Software pipelining

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Abstract

Main goal of this presentation is to enlighten listener in approaches of acceleration of computer programs. One the approaches is a software pipelining and this presentation will focus on basics and main ideas of this topic. The first part of presentation contains some examples of applications of software pipelining. One of them is so called do-all loops, which are very attractive from a parallelization perspective due to no data dependency. We will also look at do-across loops, which are more complicated from practical point of view, because they share data between consecutive iterations. This part will also focus on some constraints of software pipelining, such as proper resource allocations and data dependency in general. The second part of the presentation goes through the basics of software pipelining algorithm. It covers important part of software pipelining - scheduling that is needed due to data dependencies. From this point of view, this section focuses on an acyclic and a cyclic data-dependency graph. After this advanced part of presentation we will go through some lighter topics like examples how to improve software pipelining (predictions in conditional statements) and support for software pipelining from hardware part.