
Static Program Analysis

<http://proglang.informatik.uni-freiburg.de/teaching/programanalysis/2014ss/>

Exercise Sheet 2

08.05.2014

Exercise 1 (Constraint based analysis: Control flow analysis)

Consider the following program written in a functional language:

$$[[\text{fn } z \Rightarrow [z]^1]^2 \quad [\text{fn } y \Rightarrow [y]^3]^4]^5$$

1. What is the result of evaluating this expression?
2. Specify a constraint system for the program, i.e. for each label l specify $C(l)$, and for each variable x , specify $R(x)$ as on the slides (p. 45 ff.).
3. Can you give a solution for the constraint system? Is it a least solution?

Exercise 2 (Types)

1. Provide simple typing rules for the following syntactical constructs that could be part of the fun language on the slides.

$$\text{a) } \frac{\dots}{\Gamma \vdash e_1 + e_2 :}$$

$$\text{b) } \frac{\dots}{\Gamma \vdash \text{if } e_1 \text{ then } e_2 \text{ else } e_3 :}$$

2. Extend the typing rules such that function application effects are considered (cf. slides on p. 92 ff.).

Submission In PDF format via email to geffken@informatik.uni-freiburg.de. Please name your single file with the scheme: **ex02-name.pdf**, respectively.

- Deadline: **15.05.2014, 12:00**
- Late submissions will not be marked.
- Do not forget to write your name on the exercise sheet.