

VARIABLES pc

All the states that exist.

Don't forget to uncheck "Deadlock" since this is a long-running program!

$TypeOK \triangleq pc \in \{\text{"Started"}, \text{"Ping"}, \text{"Pong"}, \text{"QueryPort"}, \text{"ReplyPort"}\}$

Initial state.

$Init \triangleq pc = \text{"Started"}$

These definitions are about the simple ping-pong protocol.

$InitToPing \triangleq \begin{aligned} &\wedge pc = \text{"Started"} \\ &\wedge pc' = \text{"Ping"} \end{aligned}$

$PingPong \triangleq \begin{aligned} &\wedge pc = \text{"Ping"} \\ &\wedge pc' = \text{"Pong"} \end{aligned}$

$PongInit \triangleq \begin{aligned} &\wedge pc = \text{"Pong"} \\ &\wedge pc' = \text{"Started"} \end{aligned}$

These definitions are about the port communication.

$InitToQuery \triangleq \begin{aligned} &\wedge pc = \text{"Started"} \\ &\wedge pc' = \text{"QueryPort"} \end{aligned}$

$QueryPort \triangleq \begin{aligned} &\wedge pc = \text{"QueryPort"} \\ &\wedge pc' = \text{"ReplyPort"} \end{aligned}$

$ReplyInit \triangleq \begin{aligned} &\wedge pc = \text{"ReplyPort"} \\ &\wedge pc' = \text{"Started"} \end{aligned}$

Transitions.

$Next \triangleq \begin{aligned} &TypeOK \wedge \\ &\vee InitToPing \\ &\vee InitToQuery \\ &\vee PingPong \\ &\vee QueryPort \\ &\vee ReplyInit \end{aligned}$