

Training Materials for Language Design

Pacific Software Research Center
March 28, 2000

CONTRACT NO. F19628-96-C-0161
CDRL SEQUENCE NO. [CDRL 0002.29]

Prepared for:
USAF
Electronic Systems Center/AVK

Prepared for:
Pacific Software Research Center
Oregon Graduate Institute of Science and Technology
PO Box 91000
Portland, OR 97291

Domain specific languages (DSLs) have been proposed as a medium to capture the similarities and differences that occur in a family of software products. They are a mechanism for the representation, optimization, and analysis of such families.

Among the benefits to using domain specific languages is user-relevance. A significant advantage is gained by expressing application concepts in a language designed around those concepts. DSL designs are also user-modifiable. User-specified changes can be incorporated into fielded systems without compromising the integrity of the whole system. A DSL design of a component remains directly connected to the executing code. And last, DSLs provide a language with which design ideas can be communicated, and design principles taught.

A barrier to the widespread adoption of domain specific languages is the ability to systematically design, develop, and implement domain-specific languages. Good domain specific languages are mathematically-sound and are computer-readable. In 1998, Tim Sheard designed and taught a class about Domain Specific Languages to introduce students to the techniques used to design sound, and useable DSLs. It teaches the abstraction techniques used to make such designs easy to modify and evolve, and the implementation techniques used to embed such designs into an underlying system.

In winter quarter 2000, Tim redesigned the course and taught it again calling on new material from his own research and selected papers from the DSL workshop held in

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conjunction with POPL, on January 18, 1997, the Usenix Conference on Domain Specific Languages, held on October 15-17 1997, and the Usenix Domain Specific Language Conference held on October 3-5 1999 in Austin Texas.

The class was structured around student led discussions of the literature, lectures by the instructor, and projects where each student designed and implemented their own Domain Specific Language.

A record of the course was captured by building and maintaining a web page with all the notes, lectures, and student presentations. The page can be found at <http://www.cse.ogi.edu/~sheard/cse583W2000/index.html>

Pacific Software Research Center
Department of Computer Science and Engineering
(503) 690-1151
Internet: pacsoft@cse.ogi.edu
World Wide Web: <http://www.cse.ogi.edu/PacSoft/>

Cover: The chart on the cover tracks the problem severity factor (PSF) of each of PacSoft's program transformation tools during the software development cycle. Low PSFs indicate that detected defects in the software have been fixed. This chart was constructed by Alexei Kotov, a graduate student for the Pacific Software Research Center.



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P.O. Box 91000
Portland, OR 97291-1000