Programming Paradigms 2025
Session 5 : Recursion

Preparing for the session

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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 7 October 2025 – Recursion

The text is Chapter 6 of *Programming in Haskell*.

Learning goals for the session

- To understand the structure of a recursive function definition
- To be able to read and write recursive function definitions on lists
- To be able to read and write recursion definitions that make use of multiple recursion or mutual recursion
- To be able to write recursive function definitions in a structured fashion

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 the function `replicate` using recursion – and *use pattern matching* in your solution. This function takes an integer n and and an element x and gives us a list with n elements where x has been repeated exactly n times. As an example, `replicate 3 5` should give us `[5,5,5]`. What should the type of `replicate` be?

2. Define the function `improve` using recursion – and *use pattern matching* in your solution. It takes a list xs and, if xs contains at least two elements, it gives us a list where every other element has been removed.

   As an example, `improve [1,2,3,4,5,6,7]` should give us `[1,3,5,7]`. What should the type of `improve` be?