|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Messages | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | **(m, b)** | | | | | | - | | | base algorithm message with the tag true or false | | | | | | | | | | | | | | | | | |  |
|  | **(presnp: l)** | | | | | | - | | | snapshot algorithm control message. The parameter is the number of messages (including the control message) that where sent from the source process with the tag false | | | | | | | | | | | | | | | | | |  |
|  |  | | | | | | | | | | | | | | | |  | |  | | | | | | | | |  |
| Variables | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | recordedP | | | | | | | | - | | | true if P took local snapshot | | | | | | | | | | | | | | | |  |
|  | sentP[PQ] | | | | | | | | - | | | *The number of messages P sent to Q before taking its local snapshot (variable of the sending process)* | | | | | | | | | | | | | | | |  |
|  | arrivedP[QP] | | | | | | | | - | | | The total number of messages arrived with false tag from Q to P | | | | | | | | | | | | | | | |  |
|  | expectedP[QP] | | | | | | | | - | | | The number of messages Q sent to P before taking its local snapshot (variable of the receiving process) (This parameter is sent by Q in it's control message) | | | | | | | | | | | | | | | |  |
|  | stateP[QP] | | | | | | | | - | | | A list of false messages arrived to P from Q after P took a local snapshot | | | | | | | | | | | | | | | |  |
|  |  | | | | | | | |  | | |  | | | | | | | | | | | | | | | |  |
| Initialize | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | recordedP | | | | | | | ← | | | | false | | | | | | | | | | | | | | | |  |
|  | sentP[PQ] | | | | | | | ← | | | | 0 for all outgoing channel c | | | | | | | | | | | | | | | |  |
|  | arrivedP[QP] | | | | | | | ← | | | | 0 for all outgoing channel c | | | | | | | | | | | | | | | |  |
|  | expectedP[QP] | | | | | | | ← | | | | ∅ for all outgoing channel c | | | | | | | | | | | | | | | |  |
|  | stateP[QP] | | | | | | | ← | | | | ∅ for all outgoing channel c | | | | | | | | | | | | | | | |  |
|  | **if** P wants to initiate snapshot | | | | | | | | | | | | | | | | | | | | | | | | | | |  |
|  |  | perform procedure TakeSnapshot | | | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | **end if** | | | | | | | | | | | | | | | | | | | | | | | | | | |  |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Algorithm | | | | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | **if P sends a basic message (m) into outgoing channel c0** | | | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | send **(m, recordedP)** into **c0** | | | | | | | | | | | | | | | | | | | | | | |  | | |  |
|  | **if recordedP** = false | | | | | | | | | | | | | | | | | | | | | | | | | |  |
|  |  | | **sentP[c0] ← sentP[c0]** + 1 | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | **end if** | | | | | | | | | | | | | | | | | | | | | | | | | |  |
|  |  | | | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | **if P receives a basic message (m, b) through incoming channel** | | | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | **if b** = true | | | | | | | | | | | | | | | | | | | | | | | | | |  |
|  |  | | perform procedure TakeSnapshot | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | **else** | | | | | | | | | | | | | | | | | | | | | | | | | |  |
|  |  | | **arrivedP[c0] ← arrivedP[c0]** + 1 | | | | | | | | | | | | | | | | | | | | | | | |  |
|  |  | | **if recordedP** = true | | | | | | | | | | | | | | | | | | | | | | | |  |
|  |  | |  | | **stateP[c0]** ← **stateP[c0]** ∪ {m} | | | | | | | | | | | | | | | | | | | | | |  |
|  |  | |  | | **if** **arrivedP[c0]** +1 = **expectedP[c0]** for all incomming | | | | | | | | | | | | | | | | | | | | | |  |
|  |  | |  | |  | |  | |  | |  |  |  |  |  |  |  |  |  |  | channels | | | | | |  |
|  | |  | |  | |  | | Terminate | | | | | | | | | | | | | | | | | |  | |
|  | |  | |  | | **end if** | | | | | | | | | | | | | | | | | | | |  | |
|  | |  | | **end if** | | | | | | | | | | | | | | | | | | | | | |  | |
|  | | **end if** | | | | | | | | | | | | | | | | | | | | | | | |  | |
|  | |  | |  | |  | |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |
|  | | **if P receives (presnp, l) through an incomming channel c0** | | | | | | | | | | | | | | | | | | | | | | | |  | |
|  | | expectedP[c0] ← l | | | | | | | | | | | | | | | | | | | | | | | |  | |
|  | **if arrivedP[c0]** +1 **= expectedP[c**0**]** for all incomming channels | | | | | | | | | | | | | | | | | | | | | | | | | |  |
|  |  | | Terminate | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | **end if** | | | | | | | | | | | | | | | | | | | | | | | | | |  |
|  |  | |  | |  | |  | |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |
|  | **procedure TakeSnapshot** | | | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | **if** **recordedP** = false | | | | | | | | | | | | | | | | | | | | | | | | | |  |
|  |  | | **recordedP**← true | | | | | | | | | | | | | | | | | | | | | | | |  |
|  |  | | send **(presnp, sentP[c]+1)** into all ougoing channels c | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | **end if** | | | | | | | | | | | | | | | | | | | | | | | | | |  |
|  |  | | | | | | | | | | | | | | | | | | | | | | | | | |  |