

1.1 For $h(B)$ to be admissible $h(B)$ must be less than $\text{cost}(B, G)$. In general $h(n)$ must be lower than the total cost to reach the goal state from node n .

1.2

Open	Closed	
B^A, C_1^A	A	$f(A)=0, g(A)=0, h(A)=0$ $f(B)=100, \frac{1}{2}, g(B)=\frac{1}{2}, h(B)=100$ $f(C_1)=1, g(C_1)=1, h(C_1)=0$

Open	Closed	
B^A, C_2^A	A, C_1^A	$f(C_2)=1\frac{1}{2}, g(C_2)=1\frac{1}{2}, h(C_2)=0$

Open	Closed	
B^A, C_3^A	A, C_1^A, C_2^A	$f(C_3)=1\frac{3}{4}, g(C_3)=1\frac{3}{4}, h(C_3)=0$

Open	Closed	
B^A, C_4^A	A, C_1^A, C_2^A, C_3^A	$f(C_4)=1\frac{7}{8}, g(C_4)=1\frac{7}{8}, h(C_4)=0$

Open	Closed	
B^A, C_5^A	$A, C_1^A, C_2^A, C_3^A, C_4^A$	$f(C_5)=1\frac{15}{16}, g(C_5)=1\frac{7}{8}, h(C_5)=0$

1.3

$$\lim_{i \rightarrow \infty} f(C_i) \quad f(C_i) = 1\frac{i-1}{i}$$

$$\lim_{i \rightarrow \infty} f(C_i) = 2$$

1.4 The search will not find the goal state because the heuristic function is not admissible. The search algorithm will continue to follow the right path because the left path has a higher cost than the right path will ever have.

1.5 The range which $h(B)$ can be inadmissible and still find the goal is $1 < h(B) < 1\frac{1}{2}$. This would mean that $f(B)$ would be less than two which problem 1.3 shows the limit of the cost of the right path.

1.6 An admissible h is a necessary condition for a worst-case scenario graph. For example if the $\text{cost}(B,G)$ and $\text{cost}(A,B)$ were greater an admissible h would be necessary, but for a graph like the one used in question 1 an admissible h is a sufficient condition to find the goal.

2.

Iterations	Current Point	Temperature	Probability of moving to successor
1	2	1.8	0.574
2	3	1.62	0.291
3	1	1.458	1
4	1	1.312	0.102
5	4	1.181	0.184
6	2	1.063	0.390
7	2	0.957	0.124
8	2	0.861	0.313

3.1 There are $n!$ states for n trees.

3.2 One neighborhood covers $1/n$ amount of the state space.

3.3 1×10^{519455} possible states for Madison dataset.

3.4 Worst case for total distance would be $2LD$.

3.5 Best case for total distance would be 1125.11 km.

3.6 No the inspector could not finish the job in one day because if traveling at an average speed of 25 mph it would take around 31 hours to travel the best case distance.