The course project for this class is a group project, however students will receive both group and individual grades for the project. The goal of the project is to create a standard set of pathfinding benchmarks which can be used by researchers to evaluate their work. These benchmarks will be described in a white paper which will be published either as a technical report or in an archival proceedings. The paper and benchmarks will also be placed on a public web site.

Part 0: Make a Plan

Submit a plan before class on October 14 detailing how you plan to proceed with the project, and how the work will be divided by the members of the class. You will have the full lecture time on October 12 to work on this.

Part 1: Benchmark Sets

Collect a number of sets of interesting maps to be used in the benchmarks. Some of these will be provided by the instructor. This may include, but are not limited to maps from:

* Baldur’s Gate
* Dragon Age: Origins
* Warcraft III
* Mazes
* Rooms
* Random obstacles

Convert the maps to a standard format. If necessary, see if you can get permission from the respective company to redistribute the maps.

Part 2: Map Analysis

Given the maps, design a number of measures which could be used to typify the properties of the maps. These measures might include the size, maximum path length, average branching factor, or any other properties which seem interesting and/or useful to classify the maps.

Part 3: Problem Set Selection

Design a set of problem benchmarks which can be used for the maps. There should be a reasonable number of diverse problems on each map. Be prepared to justify the selection of problems as well as the number of problems selected. (Statistical measures might be useful in justifying problem selection.)

Part 4: Testing

Test the maps and provide a baseline performance for A*. Vary the edge cost (e.g. $\sqrt{2}$ or 1.5) and measure the differences in performance. Scale the maps and measure if the performance changes. (This may related to your metrics in part 2.) Test performance with various heuristics as well.
Part 5: Class Presentation

The second-to-last lecture in class will be devoted to a presentation. Describe in detail all the work done in the project. Practice the presentation to make it as polished as possible.

Part 6: Group Report

Your final report should be written as a research paper and describe the results of your research project. It should contain the following sections:

- An **abstract** giving a short overview of the problem and of the results
- An **introduction** giving a longer and more detailed overview of the problem and results
- A **background** section covering previous ideas that are similar to yours, or that you build on in your project
- A **results** section describing experimental results which demonstrate the strengths and/or weaknesses of your approach.
- A **conclusion and future work** section summarizing lessons learned and potential areas for future work.
- A **references** section citing any previous work that you build upon.

An electronic or hard copy of your report must be turned in by midnight on November 19th.

Part 7: Individual Report

Under separate cover turn in a 1-page summary of the work you performed for the project. Indicate the approximate split of work performed among members of the class, as well as an individuals who did extraordinary work on the project.