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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
12  | Replica  $\triangleq$  Client  $\cup$  {Server}
13  |-----|
14  | VARIABLES incoming      incoming[r]: incoming channel of replica r  $\in$  Replica
16  | TypeOK  $\triangleq$  incoming  $\in$  [Replica  $\rightarrow$  Seq(Msg)]
17  |-----|
18  | EmptyChannel  $\triangleq$  incoming = [r  $\in$  Replica  $\mapsto$   $\langle \rangle$ ]
19  |-----|
  | A replica r  $\in$  Replica receives a message.
23  | Rev(r)  $\triangleq$ 
24  |      $\wedge$  incoming[r]  $\neq \langle \rangle$       there are messages in the incoming channel
25  |      $\wedge$  incoming' = [incoming EXCEPT ![r] = Tail(@)] consume a message
  | A client sends a message msg to the Server.
29  | CSend(msg)  $\triangleq$ 
30  |      $\wedge$  incoming' = [incoming EXCEPT ![Server] = Append(@, msg)]
  | The Server sends a message to each client other than c  $\in$  Client.
34  | SSend(c, cmsg)  $\triangleq$ 
35  |      $\wedge$  incoming' = [cl  $\in$  Client  $\mapsto$ 
36  |         IF cl = c
37  |         THEN incoming[cl]
38  |         ELSE Append(incoming[cl], cmsg[cl])]
  | The Server broadcasts the same message to all the Clients other than c  $\in$  Client.
43  | SSendSame(c, msg)  $\triangleq$  SSend(c, [cl  $\in$  Client  $\mapsto$  msg])
44  |-----|
  | * Modification History
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