Generic programming and library development

Description:

The purpose of this course is to provide a deep understanding of the C++ programming language and its standard library. Advanced programming techniques are described, and it is shown how these techniques are used in modern library development.

Course team:

- Kenny Erleben `<kenny@diku.dk>`
- Knud Henriksen `<kaiip@diku.dk>`
- Jyrki Katajainen `<jyrki@diku.dk>` (course coordinator)

Course home page:

`http://www.diku.dk/forskning/performance-engineering/Generic-programming/`

Generic programming

The term **generic programming** has been used in at least four different but related meanings.

1. Programming with *generic parameters*
2. Programming by abstracting from concrete types
3. Programming with parametrized components
4. Programming method based on finding the most abstract representation of efficient algorithms

[Vandevoorde and Josuttis 2003, §14.5]

Course elements

Cycle: Lecture-Assignment-Discussion-Reading

Lectures: on Tuesdays, 8 in all

Assignments: given on Tuesdays; deadline Friday morning

Discussion sessions: on Fridays, 7 in all

Reading:

David Vandevoorde and Nicolai M. Josuttis, *C++ Templates: The Complete Guide*, Addison-Wesley (2003)

Björn Karlsson, *Beyond the C++ Standard Library: An Introduction to Boost*, Addison-Wesley (2005)

Mini-project: deadline 23 June 2006 at 9.15

Oral exam: on week 26

Grading

Group/class participation: 10%

Assignments: 10%

Presentation: 20%

Mini-project: 30%

Oral exam: 30%

Grading is based on the normal 13-scale.

Lectures

Time: every Tuesday on weeks 17–24

Place: here

Contents: We follow the textbooks quite closely; a detailed plan is available at ISIS.

Keywords: template basics, advanced programming techniques, metaprogramming, smart pointers, tuples, function objects, constraint polymorphism, generic algorithms

Assignments

Handouts: accessible via ISIS

Deadline: Friday morning (not *St. Bededag*)

Group size: 1-3 people

Answer length: 2-4 pages

Answer format: LaTeX `DIKU-article` style available via the CPH STL home page `http://www.cphstl.dk/WWW/tools.html`

Handing in: electronically via ISIS

No late assignments, please!

Discussion sessions

Time: every Friday except *St. Bededag* (also after *Kristi himmelfartsdag*)

Place: here

Presenters: 2–3 groups present their results of the assignment

Opponents: 2–3 other groups comment the presentations

16th June: dedicated to mini-projects and course evaluation

Mini-project

Handout: accessible via ISIS

Problem formulation: a preliminary version is available already now (see CPH STL report **2005-1**)

Supporting code: will be made available at the beginning of June

Group size: 1-3 people

Answer length: about 12 pages

Answer format: LaTeX `DIKU-article` style available via the CPH STL home page `http://www.cphstl.dk/WWW/tools.html`

Handing in: electronically via ISIS by 23 June 2006 at 9.15

Exam

Time: week 26

Place: *nordfløjen*

Form: individual, oral, 30 minutes, no preparation (internal examiners)

Pensum: mini-project and the material covered by the lectures