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# Question 4

**An approximate algorithm for calculating the value of π (PI) and its parallel version using the Master-Worker paradigm are provided towards the end of the tutorial that we discussed in the first class. Here is a link to the tutorial:**

[**https://hpc.llnl.gov/documentation/tutorials/introduction-parallel-computing-tutorial**](https://hpc.llnl.gov/documentation/tutorials/introduction-parallel-computing-tutorial)

**The pseudo-code is in the tutorial and the C code that uses MPI is available in the following link:**

[**https://hpc-tutorials.llnl.gov/mpi/examples/mpi\_pi\_reduce.c**](https://hpc-tutorials.llnl.gov/mpi/examples/mpi_pi_reduce.c)

**Here is what you are required to do:**

**a) Write a sequential version of the algorithm and execute it on a single node of the cluster. You can take the parallel code and change it to sequential by removing the parallel components. Measure the execution time. (Note: For fairness of performance comparison, a sequential and parallel version must do equal amount of “total computational work”, ignoring any other overheads.)**