Prof. G. Zachmann
D. Mohr

University of Bremen
School of Computer Science
CGVR Group
April 17, 2013

Summer Semester 2013

# Assignment on Massively Parallel Algorithms - Sheet 1

Due Date 24. 04. 2013

*Hint:* You can use one of the examples on the lecture homepage or from the Cuda SDK ( included in the Cuda installation package ) to test if Cuda works at all on your computer. For example, you can run the example `1_Utilities/deviceQuery`.

## Exercise 1 (CUDA basics: Memory, *3 Punkte*)

In the framework `cudaMallocAndMemcpy`

a) Allocate two arrays `d_a` and `d_b` on the device of the same size as the array `h_a` on the host. You can use `sizeof(datatype)` to get the number of bytes for `datatype`.

b) Copy `h_a` on the host to `d_a` on the device.

c) Do a device to device copy from `d_a` to `d_b`.

d) Copy `d_b` on the device back to `h_a` on the host.

e) Free `d_a` and `d_b` on the device.

## Exercise 2 (CUDA basics: Launching kernels, *3 Punkte*)

Starting from the framework `myFirstKernel`

a) Allocate device memory for array `d_a` to hold the results of the kernel.
Overall `numBlocks`×`numThreadsPerBlock` threads will be launched, and each thread writes to one array element.

b) Configure and launch the kernel `myFirstKernel( int *d_a )` using a 1D grid of 1D thread blocks.

c) Have each thread set an element of `d_a` as follows:
```
idx = blockIdx.x*blockDim.x + threadIdx.x
d_a[idx] = (blockIdx.x - 6) * (100 - threadIdx.x)
```

d) Copy the result in `d_a` back to the host memory to array `h_a`.

e) Free the device array `d_a`

f) Cuda kernels cannot return a value. What could be the reason for this?