

## Algorithm – Ballot Leader Elector

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**Algorithm 1** Gossip Leader Election

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**Implements:**BallotLeaderElector, **instance** *ble*.**Uses:**PerfectPointToPointLinks, **instance** *pp2p*.

```
1: upon event  $\langle \text{Init} \rangle$  do
2:   round := 0
3:   ballots :=  $\emptyset$ 
4:   ballot := (0, pid)
5:   leader :=  $\perp$ 
6:   ballotmax := ballot
7:   delay :=  $\Delta$ 
8:   STARTTIMER(delay)
9: function CHECKLEADER
10:  top := (topProcess, topBallot) := MAXBYBALLOT(ballots  $\cup$   $\{(self, ballot)\}$ )
11:  if topBallot < ballotmax then
12:    while ballot  $\leq$  ballotmax do
13:      ballot := INCREMENT(ballot)
14:    leader :=  $\perp$ 
15:  else
16:    if top  $\neq$  leader then
17:      ballotmax := topBallot
18:      leader := top
19:    trigger  $\langle ble, Leader \mid topProcess, topBallot \rangle$ 
20: upon event  $\langle \text{Timeout} \rangle$  do
21:  if ballots + 1  $\geq$   $\lceil \frac{\Pi}{2} \rceil$  then
22:    CHECKLEADER( )
23:  ballots :=  $\emptyset$ 
24:  round := round + 1
25:  for all p  $\in$   $\Pi$  do
26:    if p  $\neq$  self then
27:      trigger  $\langle pp2p, Send \mid p, [HEARTBEATREQUEST, round, ballot_{max}] \rangle$ 
28:  STARTTIMER(delay)
29: upon event  $\langle pp2p, Deliver \mid p, [HEARTBEATREQUEST, r, bmax] \rangle$  do
30:  if bmax > ballotmax then
31:    ballotmax := bmax
32:  trigger  $\langle pp2p, Send \mid p, [HEARTBEATREPLY, r, ballot] \rangle$ 
33: upon event  $\langle pp2p, Deliver \mid p, [HEARTBEATREPLY, r, b] \rangle$  do
34:  if r = round then
35:    ballots := ballots  $\cup$   $\{(p, b)\}$ 
36:  else
37:    delay := delay +  $\Delta$ 
```

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