

DESIGN REPORT

The given problem for 2D convolution has been approached as specified in the problem. First the 2 input files are read and stored in matrices. The 2 matrices are individually used to do N, N-point 1D FFT both row-wise and column-wise.

Then point-wise multiplication is done between A and B to get the matrix C. Matrix C is then used to do N, N-point 1D FFT both row-wise and column-wise.

Later, the output matrix is obtained by doing inverse FFT. The output matrix is then stored in separate files that can be viewed using “cat” command.

The number of processors that are used to run the programs can be specified in the command line. However, the command line statement itself is stored in the bash file at the last. So, to change the number of processors required to run the program, the integer parameter after “-np” in the command can be changed.

For example, to run the MPI Send and Recv program with 4 processors, the following command is to be added in the last line of its bash file sendrecvBash.sh.

ibrun -np 4 ./MPIsendAndRecv

Thus, we can modify the number of processors by following the above instruction.

The steps involved in the program logic is pretty straightforward. As mentioned above, the steps given in the question were followed.

However, there is a step given in the question that asks us to compute the FFT for the matrices both row-wise and column-wise. This can be done in 2 ways – **(1)** First row-wise FFT is done, then change the iteration order to get the columns before rows to perform column-wise FFT, otherwise, **(2)** Once row-wise FFT is done, we can take a transpose of the matrix and then perform the same kind of iteration. But since we are working on the transpose matrix the 2nd time, we’ll be performing column-wise FFT now. The 2nd option seemed to be better and it looked clean and neat. So, I’ve followed the 2nd method to do column-wise FFT.

LIMITATION:

1. The input files have to be uploaded on to Comet, in the home directory/project.
2. The files should be of names “im1” and “im2. Otherwise, the file pointers have to be changed in this program.
3. Output file names will be mentioned on the screen via standard output.