

Towards a Modular Program Derivation via Fusion and Tupling

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Abstract

We show how programming pearls can be systematically derived via fusion, followed by tupling transformations. By focusing on the elimination of intermediate data structures (fusion) followed by the elimination of redundant calls (tupling), we systematically realise both space and time efficient algorithms from naive specifications. We illustrate our approach using a well-known maximum segment sum (MSS) problem, and a less-known maximum segment product (MSP) problem. While the two problems share similar specifications, their optimised codes are significantly different. This divergence in the transformed codes do not pose any difficulty. By relying on modular techniques, we are able to systematically reuse both code and transformation in our derivation.

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