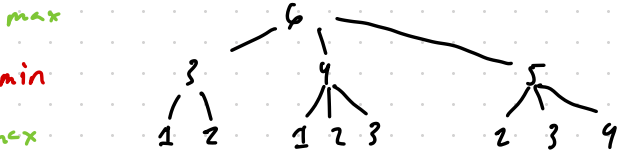
The game of NIM operates with a pile of n matchsticks. There are two players who can choose 1, 2, or 3 matches to remove from the pile. A player loses when they take the last matchstick.

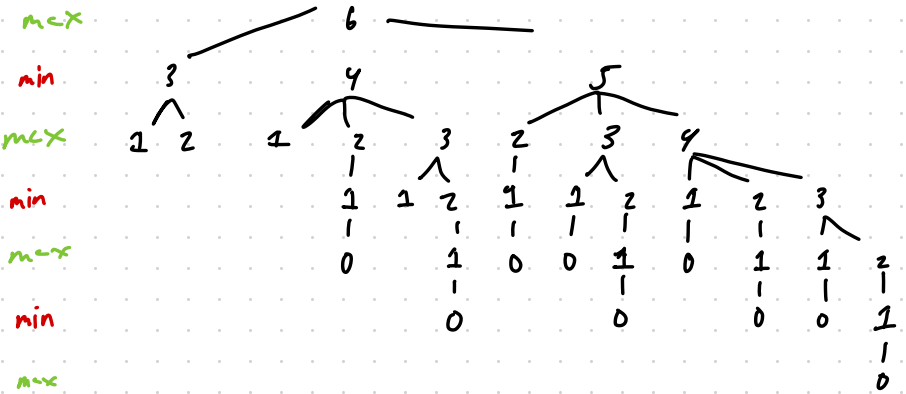
Starting with a pile of n=6

max

Next we explore one more layer in the decision tree where we can take 3, 2, 1 sticks

Let's keep doing this recursively

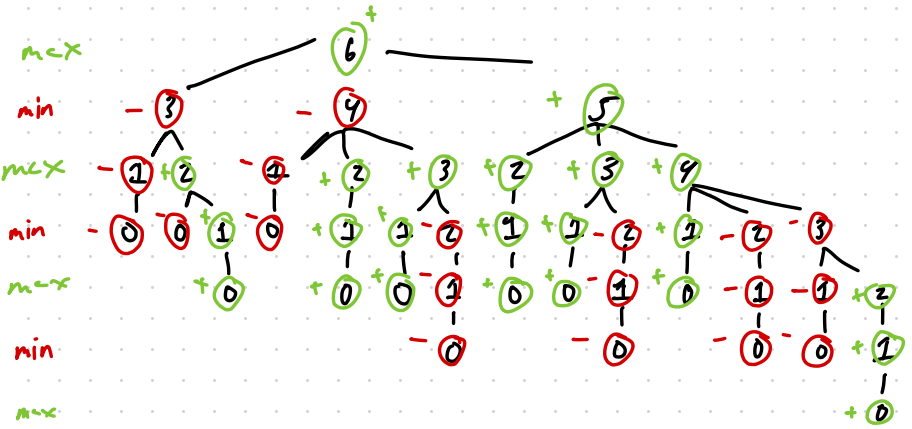




The root node represents the moves for the 1st player. We will try to maximize the objective function to enable a win for this player. Conversely, we minimize winning moves for the second player.

So, if '0' is in a "max" layer we assign the greatest cost.

If '0' is on a "min" layer we assign lowest cost



Here we can see that the 1st player will win if there is only one stick taken from the pile initially