

Abstract

An Annotated Type System for Inlining

LEI MA^{1,a)} HIROYUKI SATO¹

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Function inlining is a fundamental optimization that replaces an invocation with the body of the callee, thus the overhead associated with calling and returning can be eliminated. Moreover, additional opportunities for further optimizations can also be created at the same time. In general, although the essential idea of function inlining is very simple, its impacts and the opportunities for further optimizations are complex, hence the strategies used in function inlining are usually expected to be highly effective, which becomes a significant challenge in program optimization. In this presentation, we propose an annotated type system to formalize the impacts of function inlining, to characterize the opportunities for further optimizations after function inlining. Our type annotations for function definitions can explicitly reveal suitable conditions for function inlining. And our annotated type system can provide accurate information on binding time and the opportunities for further optimizations. We have also demonstrated our annotated type system through two case studies to show its effectiveness.

¹ Department of Electrical Engineering and Information Systems, The University of Tokyo, Bunkyo, Tokyo 113-8656, Japan

^{a)} malei@satolab.itc.u-tokyo.ac.jp