The horrors of parallel programming

Max Neunhöffer

HPCGAP workshop 19–23 August 2013

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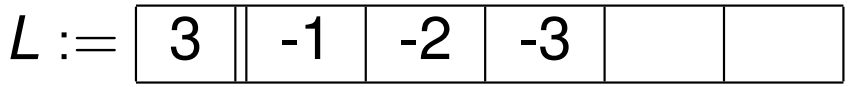

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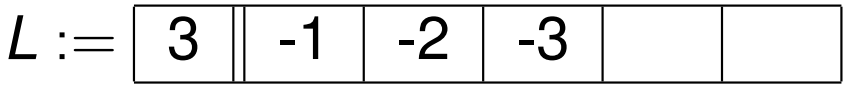

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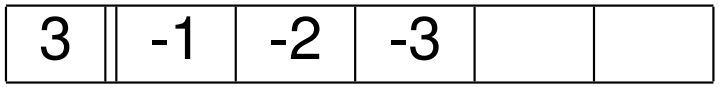
$L :=$ 

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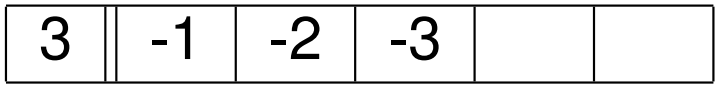
$L :=$ 

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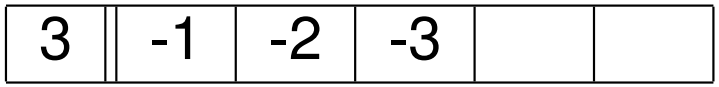
$L :=$ 

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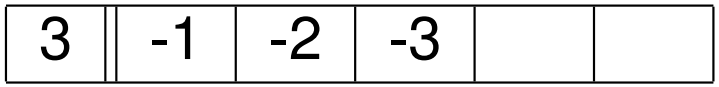
$L :=$ 

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HPCGAP offers: regions, read-only objects, private data, the `atomic` statement and atomic objects.

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HPCGAP offers:

regions, shared objects, locking, thread local variables

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HPCGAP offers: semaphores, channels, synchronisation variables

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When the second loop is started, everything will deadlock.

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HPCGAP offers: deadlock protection, region precedence

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HPCGAP offers: shared memory model, fast object serialisation, access to fast networking using MPI and ZeroMQ

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in modern machines, multiple cores share this bandwidth!

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HPCGAP offers: thread local allocation, parallel garbage collection, MPI and ZeroMQ for explicit communication.

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HPCGAP offers: nice UI and break loops for individual threads.