



UNIVERSITAT  
ROVIRA I VIRGILI

# MULTI-AGENT SYSTEMS

## Task 2: Coordination Design



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Tarragona, December 2023

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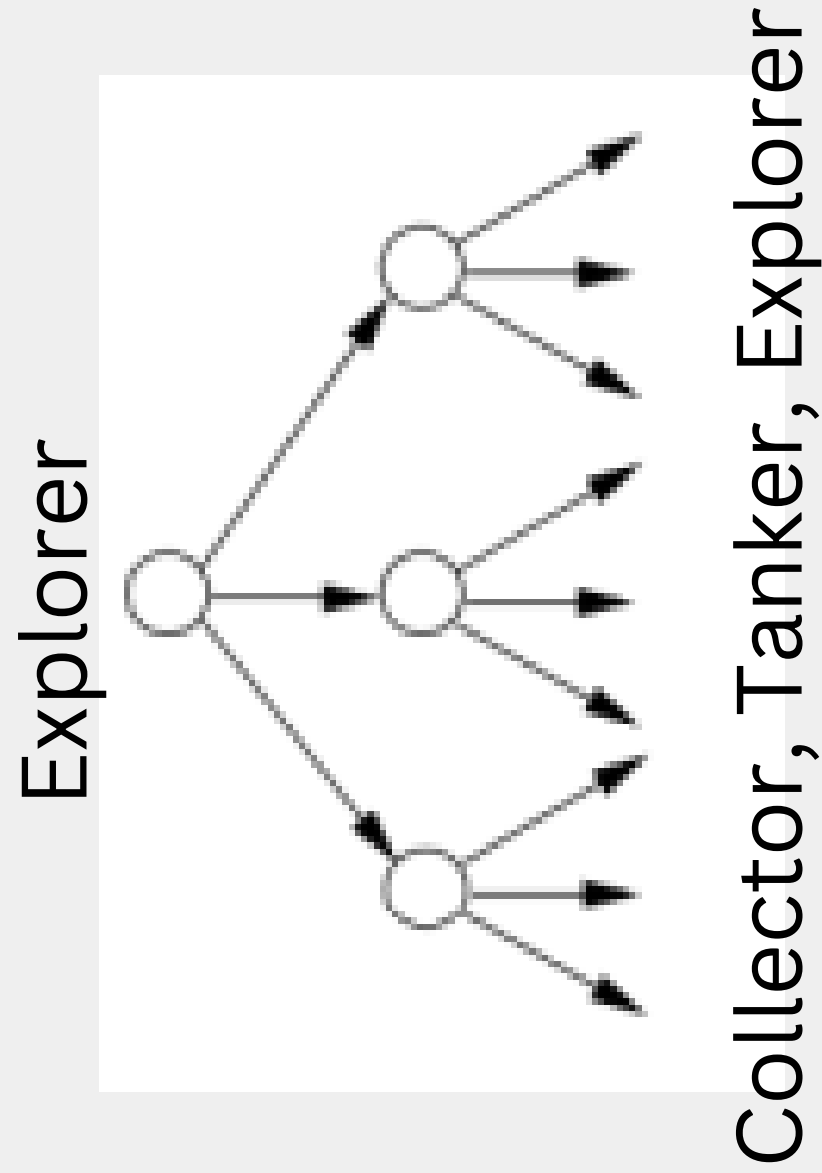
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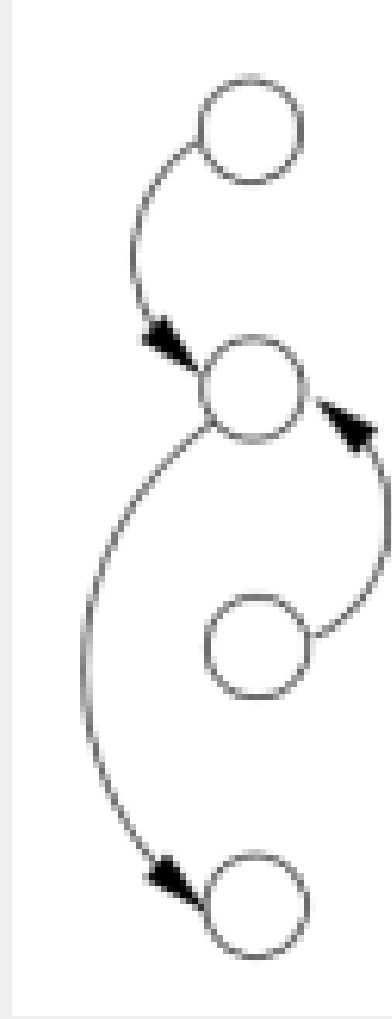
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# 1. Overview

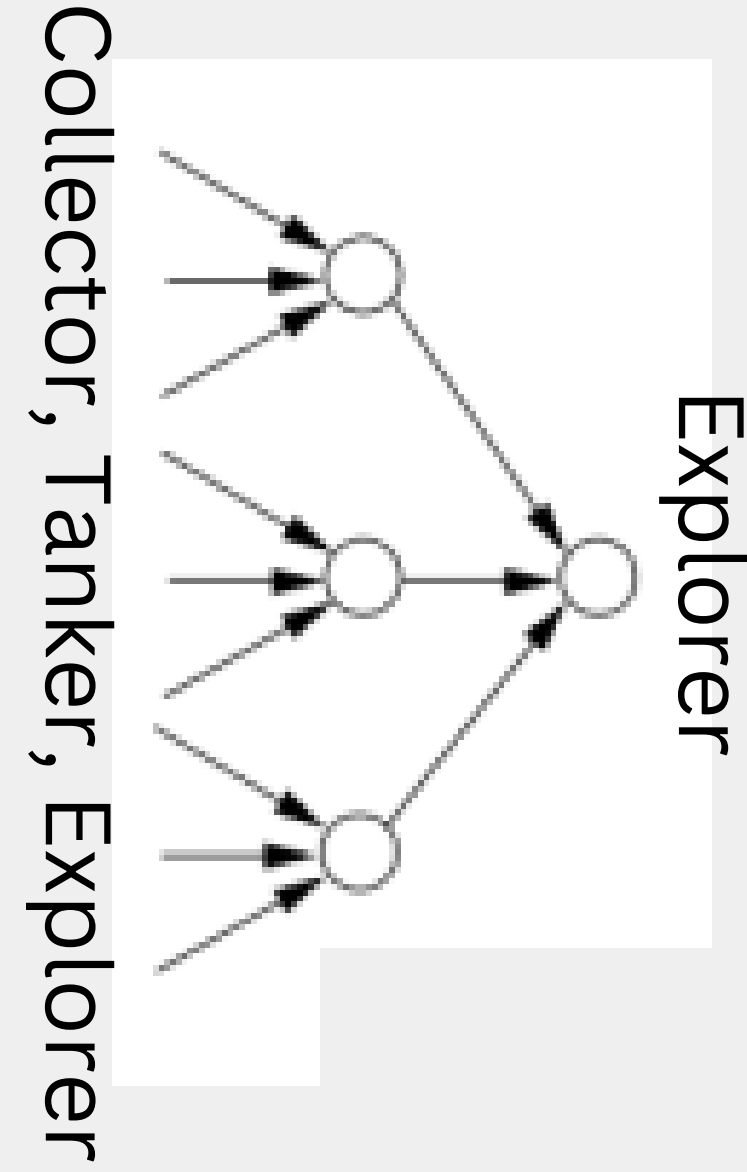
## 1. 1. Problem decomposition



## 1. 2. Sub-problem Solution



## 1. 3. Answer Synthesis



## 2. Coordination between agents

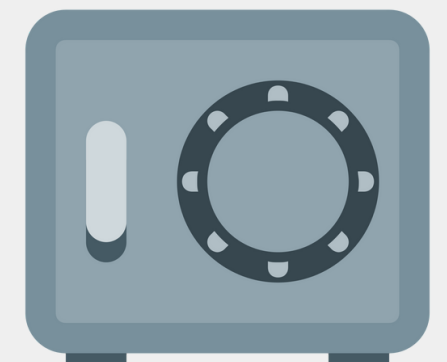
### 2.1. Explorer

- **Say Hello Behaviour:** Broadcast to discover every agent in range and their characteristics.
- **Generation of map knowledge:** Visit the nodes of the map until the whole map is discovered with treasure locations and amounts. Open safes.
- **Communication with explorers:** Exchange map information if they're in communication range. When finding a treasure, if they cannot open it.
- **Communication with collectors:** Auction to assign treasure by distance and treasure type.
- **Communication with tankers:** Auction to assign treasure by distance if collector has already been assigned.



## 2.2. Collector

- **Say Hello Behaviour:** Broadcast to discover every agent in range and their characteristics.
- **Collector Behaviour:** On every clock tick, try to open safe, collect treasure or load it to a tanker.
- **Communication with explorers:** Receive auction messages.
- **Communication with tankers:** Exchange messages to know if a tanker arrives to a node in range so it can load the treasure.



## 2. 3. Tanker

- **Say Hello Behaviour:** Broadcast to discover every agent in range and their characteristics.
- **Tanker Behaviour:** Follow an intelligent random walk avoiding visited nodes and covering different areas in the map.
- **Communication with explorers:** Receive auction messages.
- **Communication with collectors:** Exchange messages with collectors to let them know they're waiting for the treasure to be loaded into them.





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