1.4 Lecture Summary

1 Task-level Parallelism

1.4 Multiprocessor Scheduling, Parallel Speedup

Lecture Summary: In this lecture, we studied the possible executions of a Computation Graph (CG) on an idealized parallel machine with *P* processors. It is idealized because all processors are assumed to be identical, and the execution time of a node is assumed to be fixed, regardless of which processor it executes on. A *legal schedule* is one that obeys the dependence constraints in the CG, such that for every directed edge (*A, B*), the schedule guarantees that step *B* is only scheduled after step *A* completes. Unless otherwise specified, we will restrict our attention in this course to schedules that have no *unforced idleness,* i.e., schedules in which a processor is not permitted to be idle if a CG node is available to be scheduled on it. Such schedules are also referred to as "greedy" schedules.

We defined T_P as the execution time of a CG on *P* processors, and observed that

$T_\infty \leq T_P \leq T_1$

We also saw examples for which there could be different values of T_P for different schedules of the same CG on *P* processors.

We then defined the parallel speedup for a given schedule of a CG on *P* processors as *Speedup(P)* = T_1 / T_P, and observed that *Speedup(P)* must be ≤ the number of processors *P*, and also ≤ the ideal parallelism, WORK/SPAN.

Mark as completed