

Selected Topics in C++

Proseminar

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Contents

This *Proseminar* serves as an introduction to academic research. For the given topic participants are required to

- find and read related material giving an overview of the field,
- set the research agenda, e.g. by focussing on a subtopic, and write and defend a corresponding research proposal,
- conduct in-depth research into the chosen (sub)topic,
- author a manuscript to be published,
- present the manuscript to the audience.

The following topics shall be covered:

1. metaprogramming
2. expression templates
3. lambda functions

4. move semantics
5. thread parallelism in C++
6. C++ and OpenMP
7. C++ and MPI
8. C++ and CUDA
9. Boost library
10. Qt library
11. design patterns

Approach

During the first meeting on **February 12, 2016** at 09:15 in room **2.31** of the ITC building all participants are assigned their topic. Following the first meeting literature and online research is required to produce a written **research proposal** to be submitted by **April 10, 2016**. The proposal needs to be accompanied by a signed **Declaration of Compliance** with the *Ethical Guidelines for the Authoring of Academic Work*. It is defended during a 15 minute oral presentation on **dates to be specified**. Each participant produces a written report (10-15 pages) covering both theoretical and practical (algorithms, applications, reference implementation) aspects of the topic. The reports need to be submitted by **July 3, 2016**. A 30 minute final oral presentations is scheduled for **July 8, 2016** at 10:00 in room **2.31**.

Regular individual meetings throughout the semester **can be requested** by the participants.

Proposal and its Presentation (MOTIVATE)

Your written proposal's aim is to get first and early feedback on your research plan. It serves as the starting point for the final report. Its oral presentation is supposed to **MOTIVATE** the planned work. Imagine that your next semester's salary depends on the quality of this presentation.

Specific Hints

1. Use the provided L^AT_EX frame as the basis of your 2-3 pages written proposal covering
 - problem description
 - state of the art and literature survey

- work plan including milestones, deliverables, and risk management (in case the amount of work was misestimated)
2. Stay within the allocated 15 minutes.
 3. Use the provided L^AT_EX frame for slides.

Final Presentation (SELL)

SELL your final report. Your report is a publication. Publications are supposed to be read by other people. You need to generate interest in your work if you want it to become a *best seller*.

1. Provide an overview of your report's contents.
2. Summarize problems, theoretical results, and algorithmic solutions.
3. Discuss the state of the art and provide examples for relevant applications and ongoing related R&D projects.
4. Give an outlook to potential follow-up projects.
5. Use the provided L^AT_EX frame for slides.
6. Stay within the allocated 30 minutes.

Report (PUBLISH)

1. Give a detailed description of the problem.
2. Present a survey of the problem's history and present activities including literature about the problem, applications, and methods for its solution as well as related software. You should provide an *extensive bibliography*. Your research proposal should be based on this literature research phase.
3. Discuss the selected subtopics in detail. Use *self-made examples* for illustration.
4. Develop three *tutorial exercises* covering different aspects of your topic. Present the *solutions* in the appendix of your report.

General Guidelines

1. Stay within the allocated time frame.
2. Have extra material available in case you finish early.
3. Practice your presentation.

4. Never copy and paste.
5. Design your own examples.
6. Use a spell checker.
7. Check the hardware prior to your presentation.

Literature Research

The Computer Science library runs a compulsory introduction to literature research in the Computer Science department's library on date to be determined. You should sign up for the tour during the seminar's kick-off meeting.