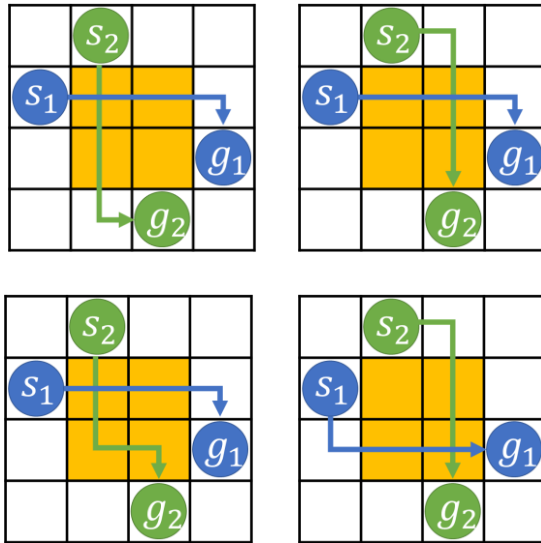


Symmetry-Breaking Constraints for Grid-Based Multi-Agent Path Finding

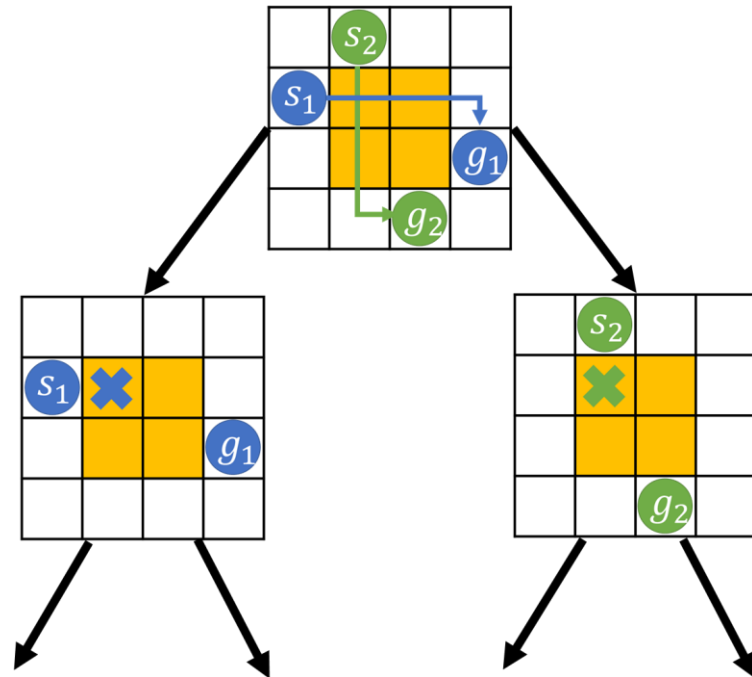
Jiaoyang Li, Daniel Harabor, Peter J. Stuckey, Hang Ma and Sven Koenig

Symmetries in Multi-Agent Path Finding (MAPF)



We call this a **rectangle conflict**.

Conflict-Based Search (CBS) a state-of-the-art MAPF algorithm



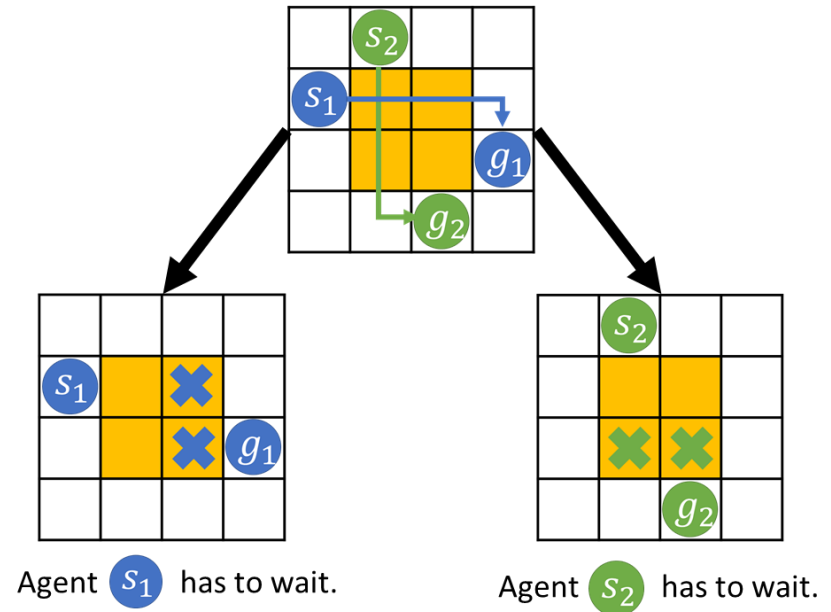
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Resolve Rectangle Conflicts

Using **barrier constraints**:

- Force one agent to leave the rectangle later;
- Immediately resolve rectangle conflicts;
- Guarantee optimality.



Experimentally, the rectangle reasoning method improves conflict-based search by up to **3 orders of magnitude** in terms of runtime.