5.	Fachgebiet Architektur eingebetteter Systeme **Multicore Systems**	WS14/15

Assignment start: 19.01.2015 Submission deadline: 09.02.2015

Assignment 5 - GPU and CUDA 2 — 65 Points

In this assignment a GPU Password Cracker should be developed. A list of MD5 hashes of short four lower case letter only passwords is provided and your program should brute force through all possible passwords to map the hashes back to the passwords. No salt is used. A CPU version of the password cracker is provided as md5.c.

- Parallelize the password cracker using CUDA.
  - Allocate memory on the GPU for the hashes and found passwords.
  - Implement a kernel, where each threads calculates the hash of a password and compares it to all provided hashes.
  - If a match was found, store the match in the GPU DRAM in an appropriate data structure.
  - Call the kernel
  - Transfer the results back and output all found passwords on the standard output
- Test your kernel using 3 letter passwords for shorter runtimes.
- Analyze the performance using GPGPU-SIM
  - The simulated GPU runs at 700 Mhz, calculate runtime and compare to CPU version.
- Report the results and explain the design of your kernel(half a page), focus on design decisions relevant to performance
- Also submit the source code of your CUDA password cracker
- Try to beat my unoptimized implementation (662623 cycles for all 4-letter lower-case-only passwords)
- **OPTIONAL:** If you have access to a real GPU try breaking the provided 6-letter passwords.