PARALLEL INSERT, COMBINE, AND LEVEL TRAVERSE IN BST

Our Project

We want to speed up the BST operations Insert, Combine and Level Traversal using parallelism

What did we do?

We used Futures, Threads and Synchronization to write multiple functions in scala and compare their performances

Benchmark Test Result

= Minimum time for that number of input

InsertAll	Number of Input			
	2^5	2^10	2^15	2^20
Seq	0.008	0.022	6.07	>10 mins
Par	0.112	0.019	0.947	498

Combine	Number of Input			
	2^5	2^10	2^15	2^20
Seq	2.88E-04	0.021	2.15	> 10 mins
Par	0.041	0.011	0.11	1.99

Level Traversing	Number of Input			
	2^5	2^10	2^15	2^20
Seq	0.0018	0.005	0.023	0.060
Thread	0.007	0.138	15.4	>10 mins
ThreadSync	0.006	0.134	16.2	>10 mins
Future	0.004	0.001	0.010	0.060
FutureSync	0.0024	0.002	0.002	0.010

Level	Number of Input			
	2^5	2^10	2^15	2^20
Seq	6.96E-04	8.86E-04	0.004	0.070
Thread	6.01E-03	0.133	18.7	>10 mins
ThreadSync	5.63E-03	0.132	18.1	>10 mins
Future	0.002	2.21E-04	0.017	0.029
FutureSync	5.51E-05	4.98E-06	6.14E-06	1.40E-04

As we have studied in class, the parallelism is not free so when the number of input is low then the sequential version could be a better option. Moreover, the combination of technique and data structure also have effect on the time that function takes so we have to pick the one that is the most suitable for the tasks.

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