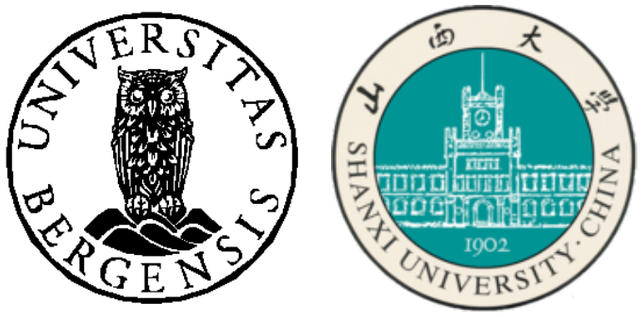
What Anonymous Public Announcements Can Do

ICICS 2026, Fukui, 2026-10-30

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University of Bergen, Norway
Shanxi University, China

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Elevator pitch

- Anonymous public announcement: someone in a group announces something in public, without revealing their identity.

- We use formal methods based on epistemic logic to analyse them

- In particular we add quantification to be able to express questions like "*is there an anonymous public announcement that can achieve a given epistemic goal, without revealing the identity of the announcer?*"

- Main results: logical soundness and completeness

Safe anonymous announcements

For an announcement to be *safely* made:

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at least three agents have to know it

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... *fixpoint!*

Example: whistleblowing

A company has been evading tax. Is there a way for someone, a whistleblower, to anonymously and publicly alert David of this fact, without revealing it to Alice?

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David knows q

But Alice doesn't

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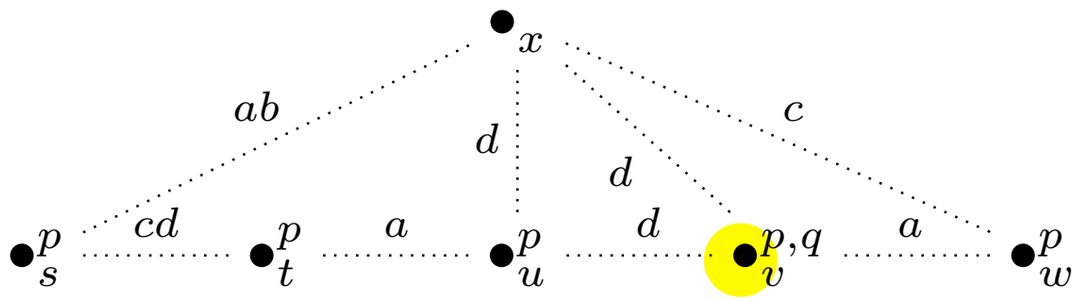
company is evading tax

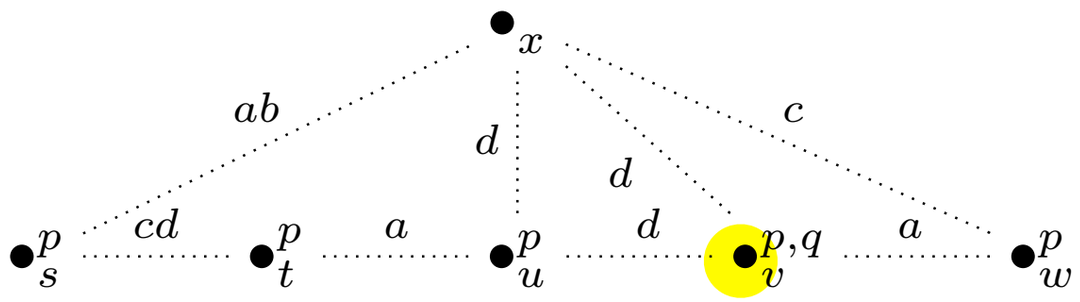
$$\Diamond\!\!\!\!-(K_d q \wedge \neg K_a q)$$

there exists an anonymous announcement such that

David knows q

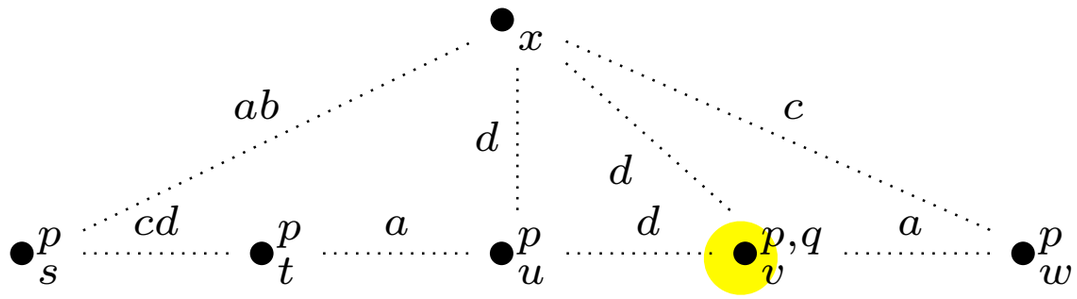
But Alice doesn't


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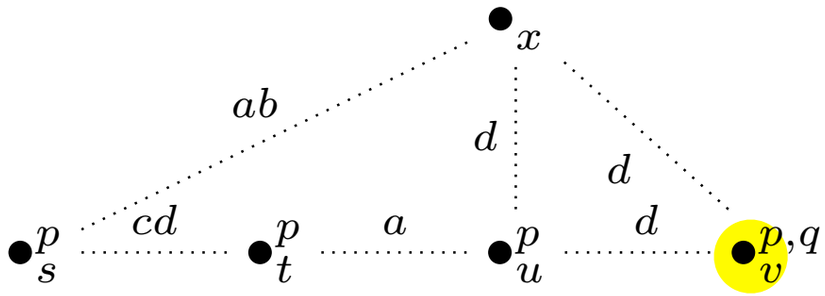


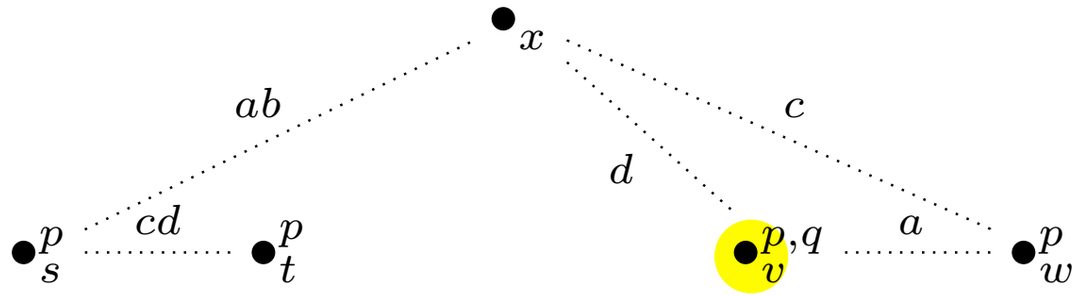
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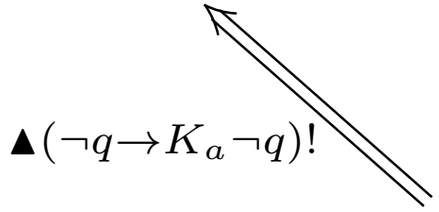
q is not safe!

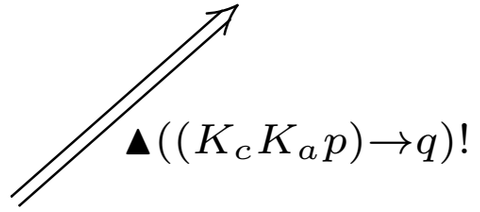


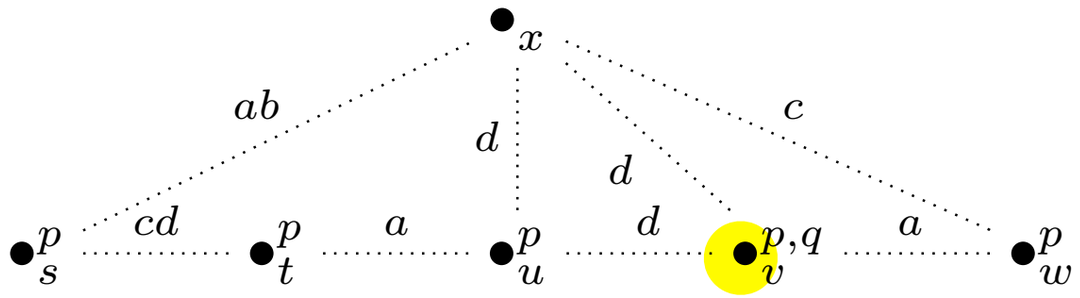
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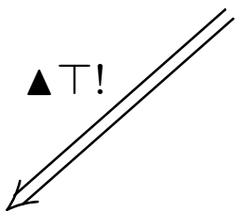


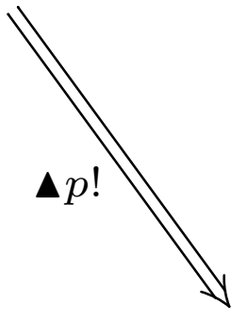


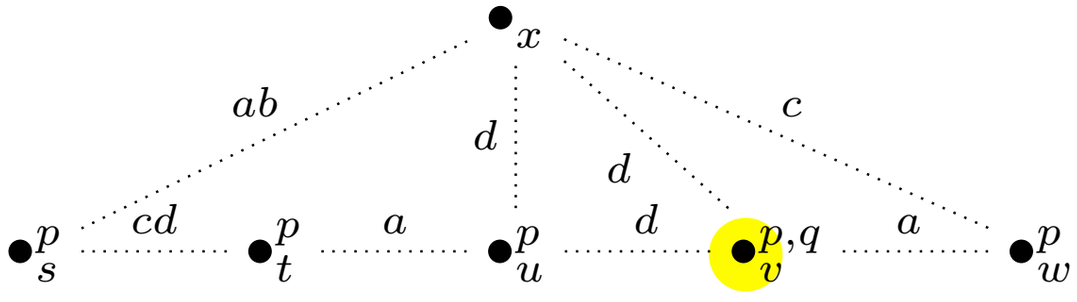


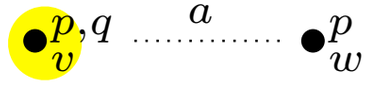


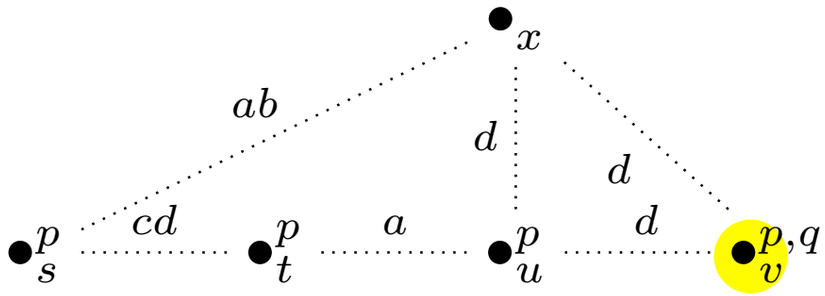
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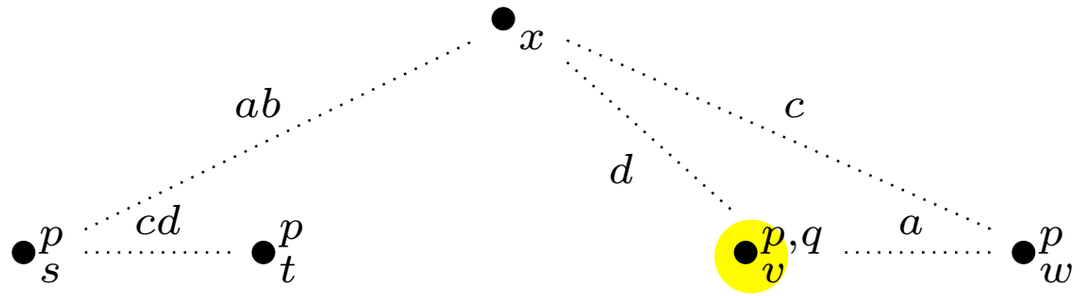


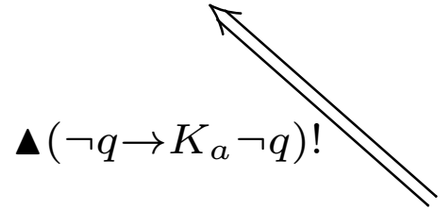


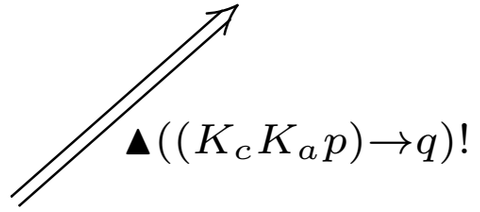


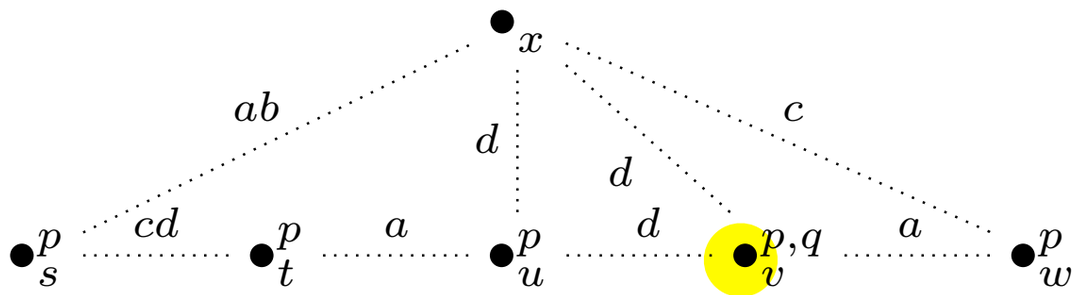




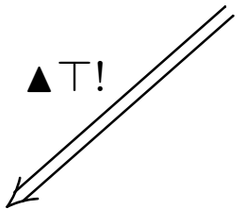


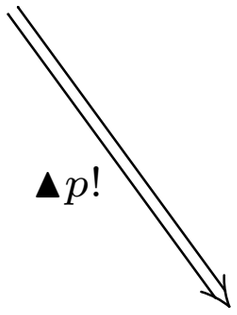


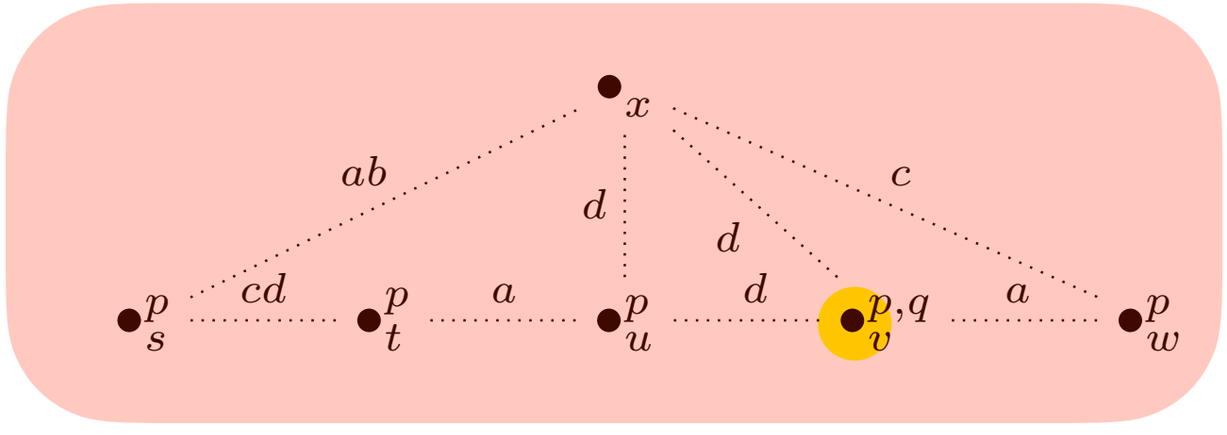


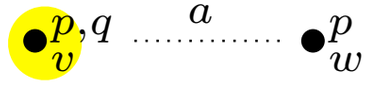


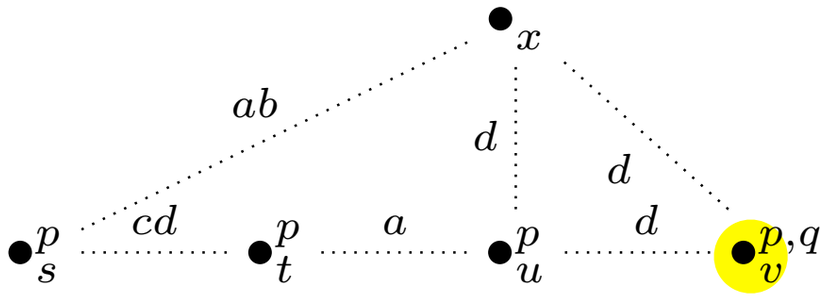
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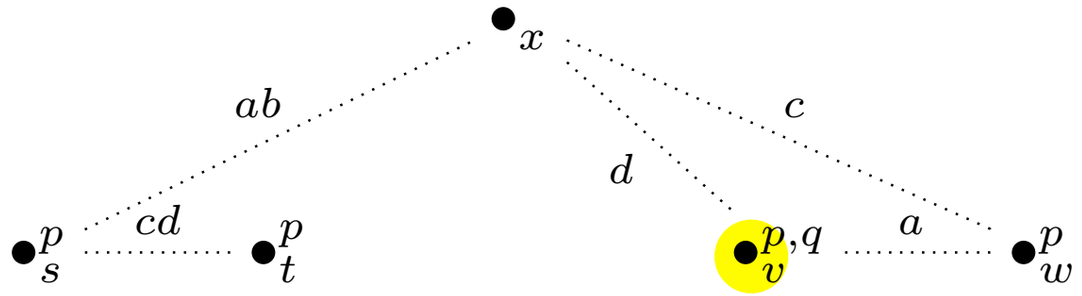


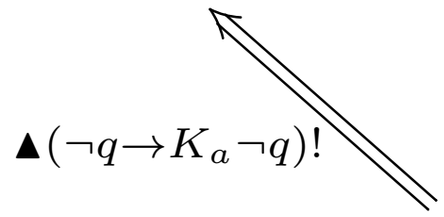


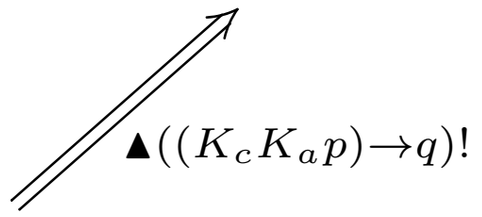


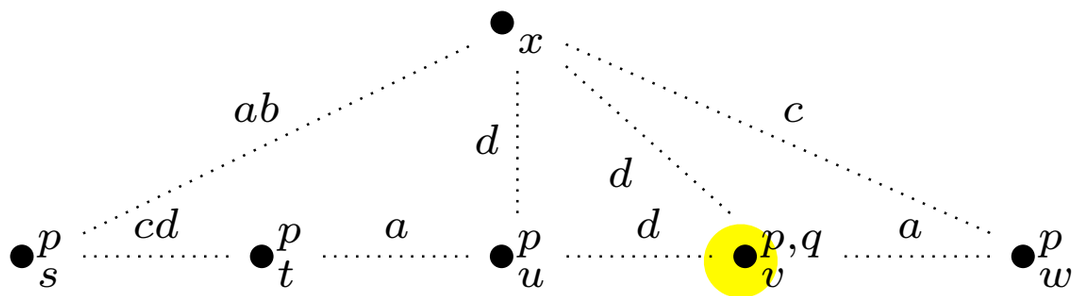




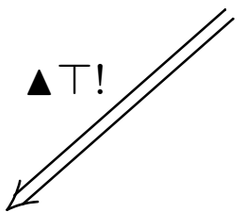


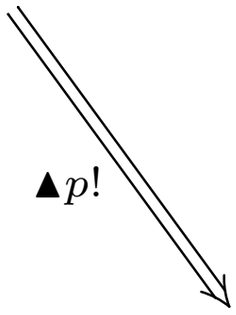


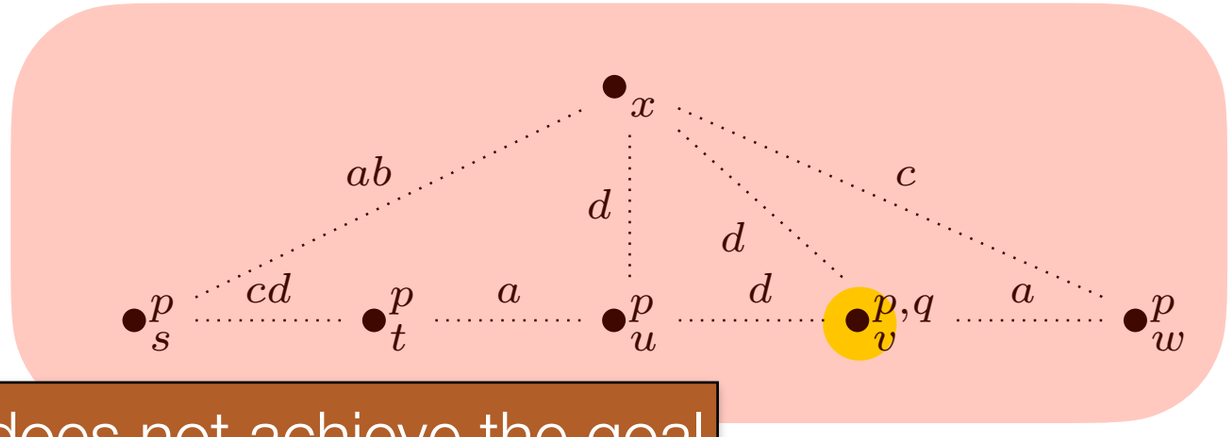


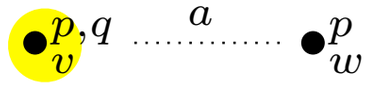


$\Diamond\!\!\!\!-(K_d q \wedge \neg K_a q)$

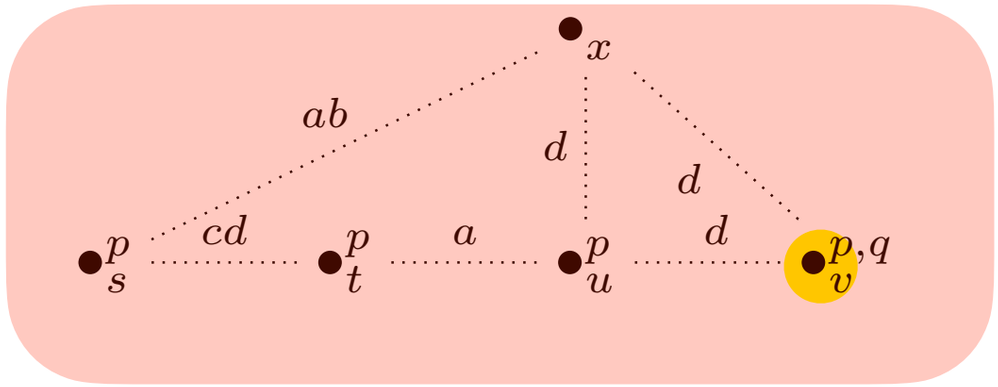


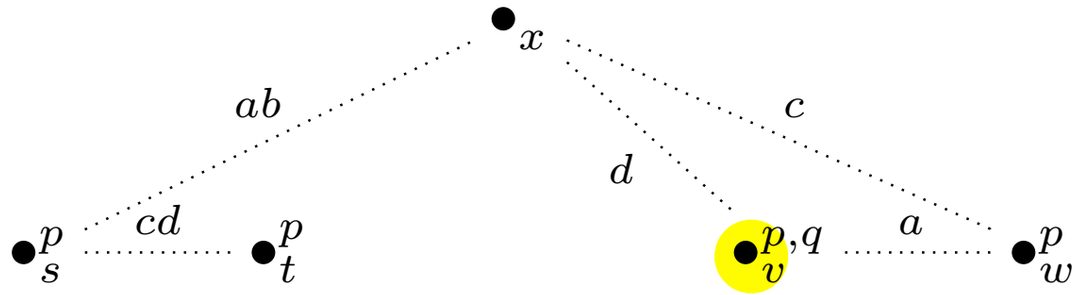






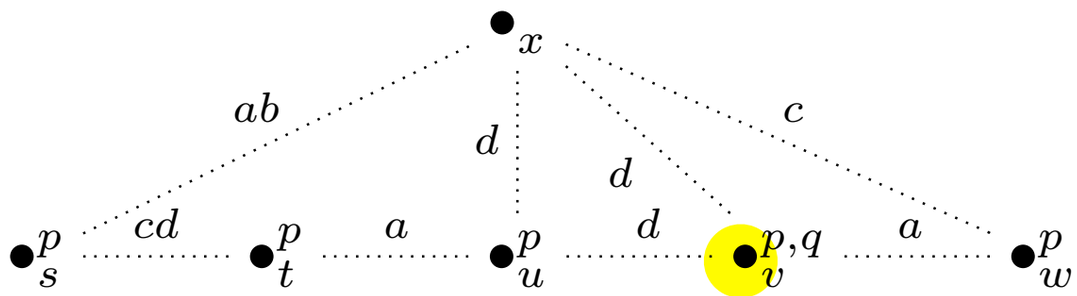
does not achieve the goal





▲$(\neg q \to K_a \neg q)!$

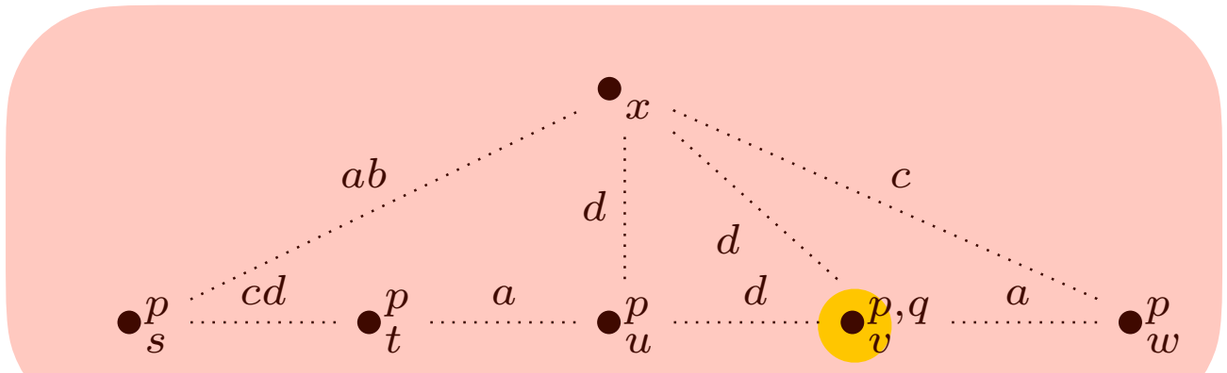
▲$((K_c K_a p) \to q)!$

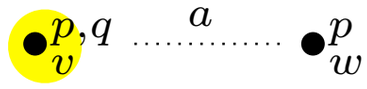


$\Diamond\!\!\!\!-(K_d q \wedge \neg K_a q)$

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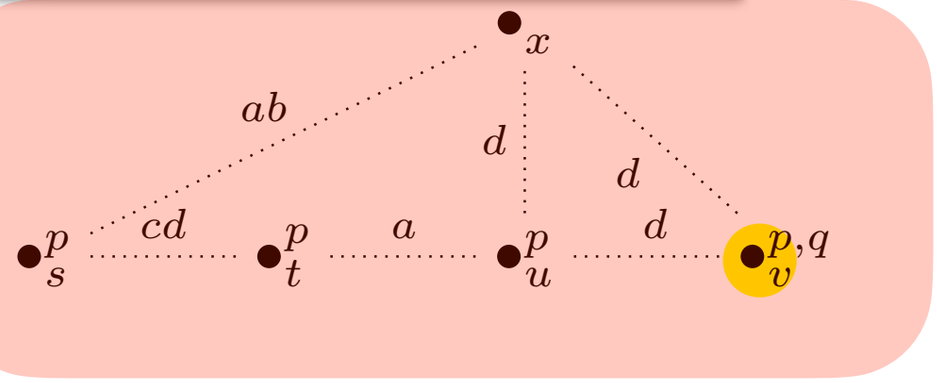
▲$p!$

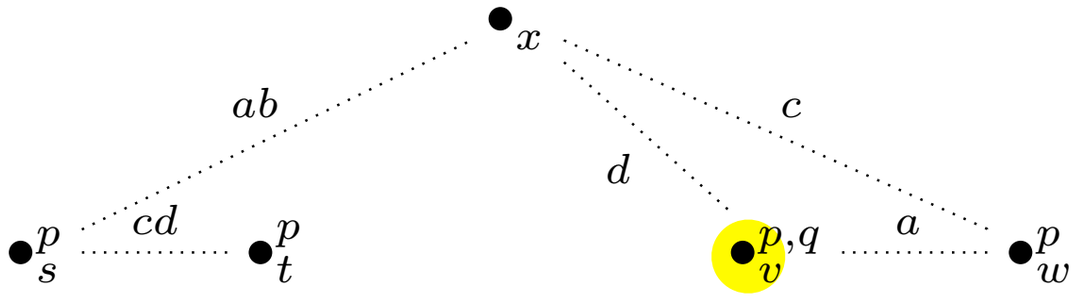




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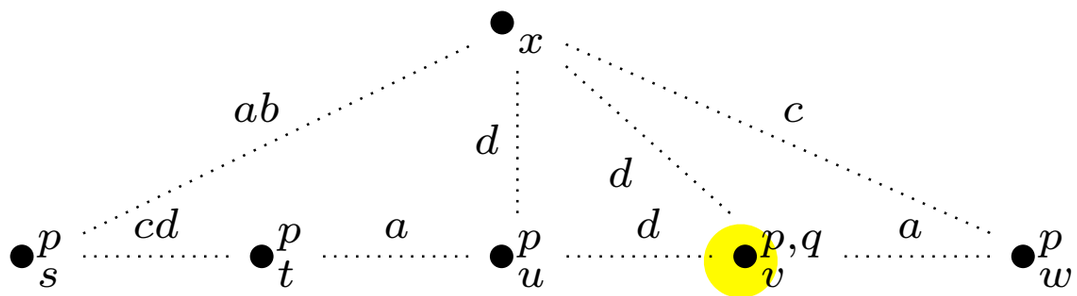
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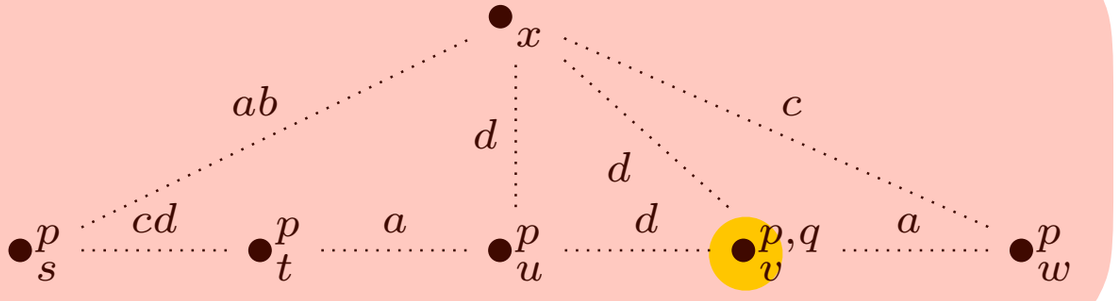
$\blacktriangle((K_c K_a p) \to q)!$

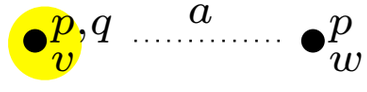


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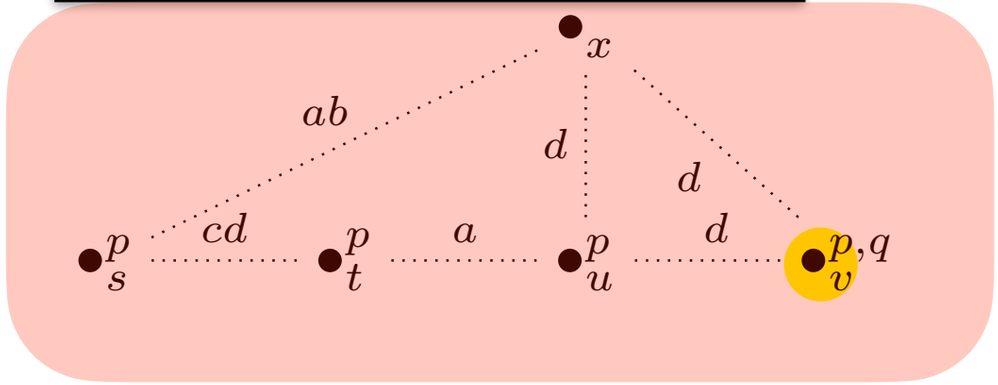
$\blacktriangle p!$

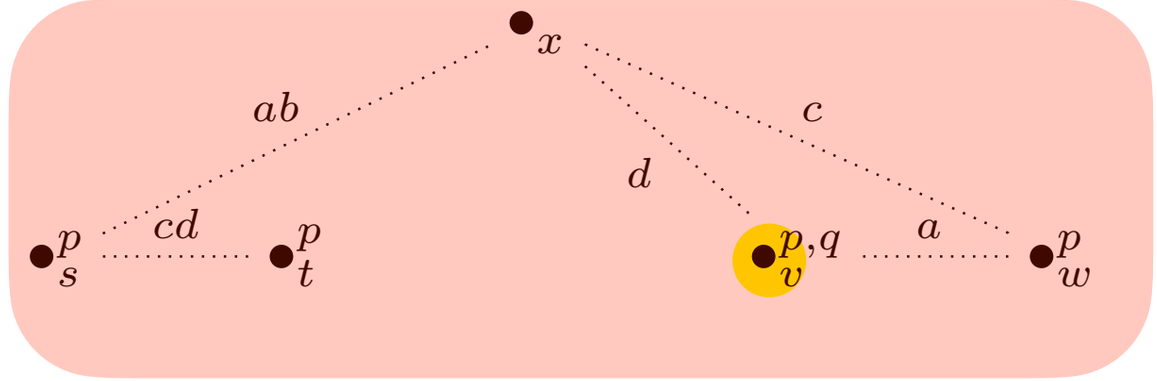




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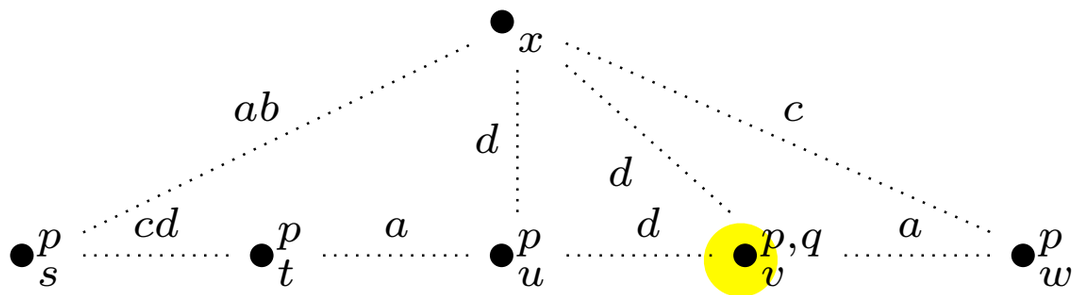
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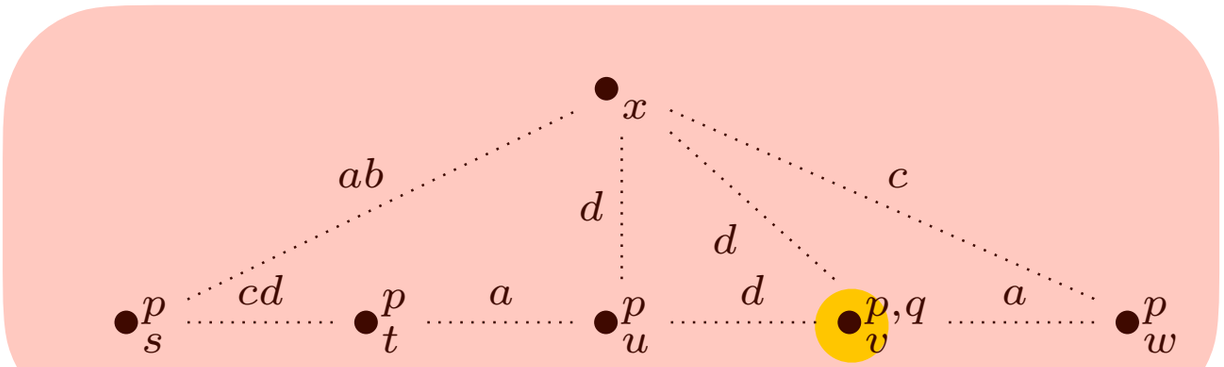
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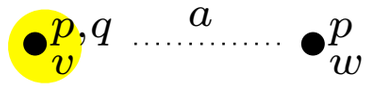


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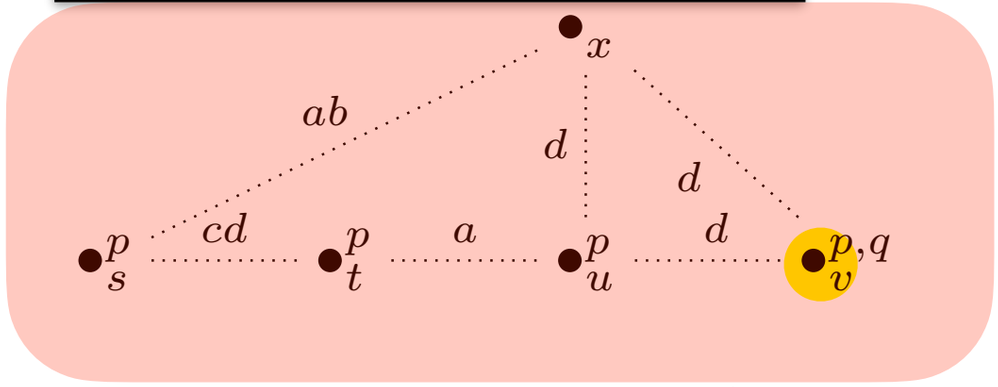
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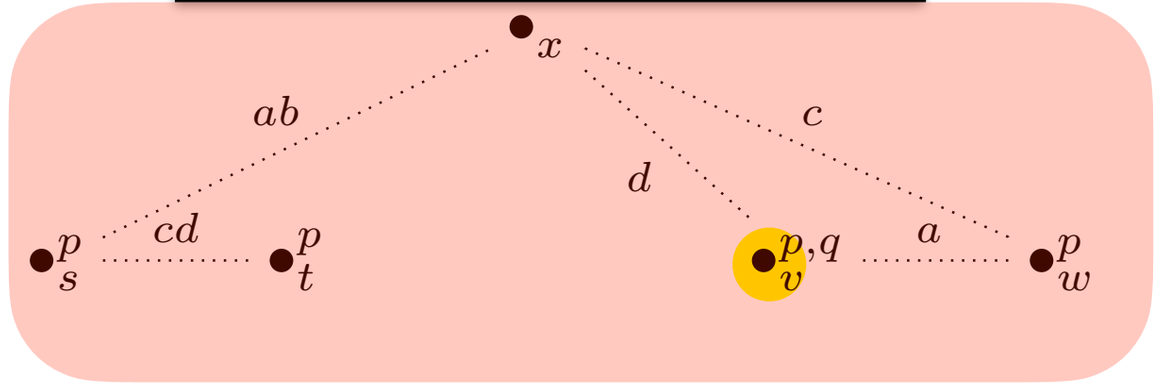


does not achieve the goal

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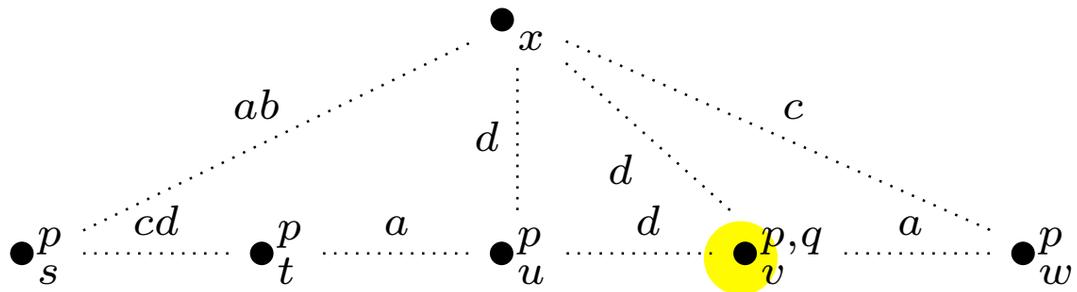


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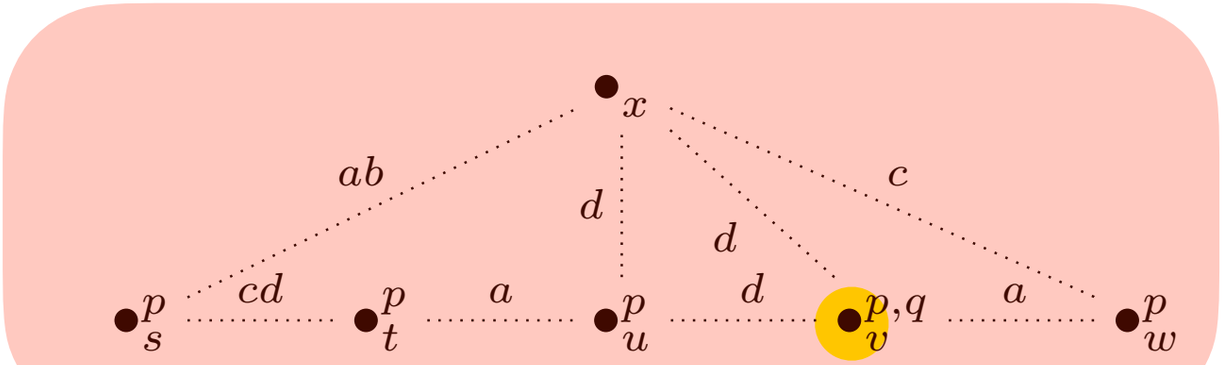
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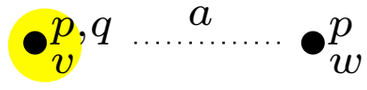
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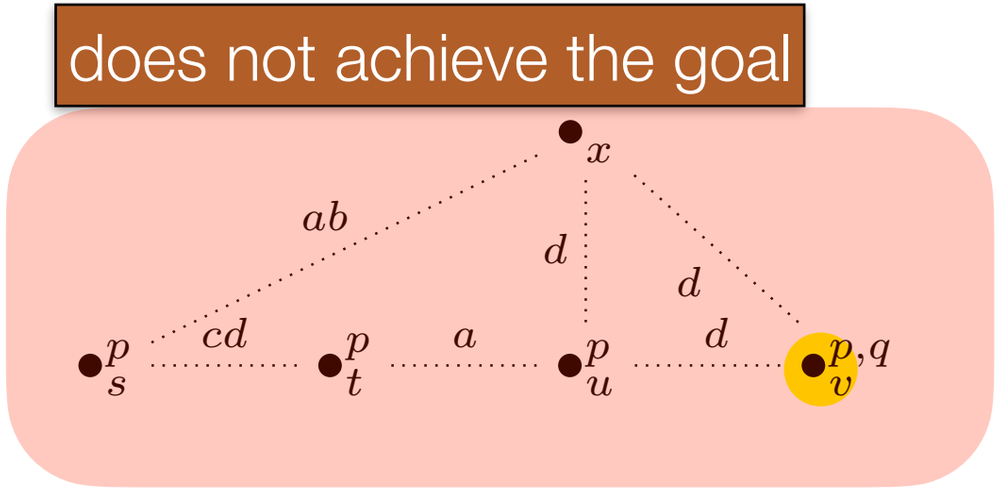
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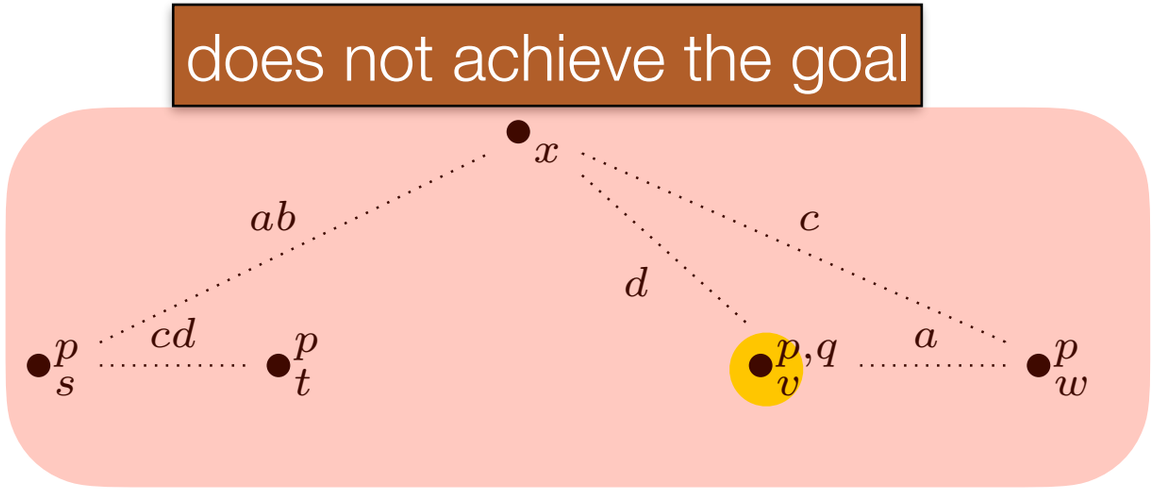
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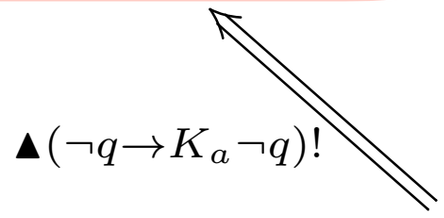


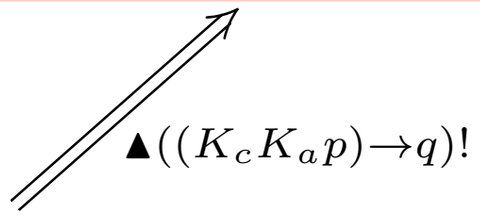
does not achieve the goal

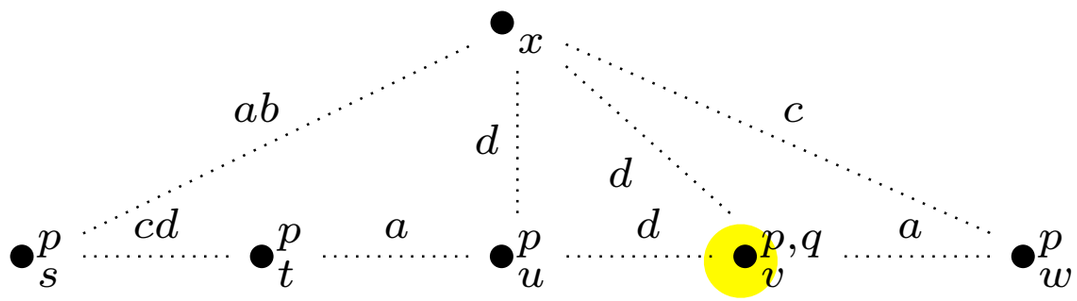




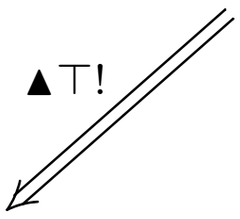


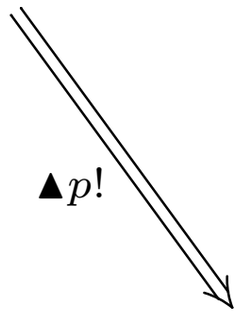


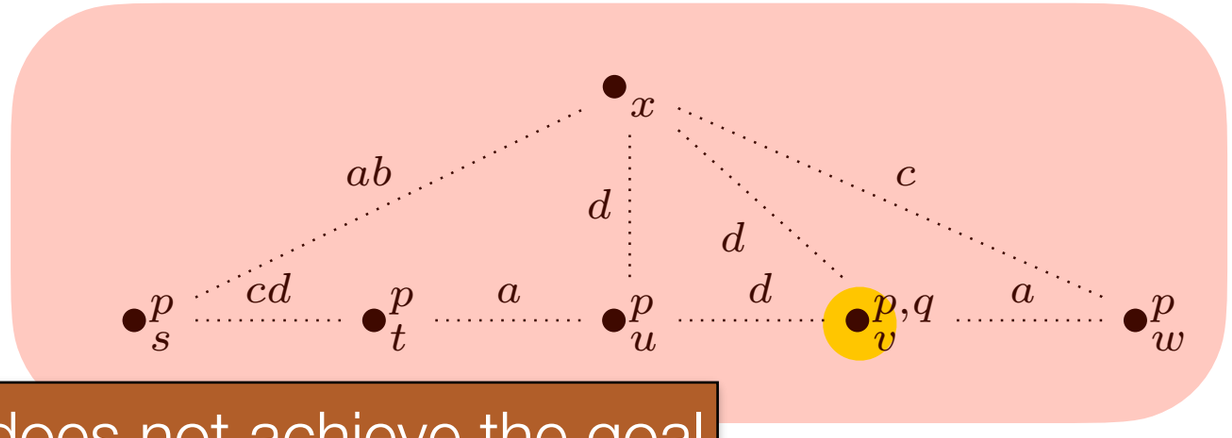


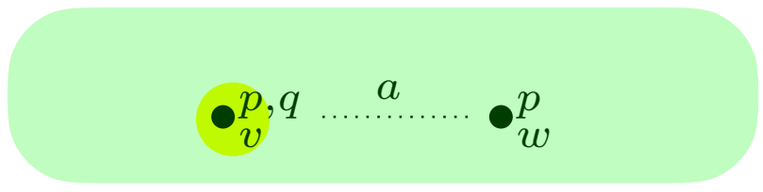


$\Diamond\!\!\!\!-(K_d q \wedge \neg K_a q)$



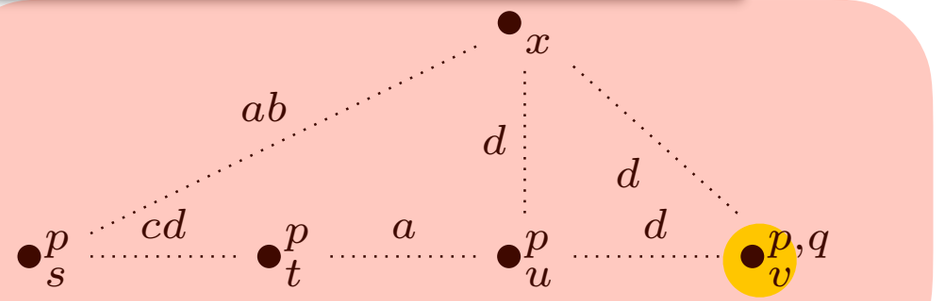




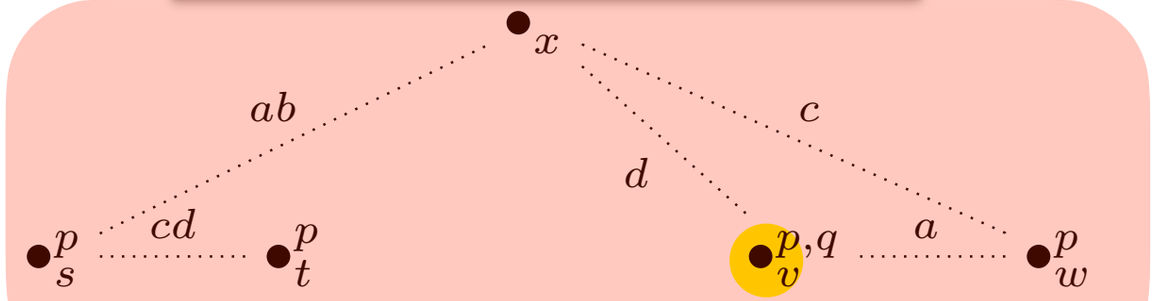


does not achieve the goal

does not achieve the goal

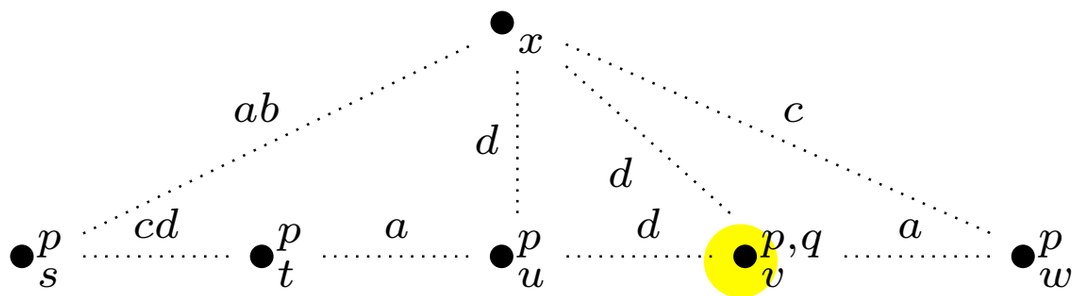


does not achieve the goal



$\blacktriangle(\neg q \to K_a \neg q)!$

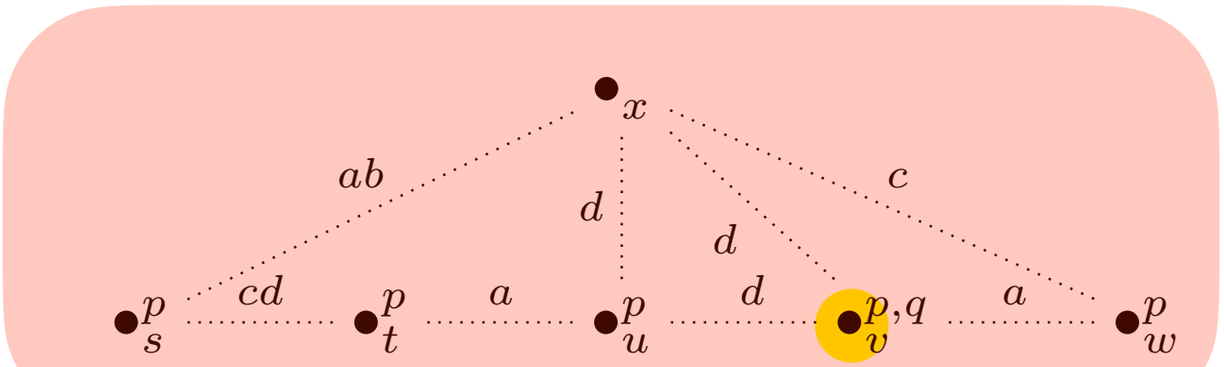
$\blacktriangle((K_c K_a p) \to q)!$



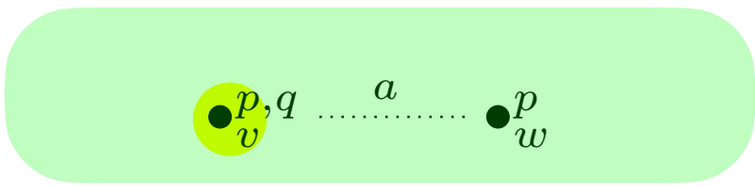
$\Diamond\!\!\!\!-(K_d q \wedge \neg K_a q)$

$\blacktriangle \top!$

$\blacktriangle p!$



does not achieve the goal



David knows q but Alice does not!

Results and summary

- Looked at anonymous public announcements
- Key idea: safety
- Added quantification
- Results: sound and complete Hilbert-style axiomatisation
- Open problem: decidability (conjecture: undecidable)