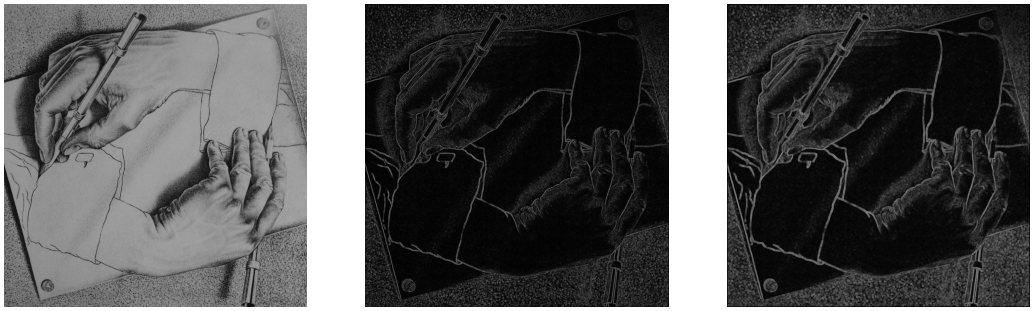
Lab 8
Microprocessor Architectures [ELEC-H-473]
SIMD 2: morphological image filtering

v1.0.0

Description of the lab

This lab will focus on non-linear filtering algorithms that allows you to extract the contour of objects in an image or smooth imperfections.

Please refer to the course slides for an explanation about those filters.



(a) Reference image (b) 3x3 (c) 5x5

Figure 1: Min/max filtering with different bouding box sizes.

Assignment

1. Implement the min/max filtering (contour extraction) in C. Use at least a 3x3 bounding box. You can extend it to 5x5 and 7x7 as a bonus.
2. Implement the same algorithm in SIMD.
3. Benchmark both solutions and compare their performance.

Code requirements

- Send only your source files, *i.e.* .c/.h/.cpp/.hpp. Do *not* send the input and output files.
- If your code requires specific configuration flags for the compilation, please write them down as comments in your code.
- Make sure it's well documented.
- All the input and output files should be in the source directory.
- All the output files should have the same base name as the source files on the UV (ie. Escher, kid or lena_gray), appended with "out_C.raw" or "out_SIMD.raw".
- Do not use any weird library that may not compile on a Linux-based computer.