

Monotonicity of cops-and-robber-games

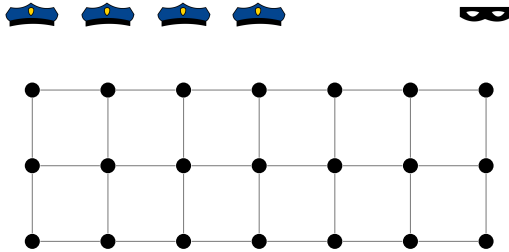
Eva Fluck

RWTH Aachen University

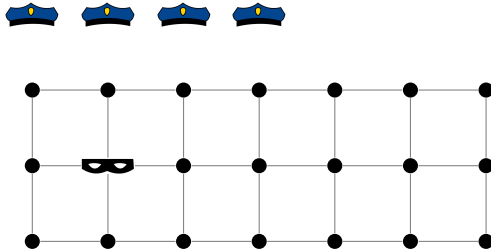
May 28, 2025

joint work with Isolde Adler and David Philipps

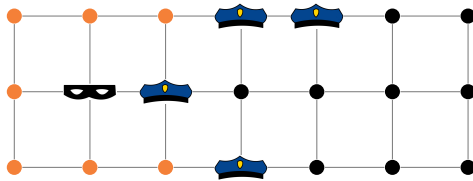
Cops-and-robber game



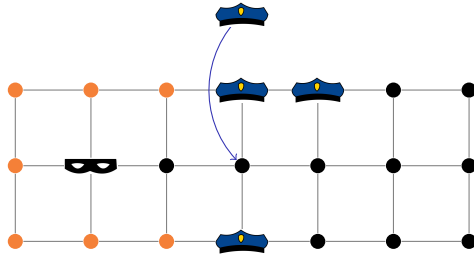
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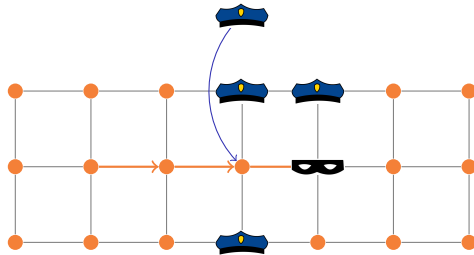
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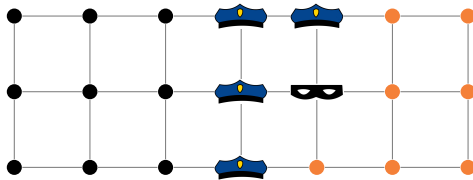
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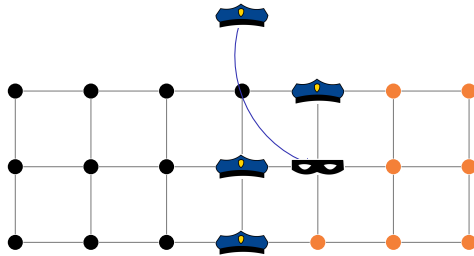
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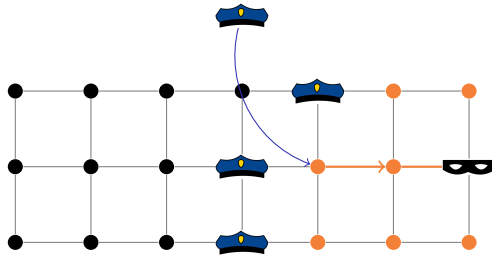
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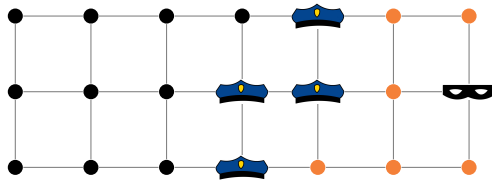
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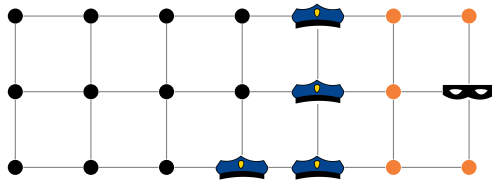
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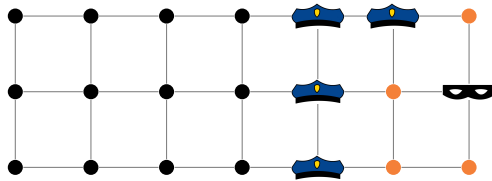
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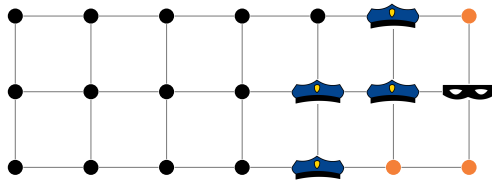
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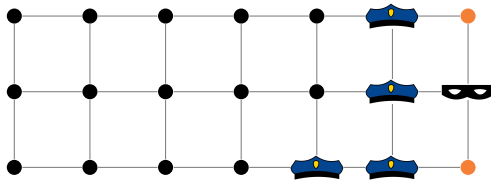
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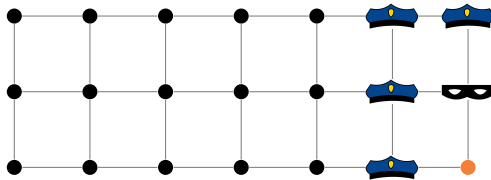
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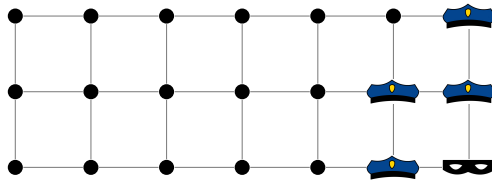
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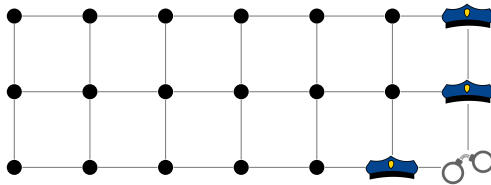
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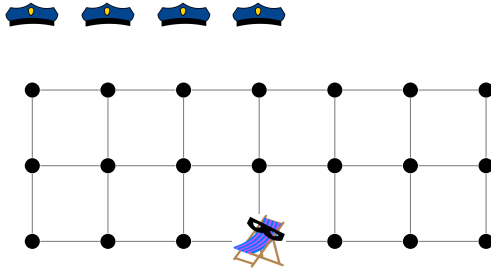
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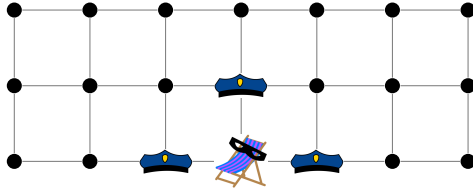
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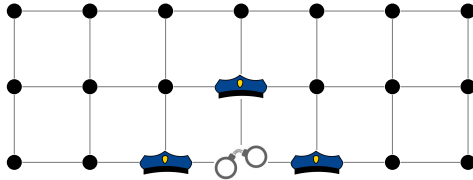
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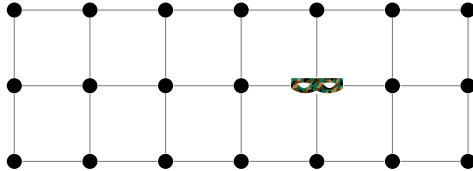
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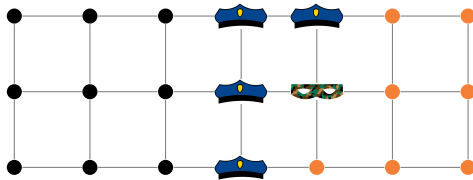
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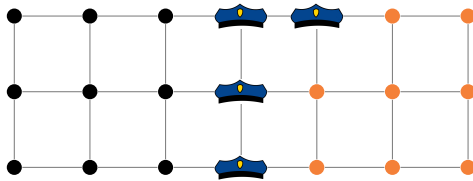
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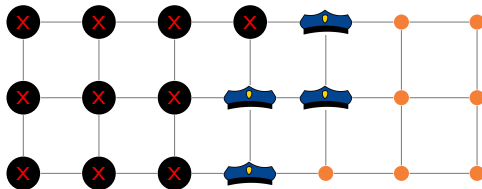
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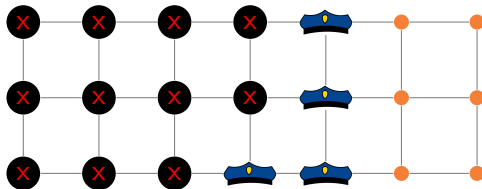
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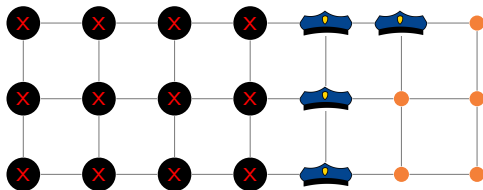
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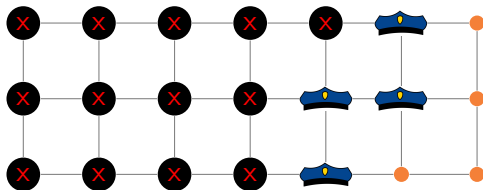
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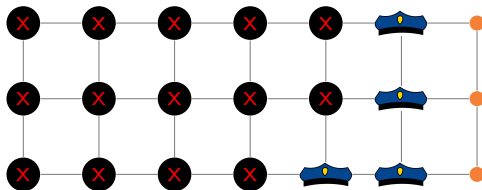
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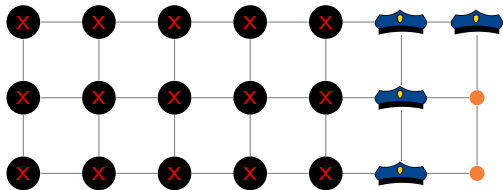
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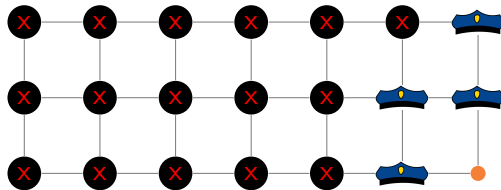
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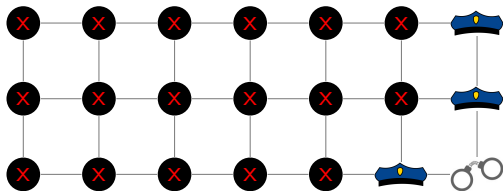
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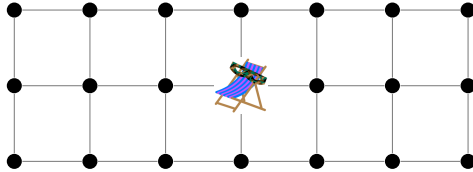
Cops-and-robber game









Cops-and-robber game



Cops-and-robber game









Comparison of variants

	non-monotone	robber-monotone	cop-monotone
			
invisible active 			
visible active 			
invisible lazy 			
visible lazy 			







How many cops are needed to catch the robber?

Comparison of variants

	non-monotone	robber-monotone	cop-monotone
			
invisible active 	path-width [KP85]	path-width [KP86]	path-width [KP86]
visible active 	tree-width [ST93]	tree-width [ST93]	tree-width [ST93]
invisible lazy 	tree-width [DKT97]	tree-width [DKT97]	
visible lazy 	∞ -degeneracy [RT11]		







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visible lazy 	∞ -degeneracy [RT11]	???	???

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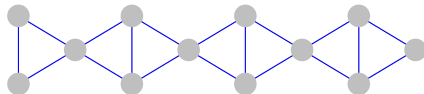
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invisible active 	path-width [KP85]	path-width [KP86]	path-width [KP86]
visible active  bounded number of rounds	tree-width [ST93] ???	tree-width [ST93] ???	tree-width [ST93] bounded-depth tw [FSS24]
invisible lazy 	tree-width [DKT97]	tree-width [DKT97]	???
visible lazy 	∞ -degeneracy [RT11]	???	???

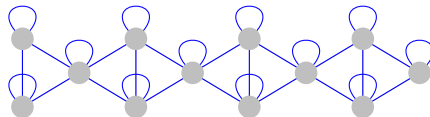
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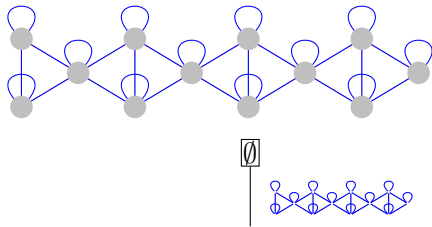
Pre-tree-decomposition from strategy



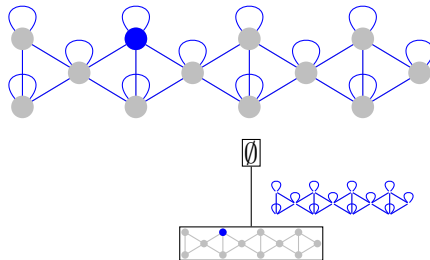
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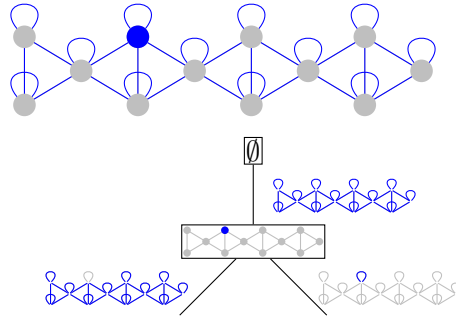
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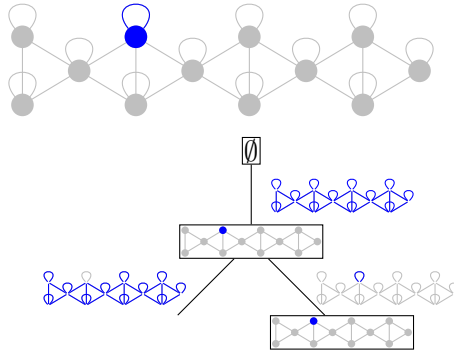
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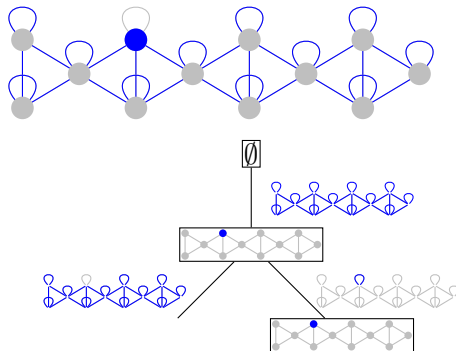
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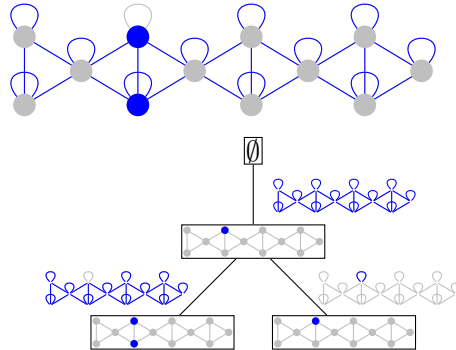
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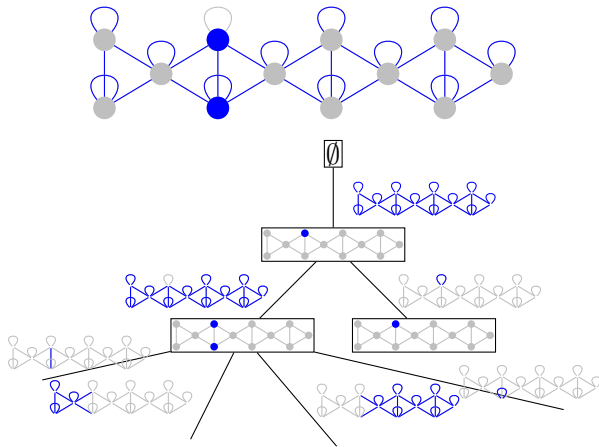
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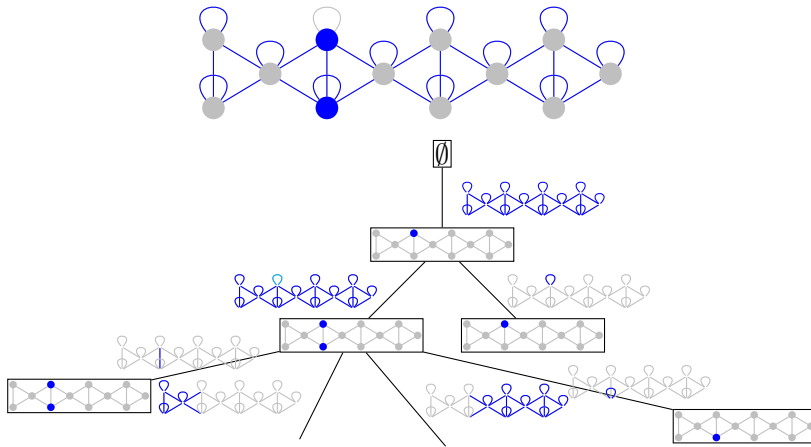
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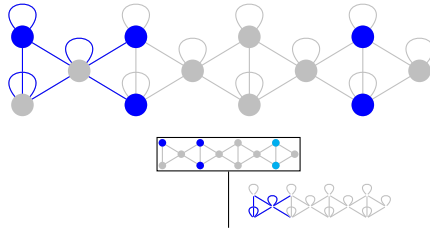
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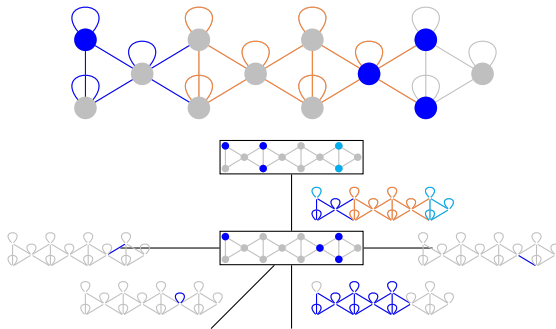
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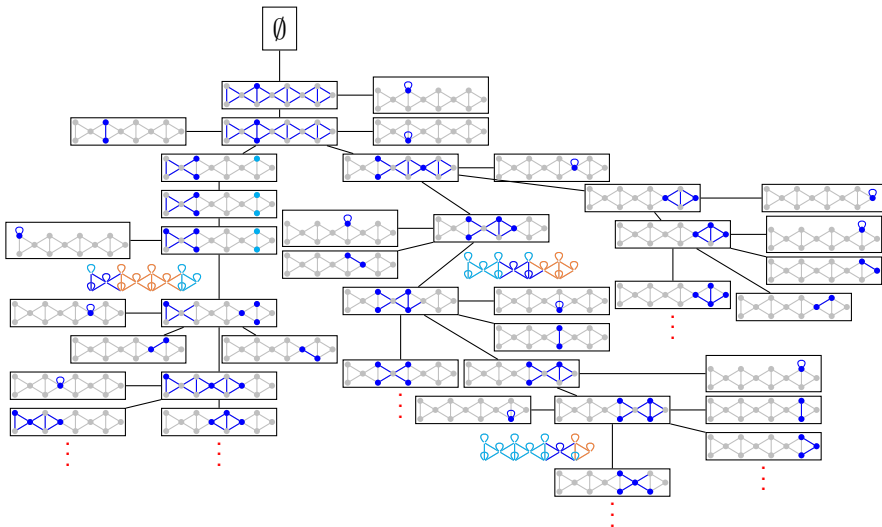
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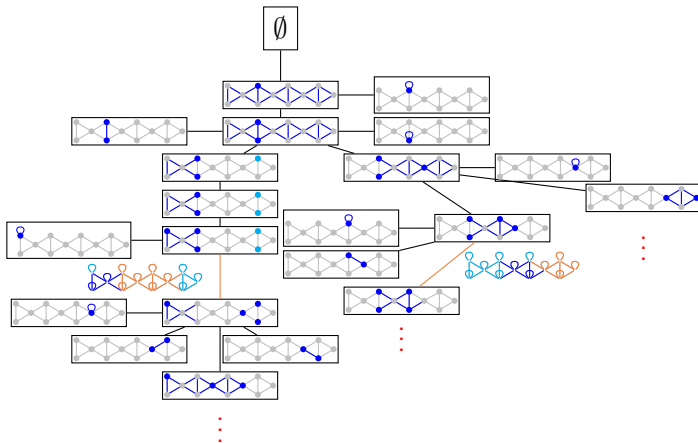
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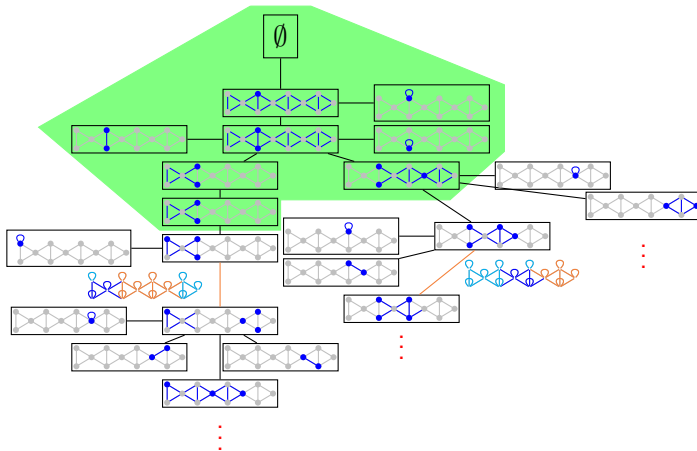
The strategy tree



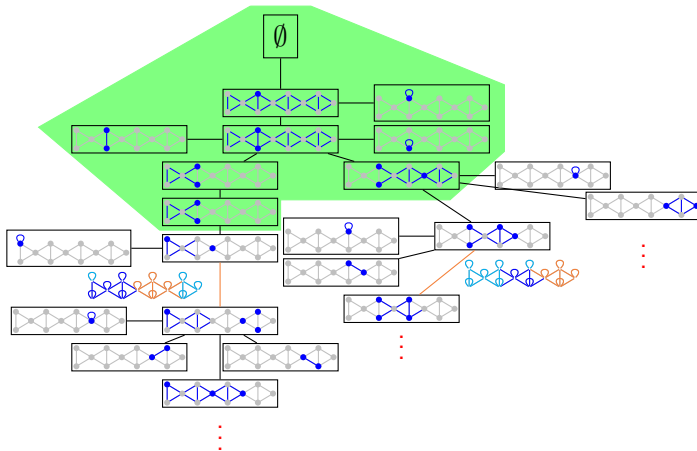
Cleaning the tree



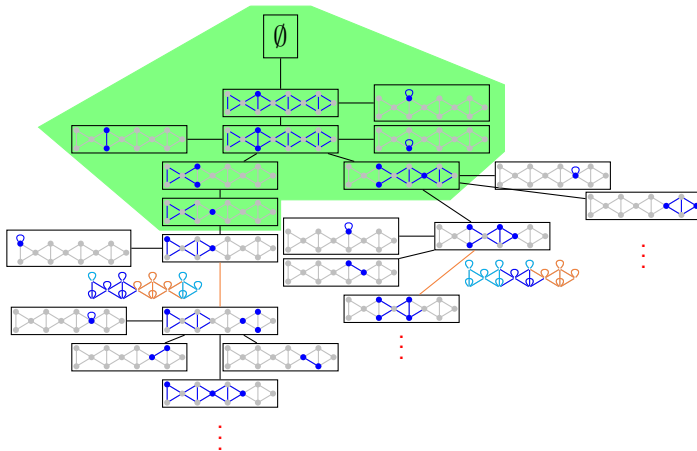
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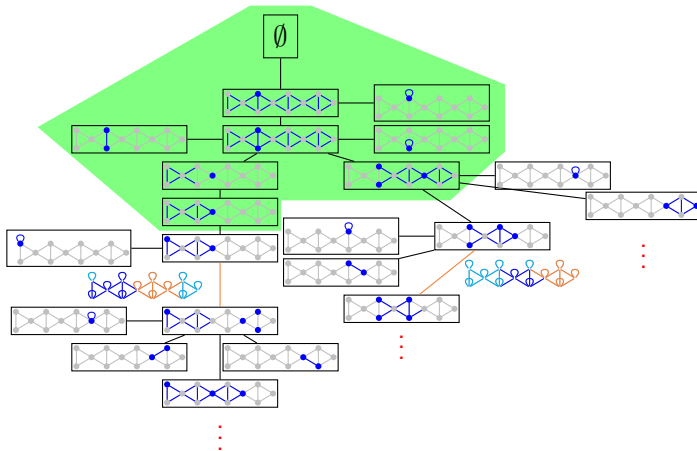
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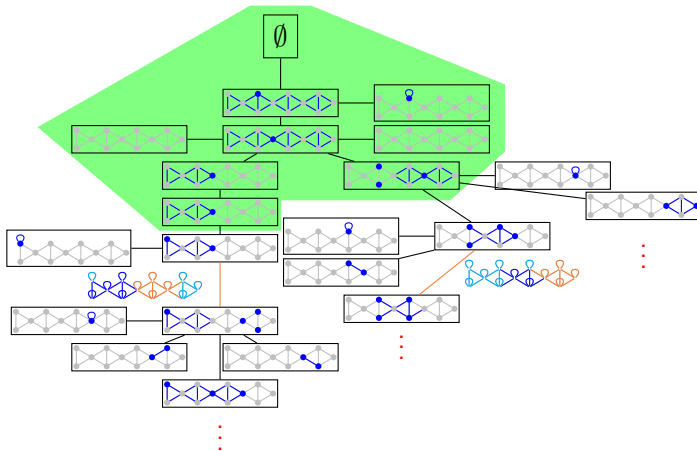
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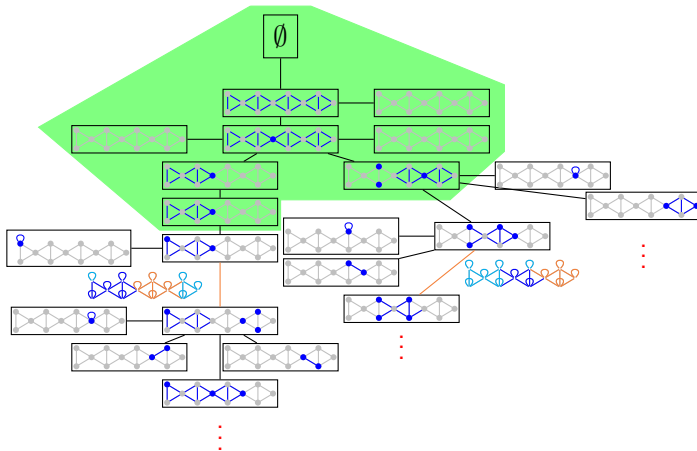
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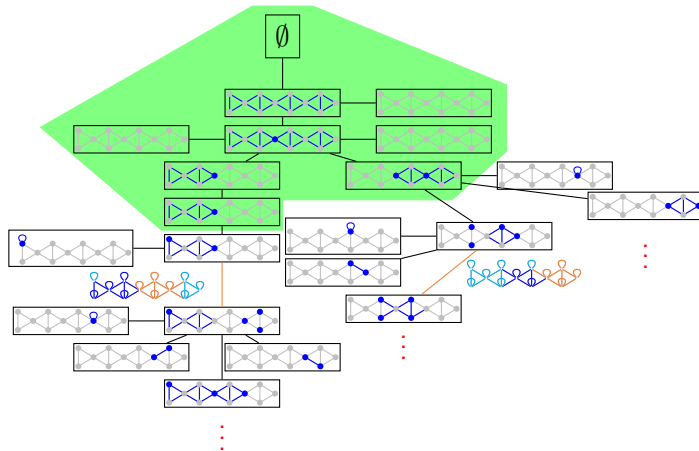
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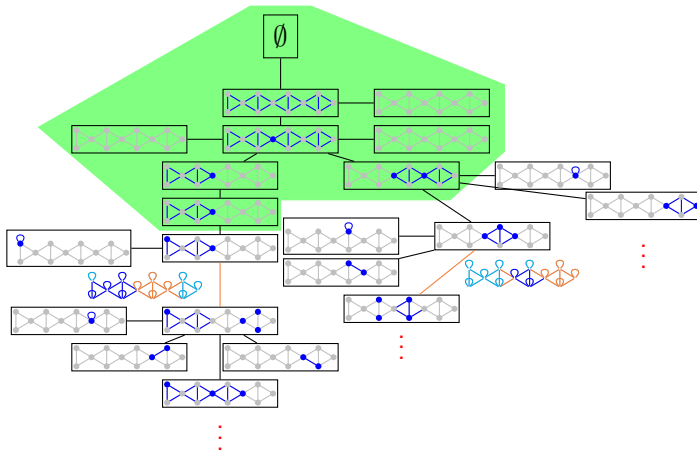
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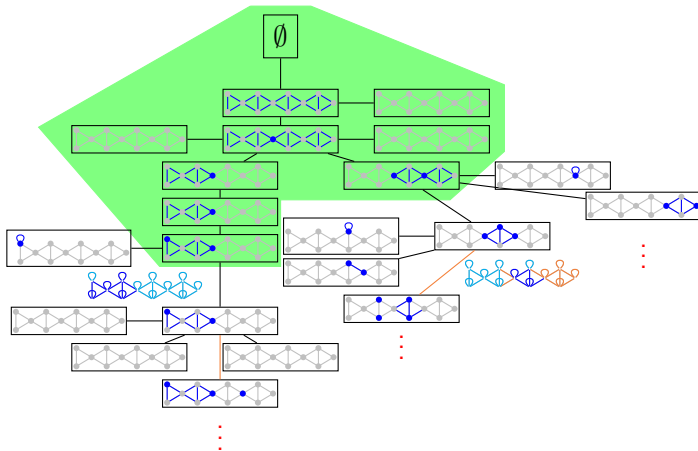
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Cleaning the tree









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visible active  bounded number of rounds	tree-width [ST93] bounded-depth tw [Adler and F., 2024]	tree-width [ST93] bounded-depth tw [Adler and F., 2024]	tree-width [ST93] bounded-depth tw [FSS24]
invisible lazy 	tree-width [DKT97]	tree-width [DKT97]	???
visible lazy 	∞ -degeneracy [RT11]	???	???







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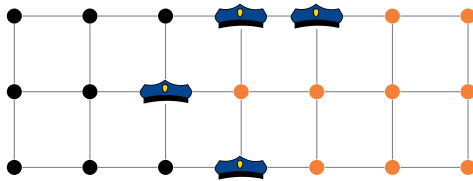
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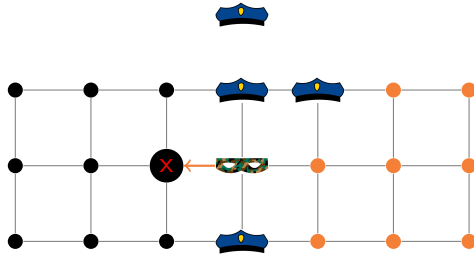
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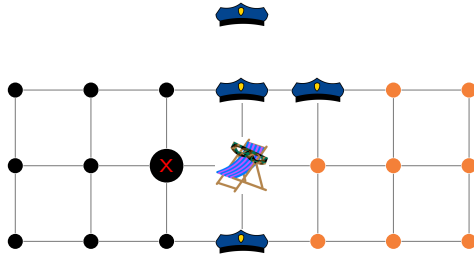
Laziness is no restriction



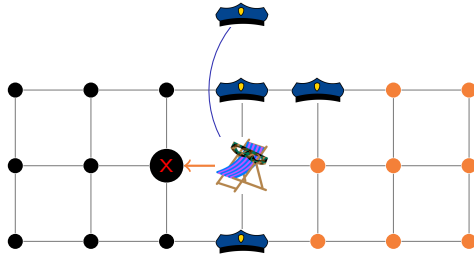
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Isolde Adler and Eva Fluck.

Monotonicity of the cops and robber game for bounded depth treewidth.

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Eva Fluck and David Philipps.

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