Short Course on

High-Performance Programming in Java: Collections and Beyond

http://www.cs.brown.edu/cgc/javacourse/

January 21-22, 1999
Department of Computer Science
Brown University

March 18-19, 1999
Department of Computer Science
The Johns Hopkins University

Course Program

Object-Oriented Design of Data Structures and Algorithms
- abstract data types and Java interfaces
- overview of object-oriented design patterns
- algorithms as objects
- algorithmic design patterns
- the algorithms layer
- benefits of algorithms and data structures libraries

The Java Collections Framework
- limitations of the java.util package in JDK 1.1
- collections and maps
- iterators and comparators
- general-purpose and wrapper implementations
- abstract implementations
- polymorphic algorithms
- exceptions
- interoperability

Using the Java Collection Classes
- elementary data manipulation
- searching
- sorting
- developing custom implementations

Beyond the Java Collections Framework
- limitations of the Collections framework
- JGL™: The Generic Collection Library for Java
- JDSL: The Data Structures Library for Java
- new design patterns for data access: Position, Locator, and Decoration
- position-based and key-based containers

Sequences and Trees
- nodes and positions
- array-based and link-based implementations
- an improved Vector class

Priority Queues and Dictionaries
- keys, items, and locators
- heaps
- hash tables
- red-black trees
- skip-lists

Graphs and Networks
- decorations
- graph traversals
- shortest paths and minimum spanning trees

Overview

In this practical, hands-on course, students will learn new techniques for rapidly developing high-performance software in Java. The recently introduced Java Collections Framework and related Java class libraries provide general-purpose algorithms and data structures that can be used to build an "algorithms layer" in an object-oriented design. These libraries have important benefits such as:
- Correct and efficient solutions to problems that are usually difficult and expensive to implement.
- Improved program readability through standard interfaces.
- Tailored implementations by selecting among classes that satisfy the same interface.

This course teaches how to take advantage of these powerful class libraries to develop efficient and robust solutions to complex problems. A number of sophisticated and practical algorithms and data structures are presented.

The first part of the course focuses on the Java Collections Framework, one of the new features of the JDK 1.2. The second part covers more advanced data-structuring techniques that extend the functionality of the Java Collections Framework.

The course includes lectures and lab sessions, where students will develop a variety of applications. A certificate of completion of the course will be issued.

The course is sponsored by the Center for Geometric Computing at Brown University and Johns Hopkins University, and by Algomagic Technologies, Inc..

The intended audience is software developers, engineers, and scientists interested in writing more efficient Java applications. A working knowledge of the Java programming language is assumed.

Instructors

Robert F. Cohen
President, Algomagic Technologies, Inc.

Michael T. Goodrich
Professor of Computer Science, Johns Hopkins University

Roberto Tamassia
Professor of Computer Science, Brown University

The instructors are international experts in algorithms, data structures, and software engineering. Cohen has extensive experience in teaching professional software development courses in the U.S. and internationally. Goodrich and Tamassia are authors of the highly acclaimed book: *Data Structures and Algorithms in Java*.

Registration Form

Short Course on

High-Performance Programming in Java: Collections and Beyond

January 21-22, 1999, Department of Computer Science, Brown University

Name (first/middle/last)	
Affiliation/Address	
Email	
Phone/Fax	
Amount Enclosed	

Location:
Department of Computer Science
Brown University
115 Waterman Street
Providence, RI 02912-1910

Dates and Time: January 21-22, 1999, 9 am - 5 pm

Fees: The course fee includes class notes, the book *Data Structures and Algorithms in Java* by Goodrich and Tamassia (Wiley, 1998), lunches, and coffee breaks. Reduced fees are available for companies that are members of the Industrial Partners Program of the Computer Science Department at Brown University, for academic institutions, and for government organizations. Discounts for multiple participants from the same institution can be arranged.

	Before 12/31/98	After 12/31/98
General	$695	$745
IPP Partner	$575	$625
Academic/Government	$275	$325

Cancellations and Refunds: The organizers reserve the right to cancel the course by January 5, 1999 if an insufficient number of registrations is received. In this case, a full refund of the course fee will be made. The course fee minus a service charge will be refunded in case of cancellations by participants. Depending on when the cancellation notification is received, the service charge will be as follows: $50 (by December 31, 1998), $150 (by January 15, 1999), $250 (after January 15, 1999).

Further Information: see the course Web page `http://www.cs.brown.edu/cgc/javacourse/`

Mail this form with a check for the amount of the course fee (payable to Brown University) to:

Fran Palazzo
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