

Assignment-5

Deadline for Part-1: 7th April 2021, 09:00 pm

All the assignments have to be supplemented with a **brief write-up with the following details** (wherever necessary):

Part-1

Integration using trapezoidal rule. Serial code and OpenMP codes have already been implemented.

Write/design two parallel implementations using MPI for Integration using trapezoidal rule.

(i) Using the 6 basic MPI calls

MPI_Init; MPI_Finalize; MPI_Comm_size; MPI_Comm_rank; MPI_Send; MPI_Recv

(ii) Using MPI_Bcast, MPI_Reduce

Use the MPI version to calculate PI and verify the implementation. **(take enough number of trapezoids to study the effect of speedup)**

Run the MPI version on 4, 8, 16 and 32 cores and compare the timings with a serial, and OpenMP version for the same accuracy of PI.

Ensure that you are taking cores from different nodes.

Which is the best implementation among all in terms of run-time and what are the important observations?

Part-2 – Deadline : 18th April, 2021

Part-2 will consist of applying MPI on your project problem - **update the results in your project overleaf document using red color. - Team of 4. Deadline : April 18.**

Steps for execution on multiple nodes:

1. Compile : `$mpicc test.c`

2. Execution

Create a file say named "machines" in the following format (machine name and number of cores/node):

gics1 slots=4

gics2 slots=4

gics3 slots=8

Run your program using :

\$mpirun -machinefile machines -np 16 ./a.out

(16 represents number of cores to be used)

One should run the codes **on the compute nodes, not on the master node.**

ip address of compute nodes:

192.168.2.2

192.168.2.3

192.168.2.4

192.168.2.5