

Elevator Spec. in Z (Event Z-Schemas)

35

Move To Next Floor

Event Z-Schema

Δ System

Changes system state

$\text{NextFloorToServe} \neq \bullet \wedge \text{CurFloor} \neq \text{NextFloorToServe}$

guard

$\text{CurFloor} > \text{NextFloorToServe} \rightarrow \text{CurFloor}' = \text{CurFloor} - 1 \wedge \text{CurDir}' = \text{dn}$

$\text{CurFloor} < \text{NextFloorToServe} \rightarrow \text{CurFloor}' = \text{CurFloor} + 1 \wedge \text{CurDir}' = \text{up}$

$\Theta \text{IntButtons}' = \Theta \text{IntButtons} \wedge \Theta \text{ExtButtons}' = \text{ExtButtons} \quad \Theta(\cdot) \equiv \text{variables of } (\cdot)$

Internal Push

Δ System

$f? : 1 \dots \text{FLOORS}$

? indicates input parameter

$\text{IntReq}' = \text{IntReq} \oplus \{f? \mapsto \text{on}\}$

$\Theta \text{Elevator}' = \Theta \text{Elevator} \wedge \text{ExtReq}' = \text{ExtReq} \wedge \Theta \text{Scheduler}' = \Theta \text{Scheduler}$

External Push

Δ System

$f? : 1 \dots \text{FLOORS}$

$\text{dir?} : \text{MOVE}$

$\text{ExtReq}' = \text{ExtReq} \oplus \{f? \mapsto \text{ExtReq}(f?) \cup \{\text{dir?}\}\}$

$\Theta \text{Elevator}' = \Theta \text{Elevator} \wedge \text{IntReq}' = \text{IntReq} \wedge \Theta \text{Scheduler}' = \Theta \text{Scheduler}$

Serve Int Req

Δ System

$\text{NextFloorToServe} = \text{CurFloor} \wedge \text{IntReq}(\text{CurFloor}) = \text{on} \quad \text{guard}$

$\text{IntReq}' = \text{IntReq} \oplus \{\text{CurFloor} \mapsto \text{off}\}$

$\Theta \text{Elevator}' = \Theta \text{Elevator}, \text{ExtReq}' = \text{ExtReq}$

Serve Ext Req Same Dir

Δ System

$\text{NextFloorToServe} = \text{CurFloor} \wedge \text{IntReq}(\text{CurFloor}) = \text{off} \wedge \text{CurDir} \in \text{ExtReq}(\text{CurFloor})$

$\text{ExtReq}' = \text{ExtReq} \oplus \{\text{CurFloor} \mapsto \text{ExtReq}(\text{CurFloor}) - \{\text{CurDir}\}\}$

$\Theta \text{Elevator}' = \Theta \text{Elevator} \wedge \text{IntReq}' = \text{IntReq}$