

<p style="text-align: center;">MODULE <i>Agreement</i></p> <p>EXTENDS <i>Naturals</i>, <i>FiniteSets</i>, <i>Commons</i></p> <p>CONSTANT <i>NPROCESSES</i>  CONSTANT <i>NMESSAGES</i>  CONSTANT <i>CONFLICTR</i>(-, -)</p>
<p>Since this algorithm is for failure-free environments, the set of all processes is the same as the correct ones.</p> <p>LOCAL <i>Processes</i> <math>\triangleq \{i : i \in 1 \dots NPROCESSES\}</math>  LOCAL <i>ChooseProcess</i> <math>\triangleq \text{CHOOSE } x \in \textit{Processes} : \text{TRUE}</math>  LOCAL <i>Create</i>(<i>id</i>) <math>\triangleq [id \mapsto id, d \mapsto \textit{Processes}, o \mapsto \textit{ChooseProcess}]</math>  LOCAL <i>AllMessages</i> <math>\triangleq \{\textit{Create}(id) : id \in 1 \dots NMESSAGES\}</math></p>
<p>VARIABLES</p> <p><i>K</i>,  <i>Pending</i>,  <i>Delivering</i>,  <i>Delivered</i>,  <i>PreviousMsgs</i>,  <i>Votes</i>,  <i>QuasiReliableChannel</i></p> <p>Initialize the instance for the Generic Multicast 0. The <i>INITIAL_MESSAGES</i> is a set with <i>NMESSAGES</i>, unordered, a tuple with the starting state <i>S0</i> and the message.</p> <p><i>Algorithm</i> <math>\triangleq</math> INSTANCE <i>GenericMulticast0</i> WITH  <i>INITIAL_MESSAGES</i> <math>\leftarrow \{\langle \text{"S0"}, m \rangle : m \in \textit{AllMessages}\}</math></p>
<p>Weak fairness is necessary.</p> <p><i>Spec</i> <math>\triangleq \textit{Algorithm}! \textit{SpecFair}</math></p>
<p>If a correct process deliver a message <i>m</i> , then all correct processes in <i>m.d</i> eventually delivers <i>m</i> .</p> <p>We verify that all messages in <i>AllMessages</i>, for all the processes that delivered a message, eventually, all the correct members in the destination will deliver.</p> <p><i>Agreement</i> <math>\triangleq</math></p> <p style="margin-left: 2em;"><math>\forall m \in \textit{AllMessages} :</math></p> <p style="margin-left: 4em;"><math>\forall p \in \textit{Processes} :</math></p> <p style="margin-left: 6em;"><i>Algorithm</i>! <i>WasDelivered</i>(<i>p</i>, <i>m</i>)</p> <p style="margin-left: 6em;"><math>\leadsto \forall q \in m.d :</math></p> <p style="margin-left: 8em;"><math>q \in \textit{Processes} \wedge \textit{Algorithm}! \textit{WasDelivered}(q, m)</math></p>