

EXTENDS Integers

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CONSTANT N

ASSUME $N \leq \text{in Nat}$

Procs $\equiv 1..N$

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$a \setminus \text{prec } b \equiv \neg (a[1] < b[1])$

$\neg (a[1] = b[1]) \wedge (a[2] < b[2])$

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--algorithm AtomicBakery

{variable num = [i \in Procs] -> 0};

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process (p \in Procs)

variables unchecked, max;

{ncs: while (TRUE)

{e1: unchecked = Procs \ {self};

max = 0;

e2: while (unchecked # {})

{with (i \in unchecked)

{unchecked = unchecked \ {i};

if (num[i] > max) {max = num[i]}

}

};

e3: with (i \in {j \in Nat: j > max}) {num[self] =

unchecked = Procs \ {self};

wait: while (unchecked # {})

{with (i \in unchecked)

{await $\neg \text{num}[i] = 0$

$\wedge \neg \text{num}[self] < \text{prec} < \text{num}[i]$

unchecked = unchecked \ {i}

}

};

cs: skip; * the critical section;

exit: num[self] = 0

}

}

}

*)

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MutualExclusion $\equiv \neg \bigwedge i, j \in \text{Procs} : (i \neq j) \rightarrow \neg (pc[i] = "cs"$

$\wedge pc[j] = "cs"$

