

Adversarial Cooperative Path-Finding

A First View



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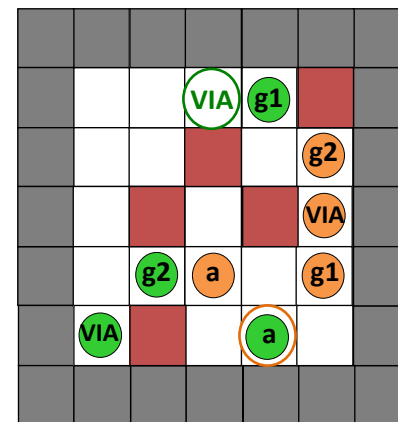


Adversarial Cooperative Path-finding (ACPF)

○ Instance of ACPF is a 7-tuple

• $\Sigma = (\mathbf{G}, \mathbf{A}, \mathbf{T}, \mathbf{t}^*, \lambda_0, \lambda_+, \alpha)$, where

- $\mathbf{G} = (V, E)$ an undirected **graph**
- $\mathbf{A} = \{a_1, a_2, \dots, a_k\}$ finite set of **agents**
- $\mathbf{T} = \{T_1, T_2, \dots, T_t\}$ finite set of **teams**
- $\lambda_0: A \rightarrow V$ **starting position** of each agent
- $\lambda_+: A \rightarrow P(V)$ set of **target positions** of agents
- α **next placement** of agents of teams of adversaries



○ Movements of agents

- into **unoccupied vertex** or into **vertex being left**
- **swapping** is forbidden
- teams **alternate**

Contributions

- PSPACE-hardness of existence of winning strategy
 - **reduction of QBF to ACPF**
- Practical Offensive and Defensive Tactics
 - **several roles of agents are suggested**
 - VIA – very important agent
 - attacker
 - defender
 - **tactics**
 - gain territory
 - block the opponent
 - secure path for own agents

