Write a simple random matrix addition serial code in C and Fortran.

- Add memory allocation methods to the code that defines the variables for size of the matrices
- Define arrays for each matrix and allocate required memory
- Write **do/for** loop(s) to initialize the matrix arrays with some numbers, you could use random number generators.
- Write loops to find the min and max array values.

Distribute the arrays across a one-dimensional processor network with MPI.

- Assume a three deep ghost region between processors.
- Compute the min – max array values in the individual memory spaces and gather them into the global min-max values.
- Add OpenMP to the MPI code and document runtime improvements and results accuracy.
- Use the Linux time command to document entire job runtime.
- Use the Linux timer command to document performance as the array size scales to large numbers – gigabytes of memory.
- Be careful in using reduction operators like: min and max.
- Compare performance of your parallel program with a single processor program.
- Do a scaling and algorithm complexity study of these programs.