Structure of Programming Languages I: Denotational Semantics

Assignments

Wolfgang Schreiner
Wolfgang.Schreiner@risc.uni-linz.ac.at
http://www.risc.uni-linz.ac.at/people/schreine
Research Institute for Symbolic Computation (RISC-Linz)
Johannes Kepler University, Linz, Austria

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Please return the completed results by February 1. Put them in an envelope, address it to me, and put it into some university mail box. If there are problems, feel free to contact me per email. Do not forget to denote your name, Matrikelnummer and Studienkennzahl (SKZ).

1. Design a programming language for performing character string manipulations. The language should support fundamental operations for pattern matching and string manipulation and possess assignment and control structure constructs for imperative programming. Define the corresponding semantic algebras, abstract syntax, and valuation functions.

2. Take the imperative language whose denotational semantics was defined in "Imperative Languages I" and prove that for every expression E, identifier I, and store s the following holds:

$$\mathbf{E}[[\ [\mathrm{E'/I}]\mathrm{E}\ ]]s = \mathbf{E}[[\mathrm{E}]](\mathit{update}\ [[\mathrm{I}]]\ \mathbf{E}[[\mathrm{E'}]]s\ s)$$