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Summary

My project attempts to use Haskell's parallelism to improve the speed of Bellman-Ford algorithm in detecting arbitrage opportunities on the foreign exchange market. By detecting negative cycles in the currency graph, Bellman-Ford algorithm is able to detect arbitrage opportunities. The project will use bid-ask price data up to milliseconds of 53 currency pairs.

Approach

First, the csv data will be read by a Haskell program into an adjacency matrix representation of the currency graph. Second, a Haskell program will run the parallelized Bellman-Ford algorithm to find any negative cycles in the graph. There are two resources that have the potential of being parallelized: (1) the search for shortest paths, which can be independently performed for all the nodes, and (2) the search for shortest paths beginning in a fixed node.

Details

I will experiment with parallelizing to different depths to find the optimal granularity, use threadscope to analyze the runtime profile, find a balance between the number of cores and granularity, etc.