

Dynamic Haven Selection for Multi-Agent Pickup and Delivery

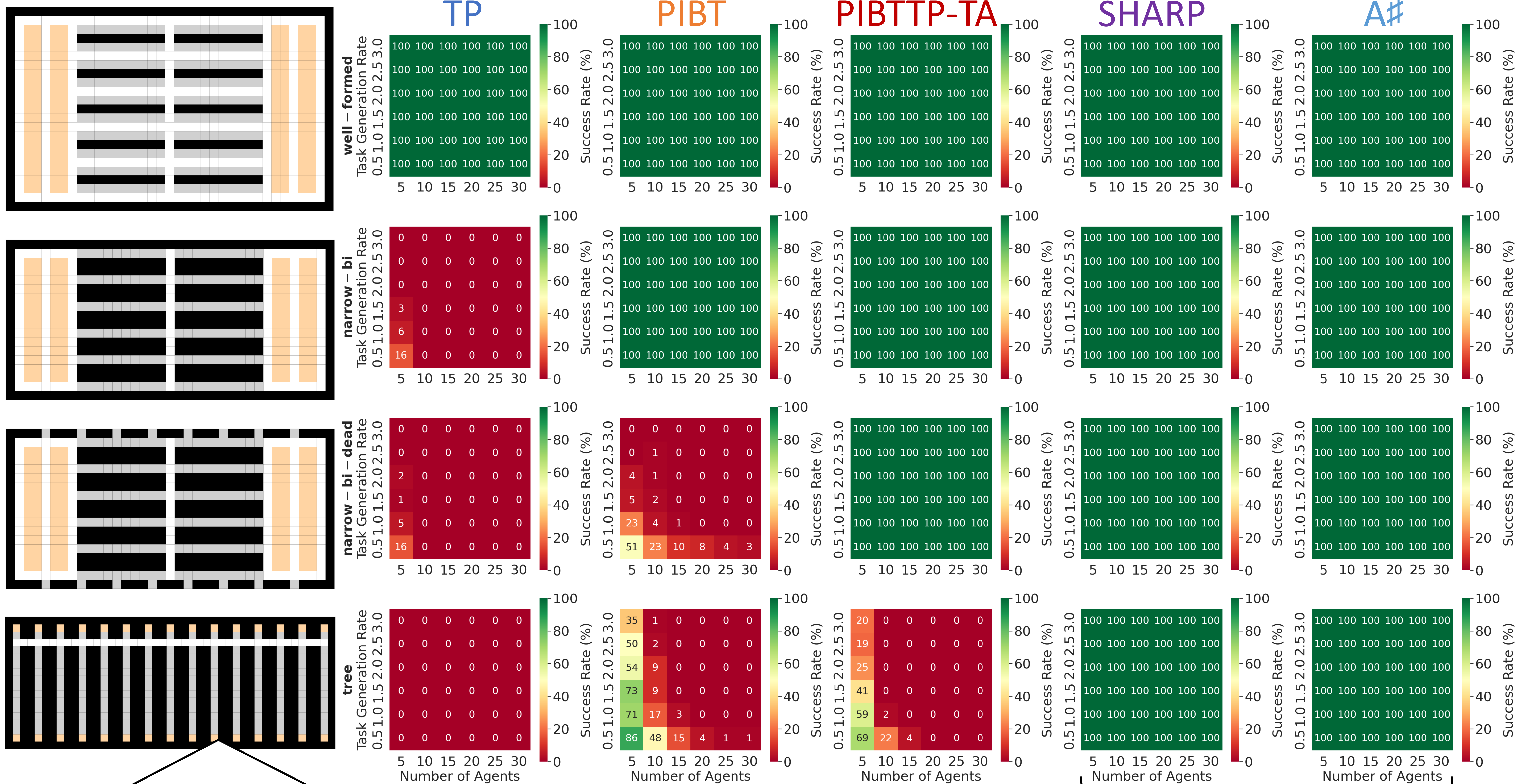
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in Constrained Warehouses

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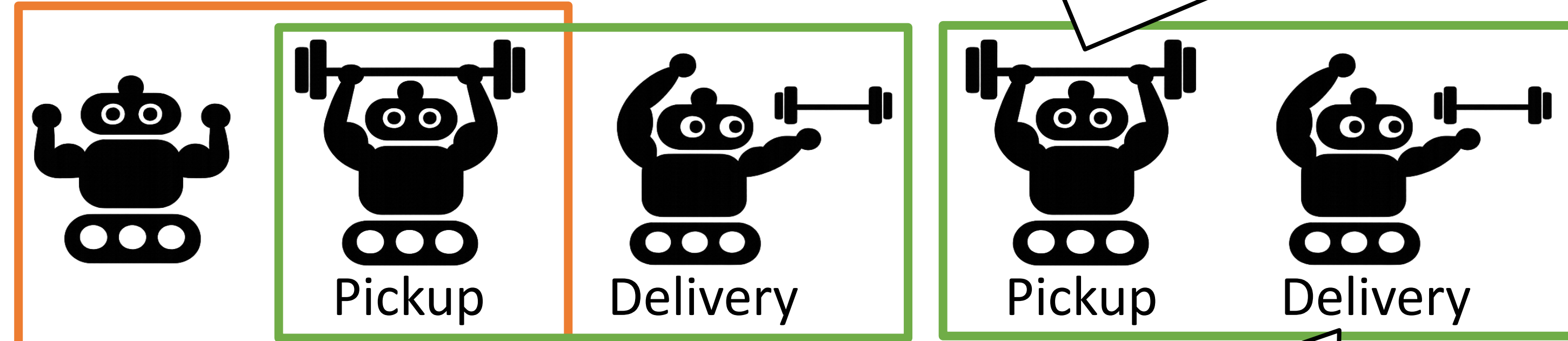
1. Constrained layouts are challenging; A# improves efficiency safely.



Multi-Agent Pickup and Delivery (MAPD)

In real warehouses, new tasks arrive online and must be assigned while robots are moving

Multi-Agent Path Finding (MAPF)

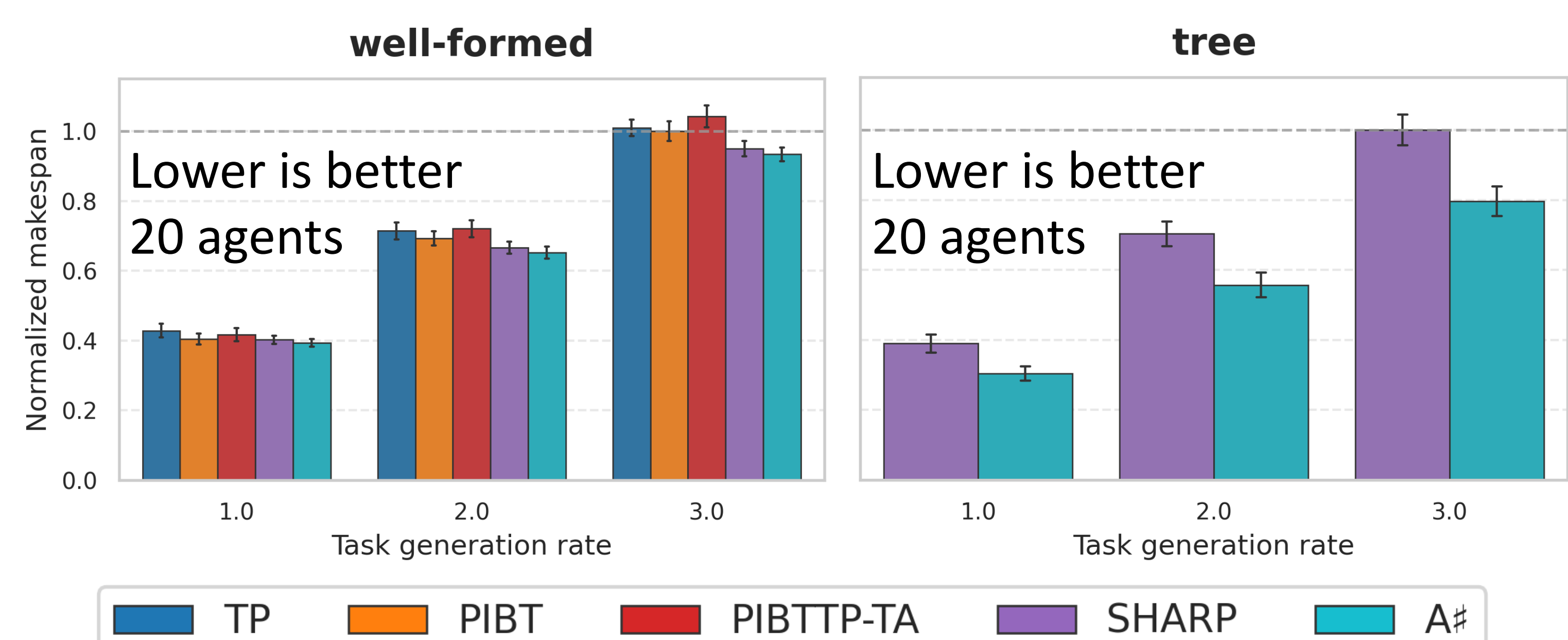


One-shot planning is not enough

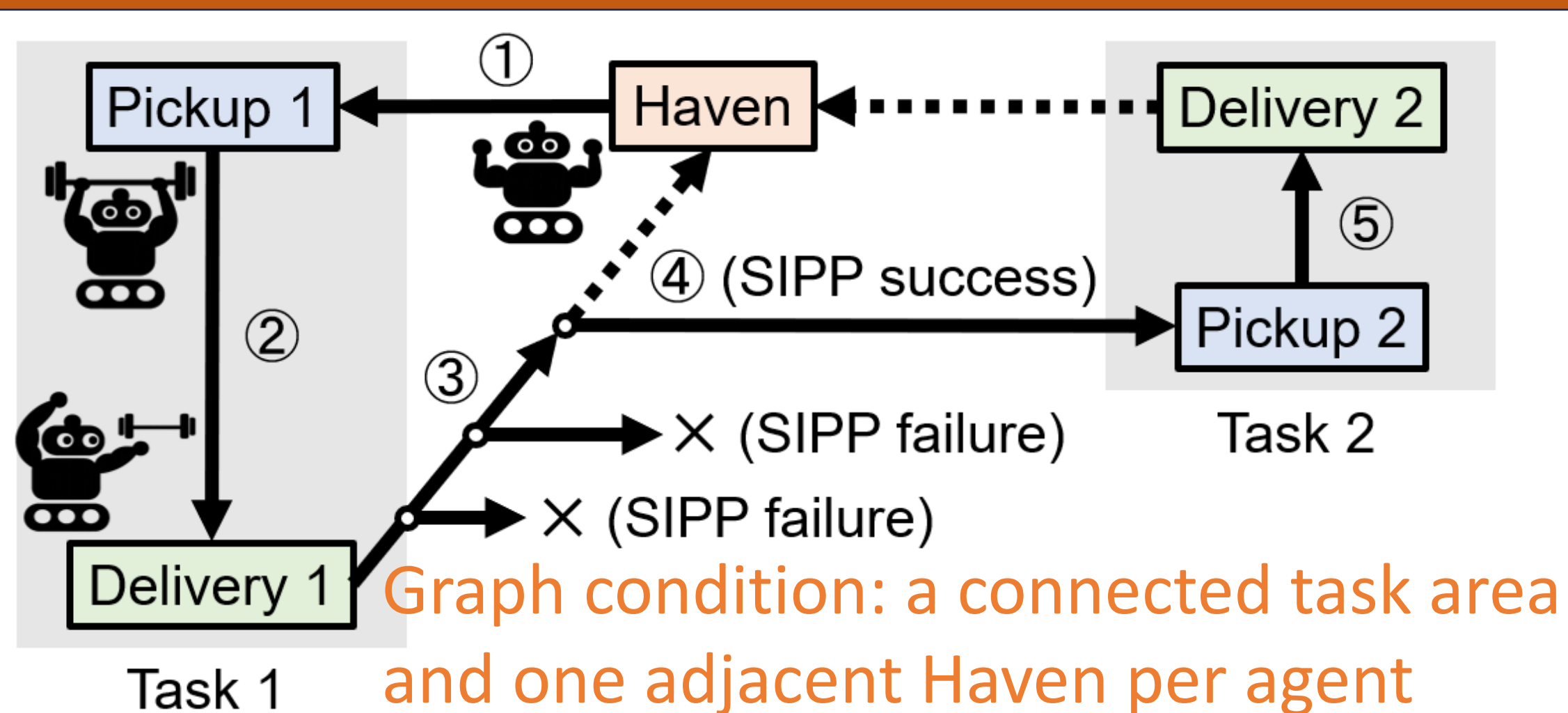
I must avoid collisions and deadlocks. In tree-like warehouse layouts, where should I wait after completing a task?

Our proposal

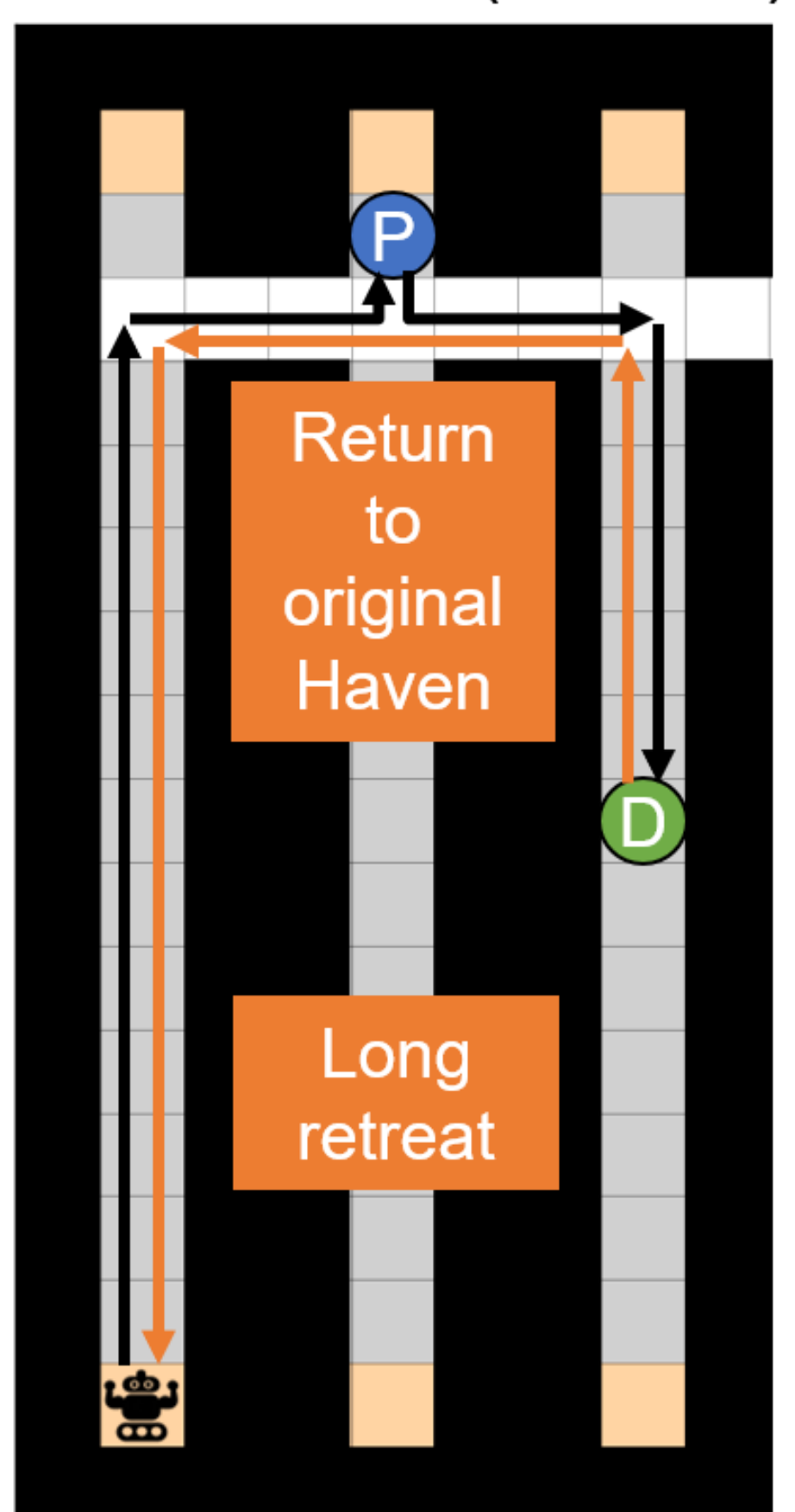
2. A# reduces makespan, especially on the tree map.



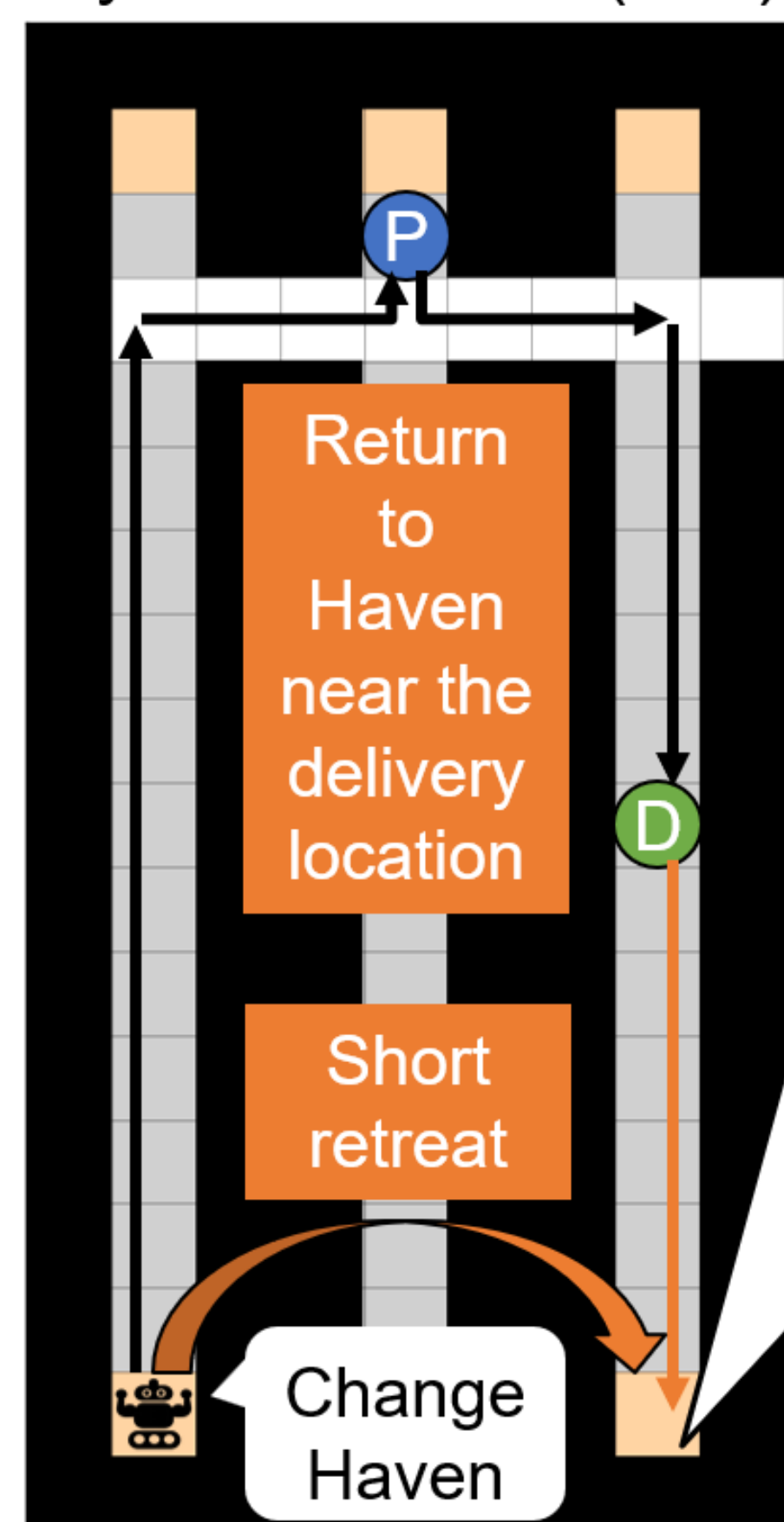
3. SHARP reserves a safe retreat; A# safely changes the retreat Haven.



Fixed Haven (SHARP)



Dynamic Haven (A#)



1) Old Haven may still be occupied

Agent 1

Agent 2

My current plan keeps me at the old Haven for one more timestep.

2) Candidate Haven may be reserved

Agent 1

Agent 2

My future path uses this Haven.

3) Path reservations and Haven ownership may become inconsistent

Reservation (plan)

Ownership (reality)

free

Owned by another agent