

Assignment #1 Writeup - 1/27/17 - Tom Farro, Kelly Zhang, Miya Gaskell, Alex Guerra

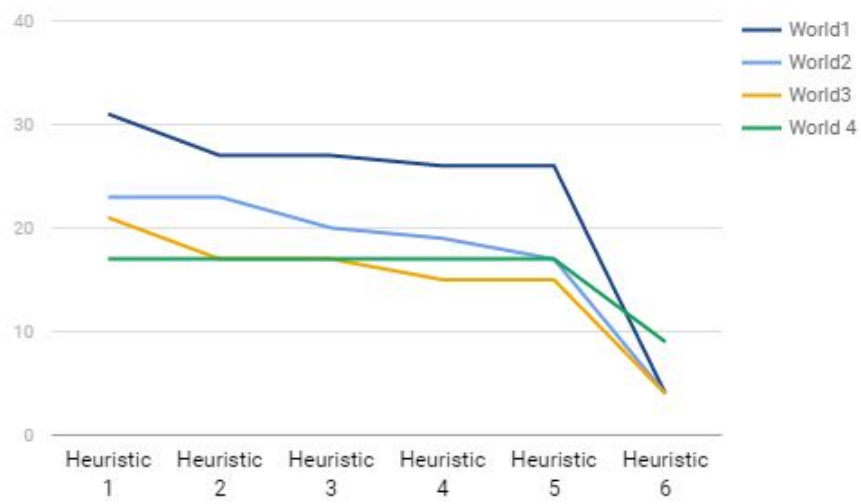
How do the 5 heuristics vary in effectiveness? How much gain is there to using any heuristic (#1 vs. #2)? Is #5 noticeably more effective than the other heuristics?

As the number of expanded nodes decreases, the heuristics increase in effectiveness. Thus, heuristics become more effective as they dominate the previous heuristic. There is minimal gain to using any of the first four heuristics because there are only a small number of nodes to expand. Compare to World 5, where the number of expanded nodes decreased from 1343 (heuristic #1) to 1297 (heuristic #2). Heuristic #5 is also noticeably more effective than the other heuristics in comparison, expanding 1178 nodes.

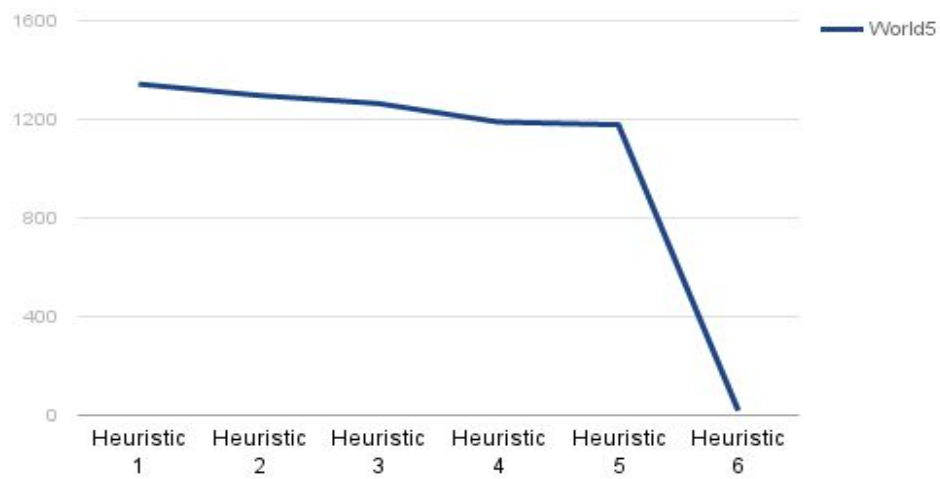
For heuristic #6: how does its solution quality compare with #5? Is it performing noticeably worse? How much more efficient is it?

The solution quality is not optimal, but it is complete. With smaller worlds, the difference between heuristic #5 and heuristic #6 is not noticeable. In a larger world, the difference is much more noticeable, with #5 resulting in a score close to 300 while #6 scores around 150. However, despite the much worse solution quality, we see a drastic increase in efficiency; heuristic #6 evaluates a fewer number of nodes than its competing heuristics by an order of magnitude in some cases. Additionally, it is worth noting that, in order to make heuristic #6 strongly inadmissible and therefore produce noticeable results, we increased the multiplication factor from 3 to 9, which allows it to easily overcome the time complexity values, and therefore create an inadmissible estimate.

Number of Nodes Expanded



Number of Nodes Expanded (World5)



Effective Branching Factor

