

## Roles of Variables in Teaching

*Juha Sorva, Ville Karavirta, and Ari Korhonen*  
*Department of Computer Science and Engineering*  
*Helsinki University of Technology, Espoo, Finland*

[Jsorva@cs.hut.fi](mailto:Jsorva@cs.hut.fi) [vkaravir@cs.hut.fi](mailto:vkaravir@cs.hut.fi) [archie@cs.hut.fi](mailto:archie@cs.hut.fi)

### Abstract

Expert programmers possess schemas, abstractions of concrete experiences, which help them solve programming problems. Stereotypes of variable use in computer programs can be characterized using *roles of variables*, which can be taught to novices in order to support schema formation. This paper describes the 'lightweight' adoption of roles of variables in our teaching of introductory programming. We discuss the changes made to our courses, our experiences with this process, and some preliminary results of how our students took to roles of variables. Roles provided us with a new way to improve our teaching materials and methods. They are easily linked to code and to pseudocode designs, and we found them easy to use both as a documentative tool and for the stepwise refinement of programs. Our results indicate that more than a very 'lightweight' introduction of roles is needed in order for students to adopt them into active use.

**Keywords:** roles of variables, teaching, CS1, CS2, lightweight introduction.

*Full version of this paper has been fast-tracked for publication in the Journal of IT Education*