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1  |----- MODULE JupiterInterface -----|
   |Interface of a family of Jupiter protocols.
5  |-----|
   |EXTENDS Op
6  |-----|
7  |VARIABLES
8      aop,      aop[r]: the actual operation applied at replica r ∈ Replica
9      state,    state[r]: state (the list content) of replica r ∈ Replica
10     chins     a set of chars allowed to insert; this is for model checking
12  intVars  $\triangleq$   $\langle aop, state, cincoming, sincoming, chins \rangle$ 
13  |-----|
14  SetNewAop(r, aopr)  $\triangleq$ 
15     aop' = [aop EXCEPT ![r] = aopr]
17  ApplyNewAop(r)  $\triangleq$ 
18     state' = [state EXCEPT ![r] = Apply(aop'[r], @)]
19  |-----|
20  TypeOKInt  $\triangleq$ 
21      $\wedge aop \in [Replica \rightarrow Op \cup \{Nop\}]$ 
22      $\wedge state \in [Replica \rightarrow List]$ 
23      $\wedge Comm!TypeOK$ 
24      $\wedge chins \subseteq Char$ 
26  InitInt  $\triangleq$ 
27      $\wedge aop = [r \in Replica \mapsto Nop]$ 
28      $\wedge state = [r \in Replica \mapsto InitState]$ 
29      $\wedge Comm!Init$ 
30      $\wedge chins = Char$ 
32  DoIns(DoOp(-, -), c)  $\triangleq$  Client c ∈ Client generates and processes an “Ins” operation.
33      $\exists ins \in Ins :$ 
34          $\wedge ins.pos \in 1 \dots (Len(state[c]) + 1)$ 
35          $\wedge ins.ch \in chins$ 
36          $\wedge ins.pr = Priority[c]$ 
37          $\wedge DoOp(c, ins)$ 
38          $\wedge chins' = chins \setminus \{ins.ch\}$  We assume that all inserted elements are unique.
40  DoDel(DoOp(-, -), c)  $\triangleq$  Client c ∈ Client generates and processes a “Del” operation.
41      $\exists del \in Del :$ 
42          $\wedge del.pos \in 1 \dots Len(state[c])$ 
43          $\wedge DoOp(c, del)$ 
44          $\wedge UNCHANGED chins$ 
46  DoInt(DoOp(-, -), c)  $\triangleq$  Client c ∈ Client generates an operation.
47      $\wedge \vee DoIns(DoOp, c)$  DoOp(c ∈ Client, op ∈ Op)
48      $\vee DoDel(DoOp, c)$ 

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49       $\wedge \text{ApplyNewAop}(c)$ 
51       $\text{RevInt}(\text{ClientPerform}(-, -), c) \triangleq$  Client  $c \in \text{Client}$  receives and processes a message.
52       $\wedge \text{Comm!CRev}(c)$ 
53       $\wedge \text{ClientPerform}(c, \text{Head}(\text{cincoming}[c]))$   $\text{ClientPerform}(c \in \text{Client}, m \in \text{Msg})$ 
54       $\wedge \text{ApplyNewAop}(c)$ 
55       $\wedge \text{UNCHANGED } \text{chins}$ 
57       $\text{SRevInt}(\text{ServerPerform}(-)) \triangleq$  The Server receives and processes a message.
58       $\wedge \text{Comm!SRev}$ 
59       $\wedge \text{ServerPerform}(\text{Head}(\text{sincoming}))$   $\text{ServerPerform}(m \in \text{Msg})$ 
60       $\wedge \text{ApplyNewAop}(\text{Server})$ 
61       $\wedge \text{UNCHANGED } \text{chins}$ 
62  |
    \ * Modification History
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