3.5.4.8 Exercise 5

Exercise 5 and 6

5. Perform (i) a **left to right** alpha-beta prune on the tree of Fig.ex5; (ii) **right to left** alpha-beta prune on the same tree. Discuss why different pruning occurs.

6. Consider the game tree in Fig. ex6. Explore the tree using **left to right** alpha-beta pruning. Indicate all nodes of the tree that are cut off. Indicate the winning path or paths.

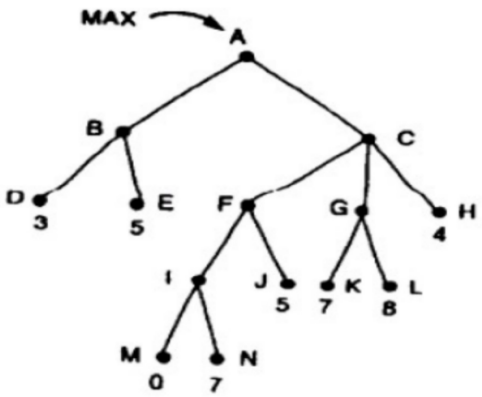


Fig.ex5

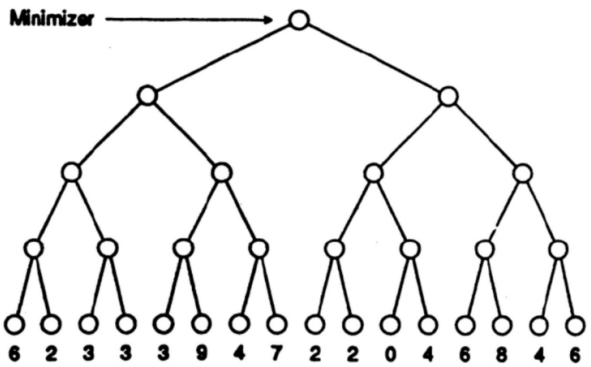


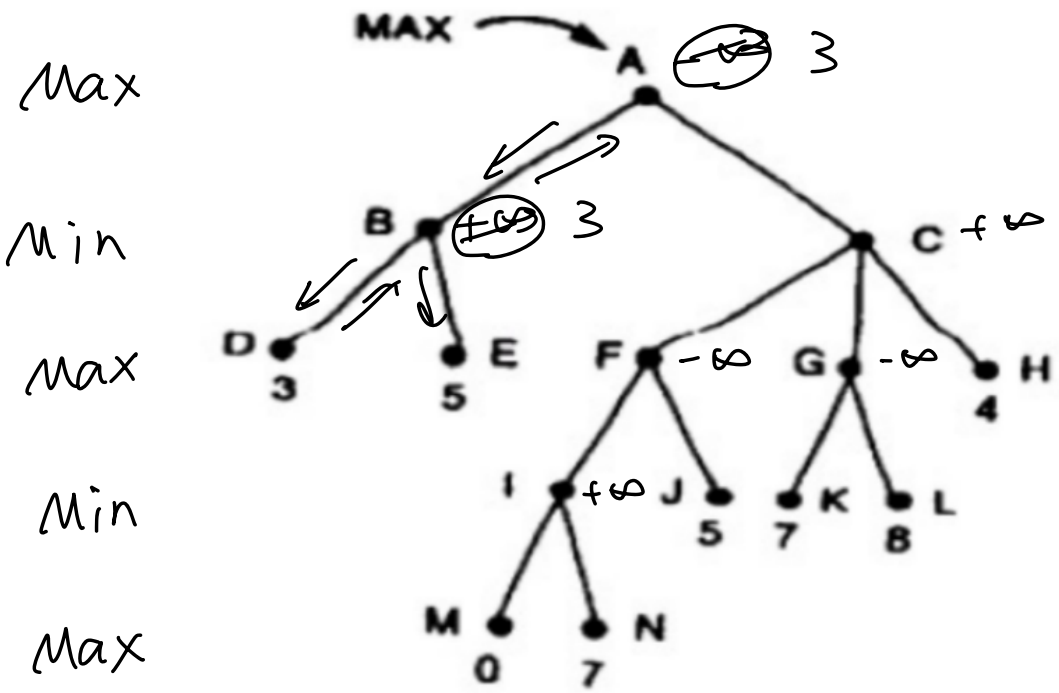
Fig. ex6

Q5(i) left → right α β prune

(ii) right → left α β prune.

Solution (i) left → right

① initiate



$3 < -\infty$ ✗

②

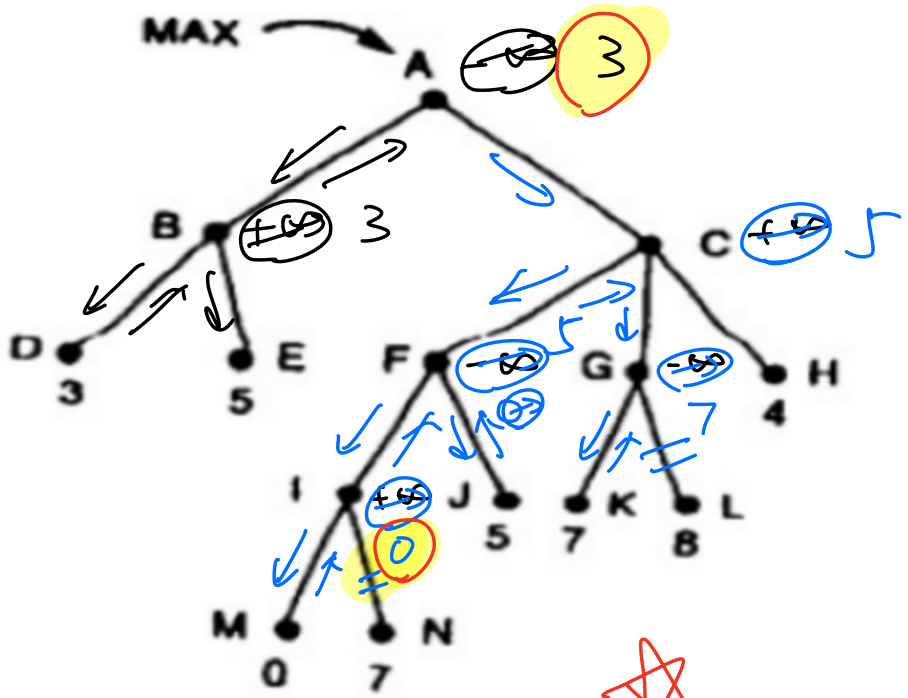
α Max

β Min

α Max

β Min

α Max

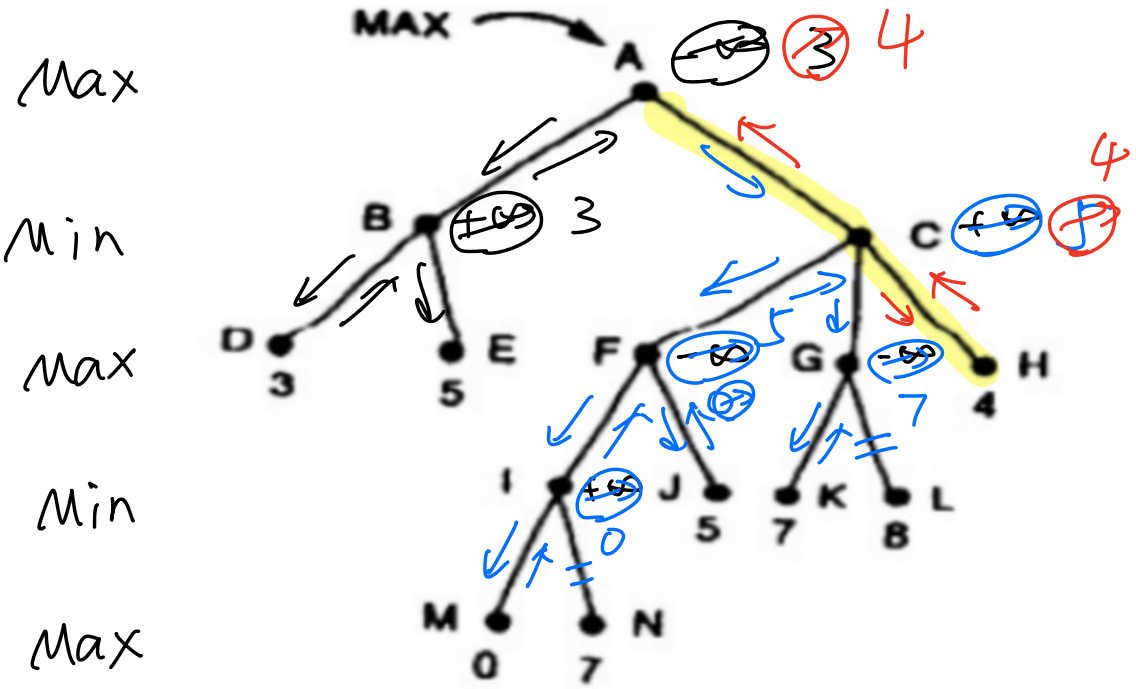


$0 < -\infty$ ✗ $0 < 3$ ✓

$5 > +\infty$ ✗

$7 > 5$ ✓

③



$5 < 3$ X

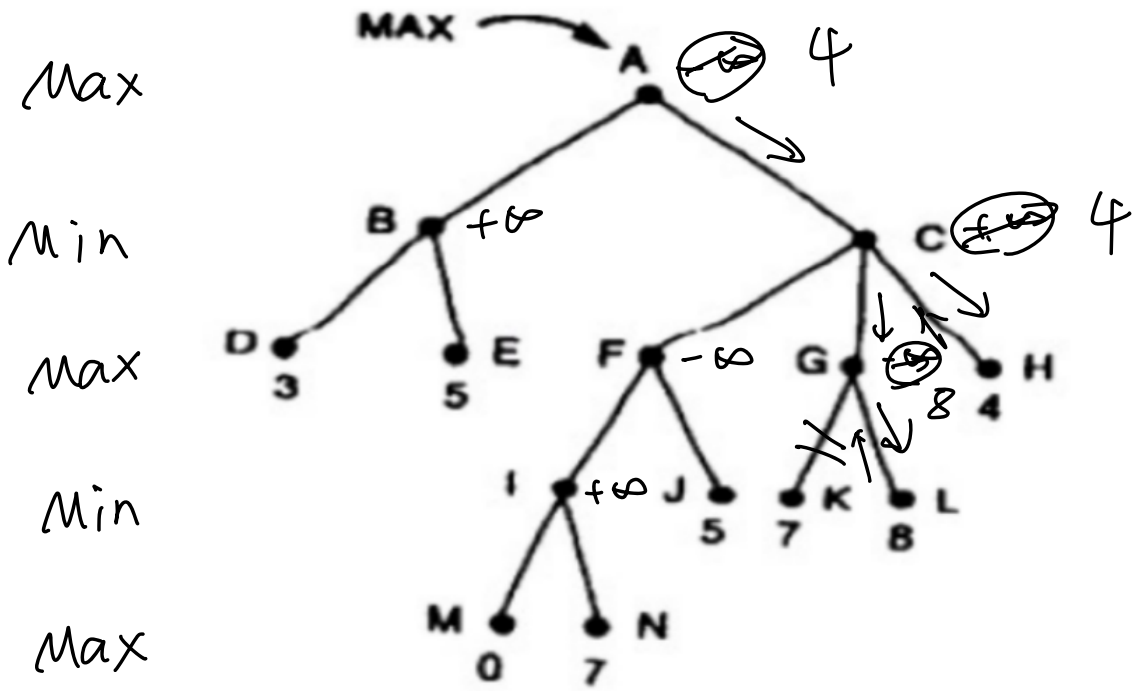
$4 < 3$ X

Max (3, 4) = 4

A → C → H

Solution (ii) right to left

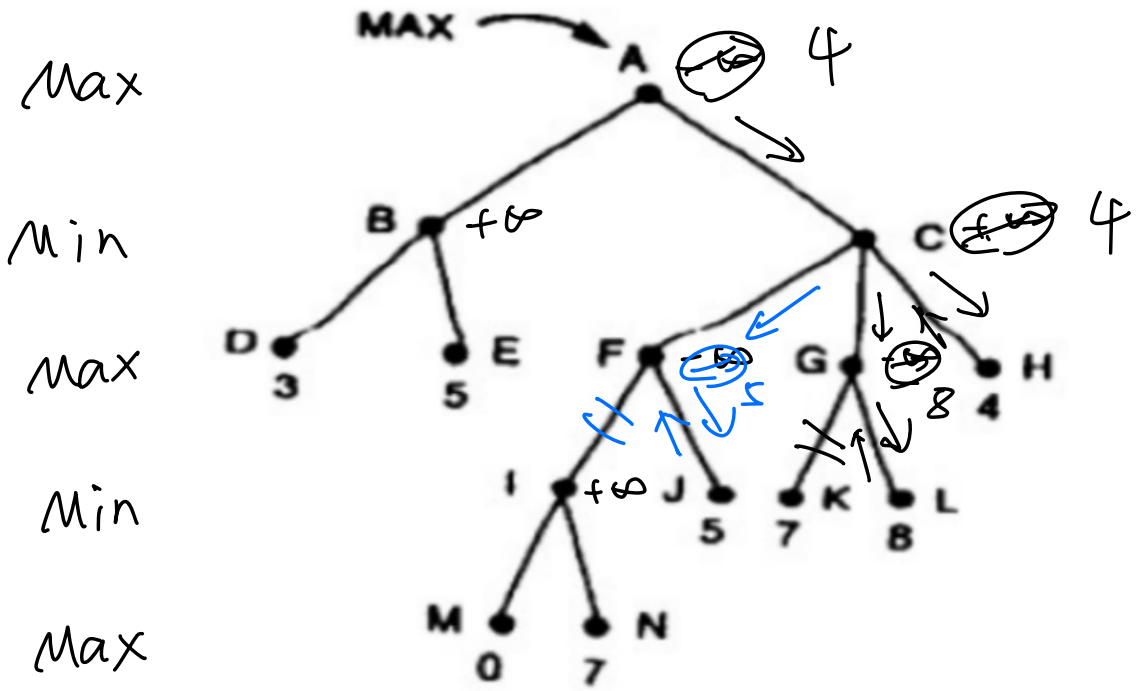
① initiate



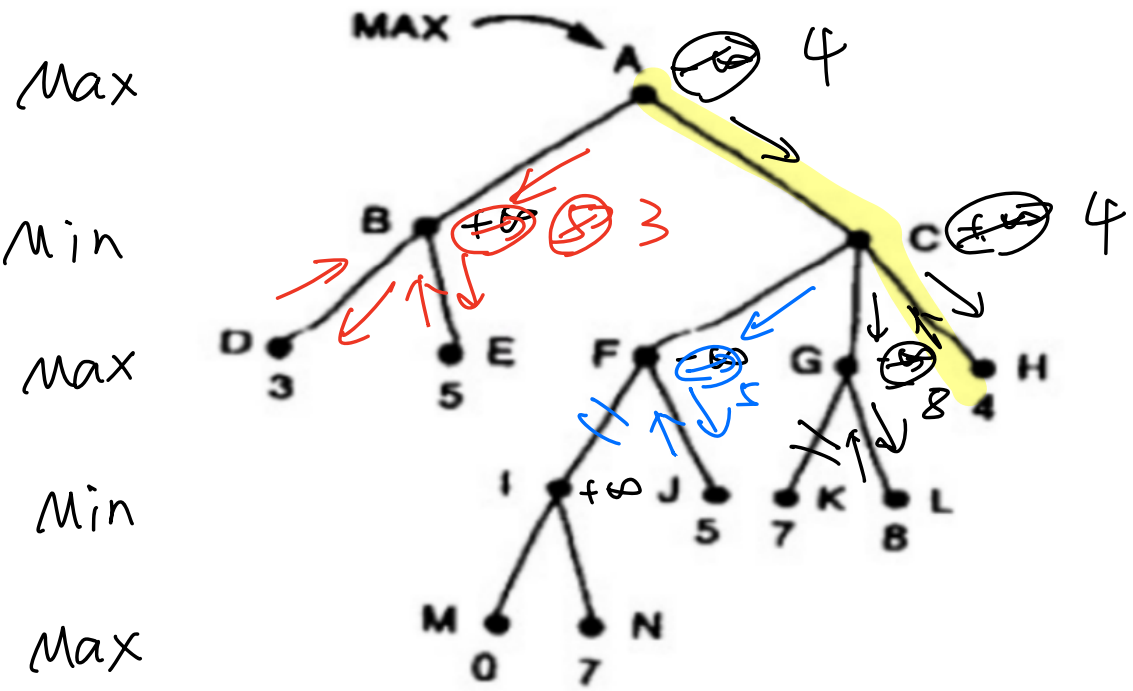
$4 < -\infty$ ✗

$8 > 4$ ✓

(2)



③

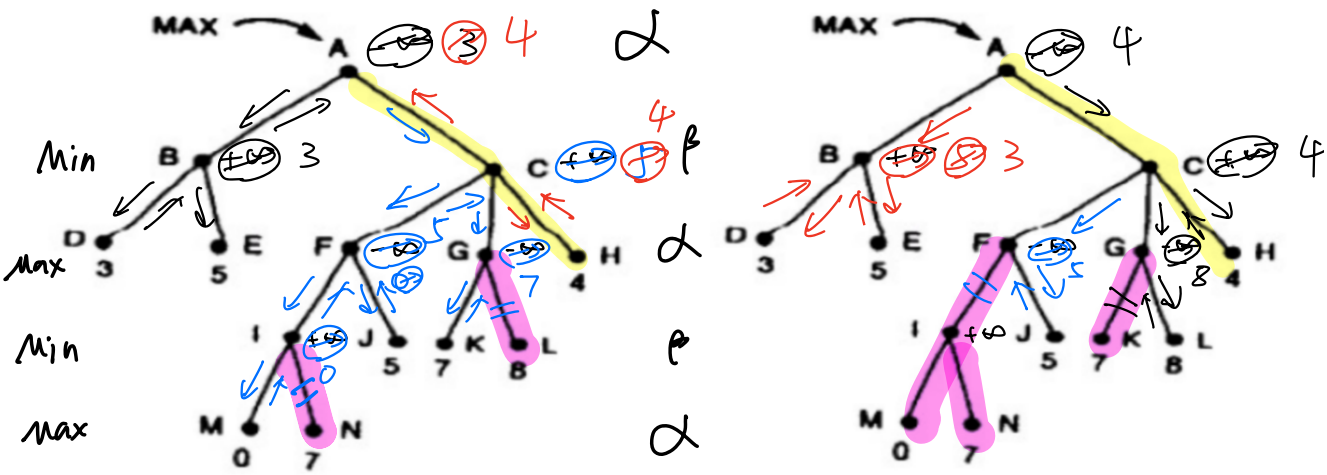


$5 < 4$ ✗

$3 < 4$ ✓

④ So A → C → H

Solution : Why the pruning differs?



① Alpha - Beta cutoff depends heavily on the order in which children are visited.

② In the left-to-right, we happened to see the subtree gave us $\alpha = 3$ first, so we never shut down the search in G

③ In the right-to-left, we discovered an 8 immediately in G while β was only 4 so we pruned.

④ The final value at the root is

the same f, but the amount and location of pruning differs because the same tree is traversed in the opposite order