CIS681 – Homework 2 – Algorithm A Search

Due: Tuesday March 18, 2008 – 25 points

Consider a search space with a path cost function g, and assume that h is an admissible heuristic for the space. Thus we know that an Algorithm A search which selects the nodes off of the open list according to:

$$f(n) = g(n) + h(n)$$

is guaranteed to find an optimal solution. In many cases, instead of using A^* we use w-A^*, which is a *weighted* version of A^* that places more emphasis on the heuristic function. In this case, we select nodes off of the open list according to:

$$f(n) = g(n) + w * h(n)$$

for some constant $w > 1$.

Prove that the solution found by w-A^* is at most a factor of w from optimal. More precisely, let n_g be the goal node found by w-A^*, *n-opt* be the optimal goal node, and *c' = g'(n-opt)* be the optimal cost to the goal node *n-opt*; show that

$$g(n_g) \leq w * c'$$

Your proof should be short and mathematical, and should not take more than 7-8 lines.