CMP641 SOFTWARE DEVELOPMENT FOR PARALLEL COMPUTERS

TERM PROJECT

2021-2022 Fall

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Problem:

You are expected to design and implement parallel algorithms for a made-up image processing problem. The algorithm shall be implemented using MPI, OpenMP or CUDA technologies (Intel i7 / i9 / Xeon / Xeon Scalable, AMD FX / A10 / A8 or the NVIDIA graphics processor). The algorithm to be performed on an image file with a 16-bit grayscale value for each pixel is described below.

Fig. 1 depicts the calculations to be carried out in order to calculate the output image file. For every possible 5×5 A matrix, AA^T will be calculated and the result will be added to the corresponding location (denoted by C) in the output image.

a) At least two separate parallelization methods (using the same programming paradigm) shall be used to solve the problem. Speedup values and differences in performances of those methods will be justified in the report.

b) The project may be carried out by a team of two persons. In this case, two different programming paradigms shall be selected, each person shall select one paradigm.

c) Design reports and source codes shall be submitted.

d) The assignments will be sent to kayhan.imre@gmail.com until January 9, 2022.

e) Those who cannot make due to force majeure will be given an E grade if they contact me before the submission date, then the new submission date will be set as January 23, 2022.

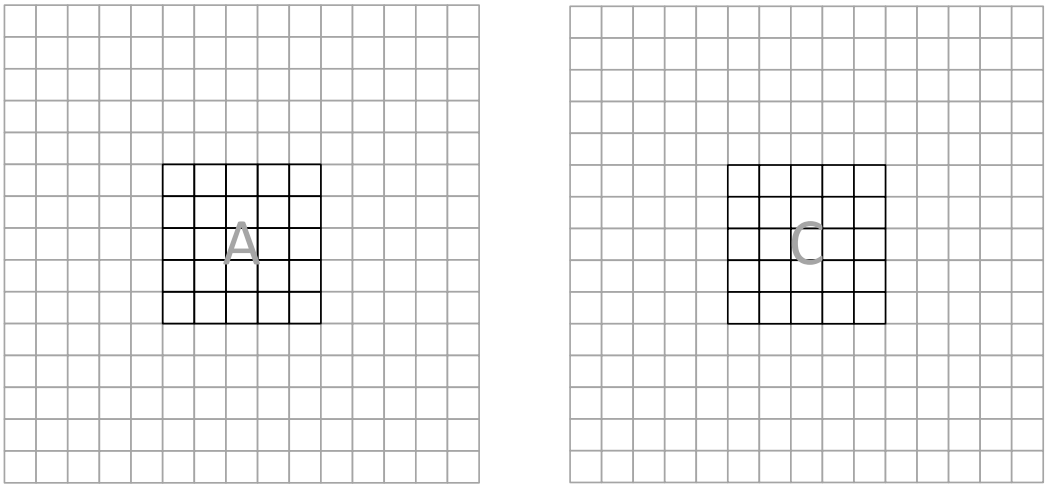

Fig. 1 Matrix calculations