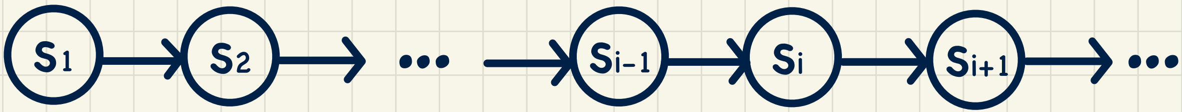
Path Satisfaction: Logical Operations

A path satisfies a proposition
if its initial state ("current state") satisfies it.



$\pi \models p$

$\pi \models \top$

$\pi \models \bot$

$\pi \models \neg\phi$

$\pi \models \phi1 \wedge \phi2$

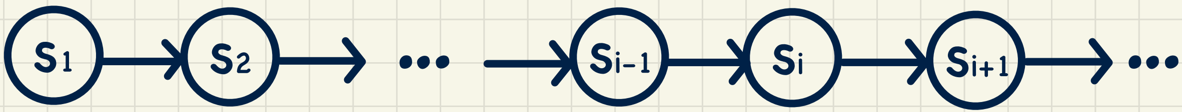
$\pi \models \phi1 \vee \phi2$

$\pi \models \phi1 \Rightarrow \phi2$

[redacted]

Path Satisfaction: Temporal Operations (1)

A path satisfies $X\phi$
if the next state (of the "current state") satisfies it.

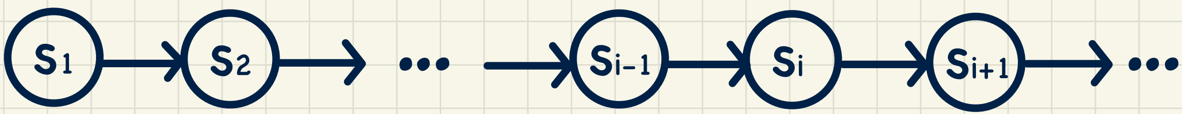


Formulation (over a path)

Q. What is $\pi 3 \models X\ p$ checking?

Path Satisfaction: Temporal Operations (2)

A path satisfies $G\phi$
if the every state satisfies it.

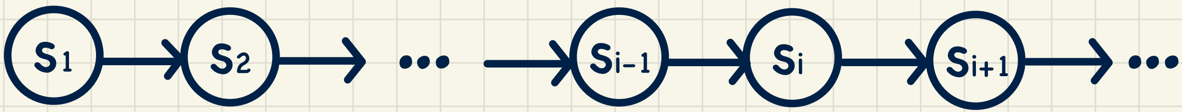


Formulation (over a path)

Path Satisfaction: Temporal Operations (3)

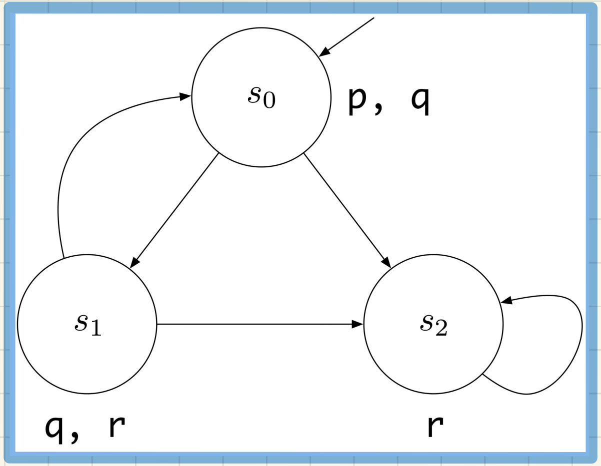
A path satisfies Fϕ

if some future state satisfies it.



Formulation (over a path)

Model vs. Path Satisfaction: Exercises (1.1)



Recall: $\pi \models p \Leftrightarrow p \in L(s_1)$

Say: $\pi = s_0 \longrightarrow s_1 \longrightarrow s_2 \longrightarrow s_2 \longrightarrow \ldots$

$\pi \models \top$

$\pi \not\models \bot$

$\pi \models p \land q$

$\pi \models p \lor q$

$\pi \models p \Rightarrow q$

$\pi \models r$

$\pi \models r \Rightarrow p \land q \land r$

Exercise: What if we change the LHS to π^2?