



Multi-Agent Programming Contest 2011

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Outline

- 1 Aim
- 2 History
- 3 Multi-Agent Programming Contest 2011
- 4 Participation



Aim

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- Stimulate research in the area of **multi-agent systems programming**
- Identify **key problems**
- Collect **suitable benchmarks** that can serve as milestones for evaluating new tools, models, and techniques
- Gather test cases which require and enforce **coordinated actions**

Challenge:

Solve a cooperative task in a dynamically changing environment.



History

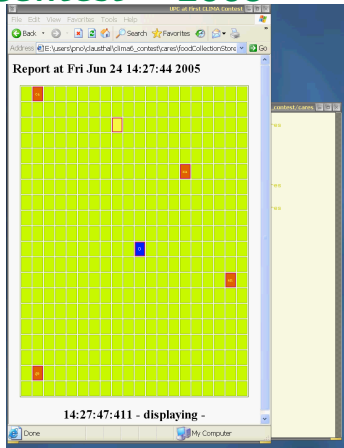
1st: The First CLIMA Contest – 2005

Scenario:

- Grid-like world
- Food and depot
- Goal: collect and store food

Competition:

- 4 participants



<http://multiagentcontest.org/2005>

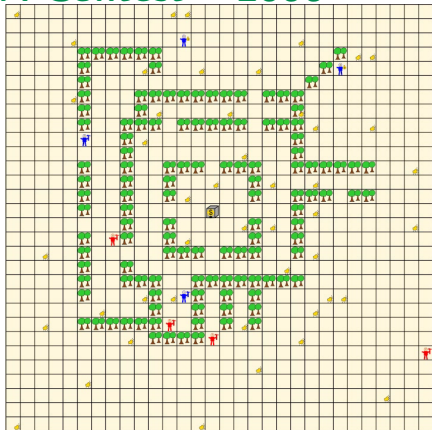
2nd: The Second CLIMA Contest – 2006

Scenario:

- Grid-like world
- Gold and depot
- Goal: collect and store gold

Competition:

- Internet based environment provided by the organizers
- 3 participants



<http://multiagentcontest.org/2006>

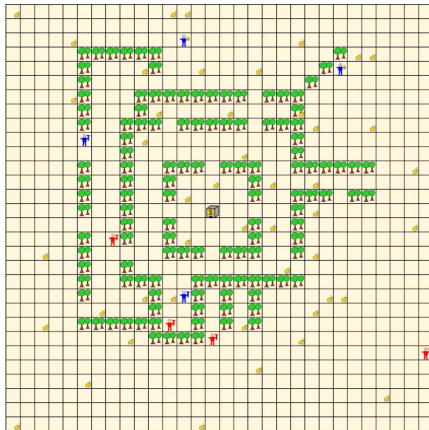
3rd: Multi-Agent Programming Contest (ProMAS) – 2007

Scenario:

- Slight changes

Competition:

- 6 participants



<http://multiagentcontest.org/2007>

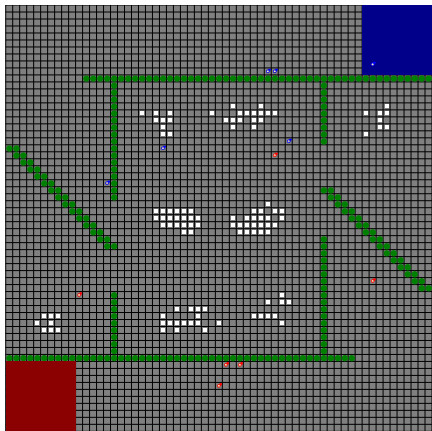
4th: Multi-Agent Programming Contest (ProMAS) – 2008

Scenario:

- New scenario
- Cows and Cowboys
- Goal: Catch cows and herd them into the corral

Competition:

- 7 participants



<http://multiagentcontest.org/2008>

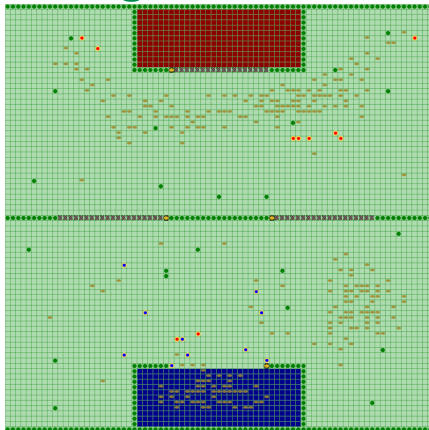
5th: Multi-Agent Programming Contest 2009

Scenario:

- Slight changes

Competition:

- 8 participants



<http://multiagentcontest.org/2009>

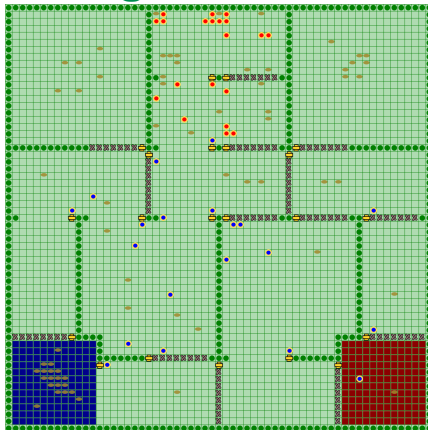
6th: Multi-Agent Programming Contest 2010

Scenario:

- Slight changes

Competition:

- 8 participants



<http://multiagentcontest.org/2010>



Multi-Agent Programming Contest 2011

Agents on Mars

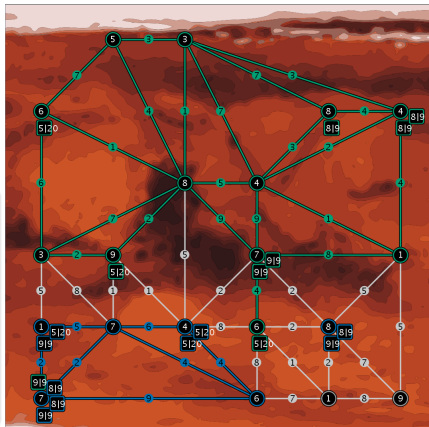
Focus on:

- **agent cooperation** and **agent coordination**
- **team decentralization**

Challenge

Occupy the biggest zones and earn a lot of money!

$$\text{score} = \sum_{s=1}^{\text{steps}} (\text{zones}_s + \text{money}_s)$$



Teams & All Terrain Planetary Vehicles

- **Explorer:** skip, goto, probe, survey, buy, recharge
Energy: 12 Health: 4 Strength: 0 Visibility range: 2
- **Repairer:** skip, goto, parry, survey, buy, repair, recharge
Energy: 8 Health: 6 Strength: 0 Visibility range: 1
- **Saboteur:** skip, goto, parry, survey, buy, attack, recharge
Energy: 7 Health: 3 Strength: 4 Visibility range: 1
- **Sentinel:** skip, goto, parry, survey, buy, recharge
Energy: 10 Health: 1 Strength: 0 Visibility range: 3
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Disabled Agents

Agents with health zero are disabled:

- Only the action goto, repair, skip are executable
- The recharge rate is set to 10 percent.

Money

Achievements:

- Having zones with fixed values, e.g. 10 or 20,
- Fixed numbers of probed vertices, e.g. 5 or 10,
- Fixed numbers of surveyed edges, e.g. 10 or 20,
- Fixed numbers of inspected vehicles, e.g. 5 or 10,
- Fixed numbers of successful attacks, e.g. 5 or 10, or
- Fixed numbers of successful parries, e.g. 5 or 10.

Percepts

In every step, the agents get these percepts:

- Current step,
- Current scores and money,
- Agents internals,
- Visible vertices,
- Visible edges,
- Visible vehicles,
- Probed vertices,
- Surveyed edges,
- Inspected vehicles.

Simulation State Transition

The simulation state transition is as follows:

- Collect all actions from the agents,
- Let each action fail with a specific probability,
- Execute all remaining attack and parry actions,
- Determine disabled agents,
- Execute all remaining actions,
- Prepare percepts,
- Deliver the percepts.



Demonstration



Participation

Developing your Agents

Software Package: <http://multiagentcontest.org/2011>

- MASSim-Server including the new Agents-on-Mars-scenario,
- Monitor for inspecting and visualizing the environment,
- Java-based environment-interface that facilitates connecting to the server,
- Set of simple dummy-agents for testing purposes, and
- Detailed documentation on all components of the package.

Mailing list

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- **June 2011:** release of the final software package.
- **August 2011:** registration phase.
- **Until September 2011:** testing phase.
- **September 2011:** tournament.

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References



Behrens, Dastani, Dix, Köster, and Novák

Special Issue: The Multi-Agent Programming Contest: History and Contestants in 2009

Annals of Mathematics and Artificial Intelligence, Springer, Netherlands, 2010.

Thank you for your attention!

Questions?