Programming Paradigms 2022
Session 7 : Re-visiting previous topics and An applied λ-calculus

Preparing for the session

Hans Hüttel

25 October 2022

Where nothing else is mentioned, chapters and page numbers refer to *Programming in Haskell*.

The video podcast

You can watch the podcast on YouTube via the course page on Moodle.

Tuesday 25 October 2022 – Re-visiting previous topics and An applied λ-calculus

The texts are

- Chapter 9 of *Programming in Haskell* and
- *An applied λ-calculus in one page*

Learning goals for the session

We will spend most of the session re-visiting topics from the first six sessions on Haskell but will also spend a bit of time on the λ-calculus. For this topic, the learning goals are

- To understand the syntax of the applied λ-calculus
- To understand and to be able to use the reduction rules of the applied λ-calculus

How you should prepare before we meet on Tuesday

Before we meet, watch the podcast and read the text. You can do this in any order you like. Also see if you can solve the following two small discussion problems. We will talk about them in class.

1. Use the applied λ-calculus to define a recursive function (using `letrec`) that finds the sum of the first n natural numbers (that is, the sum $1 + \cdots + n$).
2. Find the formation rules that describe the syntax of expressions in the applied λ-calculus in the one-page note for today.

   Define a datatype `LExp` in Haskell that describes these formation rules. It is not interesting what constants we have; simply assume that they are strings.

What happens on Tuesday?

When we meet, students that have been contacted by me who will present the solutions to the small discussion problems above.

Problems for Tuesday

For the plenary session we will solve and discuss a collection of problems that can be found on a separate page, available on the day of the session.