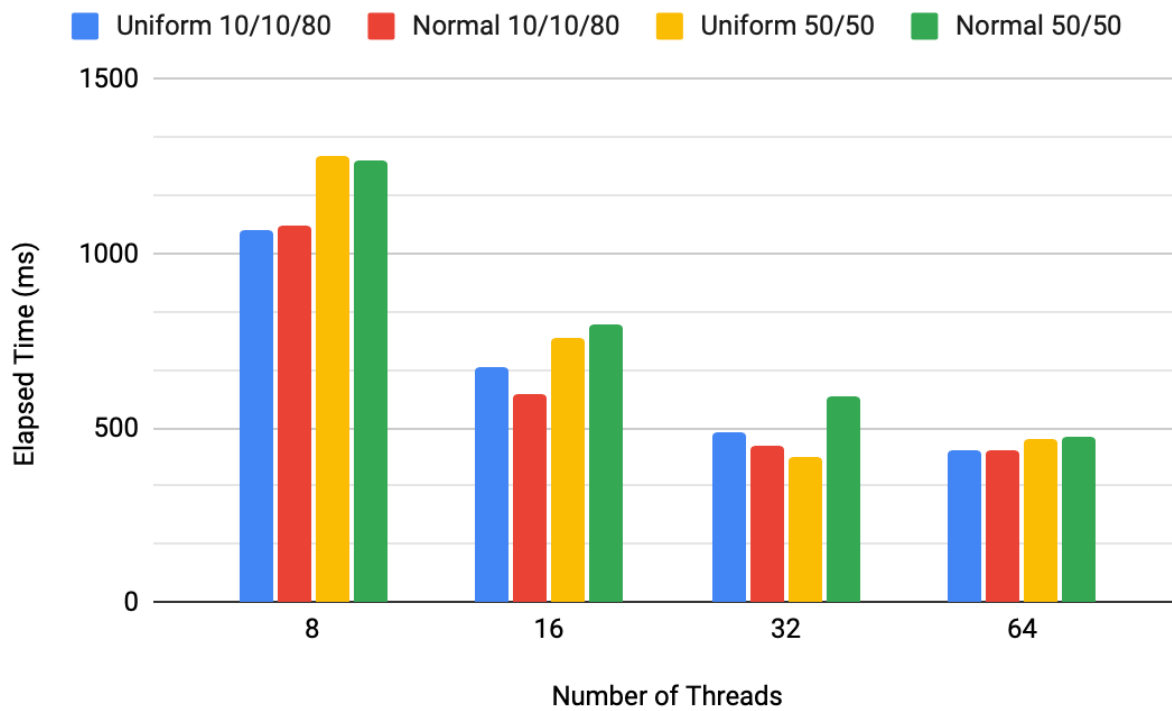


Lab 3, Lock-Free Concurrent Skip-List

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2. Measuring Execution Time

The following diagram portrays the average runtime for each configuration of lock-free concurrent skip list on Dardel. All configurations benefit from a quicker runtime as the number of threads increases. The experiments with 50% add and 50% remove are typically slightly slower than its counterpart whose operation consists of 10% add, 10% remove, and 80% remove. However, in practice, this difference may hardly be significant.



3.1 Locked time sampling

To get an idea of the global lock's effect on the execution time, repeat some of the measurements from Task 2 and compare. Do you observe a noticeable effect as the number of threads increases? If so, how do you explain this?

Answer. We have repeated the experiment as in Task 2 for the SkipList with global lock. For the uniform distribution, it turns out that the runtime increases almost 6 folds. Moreover, instead of faster runtimes at higher threads, we experienced slower runtime instead. From observation, using mutex introduces many synchronization points in the algorithm which in turn downgrade the performance. It is required because we need to guarantee that no threads can interleave between the actual linearization point and the point of sampling. Even worse, in some cases, we also need to lock, although the linearization might not happens.

