

## input-forwarding<sup>13,45</sup>

input-forwarding{i:l}  
 (es; Cmd; Sys; isupdate; In; f)

$\equiv_{\text{def}} \forall e:\mathbf{E}(Sys).$   
 (( $\uparrow(e \in_b In) \Rightarrow (Sys(e) = [In(e)])$ ))  
 & (( $\neg(\uparrow(e \in_b In))$ )  
 $\Rightarrow (\neg(\text{loc}(f(e)) = \text{loc}(e)))$   
 $\Rightarrow (((\exists e':\mathbf{E}(Sys). ((e' < \text{loc } e) \ \& \ \text{loc}(f(e')) = \text{loc}(f(e)))) \Rightarrow (Sys(e) = Sys(f(e))))$   
 $\ \& \ ((\neg(\exists e':\mathbf{E}(Sys). ((e' < \text{loc } e) \ \& \ \text{loc}(f(e')) = \text{loc}(f(e))))$   
 $\Rightarrow (Sys(e)$   
 =  
 if  $e \in_b \text{prior}(Sys)$   
 then nth\_tl(||filter(isupdate  
   ;es-interface-history(es; Sys; prior(Sys)(e))||;  
   filter(isupdate;es-interface-history(es; Sys; (f(e))))  
 else filter(isupdate;es-interface-history(es; Sys; (f(e)))  
 fi ))))  
 & (( $\neg(\uparrow(e \in_b In)) \Rightarrow (\text{loc}(f(e)) = \text{loc}(e)) \Rightarrow (Sys(e) = [])$ )  
 & (did-forward(es; Sys; f; e)  
 $\Rightarrow (\forall a:\mathbf{E}(Sys).$   
 (a < loc e)  
 $\Rightarrow \text{should-forward}(es; In; isupdate; f; a)$   
 $\Rightarrow \text{did-forward}(es; Sys; f; a))$

*clarification:*

input-forwarding{i:l}  
 (es; Cmd; Sys; isupdate; In; f)

$\equiv_{\text{def}} \forall e:\text{es-E-interface}(es; Sys).$   
 (( $\uparrow(e \in_b In) \Rightarrow (Sys(e) = [In(e) / []] \in (Cmd \text{ List}))$ ))  
 & (( $\neg(\uparrow(e \in_b In))$ )  
 $\Rightarrow (\neg(\text{es-loc}(es; (f(e))) = \text{es-loc}(es; e) \in \text{Id}))$   
 $\Rightarrow (((\exists e':\text{es-E-interface}(es; Sys)$   
 (es-loc1(es; e'; e) & es-loc(es; (f(e'))) = es-loc(es; (f(e)))  $\in \text{Id}$ )  
 $\Rightarrow (Sys(e) = Sys(f(e)) \in (Cmd \text{ List}))$ )  
 & (( $\neg(\exists e':\text{es-E-interface}(es; Sys)$   
 (es-loc1(es; e'; e) & es-loc(es; (f(e'))) = es-loc(es; (f(e)))  $\in \text{Id}$ ))  
 $\Rightarrow (Sys(e)$   
 =  
 if  $e \in_b \text{es-prior-interface}\{i:l\}(es; Sys)$   
 then nth\_tl(||filter(isupdate  
   ;es-interface-history(es;  
   Sys;

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es-prior-interface{i:l}
(es; Sys)(e
));
filter(isupdate;es-interface-history(es; Sys; (f(e))))
else filter(isupdate;es-interface-history(es; Sys; (f(e))))
fi
∈ (Cmd List))))
& ((¬(↑(e ∈b In)))
⇒ (es-loc(es; (f(e))) = es-loc(es; e) ∈ Id)
⇒ (Sys(e) = [] ∈ (Cmd List)))
& (did-forward(es; Sys; f; e)
⇒ (∀a:es-E-interface(es;Sys).
es-locl(es; a; e)
⇒ should-forward(es; In; isupdate; f; a)
⇒ did-forward(es; Sys; f; a)))

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