Course Project
CMSC 671 – Fall 2005 – Prof. desJardins

1 Project Description

Students will work in groups of two or three students to design, implement, demonstrate, evaluate, and report on a working AI system in Lisp that investigates the techniques learned in the course in more depth. Your project should identify an interesting application domain, and should combine and/or compare multiple techniques applied to this domain.

The project will be developed over the course of the semester, with a series of milestones or "deliverables." The intention of these milestones is to keep you on schedule for completing the project in time, and to give you feedback on your plans.

Here are three suggested projects. You can select one of these, or develop your own project.

1. A Sudoku puzzle solving system that uses tabu search, the min-conflicts heuristic, and/or problem-specific ordering heuristics to find solutions efficiently.

2. An HTN planner that plays a solitaire card game such as Freecell or Spider, with a reinforcement learning component that learns operator preference heuristics.

3. A constraint-based scheduler that incorporates temporal reasoning and dependency-directed backtracking.

The objectives of the project are to have students:

- Understand how to structure the development and execution of a moderately large "research" project.

- Gain experience in formulating and scoping a project.

- Practice writing proposals and technical papers.

- Acquire in-depth knowledge about several AI techniques.

- Implement a working system in Lisp.

- Apply statistically sound experimental methodologies to evaluate their approach to solving a problem.

2 Project Milestones

It's fine to submit any of these deliverables early; if you do so, I will make every effort to give you rapid feedback.

Milestone	Due date
Project description out	Tue 9/20
Teams formed	Tue 9/27
Proposal due	Tue 10/11
Design document due	Tue 10/25 *note new date*
Draft final report	Tues 12/6
System demonstration	Mon 12/5–Fri 12/9
Final working system	Fri 12/9 *note new date*
Final report	Thu 12/15

3　Proposal

A proposal describing your project is due **in two weeks**. This proposal should be a couple of pages long, and should describe:

- What your system will do.

- The application domain for your system.

- What AI techniques you plan to incorporate.

- How you will apply these techniques, and what features you will incorporate.

- Sources that you have identified to learn about these techniques (can include class readings as well as outside sources).

- What your experimental baseline will be.

- What experiments you will run to evaluate your system.

Depending on the specific details of the implementation, any of the projects listed above could be major research projects, "toy" projects completed in a weekend, or projects of appropriate scope for a term project for a graduate-level AI course (that's us). The purpose of this proposal is to identify your topic, and narrow the scope to an appropriately sized project.

I fully expect that your projects will evolve as you study the techniques more and as you begin the design and implementation. If your project scope changes significantly as a result of the development process, you may submit a revised proposal to reflect these changes.

Not surprisingly, many of these projects involve techniques that will not be covered in the course until later in the semester. Hence, the source list. You will need to study ahead on the topics for your particular project.

Please feel free to stop by during office hours or set up a time to talk to me about your ideas, or about the techniques you're planning to incorporate.

4　Design document

The project design document is due two weeks after the proposal. The design document should describe the representations and major modules you will develop to build your system. You should also include a rough schedule of tasks to be carried out. Don't forget to include tasks to write the reports, and to develop and carry out the experimental plan.

5　Demonstration and final working system

Your group must schedule a time to demonstrate your system to me during the demo week indicated in the schedule. You should prepare an organized presentation of your system and its capabilities, and should be prepared to answer quesions about the design and implementation.

The initial working system is due on Friday 12/9 (i.e., at the end of the demo week), and should be submitted in three parts: a README file summarizing what files are included in the submission; a set of Lisp files; and one or more script files demonstrating the system's current capabilities. This script file should be *documented*, so that I can understand what it is you're doing in the script.

6　Final report

Each team will deliver a final report on the project. A draft of the final report is due two weeks before the final copy. I will give you feedback on this final report within a week, which gives you

another week to make any changes based on that feedback, or based on last-minute evaluations and changes to the system. The final report is due at the beginning of the final exam.

Your team may divide the writing however you would like to; however, please remember that according to the course academic honesty policy, all team members are equally responsible for the report's contents. (The same goes for the implementation, of course.)

7   Grading and teamwork

Grading for the written and programming portions will be similar to the grading of homework assignments. In addition, your grade will depend on having an appropriate scope for the project, on the correct application of the AI techniques you use, and on the distribution of work within the team.

Each deliverable should be turned in as a team.

In addition, at the time each starred deliverable (design document and final report) is due, each student should turn in a statement of work allocation. These statements should be prepared *independently*, and may be submitted as plain text e-mails.

In the work allocation statement, if you feel that all students worked equally on all parts of the deliverable, say so. If you divided up the work by particular tasks, say so. If you feel that thpe workload was unequally distributed (whether in your favor or against), say so.

The goal is that students within a team should contribute equally to the project. How you determine what is an "equal contribution" is up to you. If for whatever reason, the contribution is unequal, then ideally there will be a consensus about this. However, if there are significant discrepancies among the work allocation statements within a team, I will work with the students to resolve those discrepancies and determine a fair grade allocation.