The purpose of the final project for this class is to enable you to explore your own ideas for the development of software for intelligent robotics. Based upon what we have studied in class, supplemented with your own ideas, your final project should first involve the definition of a new robot capability or robotic software issue you want to explore. You should then design, implement and evaluate your approach to the issue you are studying, or your algorithm for the new robot capability you are developing, using the Nomad200 simulator. You also must write up your project and your results in a 3-10 page final project report (described below). The extent of software development for the final project should be comparable to the software you developed for Assignment #3.

Ideas for your final project:
- Define and implement two alternative algorithms for foraging and compare and contrast them using results from a variety of randomly generated environments.
- Develop software that allows multiple (e.g., 2-4) robots to coordinate their motions as they move from subgoal to subgoal; evaluate the capabilities and limitations of the software.
- Define, develop, and analyze an algorithm for covering all areas of an environment, general enough to work in a variety of environments.
- Extend your Assignment #3 code to add the capability to “remember” previously visited locations to help deal with beacons of type IV. Evaluate its capabilities relative to your Assignment #3 software capabilities.
- Develop software that allows you to evaluate the pros and cons of various behavior combination methods for a given class of applications.

You can select one of these ideas, or (perhaps better) define your own project along these lines. Use your creativity to explore an idea of interest to you in autonomous robot control.

Project Proposal:
To ensure that you are “on the right track” with your final project (in terms of scope and direction), please prepare a brief project proposal (about 1 page total) that describes your plans. You’ll get feedback on your plans and possible suggestions for experiments to include, areas of focus, etc. Your project proposal should state:
- The problem you plan to address or the issue you plan to study
- Your intended approach
- Your planned experiments to evaluate your approach

You can turn in your project proposal any time prior to the project proposal due date to get feedback and approval for your project.

Final Project Report:
Your final project report will describe the algorithm you developed, the issue you studied, etc., and your results. The report should be from 3 to 10 pages (1” margins, 10pt font, single spaced) that includes the following sections:
- Introduction: Outlines the problem or issue you studied
- Approach: Describes your approach to solving the problem or studying the issue (e.g., a description of the algorithm you have developed)
• Results: Describes what your experiments were and what your results are
• Discussion: Analyzes your results and discusses what they imply
• Summary and Conclusions: Summarizes what you did and your findings, along with possible directions for further study if some issues are still inconclusive.

Your report should be written as if it were a robotics conference publication, in which your audience is technically knowledgeable about autonomous robotics, but not familiar with the specific work you have done. Be sure to include screen dumps of your results, data, graphs, etc., as needed to describe your project and your results. The reader should be able to understand what you have done and what your software does without looking at the code itself.

Final Project Deliverables:
• Electronic version of your software, emailed to parker@cs.utk.edu, named yourlastname-final.c (or .zip, etc.)
• Hard copy of your robot control code.
• Your final project report (hard copy) describing your results as outlined above.

Final Project Evaluation:
Your final project will be evaluated based upon 1) the thoroughness of your study, 2) your analysis of your results, and 3) the quality of your final project report.