Programming Paradigms 2022
Session 11 : Monads

Preparing for the session

Hans Hüttel

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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 21 November 2023 – Monads

Please read

- Section 12.3 of *Programming in Haskell*.

Learning goals for the session

- To understand the Maybe monad
- To understand the definition of a monad
- To understand the *bind* operator (>>=) and how it can be expressed using do notation
- To understand the definition of the List monad
- To understand the definition of the State monad and how it can be used in programming with state

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. Define a function

   ```
   tuple :: Monad m => m a -> m b -> m (a, b)
   ```

   using explicit (>>=) and then again, now using do-notation. What does the function do in the case, where the monad is Maybe?

2. What is the expression (that uses (>>=) that is equivalent to the following do block? (You will have to look up the definition of (>>=))

   ```
   do y <- z
      s y
      return (f y)
   ```

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.