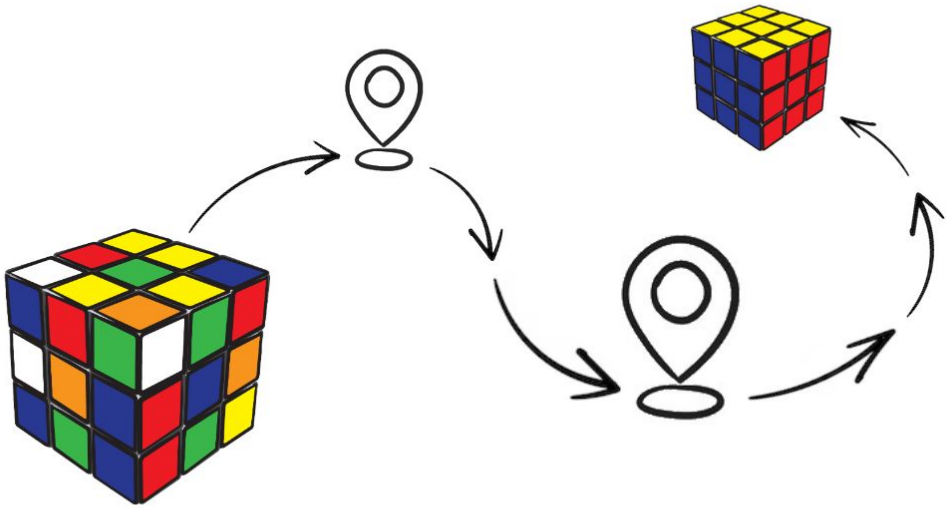
ICLR

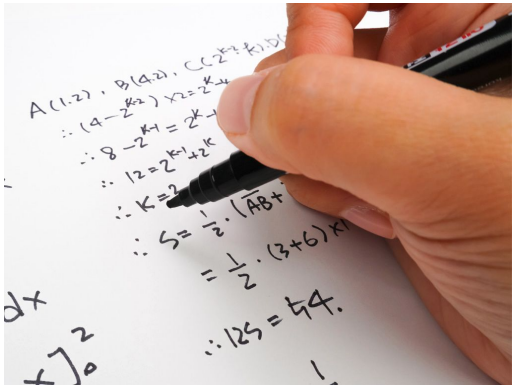
Fast and Precise: Adjusting Planning Horizon with Adaptive Subgoal Search



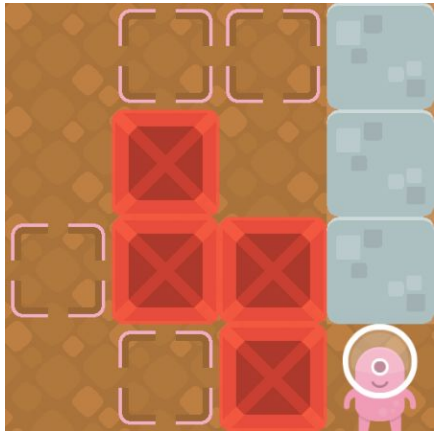
Meet the authors

Michał Zawalski, Michał Tyrolski, Konrad Czechowski, Tomasz Odrzygóźdź,
Damian Stachura, Piotr Piękos, Yuhuai Wu, Łukasz Kuciński, Piotr Miłoś

Environments



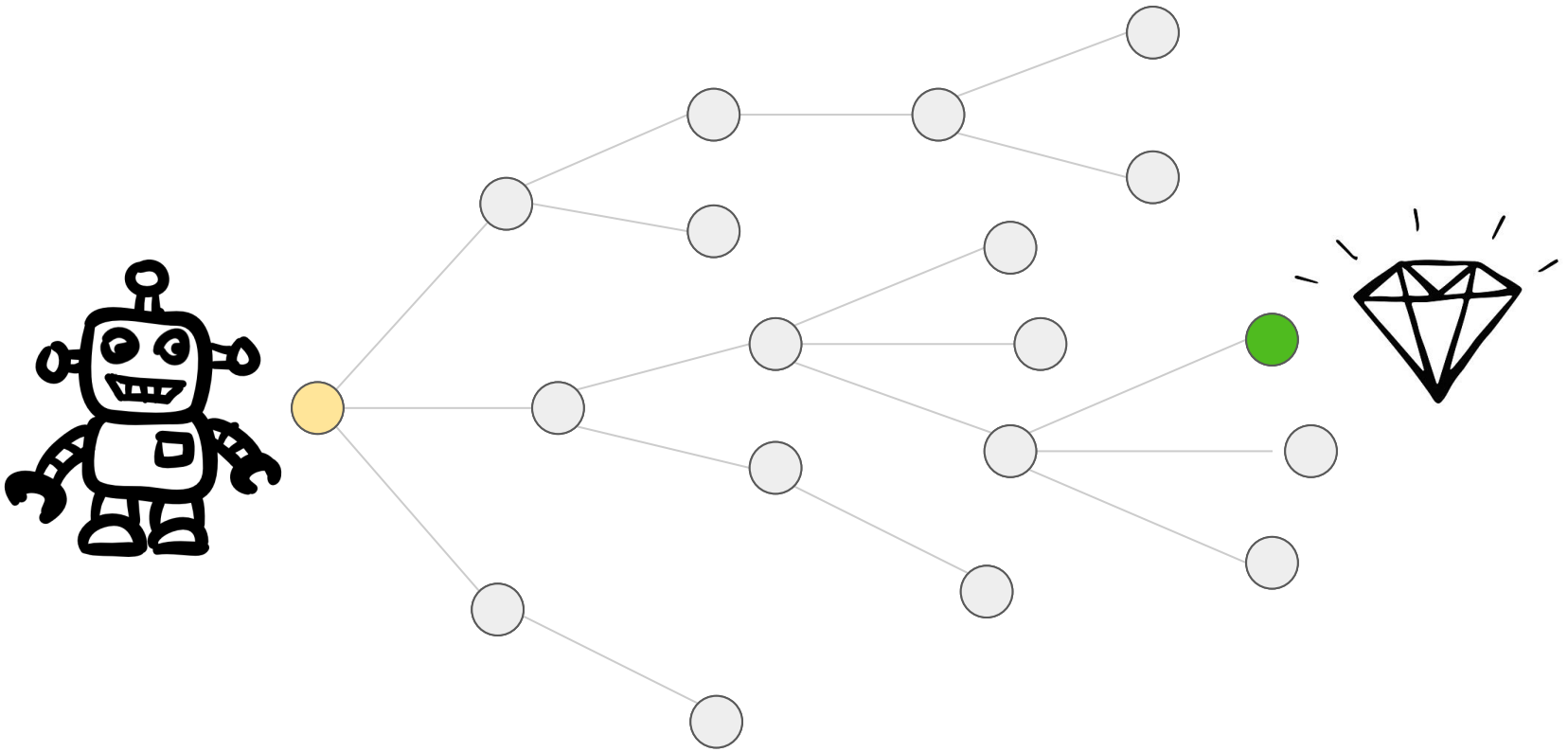
INT (proving inequalities)



Sokoban

Rubik's Cube

Graph search



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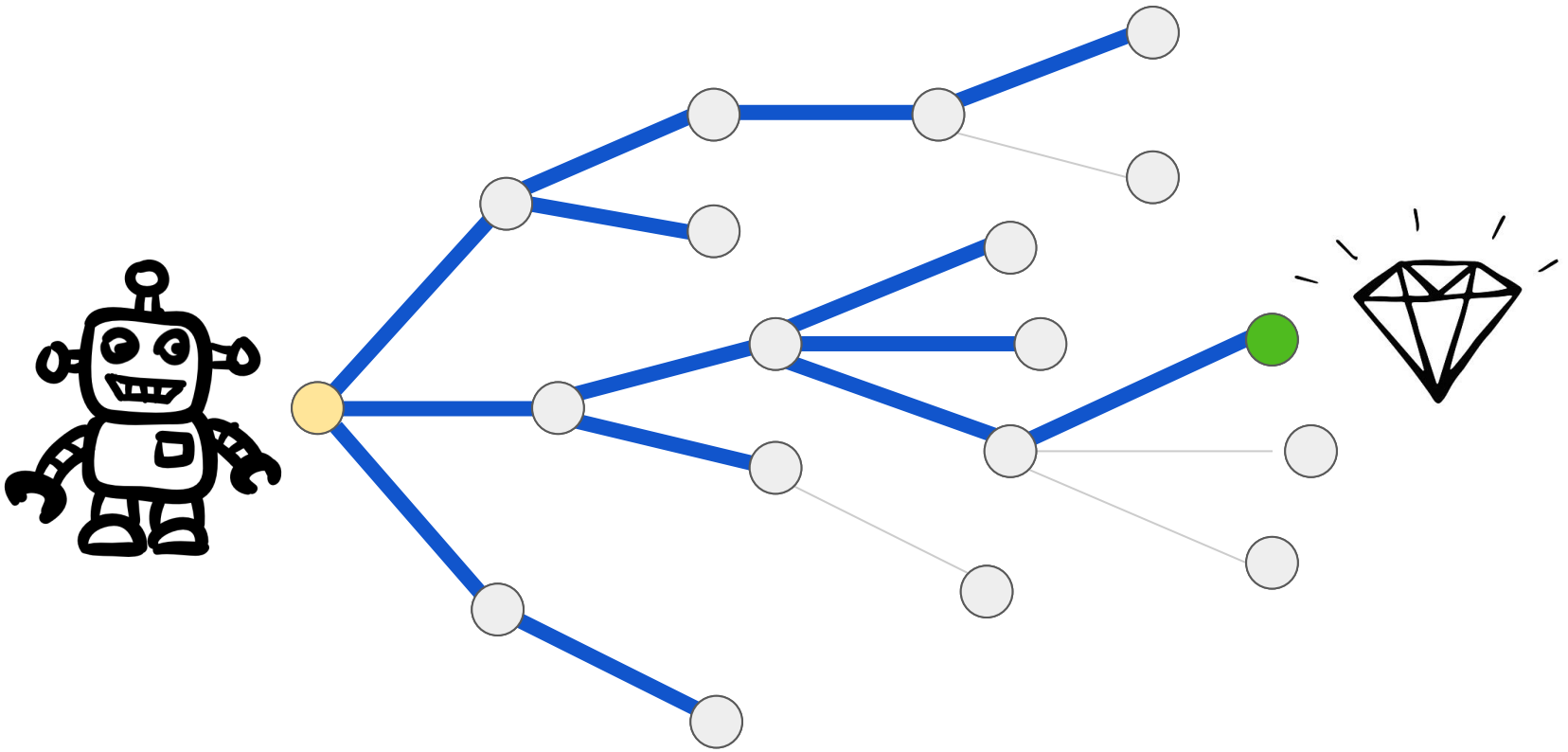
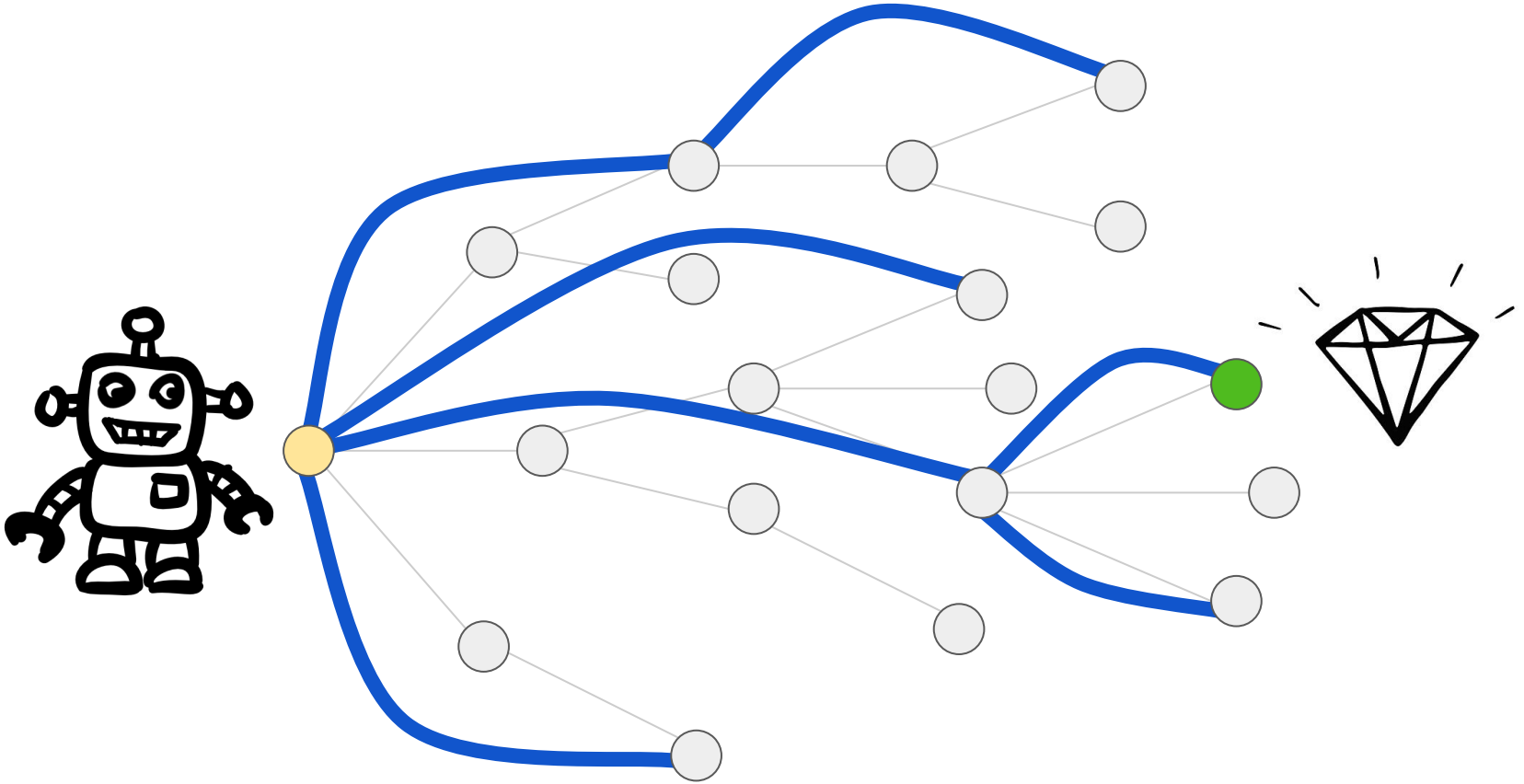


Adaptive Subgoal Search



Adaptive Subgoal Search

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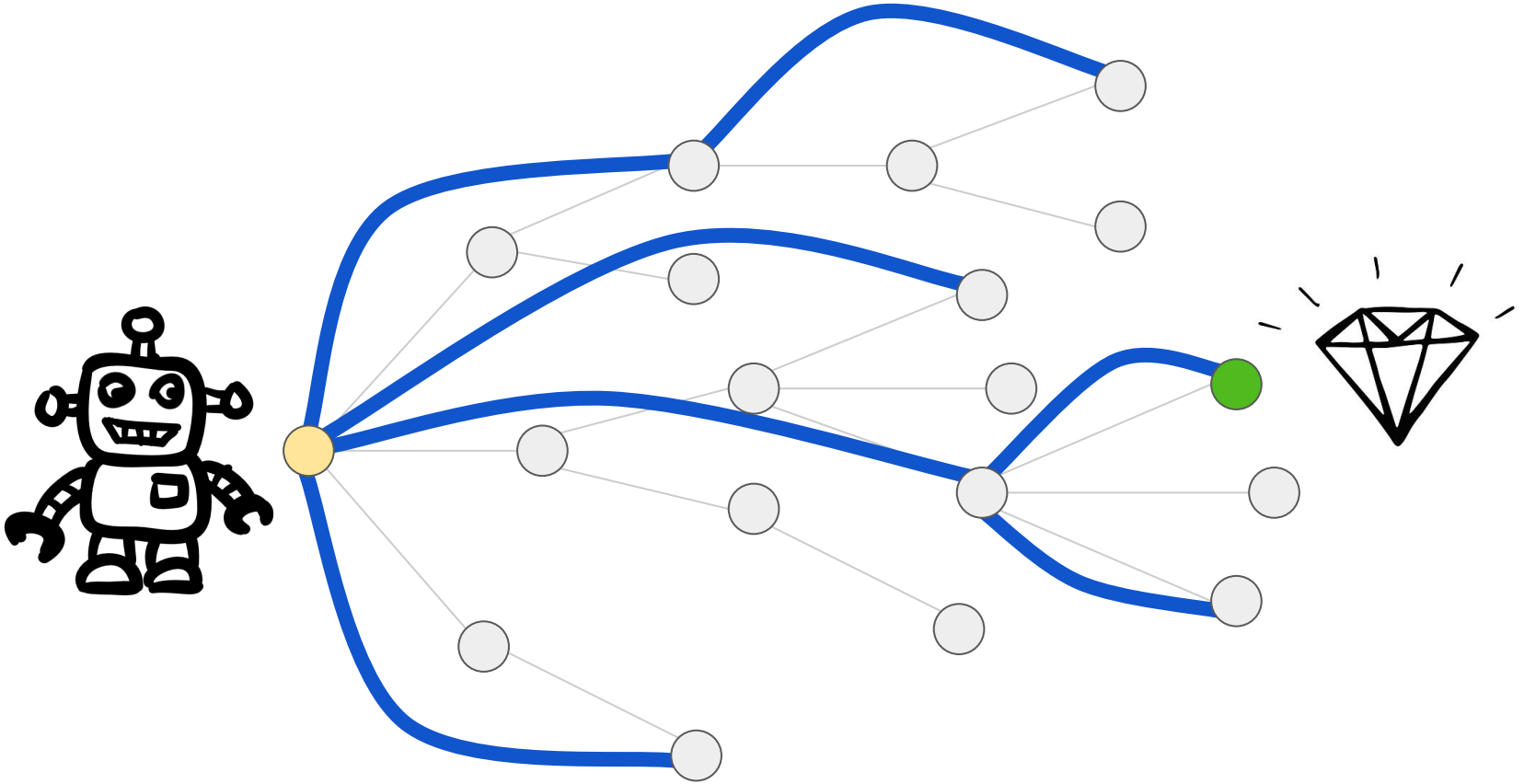

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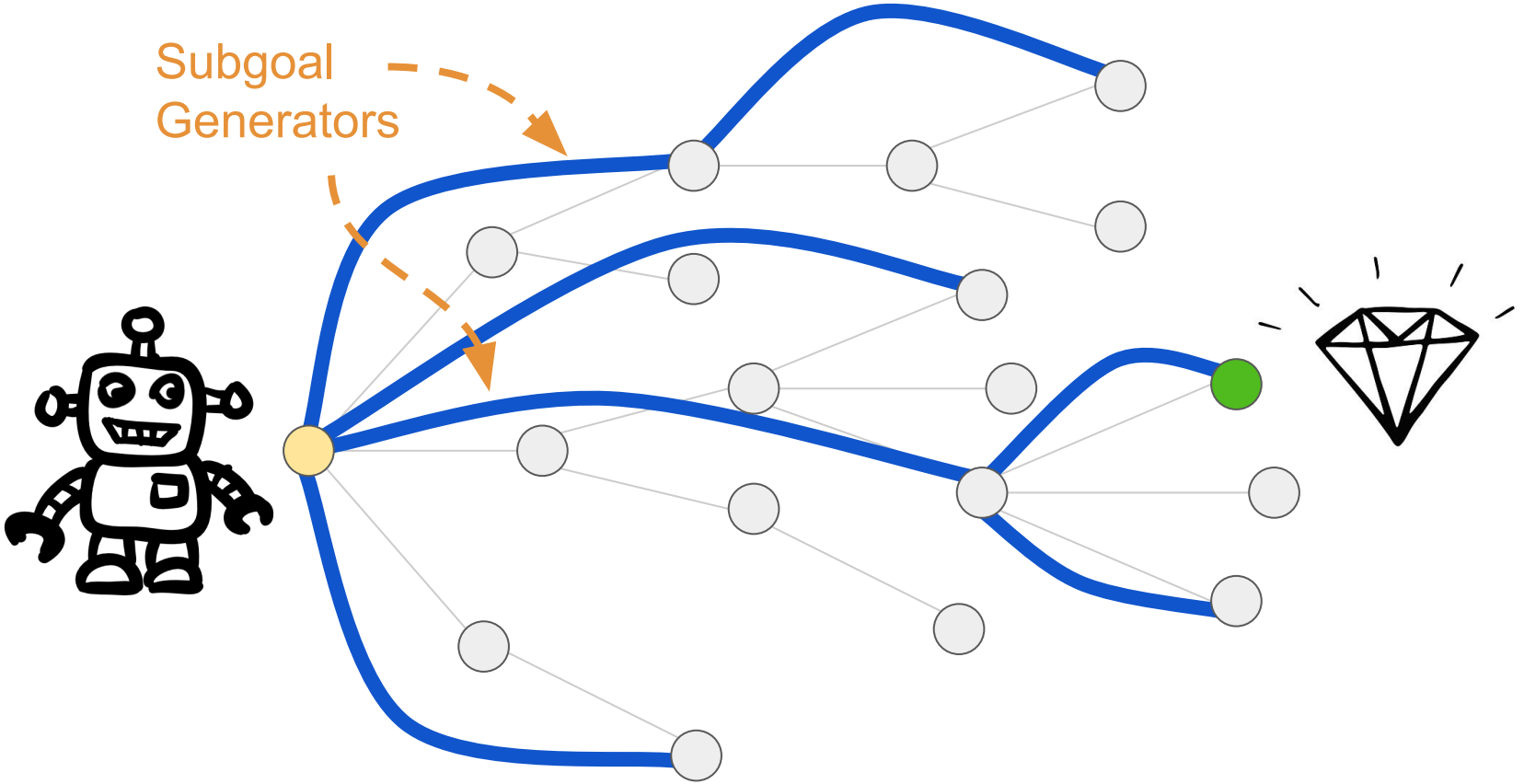

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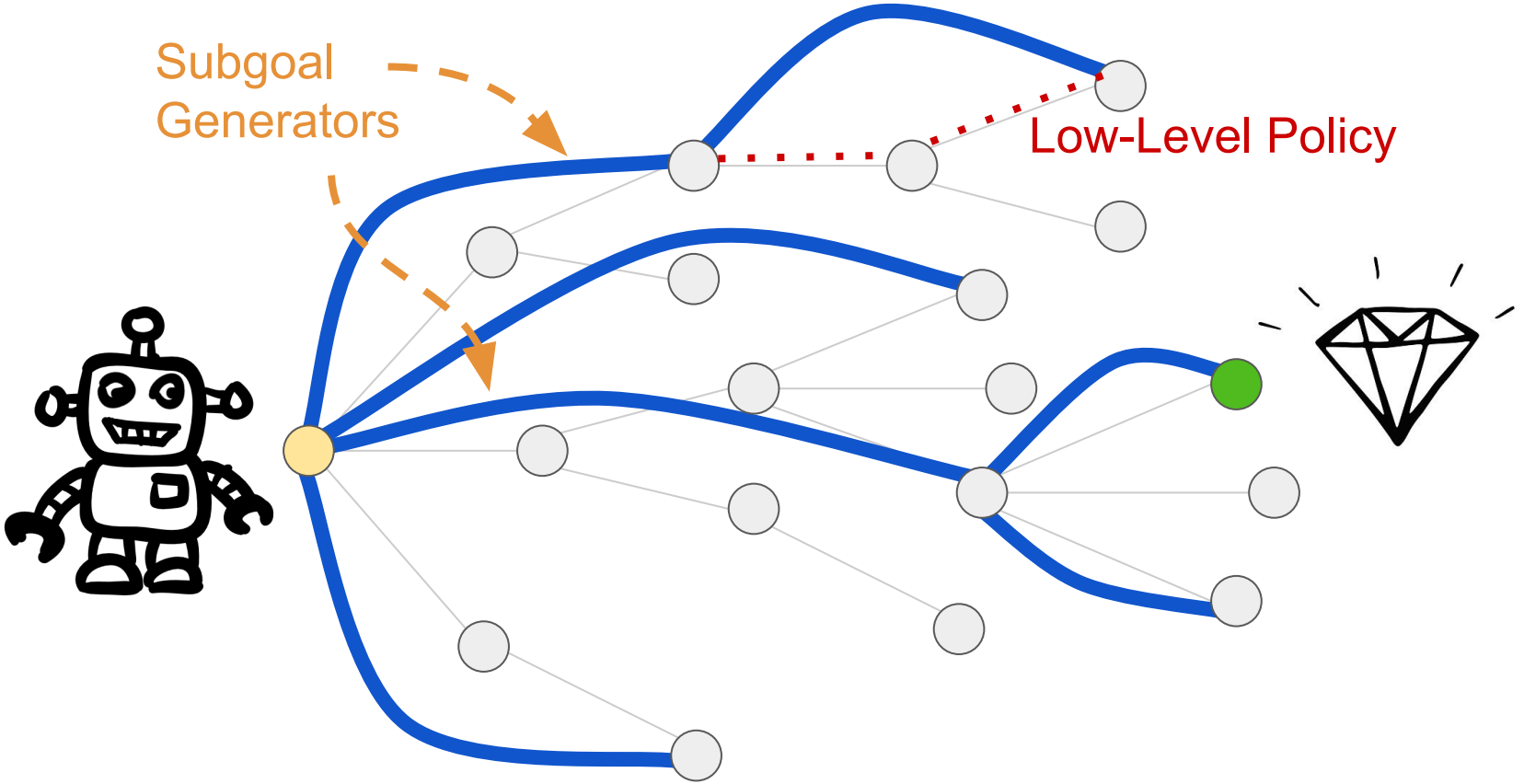

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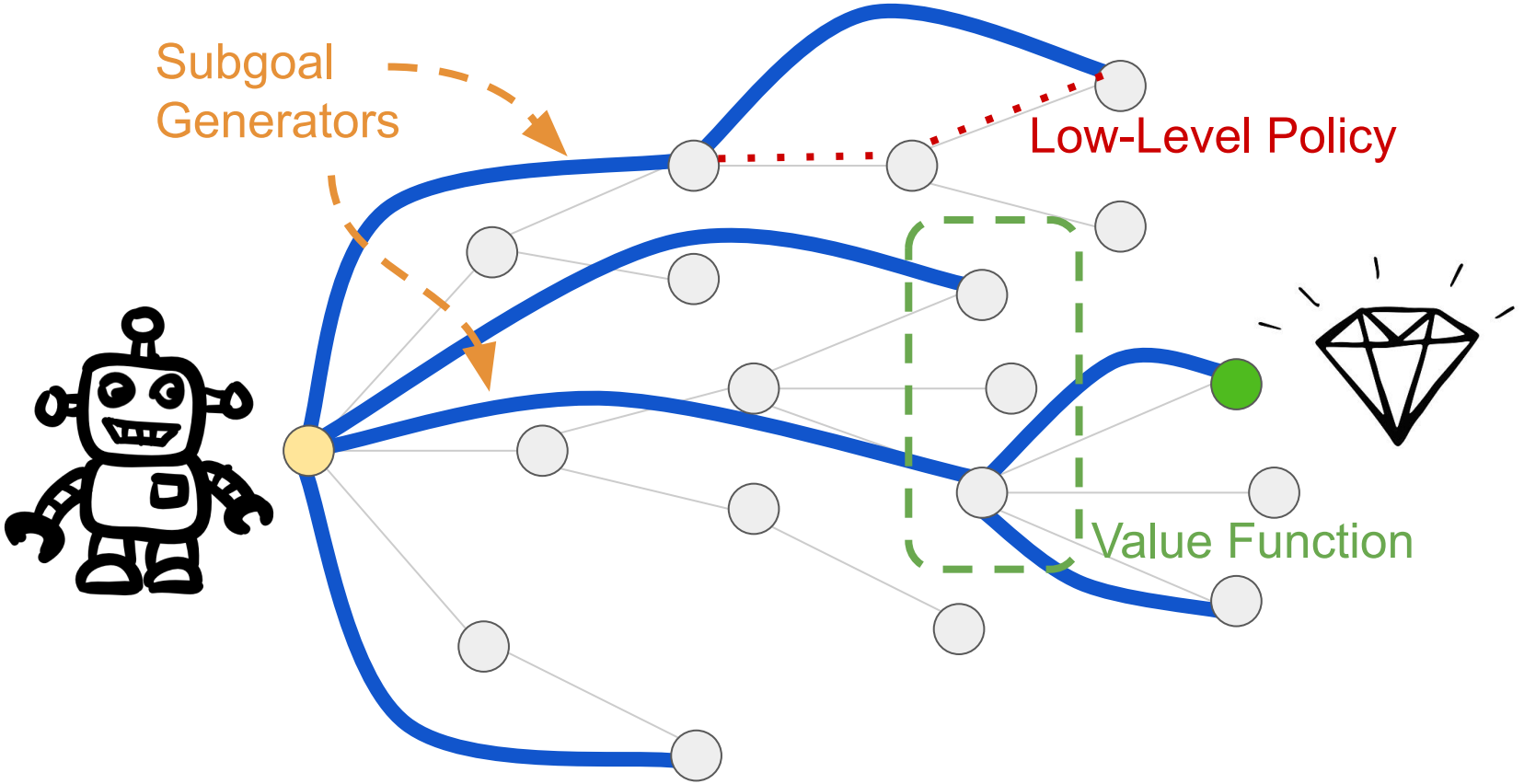

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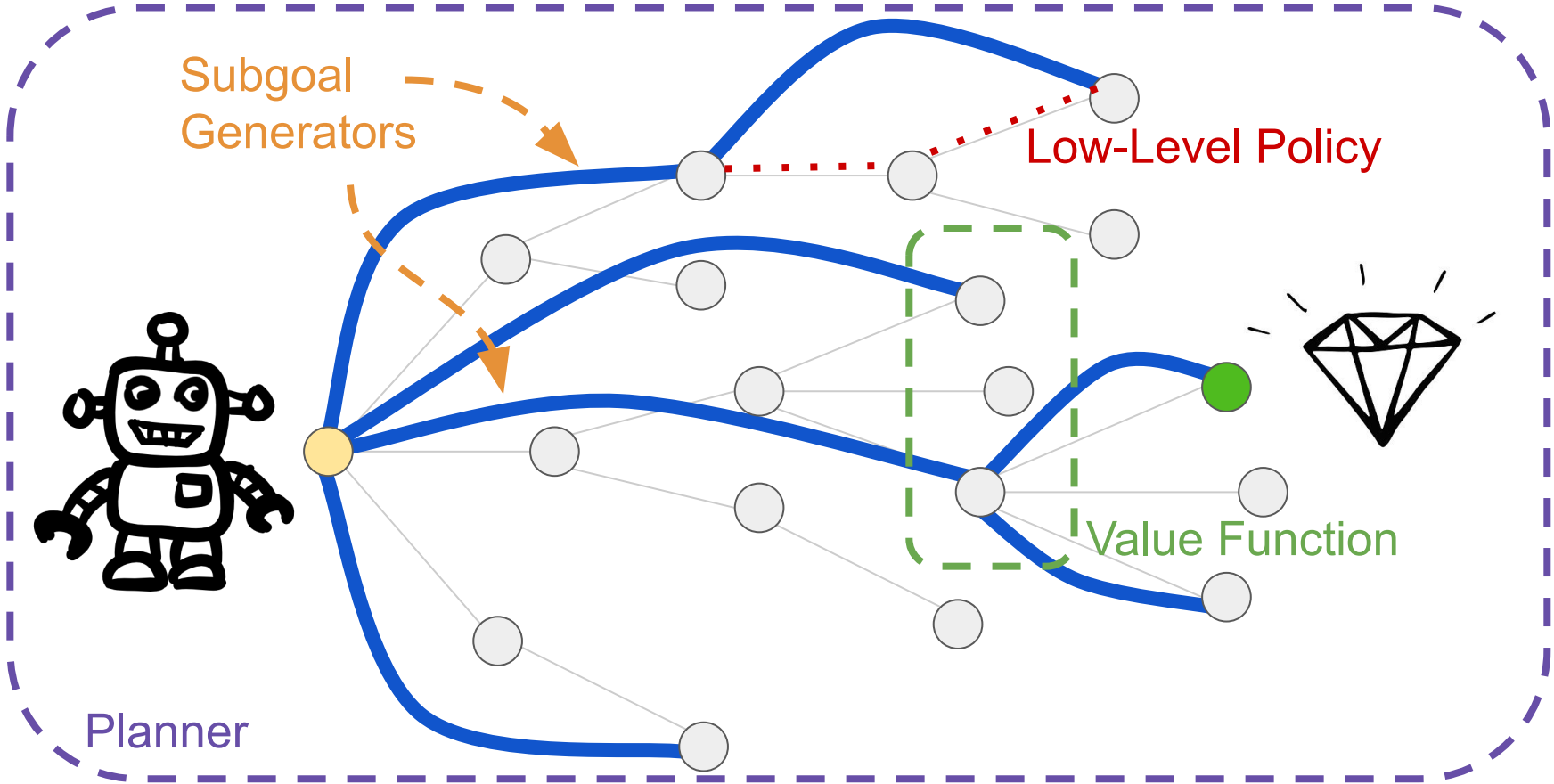
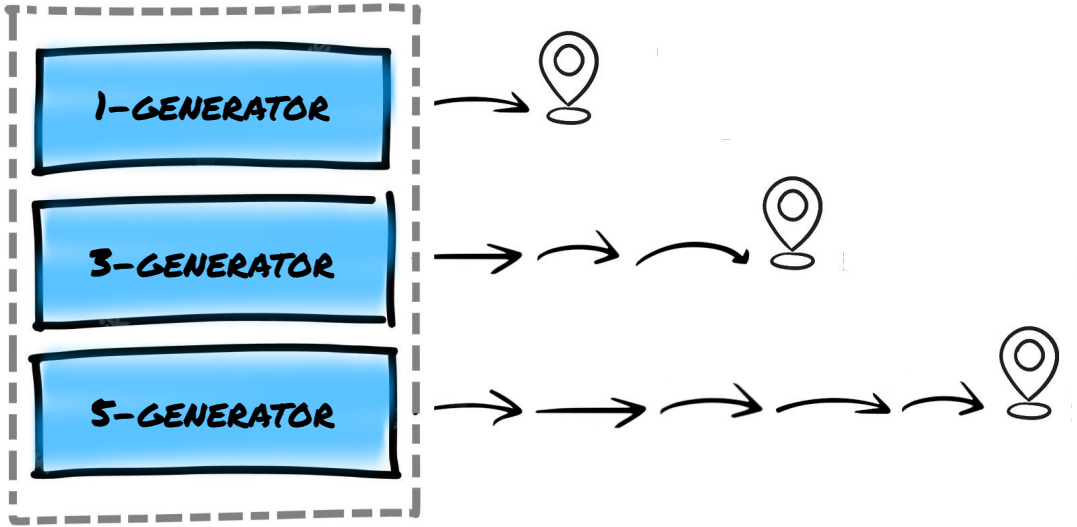


Developing adaptive search methods

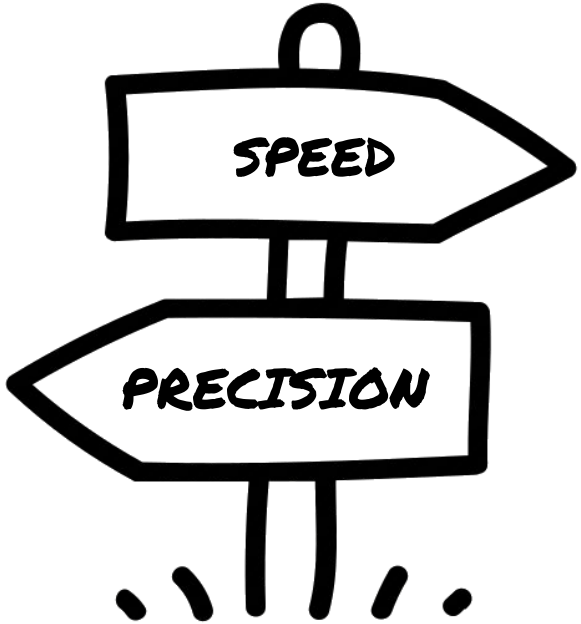
- We achieve adaptivity by using a set of subgoal generators.
- In every step, the generator is chosen by the planner



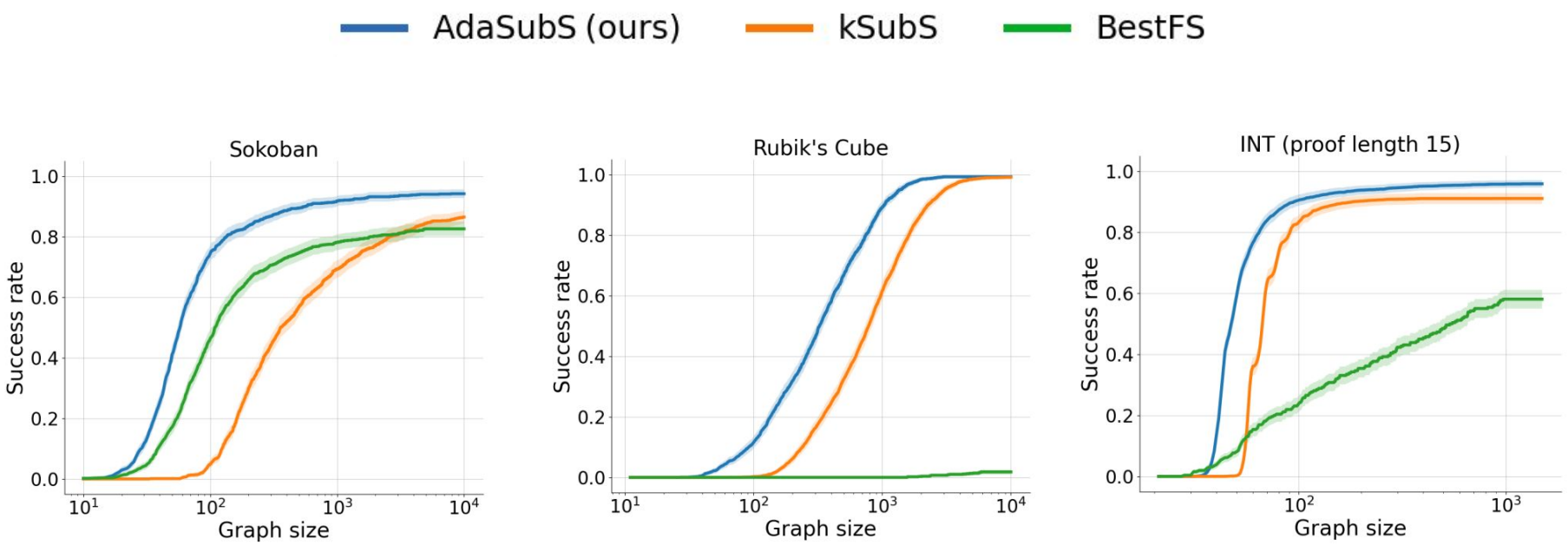
Developing adaptive search methods

We experimented with several adaptive approaches. Two conclusions follow:

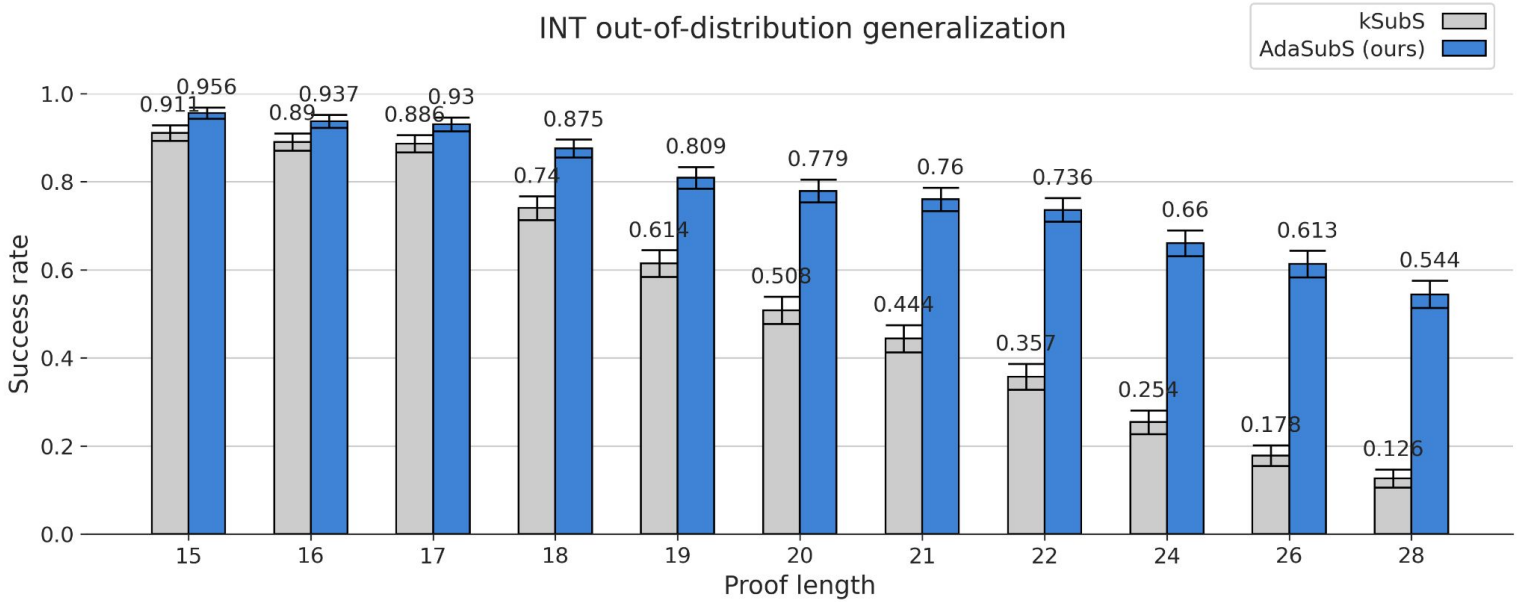
- It is beneficial to strongly prioritize the longest subgoals
- Adaptive methods outperform non-adaptive Subgoal Search



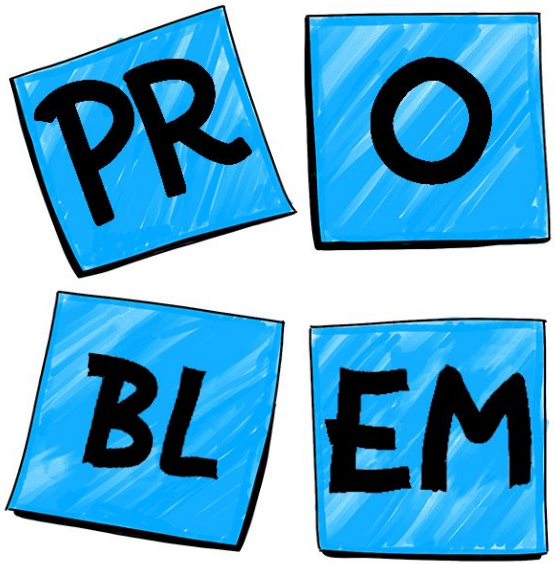
Experimental results



Out-of-distribution generalization

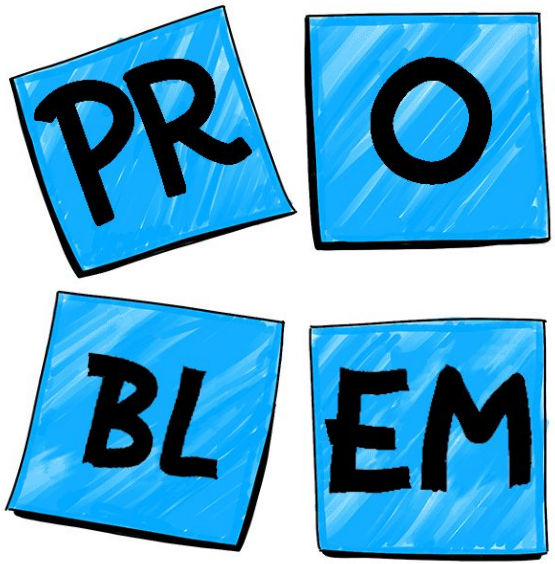


Why does Adaptive Subgoal Search work?



Why does Adaptive Subgoal Search work?

- decomposes problem into easier parts



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- decomposes problem into easier parts
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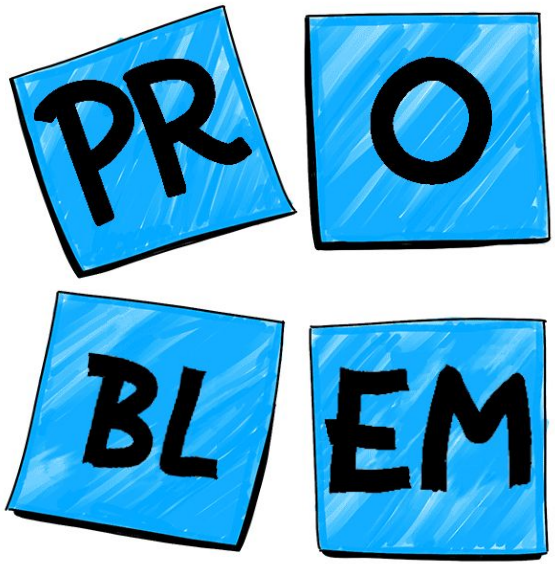

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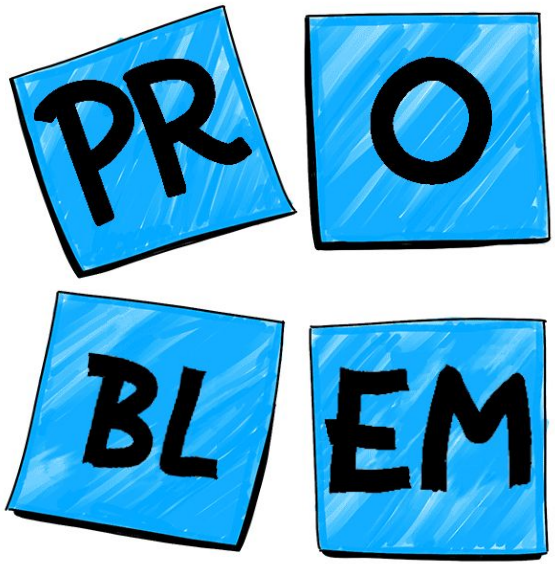
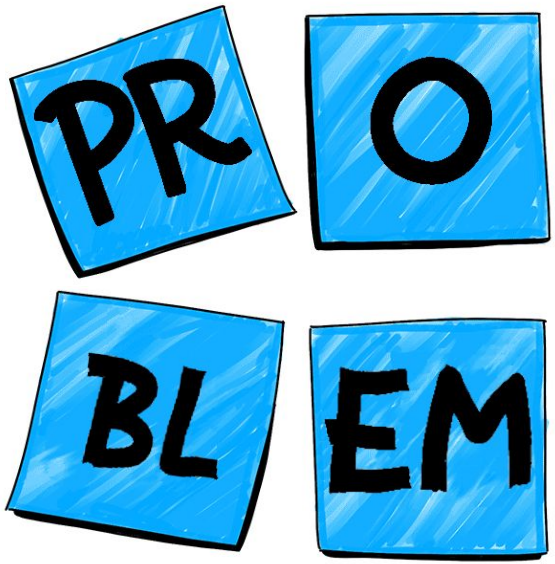


Why does Adaptive Subgoal Search work?

- decomposes problem into easier parts
- adapts to the local complexity
- mitigates errors of one component with others
- uses only supervised training objectives



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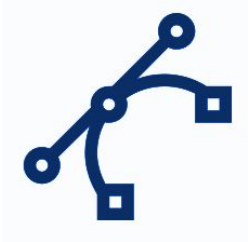
- planning in a latent space
- model dynamics
- stochastic environments
- solution optimality
- real-world applications

The final summary of Adaptive Subgoal Search

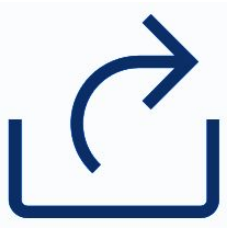
Solves complex problems

by decomposing them into subgoals and planning with high-level steps



Adapts to the local complexity

by choosing the appropriate distance for generating subgoals.



Generalizes to out-of-distribution instances

without any additional fine-tuning.

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