush4620/2019BTECS00089HPCLab>

Q1: Implement a MPI program to give an example of Deadlock

Output:

```
PS F:\College\Semesters\SEM_7\HPC\Lab\Assignment6> mpiexec -n 4 .\deadlock.exe

job aborted:
[ranks] message

[0] terminated

[1] fatal error
Fatal error in MPI_Ssend: Other MPI error, error stack:
MPI_Ssend(buf=0x000000000061FDF0, count=1, MPI_DOUBLE, dest=1, tag=1, MPI_COMM_WORLD) failed
DEADLOCK: attempting to send a message to the local process without a prior matching receive

[2-3] terminated

---- error analysis ----

[1] on LAPTOP-DE0T04S4
mpi has detected a fatal error and aborted .\deadlock.exe

---- error analysis ----
```

Q2. Implement blocking MPI send & receive to demonstrate Nearest neighbor exchange of data in a ring topology.

Ans:

```
PS F:\College\Semesters\SEM_7\HPC\Lab\Assignment6> mpiexec -n 4 .\dataExchangeNearestNeighbour.exe
Rank 3: sending to 0
Rank 3: receiving from 2
Rank 0: sending to 1
Rank 0: receiving from 3
Rank 1: sending to 2
Rank 1: receiving from 0
Rank 2: sending to 3
Rank 2: receiving from 1
```

Q3. Write a MPI program to find the sum of all the elements of an array A of size n. Elements of an array can be divided into two equal groups. The first $[n/2]$ elements are added by the first process, P0, and last $[n/2]$ elements the by second process, P1. The two sums then are added to get the final result.

Ans:

```
PS F:\College\Semesters\SEM_7\HPC\Lab\Assignment6> mpiexec -n 4 .\arraySum.exe
Sum of array = 55
```