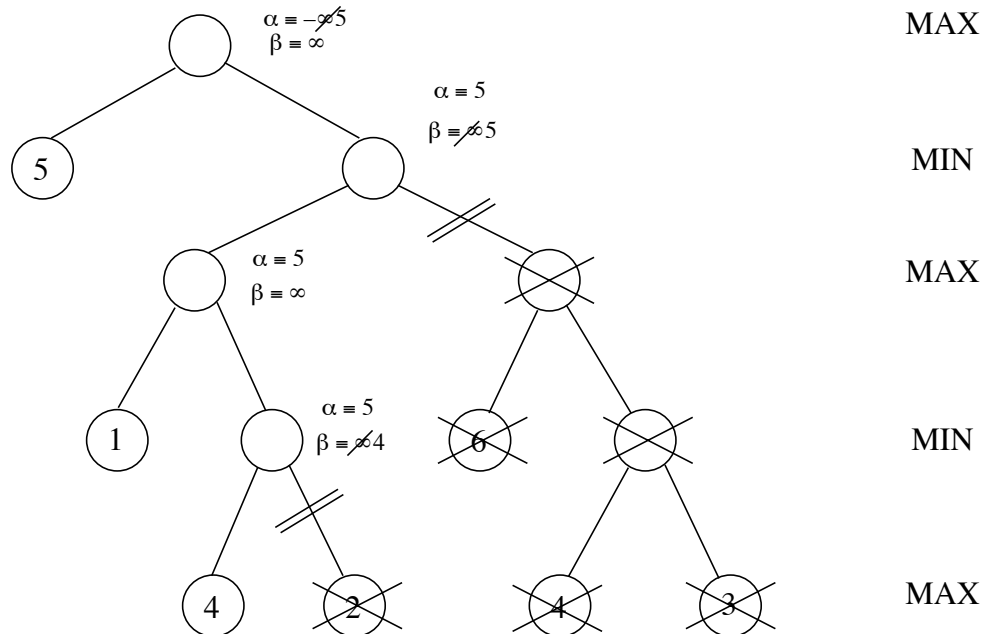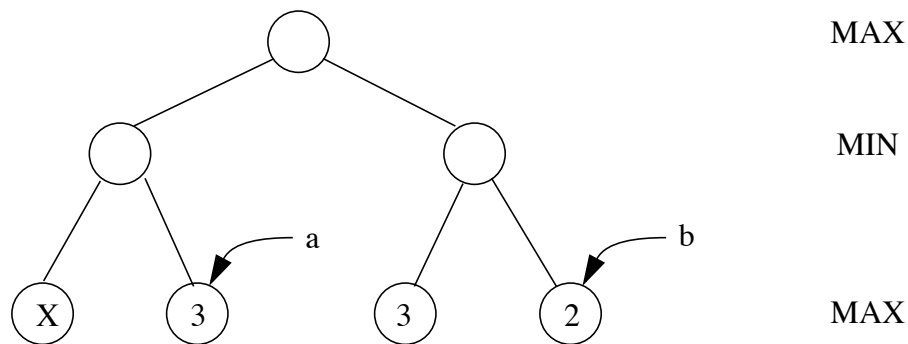# CS4600 - Homework 2 - Sample Solution

1) The minimax value of the top node is 5.
The alpha and beta values of the inner nodes are indicated on the figure below, as are the pruned branches/nodes.

$\alpha = -\infty 5$
$\beta = \infty$ MAX

$\alpha = 5$
$\beta = \infty 5$ MIN

5

$\alpha = 5$
$\beta = \infty$ MAX

1    $\alpha = 5$ $\beta = \infty 4$ 6   MIN

4   2   4   3   MAX

         MAX

2) Answer : X = 2   MIN

a   b

X   3   3   2   MAX

Proof : (trees missing)

       X = 1 : node 'a' can be pruned
       X = 2 : all nodes must be expanded (i.e., no pruning possible)
       X = 3, 4, 5, 6 : node 'b' can be pruned

3) The outcome of MAX can only be the same or better if MIN plays suboptimally compared to MIN playing optimally. So in general, it seems like a good idea to use minimax. However, suppose MAX assumes MIN plays optimally and minimax says MIN will win. In such cases, all moves are losing and are "equally good," including those that lose immediately. A better algorithm would make moves for which it is more difficult for MIN to find the winning line.