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1  ┌────────────────────────── MODULE TCM ───────────────────────────┐
2  EXTENDS Sequences
   TLA+ specification of classic transactional consistency models (hence the name TCM), following
   the framework proposed by Andrea Cerone, Giovanni Bernardi, and Alexey Gotsman in their
   – CONCUR'2015 paper: A Framework for Transactional Consistency Models with Atomic
     Visibility.
   – JACM'2018 paper: Analysing Snapshot Isolation
13  CONSTANTS Key, Val, EventId
15  Op  $\triangleq$  [type : { "read", "write" }, key : Key, val : Val]
16  R(k, v)  $\triangleq$  [type  $\mapsto$  "read", key  $\mapsto$  k, val  $\mapsto$  v]
17  W(k, v)  $\triangleq$  [type  $\mapsto$  "write", key  $\mapsto$  k, val  $\mapsto$  v]
19  Event  $\triangleq$  [eid : EventId, op : Op]
20  REvent(k)  $\triangleq$  { e  $\in$  Event : e.op.type = "read"  $\wedge$  e.op.key = k }
21  WEvent(k)  $\triangleq$  { e  $\in$  Event : e.op.type = "write"  $\wedge$  e.op.key = k }
22  HEvent(k)  $\triangleq$  REvent(k)  $\cup$  WEvent(k)
24  Transaction  $\triangleq$  Seq(Event)  A transaction is a sequence of events.
25  Session  $\triangleq$  Seq(Transaction)  A session is a sequence of transactions.
26  History  $\triangleq$  SUBSET Session  A history is a set of sessions.
27 └────────────────────────────────────────────────────────────────────────┘

\ * Modification History
\ * Last modified Mon Apr 26 21:35:03 CST 2021 by hengxin
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