

## Nesting “Global” and “Future” in LTL Formulas

$$s \models \mathbf{F}\phi_1 \Rightarrow \mathbf{FG}\phi_2$$

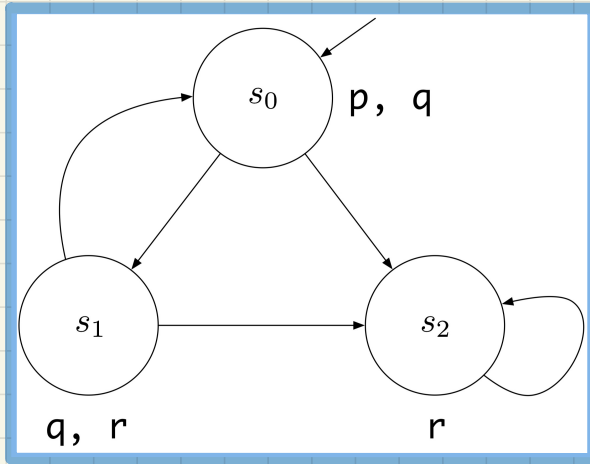
Each path  $\pi$  starting with  $s$  is s.t. if eventually  $\phi_1$  holds on  $\pi$ , then  $\phi_2$  eventually holds on  $\pi$  continuously.

Q. Formulate the above nested pattern of LTL operators.

Q. How to **prove** the above nested pattern of LTL operators?

Q. How to **disprove** the above nested pattern of LTL operators?

## Model Satisfaction: Exercises (5.2)



$s \models \phi \Leftrightarrow$  all  $\pi$  starting at  $s$ ,  $\pi \models \phi$

$$s_0 \models \mathbf{F} (\neg q \wedge r) \Rightarrow \mathbf{FG} r$$

$$s_0 \models \mathbf{F} (\neg q \vee r) \Rightarrow \mathbf{FG} r$$

Exercise: What if we change the LHS to  $s_2$ ?

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Q. How to prove the above nested pattern of LTL operators?

Q. How to disprove the above nested pattern of LTL operators?