Université de Pau et des Pays de l'Adour
Département de Mathématiques
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M2-BigData : GPGPU
Chapter 3 – Exercice 3

Objective

The purpose is to implement an image blurring on GPU. We use a 3x3 box filter to blur the input image according to the following formula :

$$C_{i,j} = \frac{1}{3^2} \sum_{k=-1}^{1} \sum_{l=-1}^{1} C_{i+k,j+l}$$

where $C_{i,j}$ is the value of the channel C of the image at row i and column j.

Instructions

Edit the given code to perform the following :
— allocate device memory
— copy host memory to device
— initialize thread block and kernel grid dimensions
— invoke CUDA kernel
— copy results from device to host
— deallocate device memory
The program (and then, the kernel) must be able to handle gray and RGB images.

Questions

1. How many floating operations are being performed in your blurring kernel ? EXPLAIN.
2. How many global memory reads are being performed by your kernel ? EXPLAIN.
3. How many global memory writes are being performed by your kernel ? EXPLAIN.
4. What could you intent to do in order to have a stronger blur effect ? Try in your kernel, and compare the results.