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 1 ┌─────────────────── MODULE JupiterSerial ───────────────────┐
   Specification of serial views used by AbsJupiter and CJupiter.

 5 EXTENDS JupiterCtx

 6 ├──────────────────────────────────────────────────────────────┤
 7 VARIABLES
 8     serial,    serial[r]: the serial view of replica r ∈ Replica about the serialization order established at the Server
 9     cincomingSerial, sincomingSerial

11 serialVars  ≜  ⟨serial, cincomingSerial, sincomingSerial⟩
12 commSerial  ≜  INSTANCE CSComm WITH Msg ← Seq(Oid),
13                     cincoming ← cincomingSerial, sincoming ← sincomingSerial

14 ├──────────────────────────────────────────────────────────────┤
15 tb(cop1, cop2, sv)  ≜    Is cop1 totally ordered before cop2 according to the serial view sv (of some replica)?
16     LET pos1  ≜  FirstIndexOfElementSafe(sv, cop1)  0 if cop1 is not in sv
17         pos2  ≜  FirstIndexOfElementSafe(sv, cop2)  0 if cop2 is not in sv
18     IN    IF pos1 ≠ 0 ∧ pos2 ≠ 0  at the server or at a client but both are remote operations
19           THEN pos1 < pos2
20           ELSE  IF pos1 = 0 ∧ pos2 = 0  at a client: both are local operations (may happen in AbsJupiter)
21                 THEN cop1.seq < cop2.seq
22                 ELSE  pos1 ≠ 0           at a client: one is a remote operation and the other is a local operation

23 ├──────────────────────────────────────────────────────────────┤
24 TypeOKSerial  ≜
25     ∧ serial ∈ [Replica → Seq(Oid)]
26     ∧ commSerial!TypeOK

28 InitSerial  ≜
29     ∧ serial = [r ∈ Replica ↦ ⟨⟩]
30     ∧ commSerial!Init

32 DoSerial(c)  ≜
33     UNCHANGED serialVars

35 RevSerial(c)  ≜
36     ∧ commSerial!CRev(c)
37     ∧ serial' = [serial EXCEPT ![c] = Head(cincomingSerial[c])]

39 SRevSerial  ≜
40     ∧ LET cop  ≜  Head(sincoming)
41       IN    ∧ serial' = [serial EXCEPT ![Server] = Append(@, cop.oid)]
42             ∧ commSerial!SSendSame(ClientOf(cop), serial'[Server])
43     ∧ UNCHANGED sincomingSerial

44 └──────────────────────────────────────────────────────────────┘
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\ * Modification History
\ * Last modified Sat Jan 05 16:27:57 CST 2019 by hengxin
\ * Created Wed Dec 05 21:03:01 CST 2018 by hengxin

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