

Register allocation and assignment

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Abstract

A register allocation and assignment is a process done by almost all compilers, and correct register allocation can help speedup generated code and fully utilize processor's resources. Unfortunately, this process is not that easy to solve and most techniques are NP-complete.

This short lecture explains what a register allocation and assignment are. The focus is on a local and global allocation and specifically at top-down and bottom-up approaches. For these techniques, some examples and algorithms are shown. Since live ranges and register spills play a big role in a register allocation, this topic is shortly discussed as well. This lecture also has a deeper look at one of the main register allocation technique – graph coloring. At the very end, some advanced techniques are mentioned.