High Productivity Programming Meets High Performance Execution

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High Productivity Meets High Performance

**The Problem: Multi-/Many-Cores rule the world:**

- Different numbers of cores
- Different styles of cores
- Complex cache hierarchies
- General-purpose graphics cards
- Other accelerators: Xeon Phi
- Heterogeneous combinations of all the above
- Large variety of possible systems
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What does that mean for software?

- All applications must become parallel
- Parallel programming tools geared to high performance computing experts
- Hard to use, error-prone, low productivity
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Research questions:

- How can we make programming today’s systems easier for the average programmer?
- How can we make programming today’s systems more productive for the above average programmer?
- How can we still get reasonable performance by aggressive compilation?
Single Assignment C and S-Net

**SAC — Single Assignment C:**
- Purely functional array programming language
- Very high-level programmin style
- All resource management implicit
- Aggressively optimising large-scale compiler
- Automatic parallelisation for ....
- Check out: www.sac-home.org

**S-Net:**
- Data flow coordination language
- Promotes almost normal functions to asynchronous components
- Arrangement of components into streaming network
- Adaptive runtime system maps computations to cores
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More information:

- Lecture in *Programming Concurrent Systems*
- Friday, December 12, 15–17, Science Park, B0.209
- Contact me: c.grelck@uva.nl
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Concrete projects:
- You name it!!
- I have ideas!!
- Depends on your prior knowledge!!
- Depends on your concrete interests!!

Prerequisites:
- Good programming skills, in particular C
- Parallel programming, depending on project
- Enthusiasm!!

Publications? YES, please!!

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