Concurrent Singly-Linked Lists

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Outline

1 Experimental Setup

2 Results

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Experimental Configuration

- Intel®Manycore Testing Lab.
- 40 processors on each node.
- Processor spec: Intel®Xeon®CPU E7-4860 @ 2.27 GHz
- 1GB heap allocated, run in server mode, 64-bit

Experiment Description

- Each thread (Task) is given two parameters: p and *range*
  - p is the probability the the task performs an insert ($1 - p$ is the probability that it performs a delete) on its next operation.
  - The Task inserts or deletes a random number modulo *range*.
- The main thread starts a collection of Tasks and performs a garbage collection. It then waits for the tasks to finish and estimates the runtime by computing a minimum start and maximum end time over all the threads.

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Parameter p

- Under low contention, p has very little effect on the algorithm's throughput
  - This is due to a 'symmetry' in Harris's algorithm. Namely, both INSERT and DELETE call the SEARCH procedure.
  - If there is no contention, then the algorithm performs a constant number of operations for INSERT and DELETE
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Low contention, $p = 0.5$

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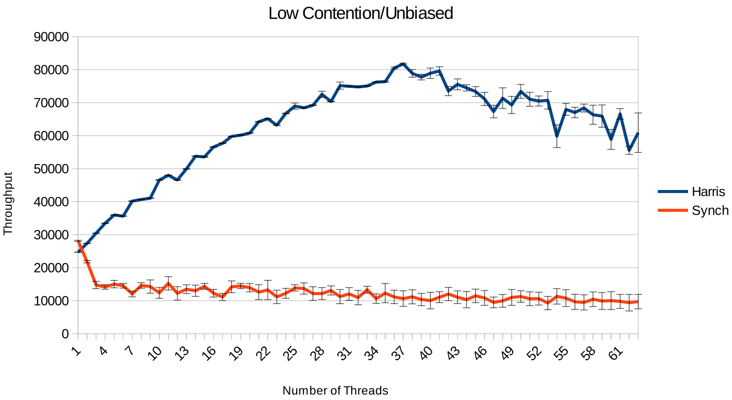

High contention, $p = 0.75$

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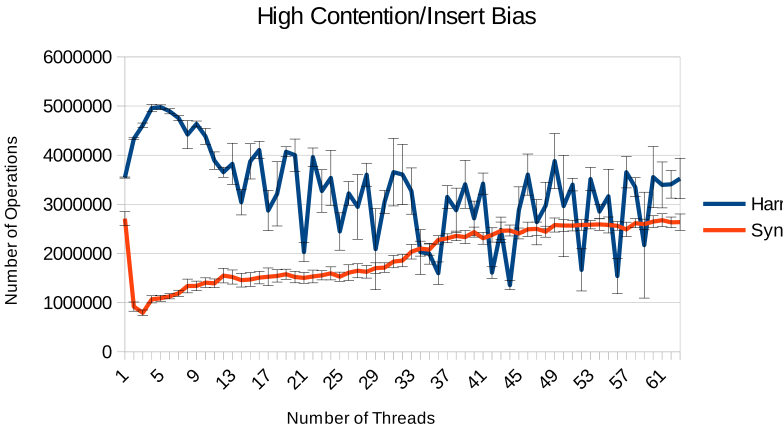
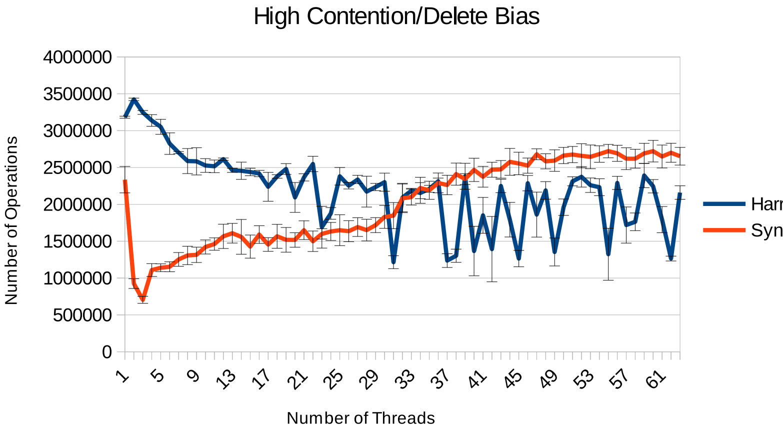


High contention, $p = 0.25$



Conclusion

- Performance of the synchronized algorithm is superior to the Harris algorithm under very high contention
  - The synchronized operations do not interfere with each other, so there is no possibility of failure and backtracking.
  - In this case, the data structure is very small, so locking it in its entirety is not very expensive
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Future Work

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The End

Questions?