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Project Proposal for Distributed Computing over the Internet

Background

Rayon [1] is an open-source data parallelism library for the programming language Rust. It supports parallel iterators, which execute iterator-like chains in parallel. And also supports join method that takes two closures and runs them in parallel. Rayon uses work stealing [2] technique to distribute work to workers.

Motivation

Besides the original work stealing technique, there are complementary algorithms to coordinate thread tempo: workpath-sensitive tempo control, workload-sensitive tempo control, and other optimizations of working stealing scheduling [3].

Expected Result

--- Studying the concurrent model of Rust.

--- Optimizing work scheduling method of Rayon.

--- Analyzing fairness of different scheduling methods.

References

[1] https://github.com/nikomatsakis/rayon

[2] Blumofe, Robert D., and Charles E. Leiserson. "Scheduling multithreaded computations by work stealing." *Journal of the ACM (JACM)* 46.5 (1999): 720-748.

[3] Ribic, Haris, and Yu David Liu. "Energy-efficient work-stealing language runtimes." *ACM SIGARCH Computer Architecture News*. Vol. 42. No. 1. ACM, 2014.