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NPTEL (https://swayam.gov.in/explorer?ncCode=NPTEL) » GPU Architectures and Programming (course)

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Due on 2020-02-28, 23:59 IST

Given a 2D matrix of floating point numbers implement a kernel which will perform the following operations in sequence.

1. Swap elements at even and odd positions of each row in a matrix.
2. Reflect the values of the matrix across the principal diagonal i.e. A[j][i]=A[i][j] where i is not equal to j.

Note, during launching only a single block of CUDA threads will be launched. Implement a CUDA program which takes as input i) the number of test cases ii) for each input case, the number of rows (m) and number of columns (n) of the matrix iii) the elements of the matrix and performs the above two operations to generate the resultant output matrix B. Refer to the following input output specification.

1
4 4
1.0 2.0 3.0 4.0
5.0 6.0 7.0 8.0
9.0 10.0 11.0 12.0
13.0 14.0 15.0 16.0

Output
2.0 6.0 10.0 14.0
1.0 5.0 9.0 15.0
4.0 8.0 12.0 16.0
3.0 7.0 11.0 15.0

For the given example, the input matrix after operation 1 becomes the following intermediate matrix.

2.0 1.0 4.0 3.0
6.0 5.0 8.0 7.0
10.0 9.0 12.0 11.0
14.0 14.0 16.0 15.0

For each row, consider each successive pair of elements (A[i],A[j]) and swap them. For the first row, 1.0 and 2.0 are swapped, and similarly 3.0 and 4.0 are swapped. Once this operation has finished, perform the reflection operation to yield the final output matrix. Note, the m x n output matrix needs to be printed
as m lines of space separated values of floating point numbers.

Please upload the completed CUDA code in **.cu file.**

Your Submission:

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.