C++
Course Overview

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COURSE OVERVIEW

- OO, Classes, inheritance, polymorphism
- Operator overloading
- Pointers & References – dynamic memory management
- Standard Template Library
  - Containers: arrary, vector, list, deque, (multi) set, (multi)map
  - Adapters: stack, queue, priority_queue, bitset
  - Algorithms: sort, binary_search, accumulate
- Exceptions
- Function pointers & function objects
- Templates
- C++ 11
  - Smart pointers
  - Lambda expressions
  - Multi-threading
- Design Patterns

SOME INTERESTING SOFTWARE ENGINEERING TOPICS COVERED (1/2)

- Avoid double initialisaton in constructors by using member initializers
- Either the prefix or postfix increment can be used. Use the prefix form for *performance* reasons because it does not create a temporary object.
- Use *explicit* constructors and conversion operators
- Use const whenever possible
- If a class has virtual functions, always provide a virtual destructor
- Polymorphisms and dynamic casts

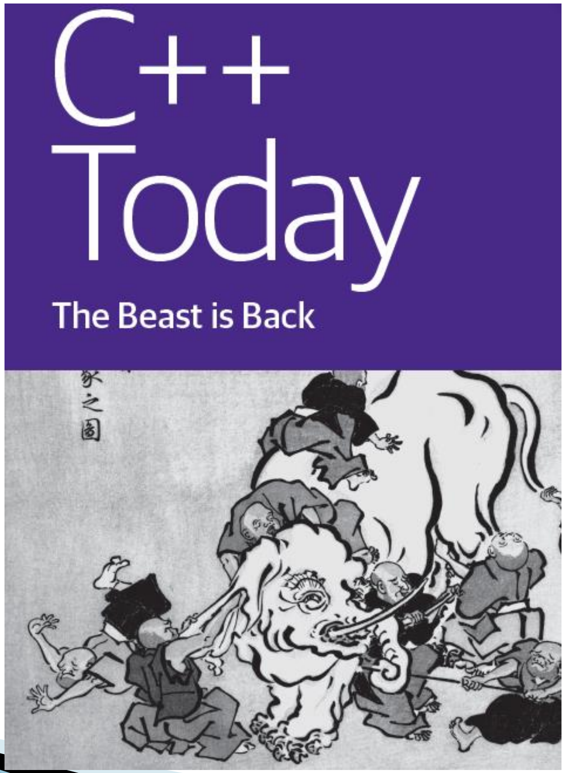
SOME INTERESTING SOFTWARE ENGINEERING TOPICS COVERED (2/2)

- Manipulating containers with iterators is convenient and provides tremendous expressive power when combined with Standard Library algorithms—in some cases, reducing many lines of code to a single statement
- When an object is inserted into a container, a *copy* of the object is made. For this reason, the object type should provide a *copy constructor* and *copy assignment operator* (custom or default versions, depending on whether the class uses dynamic memory).
- Prefer function objects over function pointers for STL algorithms

Quotes etc.

- C makes it easy to shoot yourself in the foot; C++ makes it harder, but when you do it blows your whole leg off.

-- Bjarne Stroustrup (2007)–



-- Jon Kalb & Gašper Ažman (2015) --

Who am I ?

ir. Johan Decorte (www.gorat.be)

burgerlijk ir. computerwetenschappen (M. Sc. in Eng., KUL, '86)

Software Developer	Siemens
Technical architect	Barco
Project Manager-Analyst	Attentia Sociaal Secretariaat
IT (development) manager	Agfa Healthcare

Since 2011:

- lecturer IT at University College Ghent
- freelance trainer C++, data analytics, ai, business analysis, IT&Project management
- juridical dispute resolution (*gerechtsdeskundige)* in ICT cases

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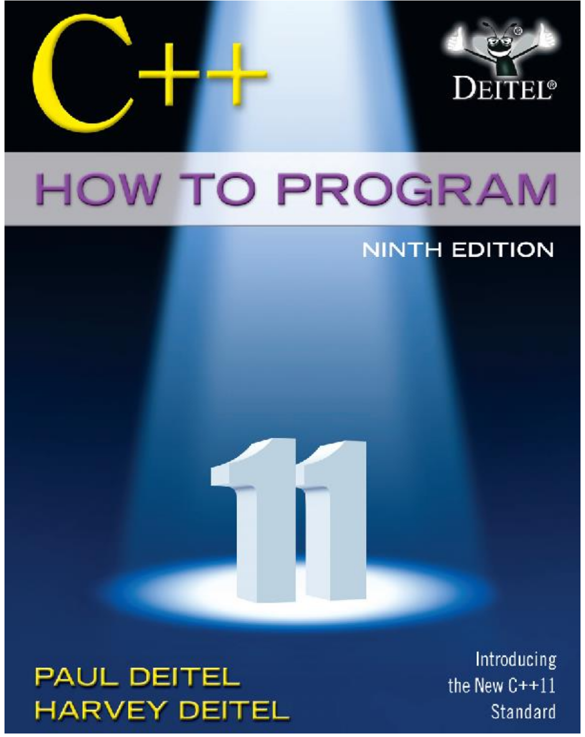
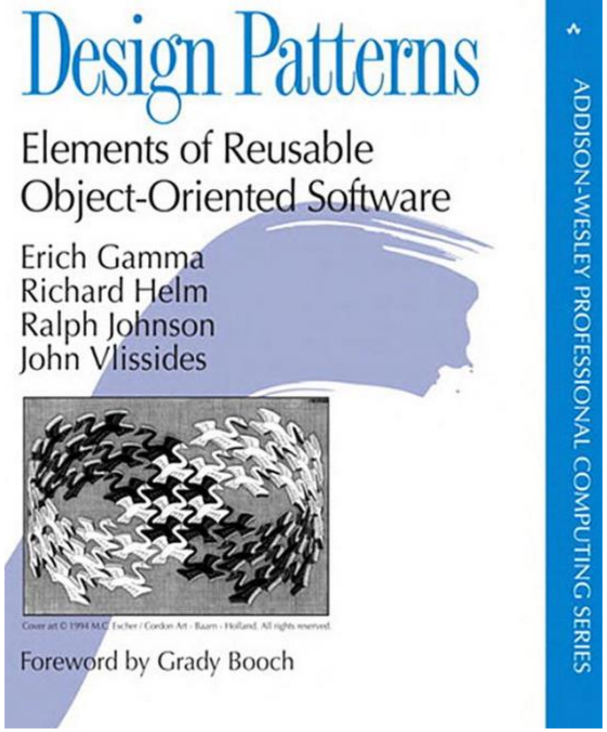
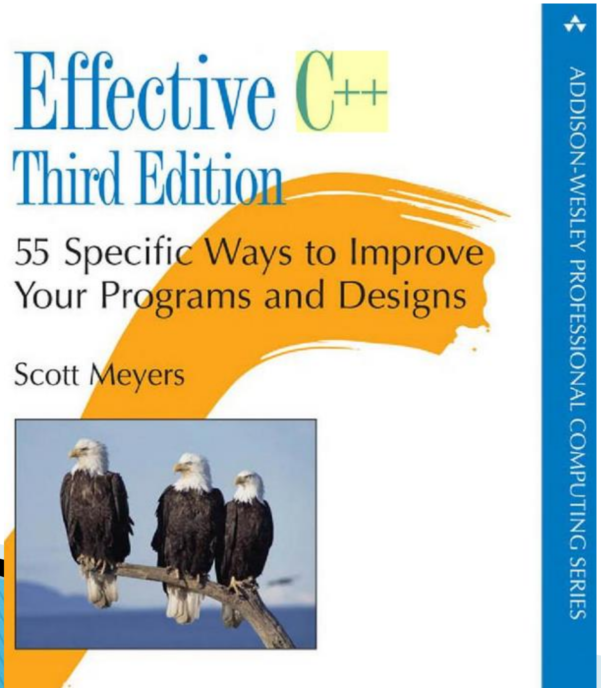
BOOKS


C++
DEITEL®
HOW TO PROGRAM
NINTH EDITION
11
PAUL DEITEL
HARVEY DEITEL
Introducing the New C++11 Standard


Design Patterns
Elements of Reusable Object-Oriented Software
Erich Gamma
Richard Helm
Ralph Johnson
John Vlissides
Foreword by Grady Booch
ADDISON-WESLEY PROFESSIONAL COMPUTING SERIES


Effective C++
Third Edition
55 Specific Ways to Improve Your Programs and Designs
Scott Meyers
ADDISON-WESLEY PROFESSIONAL COMPUTING SERIES

Your Brain on Design Patterns
Head First
Design Patterns
Avoid those embarrassing coupling mistakes
Learn why everything your friends know about Factory pattern is probably wrong
Discover the secrets of the Patterns Guru
Load the patterns that matter straight into your brain
Find out how Starbuzz Coffee doubled their stock price with the Decorator pattern
See why Jim's love life improved when he cut down his inheritance
O'REILLY®
Eric Freeman & Elisabeth Freeman
with Kathy Sierra & Bert Bates

ONLINE INFORMATION RESOURCES

- Course materials: https://github.com/jdecorte/cpp

- www.cplusplus.com
- www.cppreference.com
- www.stroustrup.com
- http://web.stanford.edu/class/cs106l/course-reader/ (course at Stanford University)
- en.wikibooks.org/wiki/C++_Programming/Code/Design_Patterns
- http://becpp.org/blog/ (Belgian C++ user group)

- twitter:
  - **Standard C++** (@isocpp)
  - **Visual C++** (@visualc)
  - **Meeting C++ (@meetingcpp)**