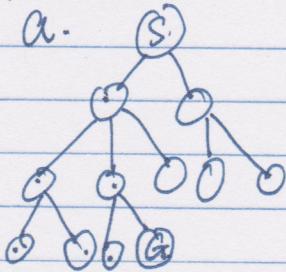


William Shu

Discussed this hw with Ziqian Ma.

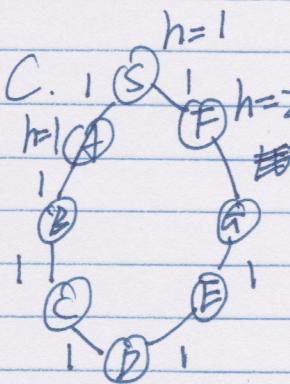
Problem 1:



a. For this tree, IDS will search the first three levels, then find the goal in the fourth one. It needs to search 12 nodes. However, DFS just need to go from S to the end of the tree for 4 times, which needs to visit 8 nodes.

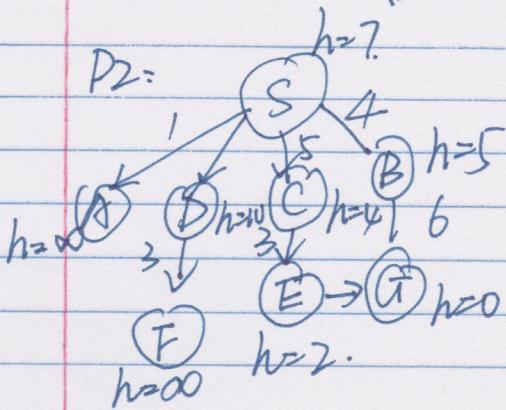
b. Since $h(n)$ is the estimated value. The true minimum cost path has to be a whole number. So $h(n)$ has to smaller than 1. Then $h(n) \leq h(n) \Rightarrow$ it is admissible.

For his successors, the smallest step has to be greater or equals to 1. Then $h(n) \leq h(n) + 1$ no matter how small the next estimated value is. $h(n) \leq 1 + h(n) \Rightarrow (h_{\text{next}}(n))$ is next estimate)



For the graph shown left, A search will find the left side $h=1 + \text{real cost}(1) = 2$, which is smaller than the right side $h=2 + \text{real cost}(1) = 3$. Then the A search will go for the left side. However, left side is definitely cost more steps than right side. So A search expands more nodes than BFS in this graph.

(In BFS, we just go down for three stages, and go for 5 nodes then we find the goal).



IDS:
Nodes Frontier.

S	{S}
A	{A, B, C, D}
B	{B, C, D}
C	{C, D}
D	{D}

S	{S}
A	{A, B, C, D}
B	{B, C, D}
G	{G, C, D}
D	{C, D}

The path is S->B->G
Total nodes expanded: 9 nodes