

Seminar

Speaker: Dr. Therapon Skotiniotis
Title: Modular Adaptive Programming
Date: Tuesday February 14, 2012
Time: 10:00 am.
Place: EV3.309

ABSTRACT

Adaptive Programming (AP) provides advanced code modularization for traversal related concerns in object-oriented programs. Computation in AP programs consists of (i) a graph-based model of a program's class hierarchy, (ii) a navigation specification, called a strategy, and (iii) a visitor class with specialized methods executed before and after traversing objects. Despite the benefits of AP there are also limitations; hardcoded name dependencies between strategies and the class hierarchy as well as non-modular adaptive code (strategies and visitors). These limitations hamper adaptive code reuse and make composition and extension of adaptive code difficult

To address these limitations we define "What You See Is What You Get" (WYSIWYG) strategies, constraints and Demeter Interfaces. WYSIWYG strategies guarantee the order of strategy nodes in selected paths simplifying the semantics of strategies and leading to more predictable behavior. Constraints provide a new mechanism that allows programmers to define invariants on the graph-based model of a program's hierarchy thereby making programmer's assumptions explicit and verifiable at compile time. Finally, Demeter Interfaces provide (i) an interface between the program's class hierarchy and both strategies and visitors, (ii) statically verifiable constraints on the structure of a class hierarchy that implements a Demeter interface and (iii) the ability to parametrize adaptive code.

We further show that our results can be applied to other technologies that share similar properties -- traversals of graph like structures using selector languages-- as Adaptive Programs, such as, XML processing, and discuss new future directions made possible because of the advantages introduced by Demeter Interfaces to AP.

Bio:

After receiving a B.Sc. in Joint Mathematics and Computer Science at Imperial College, I joined the Illinois Institute of Technology (IIT) where I started on a PhD in Computer Science under the supervision of Dr. Morris Chang with a focus on memory management systems for the JVM. In 2001, after receiving my masters from IIT, I moved to Northeastern University where I completed my PhD in Computer Science under the supervision of Dr. Karl Lieberherr with a focus in Software Engineering and Programming Languages. For the past three years I have been working as a Software Developer Engineer at Amazon where I have been involved in the design, implementation, and, maintenance of an internally developed web framework and web services used by multiple teams to develop web sites and distributed business applications.