

## Class Exercise 8

### Exercise 1 : Differences between $A^*$ and $WA^*$ , $DWA^*$ , $A^*_\varepsilon$

Explain the difference between  $A^*$  and  $WA^*$  resp.  $DWA^*$ ,  $A^*_\varepsilon$ . What is the effect of that difference?

### Exercise 2 : Relaxed Models

The algorithm  $A^*_\varepsilon$  uses two heuristic functions  $h$  and  $h_F$ . What is the advantage of using  $h_F := h$ ? What is the advantage of using  $h_F$  with  $h_F \neq h$ ?

### Exercise 3

What restrictions must be placed on  $h_F$  so that  $A^*_\varepsilon$  remains  $\varepsilon$ -admissible and what is the reason for this? What follows from this for the construction of  $h_F$ ?

### Exercise 4 : $A^*_\varepsilon$ Search

Explain the approaches  $WA^*$  and  $A^*_\varepsilon$ . Why is the completeness proof for  $WA^*$  already contained in the completeness results for  $A^*$  whereas the completeness proof  $A^*_\varepsilon$  is that complex?

### Exercise 5 : Evaluation Function in $WA^*$

Give an example of a search space graph  $G$  with  $Prop(G)$  and a heuristic function  $h$ . Let  $G$  contain a solution path. Does the following statement hold:

If  $h$  is admissible, then we have values  $\varepsilon > 0$  such that  $f_\varepsilon$  is optimistic, i.e.  $f_\varepsilon(n) \leq f^*(n)$  for all nodes  $n$ .