Genericity in Object-Oriented Programming Languages

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Genericity is one of the most powerful means for obtaining flexibility in programming with statically typed programming languages. Genericity constructs take on very different forms, the choice of which has a considerable impact on expressiveness, modularity, static checkability and efficiency properties of programs. This tutorial presents an in-depth discussion of the history, origins, and structure of a wide range of genericity mechanisms, enabling the participant to better understand the rational behind various programming language designs and to utilize available mechanisms more efficiently. The tutorial is organized as follows: the general concept of genericity is introduced by means of examples, and an overall framework for understanding and classifying the variety of genericity mechanisms is presented. Hereafter the major programming languages and mechanisms are treated in context of this framework. These include C++ templates, Eiffel's parameterised classes, F-bounded polymorphism and BETA's virtual class patterns. Special attention will be given to the last 5 years' research in adding genericity to the Java Programming Language. We will use a small number of continuing examples to illustrate the strengths and weaknesses of the different approaches, and towards the end we present a large complex example of programming using genericity mechanisms.

**Audience**

The tutorial is aimed at system developers as well as people in academics with basic knowledge of object-oriented programming languages. No prior experience with genericity constructs is necessary.

**Benefits**

- get an in-depth understanding of genericity mechanisms
- make informed comparisons and choices between generic languages
- fully utilize your available genericity constructs

**Kresten Krab Thorup** is Chief Scientist at Eastfork Object Space (EOS), a Danish Java software company. Kresten has worked with programming language design and implementation since 1993 when he joined NeXT, and later through his Ph.D. studies at the University of Aarhus. Recently, Kresten has been a member of the OOPSLA'2000 Program Committee, and of the Java Community Process expert group for "Adding Genericity to the Java Programming Language". Presentation experience: Kresten has authored or co-authored 2 conference papers, taught numerous OO courses and given a number of talks on genericity issues.

**Mads Torgersen** is working full time as a lecturer at the University of Aarhus, currently teaching the introductory OO class in the computer science department, and a graduate-level class on advanced OO technology. Since 1993 Mads has been associated with the Beta
language group at the University of Aarhus. Mads expects to finish his Ph.D. work on
generic OO type systems by the summer of 2001. Presentation experience: Mads has
authored or co-authored 2 conference papers, taught numerous OO courses and given a
number of talks on genericity issues.