

Project #3: Agents on Mars

Your assignment is to design a team of agents that can compete against other agents in an attempt to occupy the zones of Mars that have the best water wells (obviously, this is a science fiction scenario). Your team has a pool of vehicles with different capabilities and must use them strategically to your best advantage. This game has aspects of coordination and cooperation within your team, while also elements of competition with other teams. We will use the simulator designed for the Mars 2013 scenario of the Multi-Agent Programming Contest (www.multiagentcontest.org). Your work will culminate in an actual tournament against the other teams held in the Sun Lab. This will be a team project with four teams of four people each.

Important dates:

Form your team	Thursday, Nov. 17
Preliminary test	Friday, Dec. 9, 1-5pm
Tournament	Friday, Dec. 16, 4-6pm

Forming teams:

You should propose your team to me by Nov. 17. Once approved, I'll need a short name (3-10 characters, no spaces) from each team. If any team members do not have an account on the department's Linux machines, please let me know and provide your Lehigh user id.

Getting started:

In order to do well on this project, you will have to spend a lot of time designing and programming, so get started right away. To keep the playing field level, all agents must be programmed in Java. You may reuse any code in the MAPC Package 2013 from the contest website, as well as any libraries from the Java SDK. If you wish to use any additional external libraries or code-bases, you must get pre-approval from me first. I recommend that you review some of the publications on the website in order to learn about different strategies teams have used in the competition. You can test your agents by running the servers on your own machines, but eventually you should test them on the machines in the Sun Lab. You can play against the dummy agents, any other agents you can find executables for, or even schedule games against other teams in the class. Do not assume that your agent will do well in the tournament simply because it performs well against the dummy agents. Keep in mind that your agent cannot make any assumptions about the power of the machine it will run on, the load on that machine, or about network latency. Thus, one of your agent's activities should be to determine its bidding cycle time.

Rules:

Your agents are subject to the rules set for the Mars 2013 competition. As long as your agent plays by these rules, you are free to design your agent in whatever way you think gives you the best chance of winning. All three teams will play in each match. You are also free to discuss any aspect of the project with other teams, but since you will be competing against them, you may lose advantage by doing so. Note, I will change the configuration of the tournament scenario from the defaults provided in the package; in particular I will make the grid smaller and to have fewer agents per team. The precise configuration files will be provided at least two weeks before the tournament.

Preliminary Test:

In order to make sure that every team has a fieldable agent by the competition date, there will be a preliminary test of your agent in the competition environment. Your team needs to schedule a 30-minute meeting with me between 1 and 5pm on Friday, Dec. 9. At this meeting you will need to demonstrate that your agents can execute in the Sun Lab environment and gain a significant advantage over the dummy agents in 100 time steps. We will also discuss what has been accomplished so far, difficulties encountered, and plans for having your agents ready for the tournament. My judgment of your progress as a result of this meeting will account for 10% of your final grade.

The Lehigh Mars Tournament

The tournament will be held on Friday, Dec. 16 from 4-7pm in the Sun Lab. Each team will get one equivalent machine to run all of their agents on, and the server and monitor will run on a fifth machine. There will be multiple matches, and the overall winner will be the winner of the most matches. Any team can request a 10 minute “timeout” between matches to make minor configuration changes to their team in the hopes of achieving better performance.

Final Submission:

Your project is due at the start of the tournament. You must provide electronic versions of your source code, your config files, a JAR file, and a hard-copy five to ten page report, double-spaced. The report should describe your team’s design, and should include a short section on what each person contributed to the project. Be specific about individual contributions, as this will factor into each team member’s individual grade. In addition, each team member will be asked to fill out a team evaluation form in which they rate their own contributions and that of the other members on the team. These evaluations will also play a factor in your individual grade.

Grading:

Grading will be based on completing the preliminary test, the quality and originality of your design, how your team performs in the tournament, the quality of your report, and your individual contribution to the team. Part of your individual grade will also be based on your own self evaluation and the evaluation of your performance by your teammates. The breakdown of grades is as follows:

Preliminary Test	10%
Design	40%
Performance	25%
Report	15%
Individual grade	10%