

## Aufgabe 1

$\phi_1 : true \mathcal{U} \mathcal{X} a$  matches to  $\pi_1$ .

$\phi_2 : \mathcal{G} \mathcal{X} a$  matches to  $\pi_2$ .

$\phi_3 : a \mathcal{U} a$  matches to  $\pi_3$ .

$\phi_4 : a \wedge a$  matches to  $\pi_4$ .

$\phi_5 : \mathcal{F} \mathcal{G} a$  matches to  $\pi_5$ .

$\phi_6 : (\mathcal{X} b) \mathcal{U} a$  matches to  $\pi_6$ .

## Aufgabe 2

$$\begin{aligned} & \mathcal{L}, \sigma \models \mathcal{A} \mathcal{X} \mathcal{A} \mathcal{F} p \\ \Leftrightarrow & \forall \pi = \sigma s_1 \dots : \pi \models \mathcal{X} \mathcal{A} \mathcal{F} p \\ \Leftrightarrow & \forall \pi = \sigma s_1 \dots : s_1 \models \mathcal{A} \mathcal{F} p \\ \Leftrightarrow & \forall \pi = \sigma s_1 \dots : \forall \tilde{\pi} = s_1 s_2 \dots : \mathcal{F} p \\ \Leftrightarrow & \forall \pi = \sigma s_1 \dots : \forall \tilde{\pi} = s_1 s_2 \dots : \exists j \geq 0 : s_j \models p \\ \Leftrightarrow & \forall \pi = \sigma s_1 \dots : \exists j \geq 0 : \forall \tilde{\pi} = s_j s_{j+1} \dots : s_{j+1} \models p \\ \Leftrightarrow & \forall \pi = \sigma s_1 \dots : \exists j \geq 0 : \forall \tilde{\pi} = s_j s_{j+1} \dots : s_j \models \mathcal{X} p \\ \Leftrightarrow & \forall \pi = \sigma s_1 \dots : \exists j \geq 0 : s_j \models \mathcal{A} \mathcal{X} p \\ \Leftrightarrow & \forall \pi = \sigma s_1 \dots : \pi \models \mathcal{F} \mathcal{A} \mathcal{X} p \\ \Leftrightarrow & \mathcal{L}, \sigma \models \mathcal{A} \mathcal{F} \mathcal{A} \mathcal{X} p \end{aligned}$$

## Aufgabe 3

$$\begin{aligned} & \forall s_0 : \mathcal{A} \mathcal{G}(p \rightarrow \mathcal{A} \mathcal{F} q) \\ \Leftrightarrow & \forall s_0 : \forall \pi = s_0 s_1 \dots : \mathcal{G}(p \rightarrow \mathcal{A} \mathcal{F} q) \\ \Leftrightarrow & \forall s_0 : \forall \pi = s_0 s_1 \dots : \mathcal{G}(\neg p \vee \mathcal{A} \mathcal{F} q) \\ \Leftrightarrow & \forall s_0 : \forall \pi = s_0 s_1 \dots : \neg \mathcal{F}(p \wedge \neg \mathcal{A} \mathcal{F} q) \\ \Leftrightarrow & \forall s_0 : \forall \pi = s_0 s_1 \dots : \neg \mathcal{F}(p \wedge \exists \neg \mathcal{F} q) \\ \Leftrightarrow & \forall s_0 : \forall \pi = s_0 s_1 \dots : \neg \mathcal{F}(p \wedge \neg \mathcal{F} q) \\ \Leftrightarrow & \forall s_0 : \forall \pi = s_0 s_1 \dots : \mathcal{G}(\neg p \vee \mathcal{F} q) \\ \Leftrightarrow & \forall s_0 : \forall \pi = s_0 s_1 \dots : \mathcal{G}(p \rightarrow \mathcal{F} q) \end{aligned}$$

## Aufgabe 4