CIS 716 Tutorial

1. Consider the marbles example from Lecture 19, and imagine a new hypothesis h_6 that 60% of the marbles are red, and 40% are blue.

   (a) Calculate the posterior of h_6 after each of the red marbles (in the example in the slides) is pulled out of the bag. Remember that the marble that is pulled out is replaced every time.

   (b) Considering all 6 hypotheses (the one you just calculated for and the five in the notes) compute the prediction probability for the next marble being red as each of the observations is made.

2. Consider the neural network from page 14 of the notes to Lecture 19, and the threshold function from page 11. What values of the weights W_{13}, W_{14}, W_{23}, W_{24}, W_{35} and W_{45} would make this neural network implement exclusive-OR?

3. Consider the eight-puzzle state space in Figure 1 on the next page, and assume that the puzzle is now non-deterministic, so that whatever move you make from a state, you have a 50% chance of getting to the child state you try to move to, a 25% chance of remaining in the state you were in, and the probability of getting to each other child state is the same (and equal share of the remaining 25%). Thus for the state 1 and trying to move to state 2 you have a 0.5 chance of getting to state 2, a 0.25 chance of staying in state 1 and a 0.125 chance of ending up in either state 3 or state 4.

   Use 3 iterations of the value-iteration algorithm to estimate the value of each state (in other words compute $V_3(s_i)$ for all states).

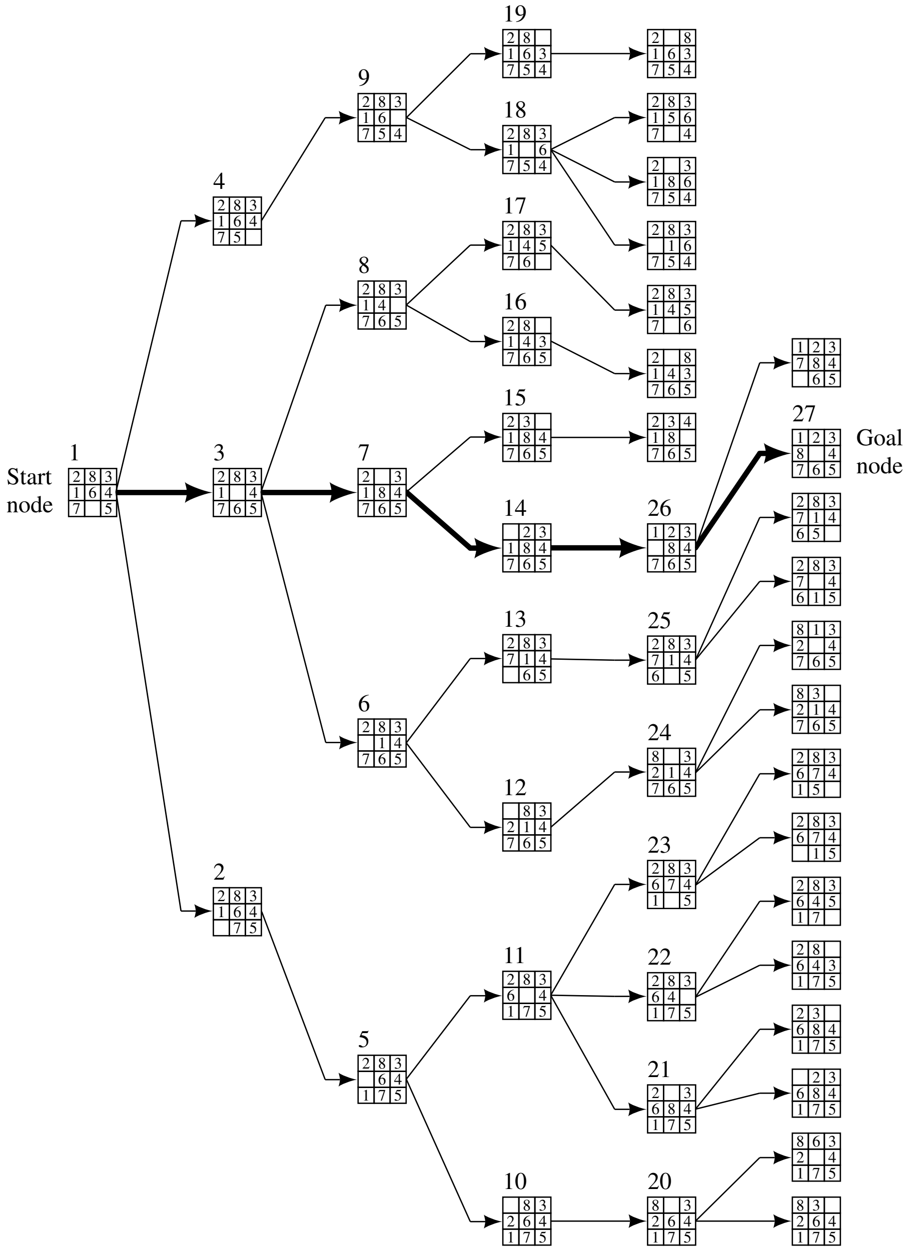

Figure 1: Search space for the eight puzzle

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