

# BACK to BASICS

## Software Development

*A Value Seminar*

# Algorithms Unleashed!

**When:** May 9, 2009  
**Where:** MIT Tang Center, Cambridge, MA  
**Cost:** \$275 through April 14  
\$315 after April 14  
\$375 day of conference

## Speaker



**George Heineman**  
George T. Heineman is an Associate Professor of Computer Science at WPI.

## Who Should Attend

This seminar is designed for software practitioners, programmers, and designers. It is best suited to moderately experienced programmers. You should already know how to program in at least one language. You should know about the essential computer science data structures. You will learn some advanced data structures and some novel ways to apply standard data structures to improve the efficiency of algorithms. Your problem solving abilities will improve when you see the key decisions for each algorithm that make for efficient solutions.

## Why Algorithms?

Your code works. *But it has to run 10X faster.* What do you do?

It is well known that the choice of key algorithms can change the performance of an application by a factor of two, ten – even a hundred or more! Now - *what does this mean to you?*

Programmers often don't see the connection between a "faintly understood" algorithm they remember seeing once in an undergraduate class and a specific programming problem they are facing.

George Heineman addresses this in his book *Algorithms in a Nutshell*, which is the foundation of this seminar. One of the goals of the book was to present algorithms to practitioners using their language. Towards this end the book includes six chapters with full code solutions available for free download. George notes "I was pleasantly surprised when the book was done to see that we had about 80,000 lines of commented code in Java, C, and C++ to support the book. Plus nearly 300 JUnit test cases to ensure over 90% coverage of the Java code."

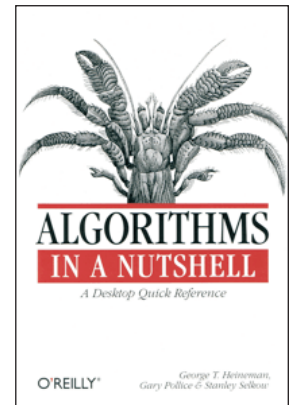
George Heineman will present 30+ algorithms, each in an appropriate context to help your understanding. For example, there is no "Best" sorting algorithm – but, if you know specific information about your data being sorted, then specific algorithms should be used because of a designed "sweet spot".

Each section is motivated by a family of problems to be solved. Based on the problem, specific techniques are appropriate, and can be clearly presented. The tutorials focus on "just enough mathematics" (as the book does) to ensure that the information remains accessible. The goal is to show how specific algorithms provide encode optimal solutions to specific problems you are likely to face. We will describe the algorithms in the language that you are using (Java/C++, etc...) rather than present the more traditional theoretic introduction. A closely related goal is to reinforce that the practitioner must devise appropriate test cases to validate the algorithms within the context where they are used.

***Details and registration: [www.gbcacm.org](http://www.gbcacm.org)***

*This seminar is a joint production of the Greater Boston Chapter of the ACM and the Boston Chapter of the IEEE Computer Society.*

## Featured Book



This seminar is based on the new book "Algorithms in a Nutshell" by Heineman, Pollice and Selkow.

## **Principle: Separate the Algorithm from the Problem**

It is hard to show the implementation for an algorithm "in the general sense" without also involving details of the specific solution.

In this seminar, we separate the generic algorithm from the specific problem. Multiple programming languages will be used, following a strict design methodology to ensure that the code is readable and the solutions are efficient. Coding in this way produces software that is easy to test, maintain, and expand.