A. For my design I included a reentrant lock field for each component. In ParBoruvka, I added nthreads as an argument to computeBoruvka and created a loop to start a loop for each thread. Each thread basically does the sequential code on a component, checking with trylock so each component only has one thread operating on it. Then at the end all threads are joined back together.
B. I believe that my implementation is correct because the locks prevent any component from being accessed by two threads at the same time. This prevents a data race and each connected component is able to grow currently until the mst has been found.
C. When !tryLock() evaluates to true that iteration of the while loop is skipped so tryLock will be called again and each thread will either be working on a component or making calls to tryLock until it can access the right component. This process ends when there are no more nodes in nodesLoaded.
D. There is no livelock because once each thread is able to access a component it will be added to nodesLoaded and progress will be made. There is no situation where a thread does not call loopNode.merge after getting past tryLock.

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 T E S T S
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Running edu.rice.comp322.BoruvkaCorrectnessTest
Testing parallel minimum spanning tree construction on src/main/resources/boruvka/USA-road-d.NY.gr.gz
Testing parallel minimum spanning tree construction on src/main/resources/boruvka/USA-road-d.BAY.gr.gz
Testing parallel minimum spanning tree construction on src/main/resources/boruvka/USA-road-d.COL.gr.gz
Tests run: 3, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 6.394 sec - in edu.rice.comp322.BoruvkaCorrectnessTest
Running edu.rice.comp322.BoruvkaPerformanceTest

HABANERO-AUTOGRADER-PERF-TEST 2T edu.rice.comp322.BoruvkaPerformanceTest.testInputUSAroadNE 2419 1546

HABANERO-AUTOGRADER-PERF-TEST 4T edu.rice.comp322.BoruvkaPerformanceTest.testInputUSAroadNE 2419 1073

HABANERO-AUTOGRADER-PERF-TEST 8T edu.rice.comp322.BoruvkaPerformanceTest.testInputUSAroadNE 2419 943

HABANERO-AUTOGRADER-PERF-TEST 16T edu.rice.comp322.BoruvkaPerformanceTest.testInputUSAroadNE 2419 1100

HABANERO-AUTOGRADER-PERF-TEST 32T edu.rice.comp322.BoruvkaPerformanceTest.testInputUSAroadNE 2419 944
=== For dataset src/main/resources/boruvka/USA-road-d.NE.gr.gz ===
Single-threaded test ran in 2419 ms, 0.6138900372054568x faster than sequential (1485 ms)
2 threaded test ran in 1546 ms, 1.5646830530401035x faster than single-threaded (2419 ms)
4 threaded test ran in 1073 ms, 2.2544268406337373x faster than single-threaded (2419 ms)
8 threaded test ran in 943 ms, 2.5652173913043477x faster than single-threaded (2419 ms)
16 threaded test ran in 1100 ms, 2.199090909090909x faster than single-threaded (2419 ms)
32 threaded test ran in 944 ms, 2.5625x faster than single-threaded (2419 ms)

Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 238.715 sec - in edu.rice.comp322.BoruvkaPerformanceTest

Results :

Tests run: 4, Failures: 0, Errors: 0, Skipped: 0

[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 04:11 min
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