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8.1 Total-Order Broadcast using Consensus

(a) Consensus does not sort *deterministically* before *tob-delivering*

(b) Modifying algorithm s.t. we do not require the sorting of decided payload messages

8.2 Atomic Register as a Replicated State Machine

upon event $\langle nnar,\ \text{INIT}\rangle$ do
  $val = \emptyset$
  $readCount = 0$
  $writeCount = 0$

upon event $\langle nnar,\ \text{READ}\rangle$ do
  trigger $\langle tob, \text{BROADCAST} \mid \text{READ}\rangle$

upon event $\langle nnar,\ \text{WRITE} \mid v\rangle$ do
  trigger $\langle tob, \text{BROADCAST} \mid [\text{WRITE}, v]\rangle$

upon event $\langle tob,\ \text{DELIVER} \mid p, \text{READ}\rangle$ do
  trigger $\langle pl, \text{SEND} \mid p, [\text{READACK}, val]\rangle$

upon event $\langle tob,\ \text{DELIVER} \mid p, [\text{WRITE}, v]\rangle$ do
  $val = v$
  trigger $\langle pl, \text{SEND} \mid p, \text{WRITEACK}\rangle$

upon event $\langle pl,\ \text{DELIVER} \mid p, \text{WRITEACK}\rangle$ do
  $writeCount = writeCount + 1$
  if $writeCount = \mid \Pi \mid$ **then**
    $writeCount = 0$
    trigger $\langle nnar,\ \text{WRITERETURN}\rangle$

upon event $\langle pl,\ \text{DELIVER} \mid p, [\text{READACK}, v]\rangle$ do
  $readCount = readCount + 1$
  if $readCount = \mid \Pi \mid$ **then**
    $readCount = 0$
    trigger $\langle nnar,\ \text{READRETURN} \mid v\rangle$

8.3 Replicated Register with Local Read