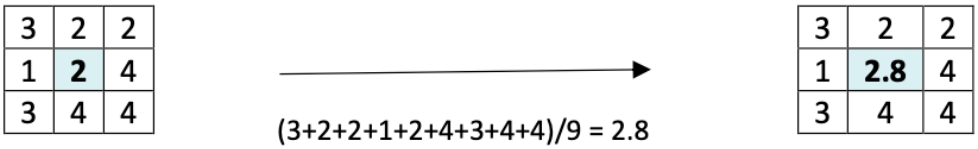
COMPUTAÇÃO DE ALTO DESEMPENHO

2022/2023

Lab 03

1. Consider a matrix of values and the operation that produces a new matrix were each element is the average with its neighbors of the original matrix. Example:



If the matrix represents the pixels of an image, applying this operation can be an implementation of a smoothing filter, which reduces some of image noise and detail. A simple sequential implementation is provided in lab3.zip with some example images in PPM ascii format.

a) Implement a new version using CUDA (or OpenCL) for optimization of the hotspot section(s).

b) Improve your version using block's shared memory.

Bibliography:

[1] Nvidia CUDA Programming Guide:
`https://docs.nvidia.com/cuda/cuda-c-programming-guide/`

[2] Nvidia CUDA Runtime API:
`https://docs.nvidia.com/cuda/cuda-runtime-api/`

[3] OpenCL Guide, Khronos Group:
`https://github.com/KhronosGroup/OpenCL-Guide`

[4] OpenCL API Specification (v3.0), Khronos Group:
`https://www.khronos.org/registry/OpenCL/specs/3.0-unified/html/OpenCL_API.html`