**COMPUTER ARCHITECTURE PROJECT**

**PL-I 4-D**

**Assignment of the Teamwork**

The project was divided among the three members of the teamwork as follows:

* Phase 2.2.1, corresponding to the SIMD program was assigned to Martín and Adrián
* Phase 2.2.2, corresponding to the multi-threaded program was assigned to Hugo
* Regarding phase 2.1, corresponding to the single-threaded program, Martín single-handedly did it without any of the other members questioning it.

**Algorithm**

The algorithm of the program is explained in the documentation of the three programs that will be sent together with this report.

**Screenshots**

A statue in a city

Description automatically generatedA statue in a city

Description automatically generatedBoth the original and filtered image are shown here:

Then, using the application diffImages, we compare the images generated by the single-threaded program and both the SIMD and multi-threaded programs.

* Single-threaded and SIMD

A statue in a city

Description automatically generated

* Single-threaded and multi-threaded

A statue in a city

Description automatically generated

**Response time and Standard deviation**

This data has been calculated in an excel sheet that will be sent together with this report.

**Results**

After measuring the times, we reach the conclusion that the multi-threaded program is faster than the single-threaded program. This is not the case for the SIMD program, as the set of operations to be performed in our algorithm does not benefit from SIMD instructions, something that does not happen in the multi-threaded program, which instead, splits the tasks into several threads allowing for the development of different parts of the program in parallel, reducing the overall time it takes for the program to process the image.

These particularities of our algorithm made the analysis of performance a bit more challenging to complete. Be ware that the typical situation would be to get a performance improvement when executing the SIMD implementation against the single threaded.