Final Project; counts roughly 15% of your final grade
Topics due Monday, 17 April. Final due date to be determined

There are two broad categories of projects:

- research papers (7 – 10 pages of text, not including figures and worked examples)

- programming projects, fully commented, with accompanying formal description, sample runs, etc. We can talk about what I mean by “formal description;” basically, I mean an English-language description of the program’s structure, algorithms used, correctness (e.g., how was it tested?), description of experiment, analysis of results, graphs of results, etc. I don’t just want a hand-written one-page “cover sheet” attached to a bunch of code.

Research papers may provide a tutorial of some aspect of artificial intelligence that was either not included in the course material or that extends the material covered in the course. Such a paper should include elements of both theory (the underlying principles, how and why they work) and practice (worked examples). A research paper may make use of software written by others (for instance, open source tools available over the Internet). Research papers must be done individually; no collaboration.

Programming projects should implement a nontrivial AI technique in a specific application domain. Programs must be original (not variations of programs obtained via the Web) and the relevant theoretical concepts must be implemented correctly. You must perform some type of experiment and collect and summarize data from the experiment.

Programs may be undertaken by teams of two students, but only if the project is sufficiently ambitious. I would expect twice the amount of documentation, testing, code, etc., that would reasonably be expected of one person. In order for me to approve a two-person project, I must see a work plan that clearly delineates who is responsible for which parts of the project so that I can grade accordingly.

Here are some suggestions for both kinds of projects.

- Read some journal articles about applications of AI (genetic programming, simulated annealing, etc.) to particular real-world problems; summarize and explain these papers, including the underlying principles. Articles should be from refereed journals or conferences, not from gaming magazines, people’s Websites (unless they are online versions of published journal or conference articles), or other non-research-related sources. The intent is not to restrict you from using such resources, but to require you to read at least one challenging “real” article. I can compile a list of papers that I consider to be accessible if you’d like.

- Implement a genetic algorithm to solve some computationally hard problem; locate some hard instances (there are repositories of hard instances for a number of NP-complete problems), and experiment with your program using these instances.

- Review a book on some application of artificial intelligence (for instance, Blondie24: Playing at the Edge of AI by David B. Fogel, a book about an evolutionary approach to designing a checkers-playing program) and give an in-depth summary and critique of it.
• Implement an intelligent player for some nontrivial two-person game; implement game-tree search and an evaluation function for your game and test it to see how well it plays (maybe have it play against itself?).

• Choose one of the chapters in our book or another AI textbook that we did not cover, or did not cover in its entirety, explain the material there, solve some or all of the exercises related to that chapter, and summarize the material in your own words.

• Construct a fully intelligent artificial human being.