

Informed Search - Prac Sheet SOLUTION

Last modified on Saturday, 16 March 2019 by f.maire@qut.edu.au

This prac is a preparation for the first assignment. In the first assignment, the main task is to define and implement a class derived from the *search.Problem* class in order to solve a planning problem. In this prac, you also define and implement a class derived from the *search.Problem* as a way to find optimal sequences of actions, but on a much simpler problem.

Exercise 1 – A* implementation

Edit the file *W04_search.py* to implement the function *astar_graph_search*.

Hint: look at the implementation of *astar_tree_search*.

See file W04_search_SOLUTION.py

Exercise 2 – Creating your own *search.Problem* class

Create a class derived from the *search.Problem* class to solve the "pancake puzzle" introduced in Week 03 lecture. Implement a search heuristic function for this problem. Once your *PancakePuzzle* class is completed, compare BFS and A* search.

Recall that in Week 03 prac, you used code that defined a class *Sliding_puzzle*. This class gives you a good example of the definition of a derived class of the *search.Problem* class.

See file pancake_puzzle_SOLUTION.py

Exercise 3 – Admissible heuristics (non-programming exercise)

Assuming that h_1 and h_2 are admissible, which of the following expressions are also guaranteed to be admissible?

- (i) $h_1 + h_2$ **no, consider $h_1=h_2=h^*$ 2 h^* is not smaller or equal to h^***
- (ii) $h_1 * h_2$ **no, same counter example**
- (iii) $\max(h_1, 0.3*h_2)$ **yes**
- (iv) $\min(h_1, 3*h_2)$ **yes**
- (v) $0.94*h_1 + 0.08*h_2$ **no**