

## Transitionssystem $\mathcal{T}_{\text{AirlineSystem}}$

Das  $\Sigma_{\Delta}$ -Transitionssystem  $\mathcal{T}_{\text{AirlineSystem}} = (\text{State}_{\Delta}, \sigma_{\text{init}}, \text{Label}_{\Delta}, \Omega_{\Delta}, R_{\Delta})$

hat folgende Transitionsrelation  $R_{\Delta}$ :

$$R_{\Delta} =$$

$$\begin{aligned} \{ \sigma^- \xrightarrow{\text{Airline}(vs):va} \sigma \mid \sigma^-, \sigma \in \text{State}_{\Delta}, \\ \sigma = \sigma^- [ va = \text{new}_{\text{Airline}}, va.name \mapsto vs ], \\ vs \in \mathcal{A}^*, va \in \text{OId}_{\text{Airline}}, va \notin \text{Airline}_{\sigma^-} \} \end{aligned}$$

$$\begin{aligned} \cup \{ \sigma^- \xrightarrow{va.createPilot(vs, vr):vpi} \sigma \mid \sigma^-, \sigma \in \text{State}_{\Delta}, \\ \sigma = \sigma^- [ vpi = \text{new}_{\text{Pilot}}, vpi.name \mapsto vs, \\ vpi.salary \mapsto vr, vpi.flights \mapsto \emptyset, \\ va.employees \mapsto va.employees_{\sigma^-} \cup \{vpi\} ], \\ va \in \text{Airline}_{\sigma^-}, vs \in \mathcal{A}^*, vr \in \mathbb{R}, vpi \in \text{OId}_{\text{Pilot}}, vpi \notin \text{Pilot}_{\sigma^-} \} \end{aligned}$$

$$\begin{aligned} \cup \{ \sigma^- \xrightarrow{va.createSteward(vs, vr):vst} \sigma \mid \sigma^-, \sigma \in \text{State}_{\Delta}, \\ \sigma = \sigma^- [ vst = \text{new}_{\text{Steward}}, vst.name \mapsto vs, \\ vst.salary \mapsto vr, vst.flights \mapsto \emptyset, \\ va.employees \mapsto va.employees_{\sigma^-} \cup \{vst\} ], \\ va \in \text{Airline}_{\sigma^-}, vs \in \mathcal{A}^*, vr \in \mathbb{R}, vst \in \text{OId}_{\text{Steward}}, vst \notin \text{Steward}_{\sigma^-} \} \end{aligned}$$

$$\begin{aligned} \cup \{ \sigma^- \xrightarrow{va.createFlight(vi, vpi, vst):vf} \sigma \mid \sigma^-, \sigma \in \text{State}_{\Delta}, \\ \sigma = \sigma^- [ vf = \text{new}_{\text{Flight}}, vf.number \mapsto vi, vf.airline \mapsto va, \\ va.flights \mapsto va.flights_{\sigma^-} \cup \{vf\}, \\ vpi.flights \mapsto vpi.flights_{\sigma^-} \cup \{vf\}, \\ vst.flights \mapsto vst.flights_{\sigma^-} \cup \{vf\} ], \\ va \in \text{Airline}_{\sigma^-}, vi \in \mathbb{Z}, vpi \in \text{Pilot}_{\sigma^-}, vst \in \text{Steward}_{\sigma^-}, \\ vf \in \text{OId}_{\text{Flight}}, vf \notin \text{Flight}_{\sigma^-} \} \end{aligned}$$

$$\begin{aligned} \cup \{ \sigma^- \xrightarrow{va.createFlight(vi, vpi, vst):vf} \perp \mid \sigma^- \in \text{State}_{\Delta}, \\ va \in \text{Airline}_{\sigma^-}, vi \in \mathbb{Z}, \\ vpi \in \text{Pilot}_{\sigma^-} \cup \{null\}, vst \in \text{Steward}_{\sigma^-} \cup \{null\}, \\ vpi = null \text{ oder } vst = null \} \end{aligned}$$

$$\cup \left\{ \sigma^- \xrightarrow{va.deploy(vp,vf)} \sigma \mid \sigma^-, \sigma \in State_{\Delta}, \right. \\ \left. \begin{aligned} \sigma &= \sigma^- [vp.flights \mapsto vp.flights_{\sigma^-} \cup \{vf\}], \\ va &\in Airline_{\sigma^-}, vp \in Person_{\sigma^-}, vf \in Flight_{\sigma^-} \cup \{null\} \end{aligned} \right\}$$

$$\cup \left\{ \sigma^- \xrightarrow{va.deploy(null,vf)} \perp \mid \sigma^- \in State_{\Delta}, \right. \\ \left. va \in Airline_{\sigma^-}, vf \in Flight_{\sigma^-} \cup \{null\} \right\}$$

$$\cup \left\{ \sigma^- \xrightarrow{va.cooperate(vb)} \sigma \mid \sigma^-, \sigma \in State_{\Delta}, \right. \\ \left. \begin{aligned} \sigma &= \sigma^- [va.partners \mapsto va.partners_{\sigma^-} \cup \{vb\}, \\ &\quad vb.partners \mapsto vb.partners_{\sigma^-} \cup \{va\}], \\ va, vb &\in Airline_{\sigma^-} \end{aligned} \right\}$$

$$\cup \left\{ \sigma^- \xrightarrow{va.cooperate(null)} \perp \mid \sigma^- \in State_{\Delta}, \right. \\ \left. va \in Airline_{\sigma^-} \right\}$$

...

$$\cup \left\{ \sigma^- \xrightarrow{vf.business():vr} \sigma^- \mid \sigma^- \in State_{\Delta}, \right. \\ \left. vf \in Flight_{\sigma^-}, vr \in \mathbb{R}, vr = vf.basicPrice_{\sigma^-} * 4 \right\}$$

...

$$\cup \left\{ \sigma^- \xrightarrow{vst.increaseSteward(vr)} \sigma \mid \sigma^-, \sigma \in State_{\Delta}, \right. \\ \left. \begin{aligned} \sigma &= \sigma^- [vst.salary \mapsto vst.salary_{\sigma^-} + (vr/2)], \\ vst &\in Steward_{\sigma^-}, vr \in \mathbb{R} \end{aligned} \right\}$$