CPU vs. GPU Performance Report

All tests done on a machine with these specifications:

CPU	Intel Core i7
GPU	NVIDIA GeForce GTX 960M
RAM	16 GB

First Test – Matrix Multiplication:

All measures below are the *execution time* in *micro seconds*.

- Matrix 4x4:

CPU	GPU (without Shared Memory)	GPU (with Shared Memory)
5	194234	206331

- Matrix 1024x1024

CPU	GPU (without Shared Memory)	GPU (with Shared Memory)
1878834	414851	218700

The previous tests showed that:

- With small matrices CPU performance is better than GPU because of the cost of transferring the data from main memory to GPU's memory which consumes a lot of time.
- With large matrices GPU performance is better than CPU as threading in GPU's can hide the memory latency, so that the benefit of parallelism in the large number of cores in the GPU becomes obvious, and GPU's performance becomes better with the use of shared memory.

Second Test – Prewitt Filter:

All measures below are the *execution time* in *micro seconds*.

- Image size 384x480:

CPU	GPU (without Shared Memory)	GPU (with Shared Memory)
4164	412621.67	509924.25

- Image size 1024x1024:

CPU	GPU (without Shared Memory)	GPU (with Shared Memory)
21512	339458	305187