Assignment 7 – MPI Point-to-Point

Q1. Preliminary: ping pong

Answer: The test run case is stored in file run.sh.o67604.

Q2. Numerical Integration : Master-Worker

Answer: The folder “master_worker/plots” contains all the obtained and required plots.

Q3. 2D heat equation

Answer:

1. Does the code scale strongly?
Answer: Yes, the code scales strongly. It can be concluded by seeing the graphs that as the number of processors increase the speedup increases when the load or N is kept same. There is almost a linear increase in the speedup while we go to higher number of processors.

2. Does the code scale weakly?
Answer: Yes, the code scales weakly in almost all the cases except in the case where the N is increased drastically as compared to the number of processors are increased. In this exceptional case the time taken is relatively very high so the graph sees a sudden rise in the execution time. But for all other small N cases it scales weakly.

3. Describe how you would increase communication and computation overlap?
Answer: Exploiting the spatial and temporal locality in extended hierarchy can increase communication and computation overlap. The techniques used can be similar to single processor. Here, in the 2D head equation code the use of Non-blocking send and received has also increased communication and computation overlap.