Design of Parallel and High Performance Computing
HS 2013
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Homework 9
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Consensus

Give a constructive proof that the consensus number (for wait-free consensus) of fetch-and-add is (at least) two. Give a constructive proof that the consensus number (for wait-free consensus) of compare-and-swap is unbounded.

Broadcast in the α-β-Model

The time taken to send a message of size s from one process to another is $T(s) = \alpha + s\beta$. If a process sends a message of size s at the time t_0 it can not send another message before $t_0 + T(s)$.

For $\alpha = 20$ and $\beta = 1$ evaluate three different algorithms which replicate a data item of sizes $s_1 = 1$, $s_2 = 500$, and $s_3 = 40000000$, available on process 0, to all $P = 1000$ processes.

If your algorithm depends on more parameters than α, β and s, also explain how suitable values for those parameters can be found.