

## Multithreaded Programming in Cilk

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Cilk is a multithreaded programming language aimed at making parallel programming a seamless extension of commodity serial computing. Cilk minimally extends the C programming language to allow interactions among computational threads to be specified in a simple and high-level fashion. Cilk's provably efficient runtime system dynamically maps a user's program onto available physical resources, freeing the programmer from concerns of communication protocols and load balancing. In addition, Cilk provides an abstract performance model that a programmer can use to predict the multiprocessor performance of an application from its execution on a single processor. Cilk programs not only scale up to run efficiently on multiple processors, they also 'scale down': the efficiency of a Cilk program on one processor rivals that of a comparable C program.

In this talk, I will provide a tutorial on the Cilk language for people with a basic background in computer programming. I will explain how to program multithreaded applications in Cilk and how to analyze their performance. I will illustrate some of the ideas behind Cilk using the example of MIT's championship computer-chess programs, \*Socrates and Cilkchess. I will also briefly sketch how the software technology underlying Cilk actually works.