

Master's Thesis Exam

Verification of the Blocking and Non-Blocking Michael-Scott Queue Algorithms

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Overview of the Project and Contributions

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- 1 Queue Specifications
- 2 The Two-Lock Michael-Scott Queue
- 3 Proving that the Two-Lock Michael-Scott Queue Satisfies the HOCAP-style Specification
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- 5 Proving that the Lock-and-CC-Free Michael-Scott Queue Satisfies the HOCAP-style Specification

Queue Specifications

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Sequential Specification

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The Two-Lock Michael-Scott Queue

Implementation: initialize

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Implementation: enqueue

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Implementation: dequeue

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Observations on Behaviour of the Two-Lock M&S Queue

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Proving that the Two-Lock Michael-Scott Queue Satisfies the HOCAP-style Specification

Invariant

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The isLL Predicate

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Queue Predicate

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Proof of Initialise

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The Lock-Free Michael-Scott Queue

Implementation: initialize

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Implementation: enqueue

► create slide ◀

Implementation: dequeue

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Prophecies

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The Lock-and-CC-Free Michael-Scott Queue

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Proving that the Lock-and-CC-Free Michael-Scott Queue Satisfies the HOCAP-style Specification

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Invariant

► create slide ◀

Queue Predicate

► create slide ◀

Proof of initialize and ►enqueue **xor** dequeue◄

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