
Parallel Visual Computing

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Introduction

Winter 2012/13

Ivo Ihrke, Tobias Ritschel, Mario Fritz

Coordinates

- Where: room 0.01, building E1.7
- When: Thursdays, 2-4pm
- Mailinglist: parallelvc@mpi-inf.mpg.de
(not sure sending from outside is allowed)
- Webpage:
http://www.mpi-inf.mpg.de/departments/d4/teaching/ws201213/gpu_computing
- Forum:
<http://parallelvc.freeforums.org>

Coordinates

▪ Lecturers

- Ivo Ihrke, office R.1.07 in E1.7 (MMCI)
- Tobias Ritschel, office R 115F1, E1.4 (MPI)
 - Mondays and Thursdays
- Mario Fritz, office R 629, E 1.4 (MPI)

Reminder

- If you have not done so already, please send
 - name
 - matriculation number
 - study program
 - email address

to Ivo Ihrke (ihrke@mmci.uni-saarland.de)

Course Format

- Teams of two
- Two-week cycle
 - Lecture
 - Assignment
 - Discussion / Documentation of results / Improvement
- End of course: competition: pimp my code
 - Suggestions for slow programs welcome!

Evaluation

- 70% of grade: points for assignments
 - Each assignment 20 points
 - There will be more points than necessary, you can pick
 - Must be able to explain solution and optimization choices
 - Must demonstrate performance / accuracy
- 30% of grade: participation in discussion
- Competition will **not** be part of your grade

Competition

- In the spirit of sportsmanship
- Try to find the best solution
- Learn from each other
- Winner will receive a prize and honorable mention ;)

Outline

■ Topics

- Single-instruction, multiple-data (SIMD) – Ivo
- Multi-core (CPU) – Mario
- Fine-grained parallelism (GPU) – Ivo
- Prefix scan, sorting, MIP maps (GPU) – Tobias
- GPU vision applications: Classifiers – Mario
- Advanced Screen Space Shading - Tobias

History and Background

Hardware and Software Requirements

Hardware

- CPU – at least dual core
- GPU – CUDA capable GPU (Nvidia)
 - <http://developer.nvidia.com/cuda/cuda-gpus>

Hardware and Software Requirements

Software

- Win:
 - Visual Studio 2010
 - Cygwin (need Visual Studio compiler for CUDA), other topics are ok with gcc
- Linux:
 - gcc
- Also need: nasm, CUDA, OpenGL, glut

Setting up your computer

- `How_to_set_up.txt`

The software framework

- Download from course webpage
- First assignment:
 - Get code compiled for your architecture
 - Optimize `tut1b.cpp`

Resources

- History

<http://en.wikipedia.org/wiki/Vectrex>

<http://en.wikipedia.org/wiki/Simd>

<http://en.wikipedia.org/wiki/Multi-core>

<http://en.wikipedia.org/wiki/GPU>

- Programming Platforms

http://en.wikipedia.org/wiki/Microsoft_Visual_Studio

<http://www.cygwin.com/>

- Program Profiling

http://en.wikipedia.org/wiki/Profiling_%28computer_programming%29

For Visual Studio you need apparently a “Premium” edition for this feature