

Informed Search - Prac Sheet

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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 *W05_search.py* to implement the function *astar_graph_search*.

Hint: look at the implementation of *astar_tree_search*.

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 04 lecture. Implement a search heuristic function for this problem. Once your *PancakePuzzle* class is completed, compare BFS and A* search.

Recall that in Week 04 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.

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? Justify your answers.

- (i) $h_1 + h_2$
- (ii) $h_1 * h_2$
- (iii) $\max(h_1, 0.3 * h_2)$
- (iv) $\min(h_1, 3 * h_2)$
- (v) $0.94 * h_1 + 0.08 * h_2$