Project 1 Part 1

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1 The maps

The map files are available at `https://github.com/Joshua-Westbrook/AIproject1maps`

They are also in the folder that opens after unzipping the .zip file attached and importing it into Eclipse as an existing project.

2 The algorithm

The algorimths can be found in in the searches package. The UCS algorithm is fully implemented in SearchAlgo.java but uses UCS.java so it has a specific name. A* and Weighted A* overwrite the h(n) being zero in UCS with them using either the heuristic from DistanceHeuristic.java or the heuristic times the weight. Unforunately the algorithms do not seem to be working fully properly. There is no error where Weighted A* sometimes returning a cheaper path than A*. We have not been able to figure out the cause yet.

3 Optimizations

No optimizations have been done beyond that of following the UCS/A*/Weighted A* rules.

4 Heuristics

The Heuristic we finally used was a modified Euclidean distance . We then multiply the Euclidean distance between the currNode and goal by .25 and the start node and the goal by 0.25 since in a best case scenario the entire path to the goal is an highway/river with no hard to travel in which case all movements is the distance divided by 4 which is the same thing as times 0.25 The formula for the heuristic is $\frac{0.25*\sqrt{(currNode.x-end.x)^2+(currNode.y-end.y)^2}}{0.25*\sqrt{(start.x-end.x)^2+(start.y-end.y)^2}}$.

Other attempted heuristics included just the Euclidean distance which was not admissable. We also tried using numbers like 0.50 or 0.75 instead of 0.25 when modifying the Euclidean Distance but those failed. Our first attempt was to use just the Euclidean distance from the currNode to the goal which also failed to be admissable.

5 benchmarks

TBD

6 Final Explanation