



Programming Languages 2

Homework 4 – WS 18

Tübingen, 15. November 2018

In order to be admitted to the exam, you have to successfully submit your homework every week, except for 2 weeks. A successful submission is one where you get at least 1 point.

Handin Please submit this homework until Thursday, November 22, either via email to Philipp Schuster (philipp.schuster@uni-tuebingen.de) before 12:00, or on paper at the beginning of the lab.

Groups You can work in groups of up to 2 people. Please include the names and Matrikelnummern of all group members in your submission.

Points For each of the Tasks you get between 0 and 2 points for a total of 6 points. You get:
1 point, if your submission shows that you tried to solve the task.
2 points, if your submission is mostly correct.

Task 1: Free variables

Implement the algorithm that finds the set of free variables in a lambda term in a language of your choice. This topic is covered in lecture Programming Languages 1. Examples for how to represent lambda terms in C++ and Coq are on the website.

Task 2: Capture avoiding substitution

Implement capture avoiding substitution for lambda terms in a language of your choice. This topic is covered in lecture Programming Languages 1. Examples for how to represent lambda terms in C++ and Coq are on the website.

Task 3: Alpha equivalence

Implement an algorithm that tests if two lambda terms are alpha equivalent in a language of your choice. This might turn out to be pretty difficult. Examples for how to represent lambda terms in C++ and Coq are on the website.