Algorithm – Regular Register

Algorithm 1 Read-One Write-All

Implements:

$(1, N)$-RegularRegister, **instance** *onrr*.

Uses:

BestEffortBroadcast, **instance** *beb*.
PerfectPointToPointLinks, **instance** *pp2p*.
PerfectFailureDetector, **instance** P.

1: **upon event** $\langle$ *Init* $\rangle$ **do**
2: $val := \bot$
3: $correct := \Pi$
4: $writeset := \emptyset$
5: **upon event** $\langle$ P, *Crash* | p $\rangle$ **do**
6: $correct := correct \cup \{p\}$
7: **upon event** $\langle$ *onrr*, *Read* $\rangle$ **do**
8: **trigger** $\langle$ *onrr*, *ReadReturn* | *val* $\rangle$
9: **upon event** $\langle$ *onrr*, *Write* | v $\rangle$ **do**
10: **trigger** $\langle$ *beb*, *Broadcast* | [WRITE, v] $\rangle$
11: **upon event** $\langle$ *beb*, *Deliver* | p, [WRITE, v] $\rangle$ **do**
12: $val := v$
13: **trigger** $\langle$ *pp2p*, *Send* | p, ACK $\rangle$
14: **upon event** $\langle$ *pp2p*, *Deliver* | p, ACK $\rangle$ **do**
15: $writeset := writeset \cup \{p\}$
16: **upon event** $\langle$ $correct \subseteq writeset$ $\rangle$ **do**
17: $writeset := \emptyset$
18: **trigger** $\langle$ *onrr*, *WriteReturn* | $\rangle$

Algorithm 2 Majority Voting

Implements:

(1, N)-RegularRegister, **instance** *onrr*.

Uses:

BestEffortBroadcast, **instance** *beb*.

PerfectPointToPointLinks, **instance** *pp2p*.

1: **upon event** $\langle$ *Init* $\rangle$ **do**
2: $(ts, val) := (0, \bot)$
3: $wts := 0$
4: $acks := 0$
5: $rid := 0$
6: $\forall_{p \in \Pi}$ $readlist[p] := \bot$
7: **upon event** $\langle$ *onrr*, *Read* $\rangle$ **do**
8: $rid := rid + 1$
9: $\forall_{p \in \Pi}$ $readlist[p] := \bot$
10: **trigger** $\langle$ *beb*, *Broadcast* | [READ, *rid*] $\rangle$
11: **upon event** $\langle$ *onrr*, *Write* | v $\rangle$ **do**
12: $wts := wts + 1$
13: $acks := 0$
14: **trigger** $\langle$ *beb*, *Broadcast* | [WRITE, *wts*, v] $\rangle$
15: **upon event** $\langle$ *beb*, *Deliver* | p, [READ, r] $\rangle$ **do**
16: **trigger** $\langle$ *pp2p*, *Send* | p, [VALUE, r, *ts*, *val*] $\rangle$
17: **upon event** $\langle$ *beb*, *Deliver* | p, [WRITE, ts', v'] $\rangle$ **do**
18: **if** $ts' > ts$ **then**
19: $(ts, val) := (ts', v')$
20: **trigger** $\langle$ *pp2p*, *Send* | p, [ACK, ts'] $\rangle$
21: **upon event** $\langle$ *pp2p*, *Deliver* | p, [VALUE, r, ts', v'] $\rangle$ **do**
22: **if** $r = rid$ **then**
23: $readlist[p] := (ts', v')$
24: **if** $|readlist| > \frac{N}{2}$ **then** ▷ Where $N = |\Pi|$.
25: **trigger** $\langle$ *onrr*, *ReadReturn* | HIGHESTVAL(*readlist*) $\rangle$
26: $\forall_{q \in \Pi}$ $readlist[q] := \bot$
27: **upon event** $\langle$ *pp2p*, *Deliver* | p, [ACK, ts'] $\rangle$ **do**
28: **if** $ts' = wts$ **then**
29: $acks := acks + 1$
30: **if** $acks > \frac{N}{2}$ **then**
31: $acks := 0$
32: **trigger** $\langle$ *onrr*, *WriteReturn* | $\rangle$