CS301 Assignment-4

Deadline: 19th April 2022, 11:59 pm

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

Problem:

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?

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