

Elevator spec. in \mathbb{Z} (System \mathbb{Z} -schema)

System

Elevator

IntButtons

ExtButtons

Scheduler

$$P1U \leftrightarrow \exists f \in \{1 \dots \text{FLOORS}\}: (f \geq \text{CurFloor}) \wedge (\text{IntReq}(f) = \text{on} \vee \text{up} \in \text{ExtReq}(f))$$

$$P2U \leftrightarrow \exists f \in \{1 \dots \text{FLOORS}\}: \text{dn} \in \text{ExtReq}(f) \vee (f < \text{CurFloor} \wedge \text{IntReq}(f) = \text{on})$$

$$P3U \leftrightarrow \exists f \in \{1 \dots \text{FLOORS}\}: f < \text{CurFloor} \wedge \text{up} \in \text{ExtReq}(f)$$

$$P1D \leftrightarrow \exists f \in \{1 \dots \text{FLOORS}\}: (f \leq \text{CurFloor}) \wedge (\text{IntReq}(f) = \text{on} \vee \text{dn} \in \text{ExtReq}(f))$$

$$P2D \leftrightarrow \exists f \in \{1 \dots \text{FLOORS}\}: \text{up} \in \text{ExtReq}(f) \vee (f > \text{CurFloor} \wedge \text{IntReq}(f) = \text{on})$$

$$P3D \leftrightarrow \exists f \in \{1 \dots \text{FLOORS}\}: f > \text{CurFloor} \wedge \text{dn} \in \text{ExtReq}(f)$$

$$(\text{CurDir} = \text{up}) \rightarrow (P1U \neq \emptyset \rightarrow \text{NextFloorToServe} = \min(P1U)) \vee$$

$$(P1U = \emptyset \wedge P2U \neq \emptyset \rightarrow \text{NextFloorToServe} = \max(P2U)) \vee$$

$$(P1U = P2U = \emptyset \wedge P3U \neq \emptyset \rightarrow \text{NextFloorToServe} = \min(P3U)) \vee$$

$$(P1U = P2U = P3U = \emptyset \rightarrow \text{NextFloorToServe} = 0)$$

$$(\text{CurDir} = \text{Dn}) \rightarrow (P1D \neq \emptyset \rightarrow \text{NextFloorToServe} = \max(P1D)) \vee$$

$$(P1D = \emptyset \wedge P2D \neq \emptyset \rightarrow \text{NextFloorToServe} = \min(P2D)) \vee$$

$$(P1D = P2D = \emptyset \wedge P3D \neq \emptyset \rightarrow \text{NextFloorToServe} = \max(P3D)) \vee$$

$$(P1D = P2D = P3D = \emptyset \rightarrow \text{NextFloorToServe} = 0)$$

• PDU: Priority set for down/up moving elevator

P1U: floors higher than current for which int-req "on" or ext-req "up"

P2U: floors lower than current for which int-req "on" or floors with ext-req "dn"

P3U: floors lower than current for which ext-req "up"

P1D: floors lower than current for which int-req "on" or ext-req "dn"

P2D: floors higher than current for which int-req "on" or floors with ext-req "up"

P3D: floors higher than current for which ext-req "dn"