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MODULE AbsJupiter
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Abstract *Jupiter*

EXTENDS *Naturals*, *Order*, *AdditionalSequenceOperators*

CONSTANTS
- *Client*, the set of client replicas
- *Server*, the unique server replica
- *O*, the set of original operations
- *co*, the client order in which each client generates its operations
- *so*, the server order in which the server processes operations
- *hb* the happened-before relation

$Replica \triangleq Client \cup \{Server\}$ all replicas

$sigma \triangleq [O \mapsto O,\ co \mapsto co,\ so \mapsto so,\ hb \mapsto hb]$ the schedule

ASSUME
- $\land\ O \subseteq [c : Client,\ n : Nat]$ $oid = (c,\ n)$
- $\land\ co \in [Client \to Seq(O)]$ strict total order (for each client) represented by sequence
- $\land\ so \in Seq(O)$ strict total order represented by sequence
- $\land\ hb \in O \times O$ strict partial order

The restriction of *co* to operations generated by $c \in Client$.

$R \,|\, c \triangleq \{\langle o1,\ o2\rangle \in R : o1.c = c \land o2.c = c\}$

Determine the *eo* order at client c

RECURSIVE $EOR(\_)$

$EOR(csigma) \triangleq$
- IF $csigma.co = \langle\rangle$
- THEN $csigma.so$
- ELSE LET $o \triangleq Head(csigma.co)$
- IN FALSE

eo: execution order, a function mapping each replica $r \in Replica$ to the order in which the operations are processed at each r.

$eo \triangleq [r \in Replica \mapsto$
- IF $r = Server$
- THEN so
- ELSE $EOR([sigma$ EXCEPT $!.co = co[r]])]$

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