1 ───────── MODULE $CSComm$ ─────────

Specification of communication in a Client-Server system model.

5 EXTENDS $AdditionalSequenceOperators$

6 ├───

7 CONSTANTS

8    $Client$,   the set of clients

9    $Server$,   the (unique) server

10   Msg the set of possible messages

11 ├───

12 VARIABLES

13    $cincoming$, $cincoming[c]$: incoming channel at the client $c \in Client$

14    $sincoming$ incoming channel at the $Server$

15 ├───

16 $TypeOK \triangleq$

17    $\wedge \quad cincoming \in [Client \rightarrow Seq(Msg)]$

18    $\wedge \quad sincoming \in Seq(Msg)$

19 ├───

The initial predicate.

23 $Init \triangleq$

24    $\wedge cincoming = [c \in Client \mapsto \langle\rangle]$

25    $\wedge sincoming = \langle\rangle$

26 ├───

A client sends a message msg to the $Server$.

30 $CSend(msg) \triangleq$

31    $\wedge sincoming' = Append(sincoming, msg)$

32    $\wedge$ UNCHANGED $cincoming$

A client receives a message from the $Server$.

36 $CRev(c) \triangleq$

37    $\wedge cincoming[c] \neq \langle\rangle$ there are messages to handle with

38    $\wedge cincoming' = [cincoming$ EXCEPT $![c] = Tail(@)]$ consume a message

39    $\wedge$ UNCHANGED $sincoming$

40 ├───

$SRev$ and $SSend$ below will be used together in one subaction. Therefore, there are no UNCHANGED sub-formulas in their definitions.

The $Server$ receives a message from some clinet $c \in Client$.

49 $SRev \triangleq$

50    $\wedge sincoming \neq \langle\rangle$ there are messages for the $Server$ to handle with

51    $\wedge sincoming' = Tail(sincoming)$ consume a message

The $Server$ sents a message to each client other than $c \in Client$.

55 $SSend(c, cmsg) \triangleq$

56    $\wedge cincoming' = [cl \in Client \mapsto$

57   IF $cl = c$

58   THEN $cincoming[cl]$

59   ELSE $Append(cincoming[cl], cmsg[cl])]$

The *Server* broadcasts the same message to all the Clients other than $c \in Client$.

64   $SSendSame(c, msg) \triangleq$

65       $\wedge SSend(c, [cl \in Client \mapsto msg])$

66 ├───┤

Properties of communication.

70   $EmptyChannel \triangleq Init$

71 └───┘

\ * Modification History

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