Goethe-University
Frankfurt am Main

Lab Parallelization · Summer Semester 2017

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Assignment 4

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Shear Sort on 2D Mesh

Shear Sort works in rounds on 2-dimensional meshes of p = n x n processes. The sorting algorithm consists of odd-even transposition sort in row and column sorting phases.

a) In row sorting phase, each row is sorted so that even numbered rows have the largest number to right, and odd numbered rows have the largest number to the left.

b) In column sorting phase, each column is sorted so that the smallest numbers appearing at the top of columns.

After max $2 * \lceil \log_2 n \rceil + 1$ phases the array is sorted in a snakeline order.

Implement the algorithm by using a 2-d topology, which can be created using `MPI_Cart_create()`, and create a 1-d topology for rows and columns by using `MPI_Cart_sub()`.

Each proccess generates m random numbers, where m is specified by the user during runtime. First sort the random numbers locally using quicksort. Then sort all data using Shear Sort.