MODULE *Chain_SS_QuickRd*

The model represents the model of a simple storage system extends the simple store and performs reads in a 0-phase fashion.

EXTENDS *chain_ss* extends the linearizable simple *sto0re*

$SSQ\_TypeInvariant \triangleq SS\_TypeInvariant$

$SSQ\_Init \triangleq SS\_Init$

STORE operations:

$SSQ\_HdlRead \triangleq$ handle one read requests

Get the store value (value of last committed write)

$\land\ last\_read\_val' = store$

$\land$ UNCHANGED $\langle pending\_rdreq \rangle$

$SSQ\_RunStore \triangleq$

$\lor\ \land\ SSQ\_HdlRead$

$\land$ UNCHANGED $\langle pending\_wrreq,\ store \rangle$

$\lor\ \land\ SS\_CommitWrite$

$\land$ UNCHANGED $\langle pending\_rdreq,\ last\_read\_val \rangle$

$SSQ\_Client \triangleq$ only write requests

$\lor \exists\, v \in Val : SS\_CliWrite(v)$

Full specification.

$SSQ\_Next \triangleq$

$\land\ Print(\text{“}pending\_wrreq\text{”},\ pending\_wrreq) \#\ \langle\rangle$

$\land\ Print(\text{“}pending\_wrreq'\text{”},\ pending\_wrreq') \#\ \langle\rangle$

$\land\ Print(\text{“}store\text{”},\ store) \#\ 8$

$\land\ Print(\text{“}store'\text{”},\ store') \#\ 8$

$\land\ Print(\text{“}last\_read\_val\text{”},\ last\_read\_val) \#\ 9$

$\land\ Print(\text{“}last\_read\_val'\text{”},\ last\_read\_val') \#\ 9$

$\land\ \lor\ SSQ\_Client$ a client submits a request (query or update)

$\lor\ SSQ\_RunStore$ the store deals w/ the updates

$\lor\ SS\_ChannelActions$ the incoming channel for the store drops some requests

$\lor\ SS\_Combined$ a commit action combined w/ a write dropping action

$ss1vars \triangleq ssvars$

$SSQ\_Spec \triangleq SSQ\_Init \land \Box[SSQ\_Next]_{ss1vars}$

Invariants

$SSQ\_AllInvariants \triangleq$

$\land\ SSQ\_TypeInvariant$

Theorem

THEOREM $SSQ\_Spec \Rightarrow \Box SSQ\_AllInvariants$