

A Framework for Reasoning about Dynamic Axioms in Description Logics

Bartosz Bednarczyk, Stéphane Demri, Alessio Mansutti

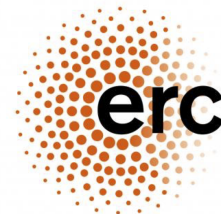
TU DRESDEN & UNIVERSITY OF WROCLAW, CNRS & ENS PARIS-SACLAY



**TECHNISCHE
UNIVERSITÄT
DRESDEN**



Uniwersytet
Wrocławski



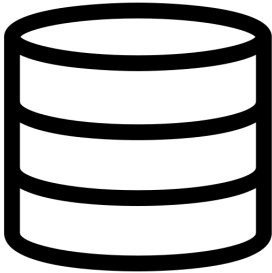
European Research Council

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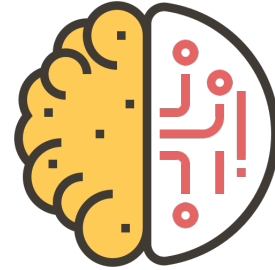
Running example: basketball teams and (possibly injured) players

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Database (ABox)

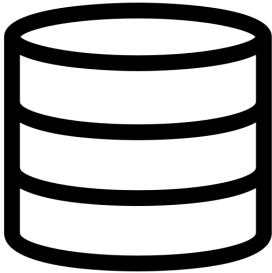


Knowledge (TBox)

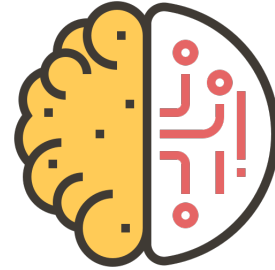


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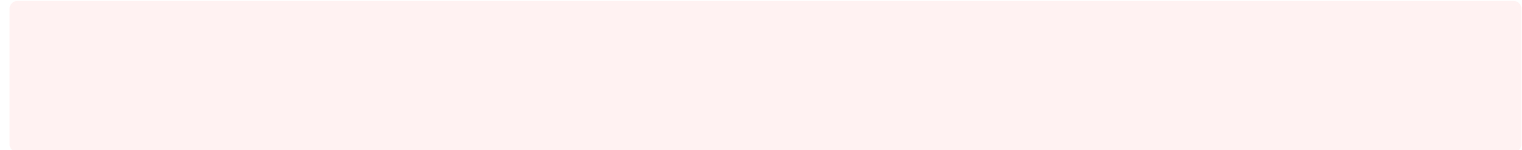
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isDrafted(Zion, Pelicans)



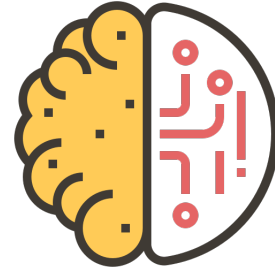
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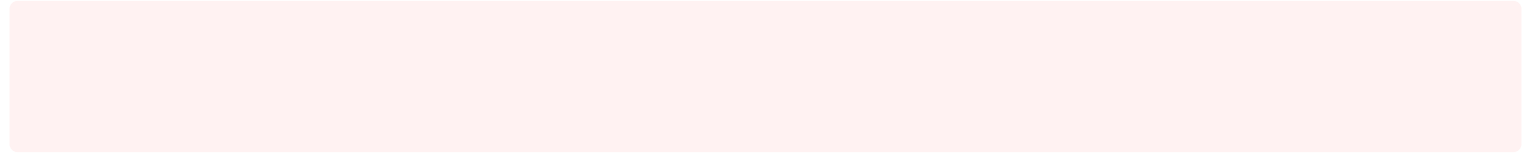


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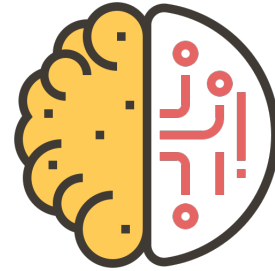
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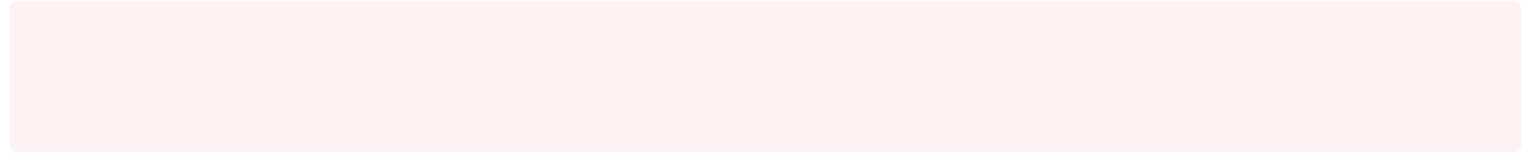
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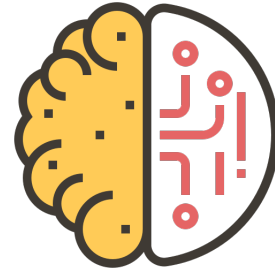
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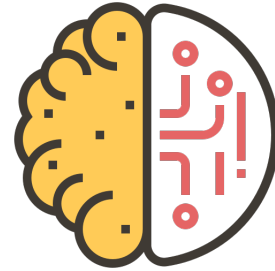
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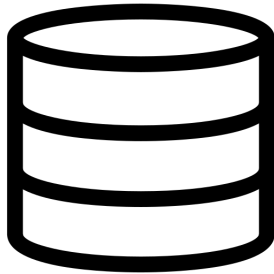
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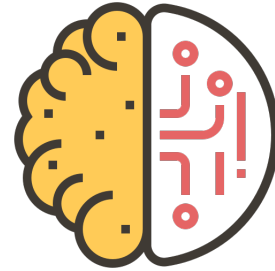
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It essentially states that **no injured player** can be **drafted** by a **team**.



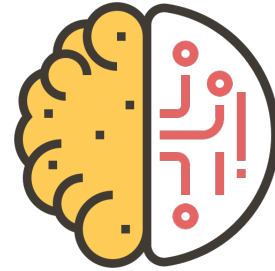
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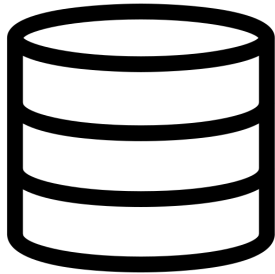
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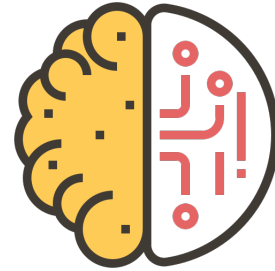
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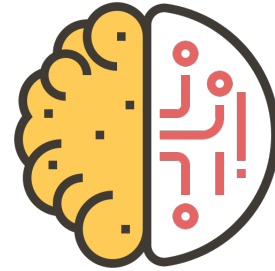
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We propose a new framework based on separation logics!

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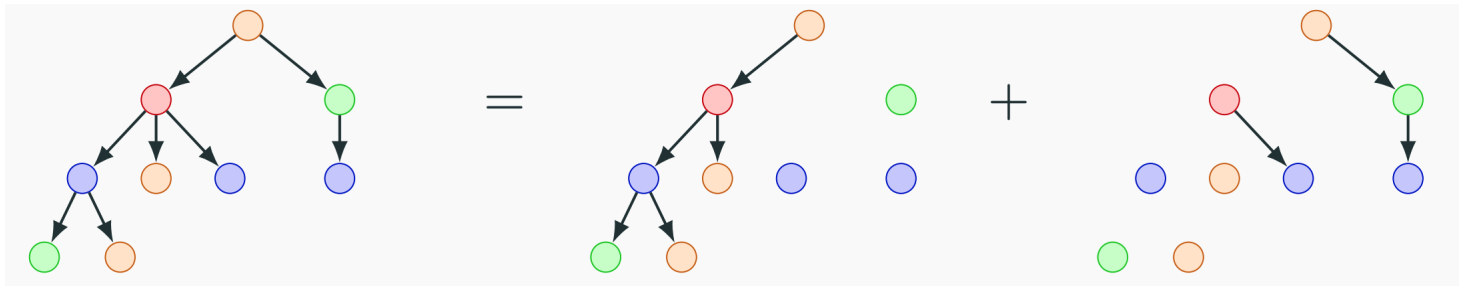
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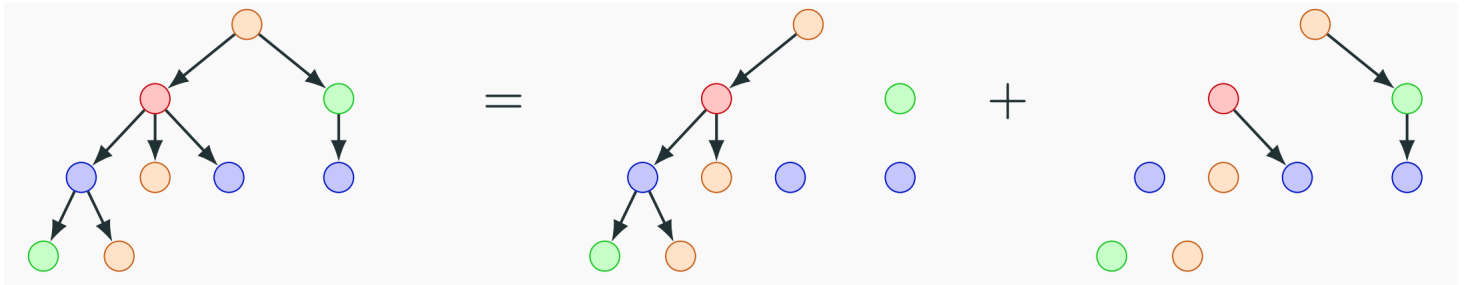


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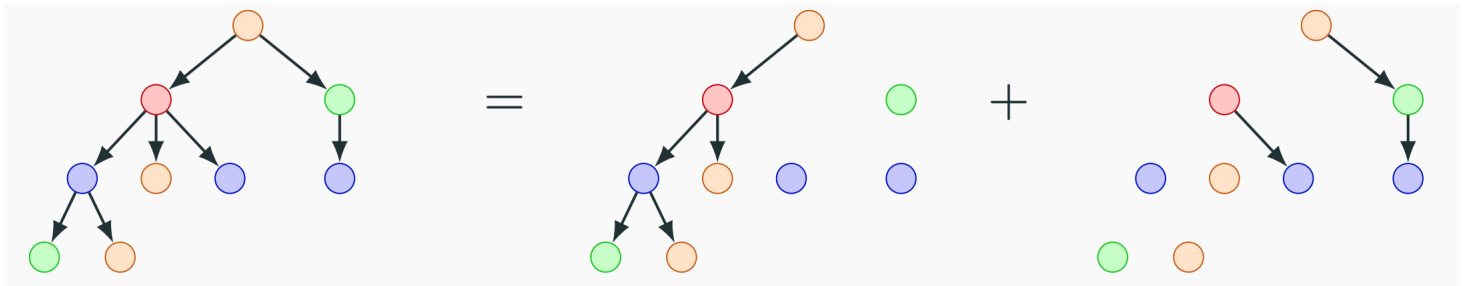
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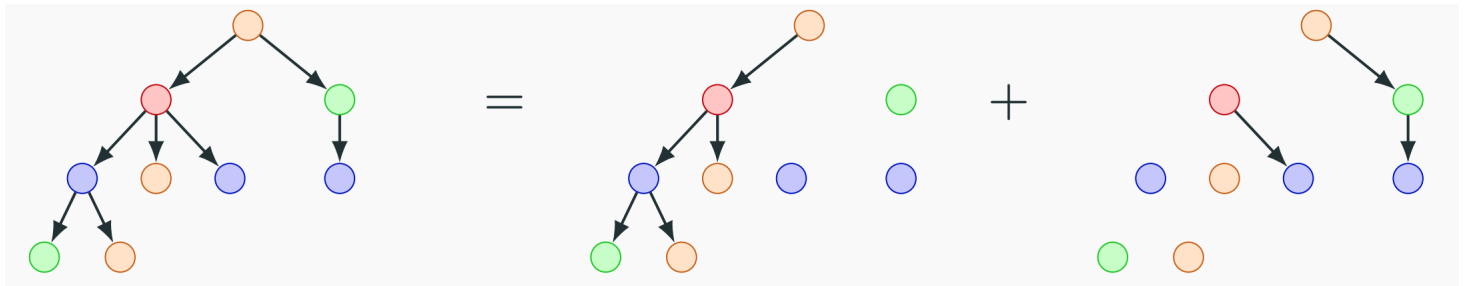
$$\mathbb{U}, \mathbb{V} ::= \underbrace{\top \mid C(\mathbf{a}) \mid r(\mathbf{a}, \mathbf{b}) \mid C \sqsubseteq D \mid \mathbb{U} * \mathbb{V} \mid \mathbb{U} \oplus \mathbb{V}}_{\text{standard DL axioms}} \quad \underbrace{\mid \neg \mathbb{U} \mid \mathbb{U} \sqcap \mathbb{V}}_{\text{boolean operations on axioms}}$$

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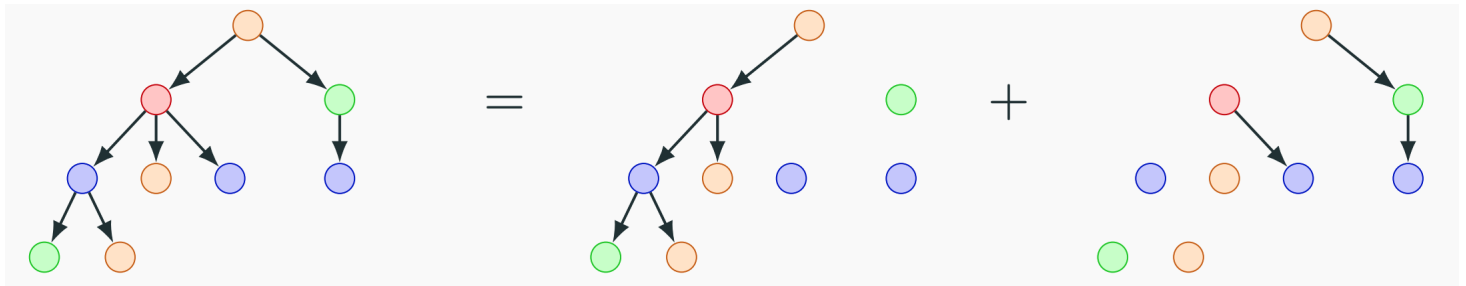
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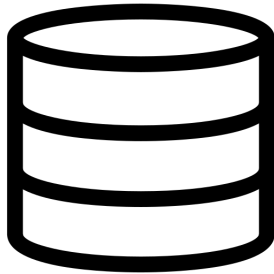
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Running example: recall \mathcal{K}

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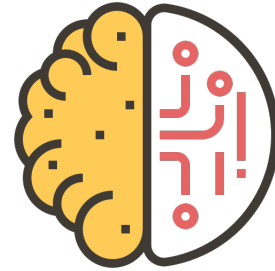
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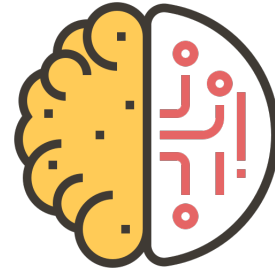
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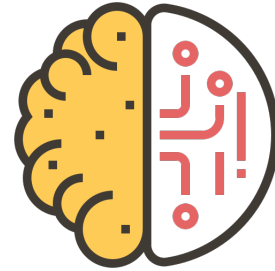
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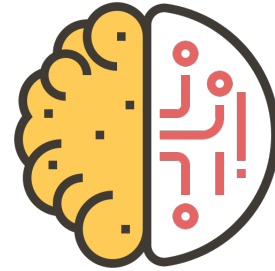
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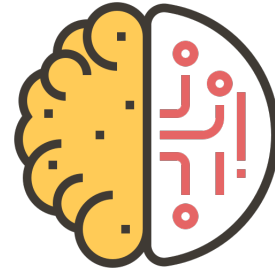
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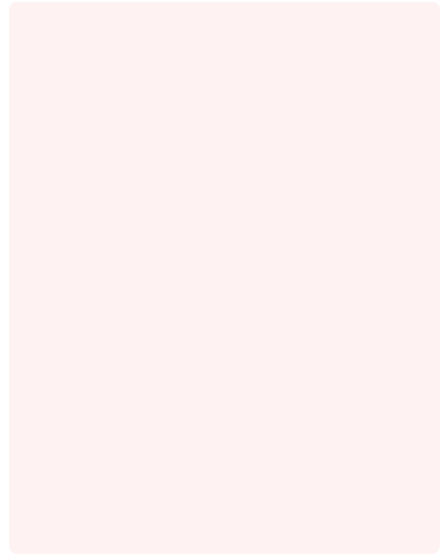
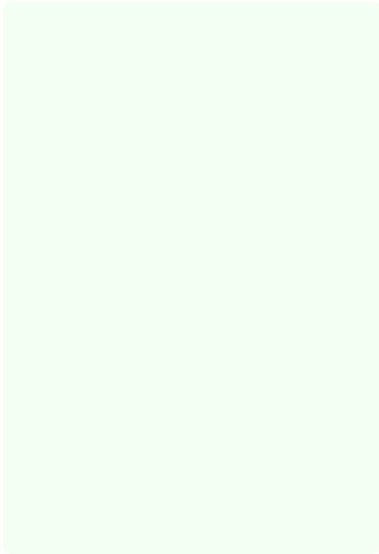
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$\mathcal{K} \cup \mathbb{U}$ is satisfiable iff there is an evolution where Zion is drafted by Pelicans.

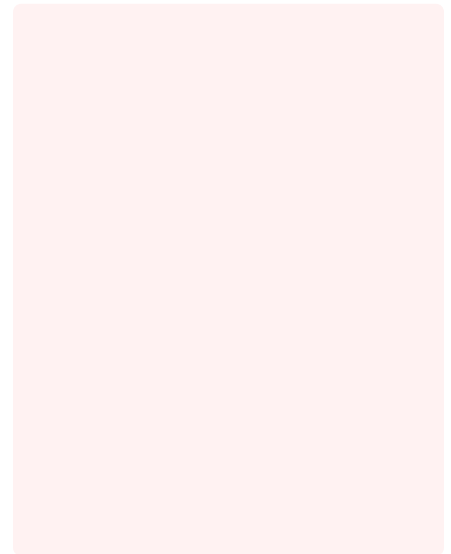
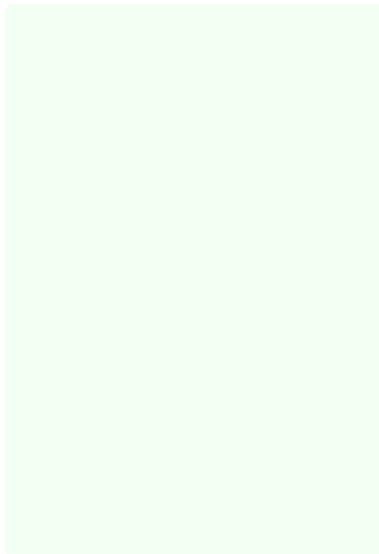


Our results



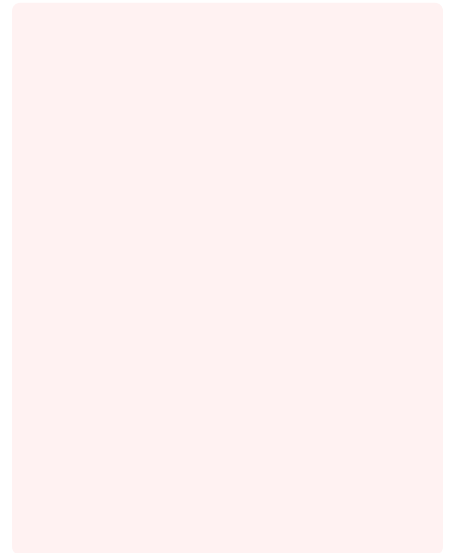
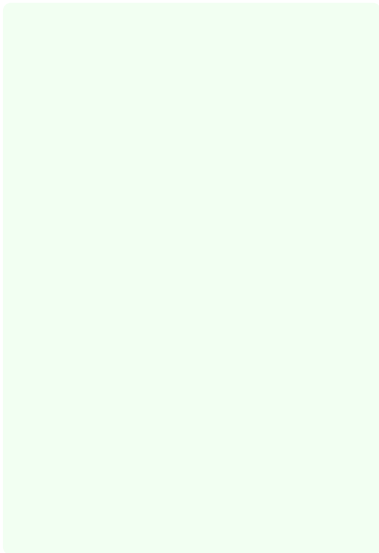
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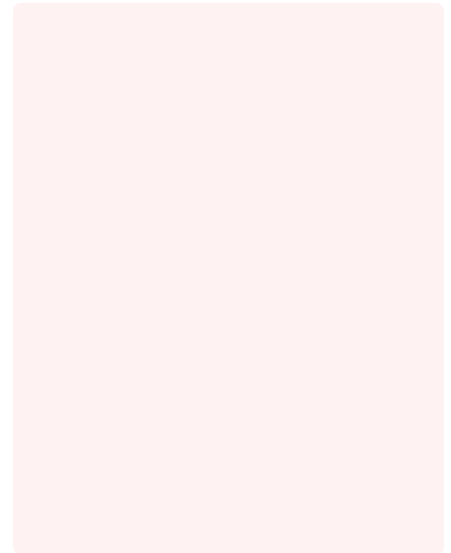
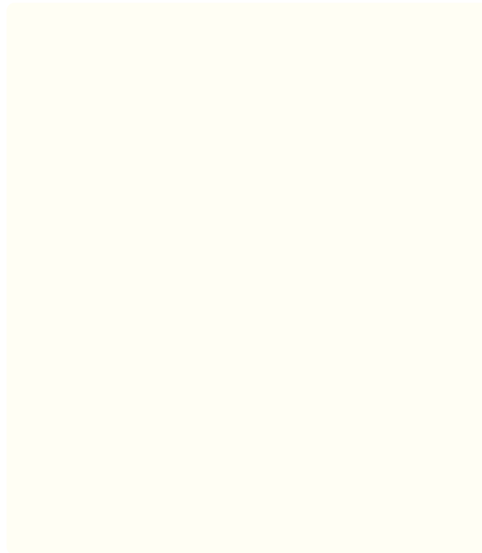
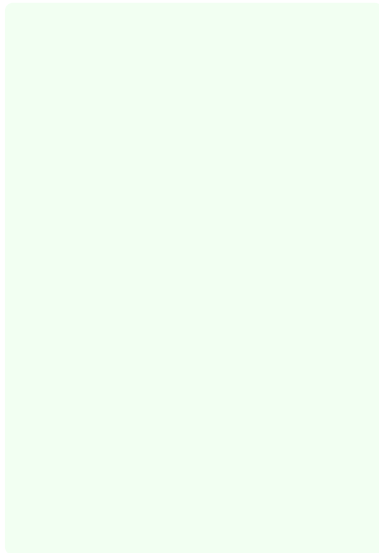
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in PTIME
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Check the paper for more details!