**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 |