C++

Presentation

Course information

- Lectures:
  - Monday - 4th period - M5
  - Lecturer:
    - Name: Pierre-Alain Fayolle (fayolle@u-aizu.ac.jp)
    - Office: Computer Graphics Laboratory, 323-C
- Exercises:
  - Monday - 5th period - std3 and std4
  - Instructors:
    - std3: Konstantin Markov (markov@u-aizu.ac.jp)
    - std4: Pierre-Alain Fayolle (fayolle@u-aizu.ac.jp)
- 14 lectures / 14 labs
- 1 final exam

Course information

- Grading:
  - Presence to lectures and labs and quizzes: 5%
  - Exercises: 50%
  - Exam: 45%
- Keywords: C++, Object Oriented Programming (OOP), Generic Programming, Standard Library

Course policy

- Academic honesty:
  - Students are expected to act maturely. Students are responsible for their actions.
  - Cheating on exams is strictly forbidden.
  - During exercises and homework, students can help each other through hints and explanations. Copying code from somebody else is strictly forbidden.

Course policy

- Absence to the exam is equivalent to no grade.
- Solution to the exercises are collected before the start of the next exercise class.
- Exercises submitted late won't be accepted unless the student has a proper justification.

Course Plan

- Lecture 1 – Introduction, Separate compilation
- Lecture 2 – Data abstraction and classes, static members
- Lecture 3 – Pointers, References
- Lecture 4 – Const correctness, Definition and declaration
- Lecture 5 – Overloading, Constructors and assignment operator
- Lecture 6 – Destructors, order of construction / destruction; Inheritance: introduction
- Lecture 7 – Inheritance access control, substitution principle
- Lecture 8 – Inheritance: virtual functions, overriding vs overloading, Abstract Base Classes
- Lecture 9 – Inheritance: public, private and protected inheritance Exceptions
- Lecture 10 – Operator overloading Introduction to generic programming
- Lecture 11 – Function and class templates, Standard library: Container classes design
- Lecture 12 – Standard library: Standard containers
- Lecture 13 – Standard library: Function pointers and function objects Standard library: iterators
- Lecture 14 – Standard library: algorithms

References: books

- *The C++ programming language*, B. Stroustrup
- *Accelerated C++*, A. Koenig and B. Moo
- Other very good books:
  - *C++ coding standards: 101 rules, guidelines and best practices,* H. Sutter and A. Alexandrescu
  - *Effective C++* and *More Effective C++*, S. Meyers
  - *Effective STL*, S. Meyers
  - *Design Patterns*, E. Gamma, R. Helm, R. Johnson, and J. Vlissides

References: web pages

- Course web-site: http://www.u-aizu.ac.jp/~fayolle/teaching/2011/C++/index.html
- C++ reference: http://www.cppreference.com/wiki/start
  - Note 1: it also includes some documentation on the standard library
  - Note 2: there is a Japanese translation of this site
- The STL documentation: http://www.sgi.com/tech/stl/