FDA125 Advanced Parallel Programming February 2007

Exercises for Topic VII (Parallel Language Concepts) Cilk

Exercise VII.1

Consider the Cilk program of the lecture and sketch the multithreaded computation DAG that results from executing FIB(5). Assume that all threads in the computation execute in unit time. What is the work of the computation? What is the critical path length? Show how to schedule the DAG on 2 processors in a greedy fashion by labeling each thread with the time step on which it executes.

Exercise VII.2

Write a Cilk procedure SUM(A), where $A[1...n]$ is an array, which uses divide and conquer to sum the elements of A in parallel.

Exercise VII.3

Prove that a greedy scheduler achieves the stronger bound

$$T_p \leq (T_1 - T_\infty)/p + T_\infty$$