

Spies and Revolutionaries

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Joint with [Cliff Smyth](#) and [Douglas West](#)

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Introduction

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Each rev. moves to a vertex, then each spy moves to a vertex.

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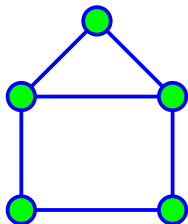
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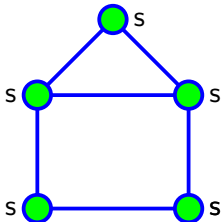
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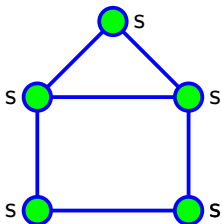
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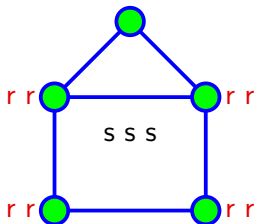
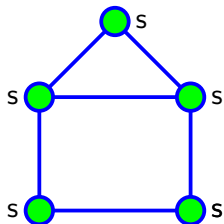
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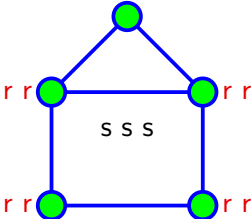
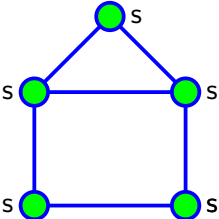
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So we assume $\lfloor r/m \rfloor \leq s < |V(G)|$.

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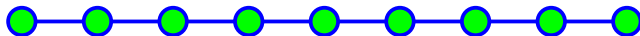
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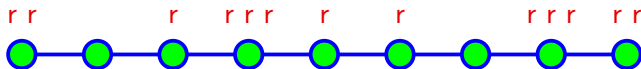
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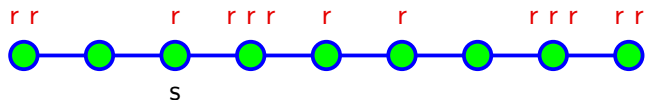
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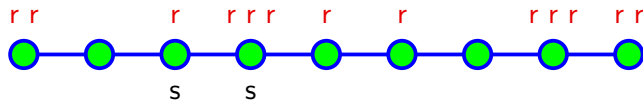
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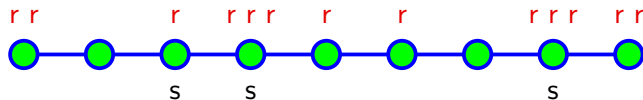
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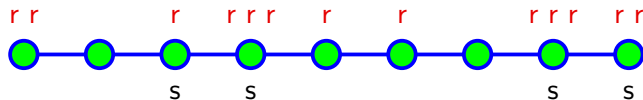
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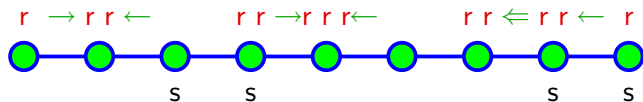
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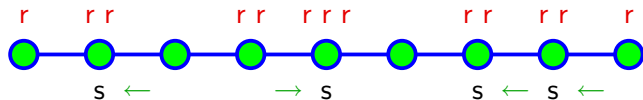
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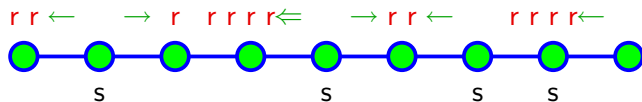
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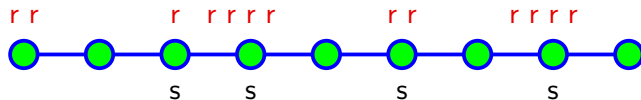
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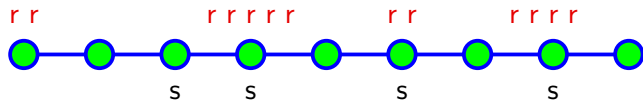
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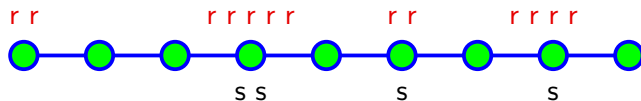
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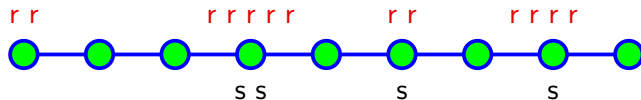
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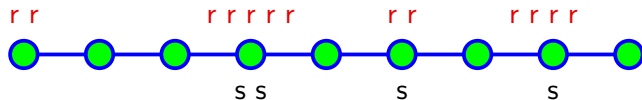
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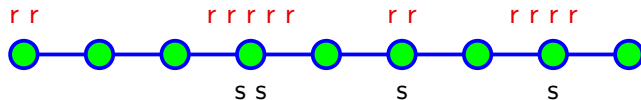
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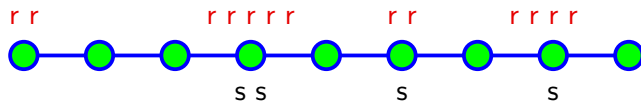
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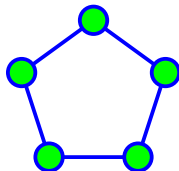
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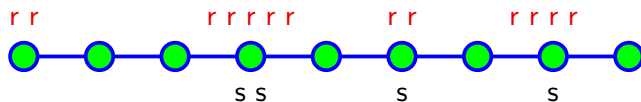
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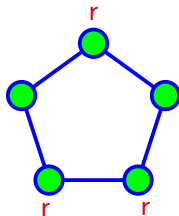
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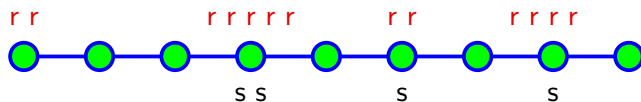
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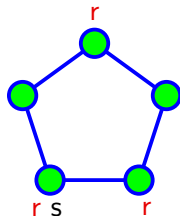
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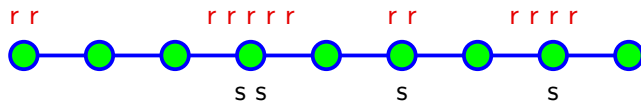
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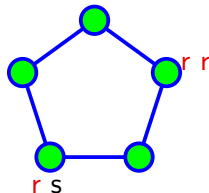
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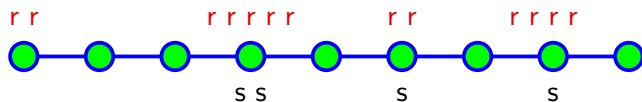
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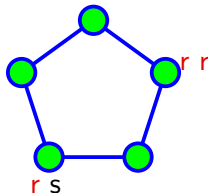


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Consider $m = 2, r = 3, s = 1$.

Lemma:

For $k \geq 4$, C_k is not spy-friendly.



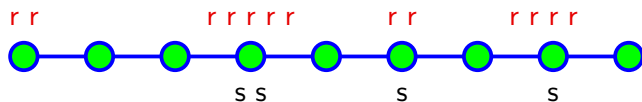
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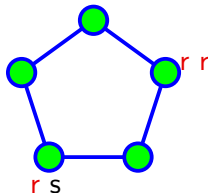


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... but it's very close.



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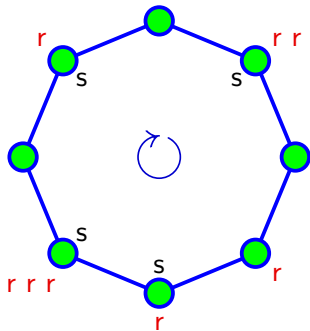
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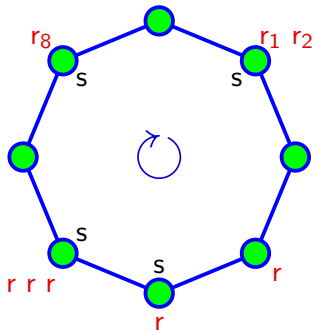
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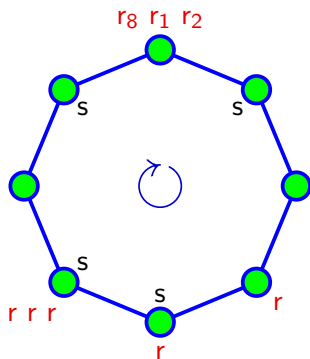
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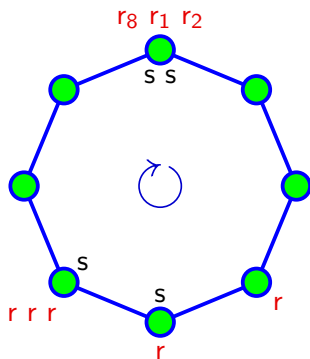
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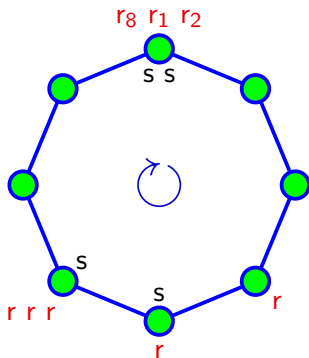
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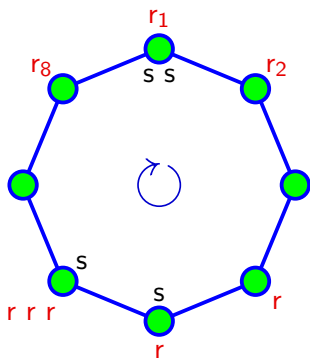
We can renumber the rev's so they always stay in order.

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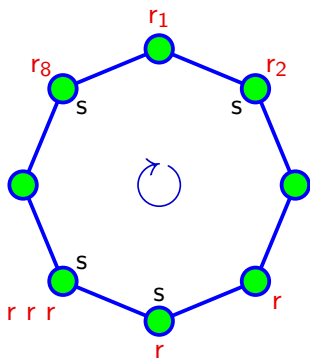
We can renumber the rev's so they always stay in order.

Nearly Spy-friendly Graphs

Def: A graph G is **nearly spy-friendly** if the spies win on G for all integers m, r, s such that $\lceil r/m \rceil \leq s$.

Thm 3: All cycles are nearly spy-friendly.

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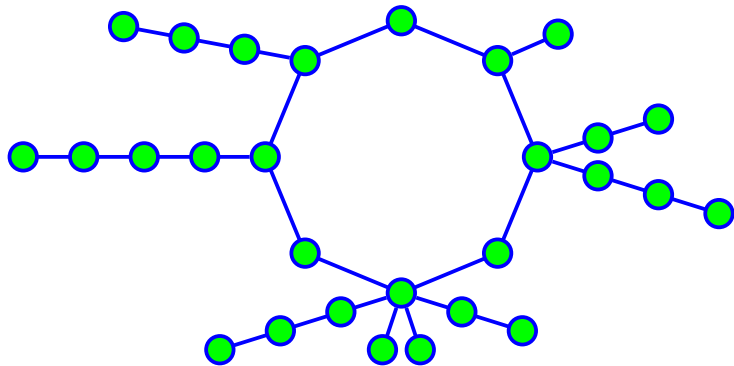
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Playing on the Sun

Def: A **sun** is a cycle with paths hanging off some vertices.

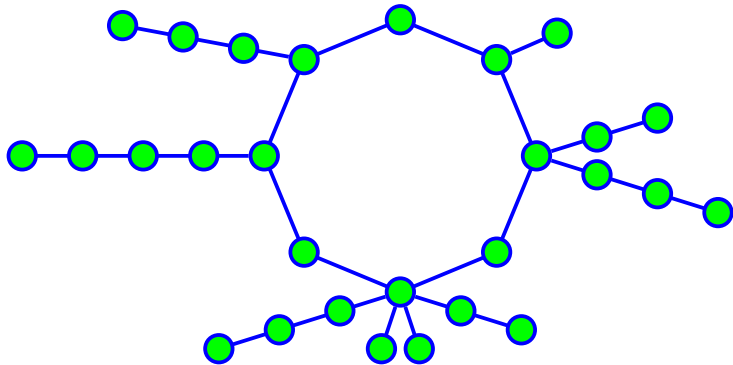
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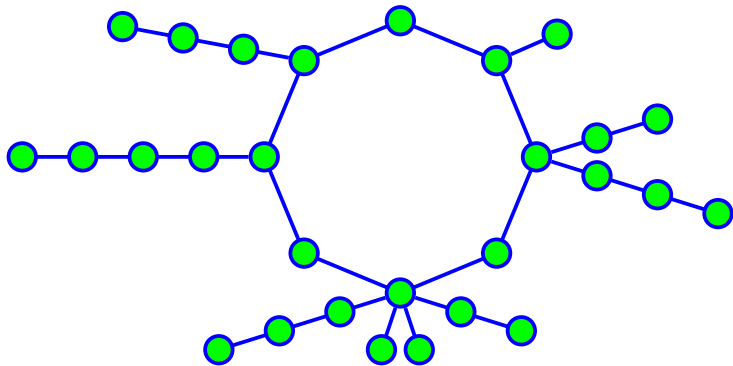
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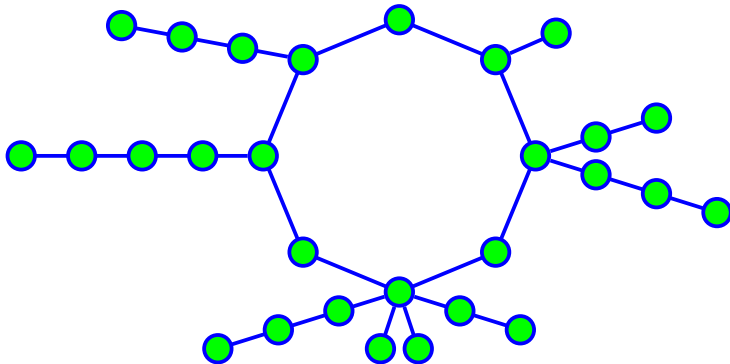
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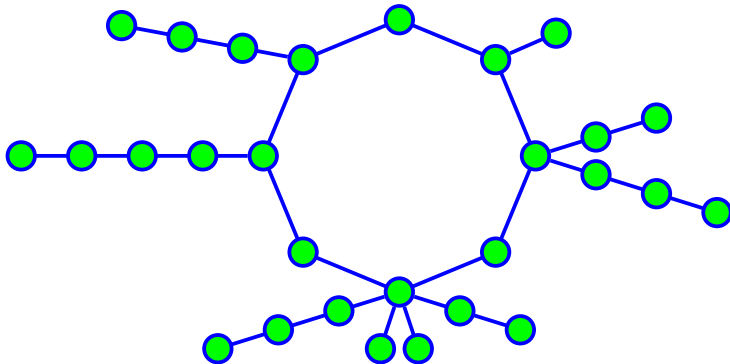


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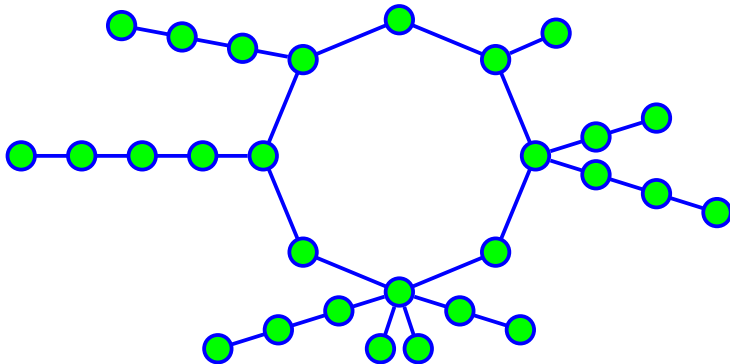
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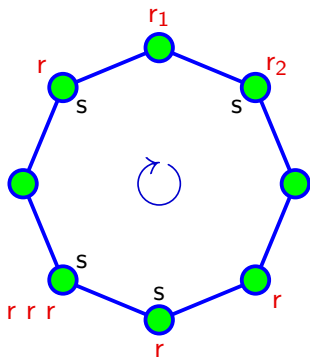
Key Insights (for cycles):

Say the spies have a good position on a cycle.

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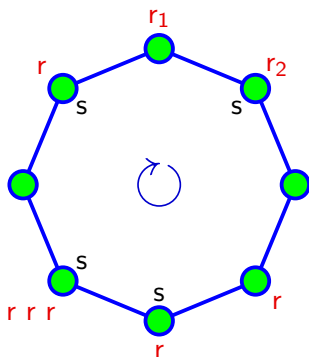


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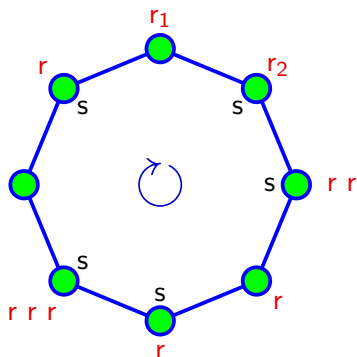
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- If m new rev's and 1 new spy appear on the same vertex of the cycle, the new position is still good for the spies.

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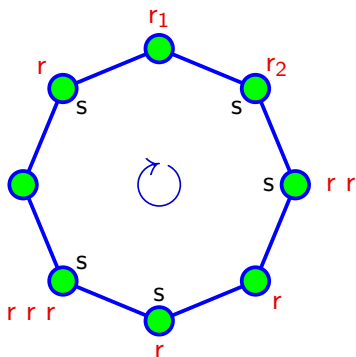
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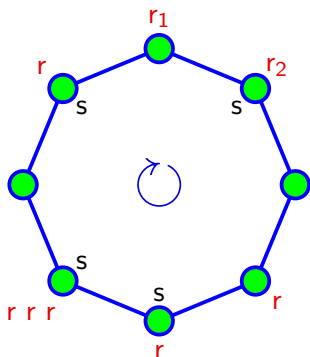
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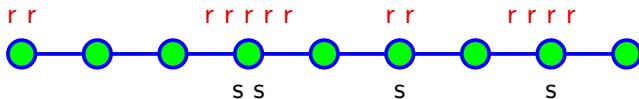
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Ex: P_9 with $m = 3$, $r = 13$, $s = 4$.

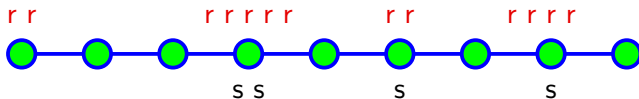


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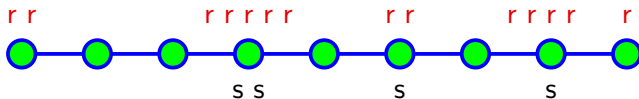
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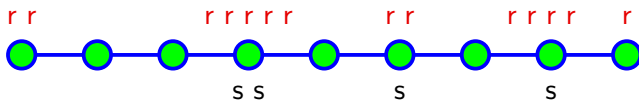
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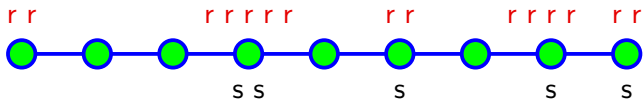
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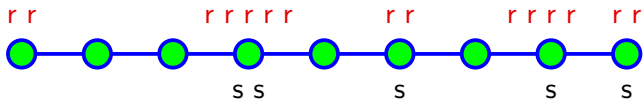
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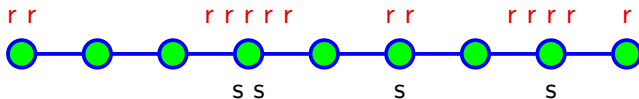
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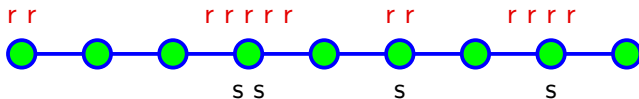
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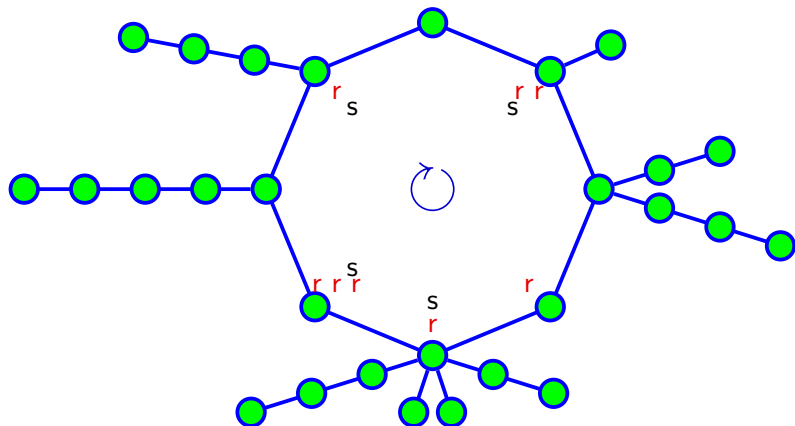
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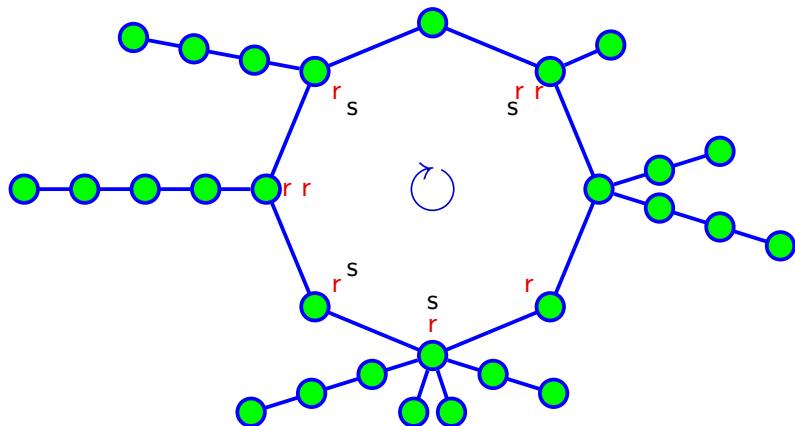


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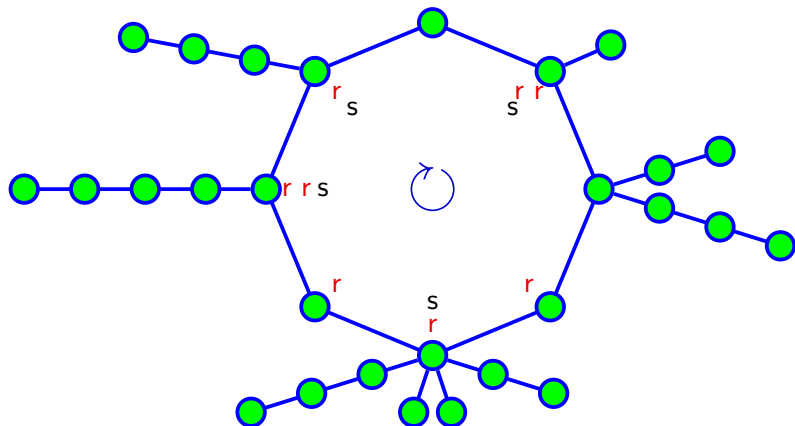


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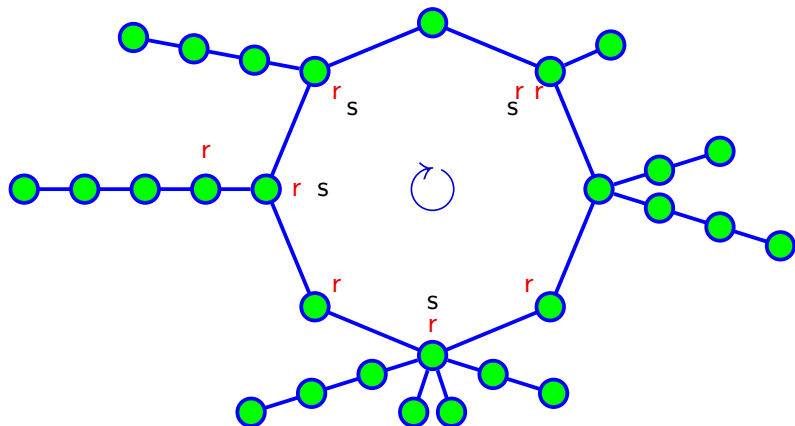


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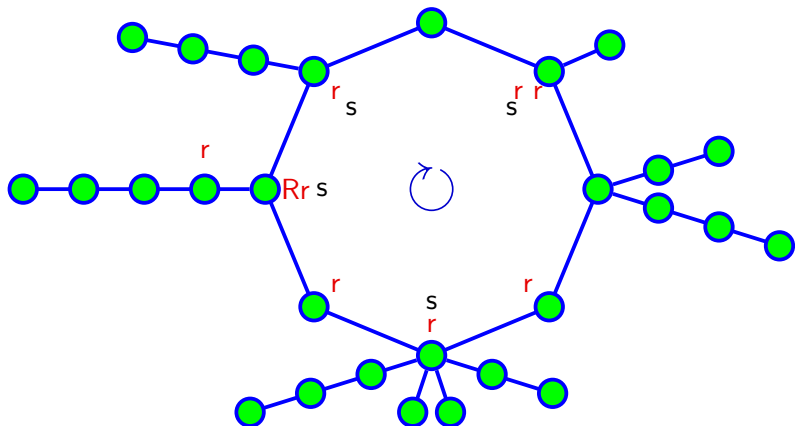


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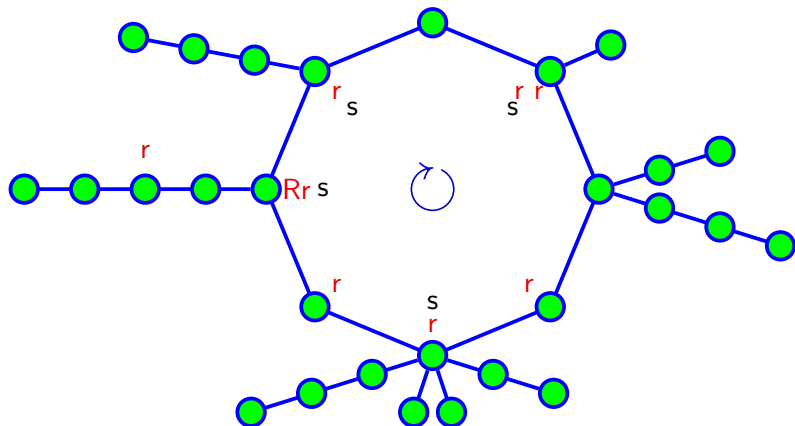


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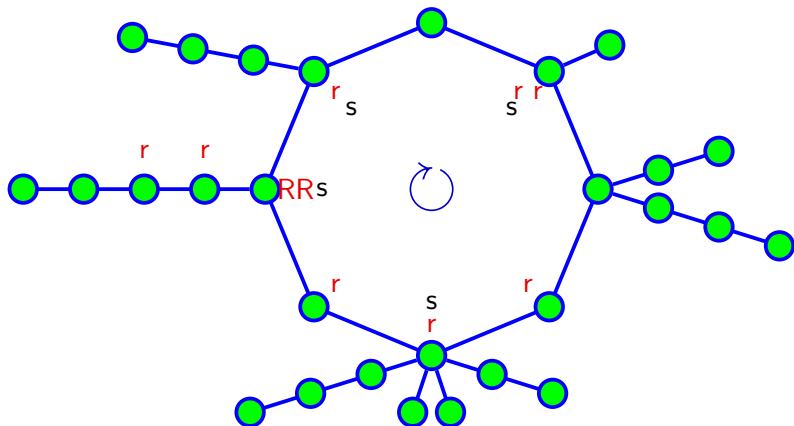


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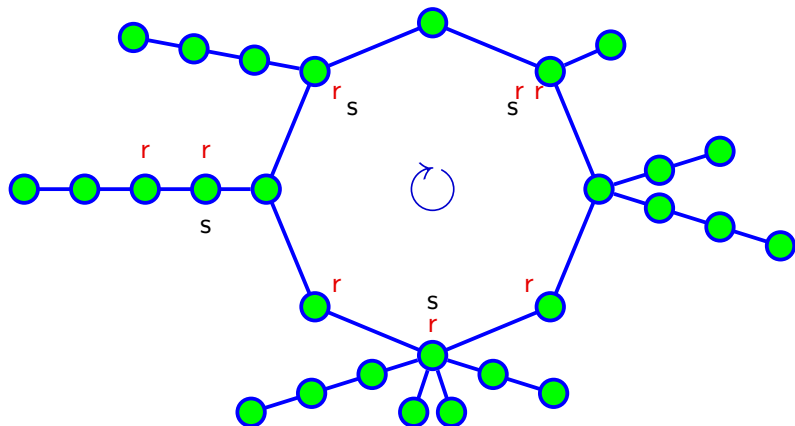


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