CS 380 Homework 3 – Informed Search

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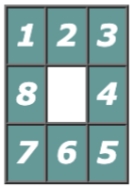
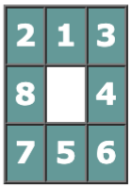
1. Written Problems to be turned in:

A. Algorithm A* (8-Puzzle)

$h_0(node)$: 0 $h_1(node)$: number of tiles out of place $h_2(node)$: sum of distances out of place $h_3(node)$: 2*$DT(node)$ - defined below $h_4(node)$: $h_2(node)$ + 3*$S(node)$ - see below $h_5(node)$: $h_1(node)$ + $h_3(node)$ $h_6(node)$: $h_2(node)$ + $h_3(node)$ $h_7(node)$: maximum of all *admissible* heuristics in $\{h_1(node), h_2(node) \ldots h_6(node)\}$	 **Sample A**	 **Goal State**	 **Sample B**

For Sample A,

h0(n) = 0
h1(n) = 5
h2(n) = 2 + 1 + 1 + 2 = 7
h3(n) = 2*DT(n) = 2 * 0 = 0
h4(n) = h2(n) + 3*S(n) = 7 + 3 * (2+2+2+1) = 28 (x)
h5(n) = 5 + 0 = 5
h6(n) = 7 + 0 = 7
h7(n) = max = 7

Actual movements will be 11, so h4 will be not admissible for 28 is more than 11. Except for h4, every heuristics are admissible.

h0=h3<h1=h5<h2=h6< h7

For Sample B,

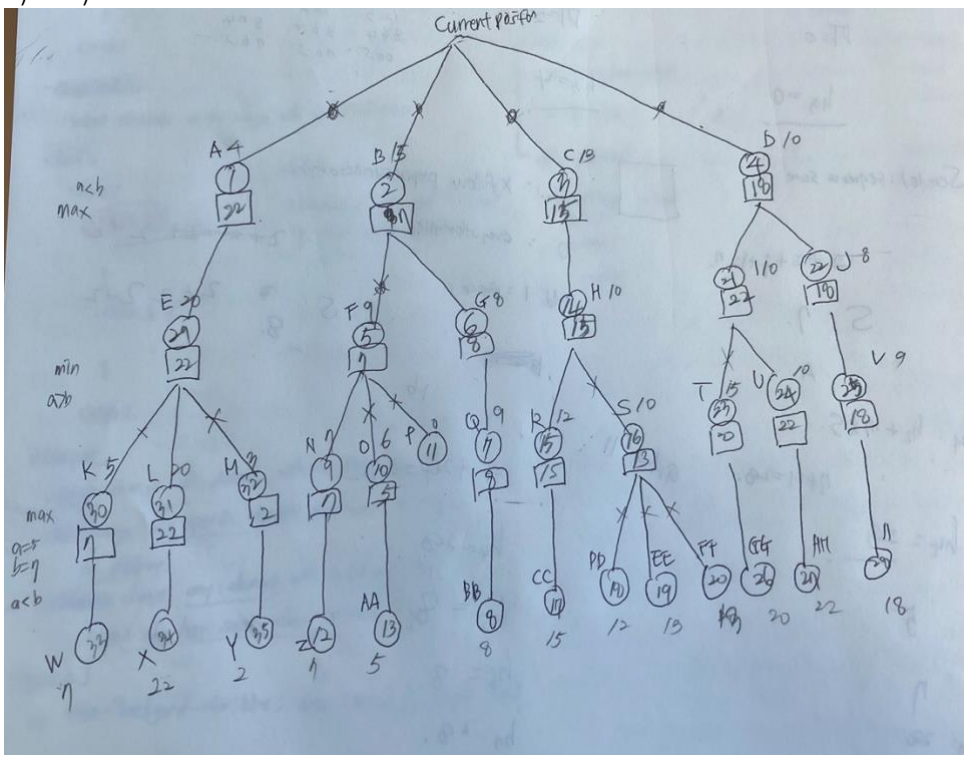
h0(n) = 0
h1(n) = 4
h2(n) = 1 + 1 + 1 + 1 = 4
h3(n) = 2*DT(n) = 2 * 2 = 4
h4(n) = h2(n) + 3*S(n) = 4 + 3 * (2+2+2+2) = 28 (x)
h5(n) = 4 + 4 = 8
h6(n) = 4 +4 = 8
h7(n) = max = 8

Actual movements will be 16, so h4 will not admissible for 28 is more than 16. Except for h4, every heuristics are admissible.
h0<h1=h2=h3<h5=h6< h7

Using a sequence score with is check for every tile around the edge is the most informed heuristic, and h0 is the least. With combining h2 and h3, we can get the enough informed too.

B. Minimax, Alpha-Beta

a) & b)



c) Keeping in mind that it takes 1/7 seconds per static evaluation, what will be the co mputer's move?

It will move to the second highest value because it had not enough time. Therefore, the computer's move will be 18.

d) Now assume that it takes 1/8 seconds per static evaluation. What will be the computer's move?

It will have enough time to calculate the static evaluation to find the best solution. It will be 22.