CHAPTER-12

GAME PLAYING

Subject :

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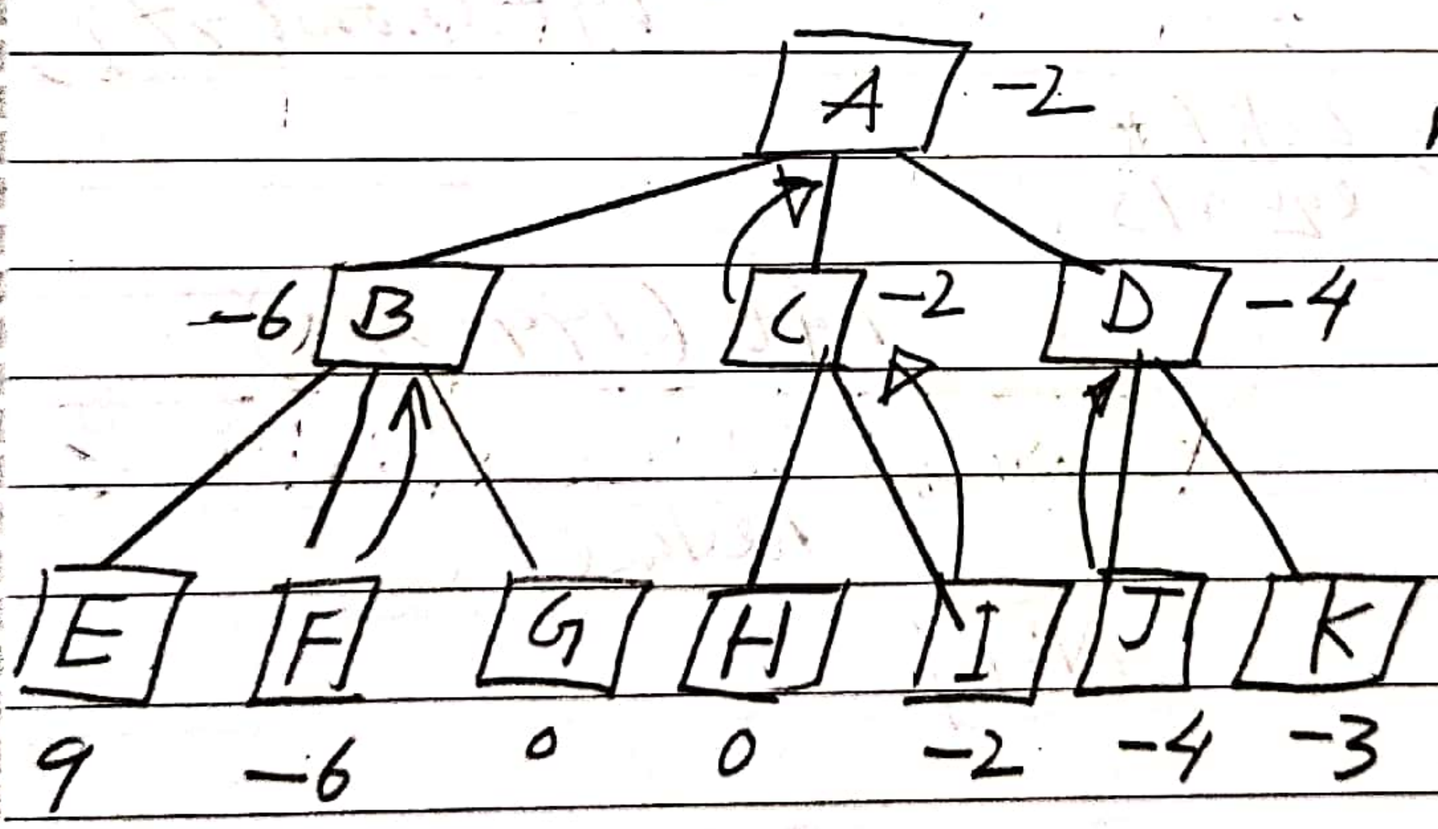
Minimax Algorithm

Minimax is a decision rule used in artificial intelligence, game theory, decision theory for minimizing the possible loss for a worst case scenario. It is used to choose the an optimal move for players and used in games such as tic-tac-toe, chess and other two-player games. The minimax algorithm performs a depth-first search for explorations.

*max: takes maximum value from its child
*min: " minimum " " " "



Therefore first player will select C.

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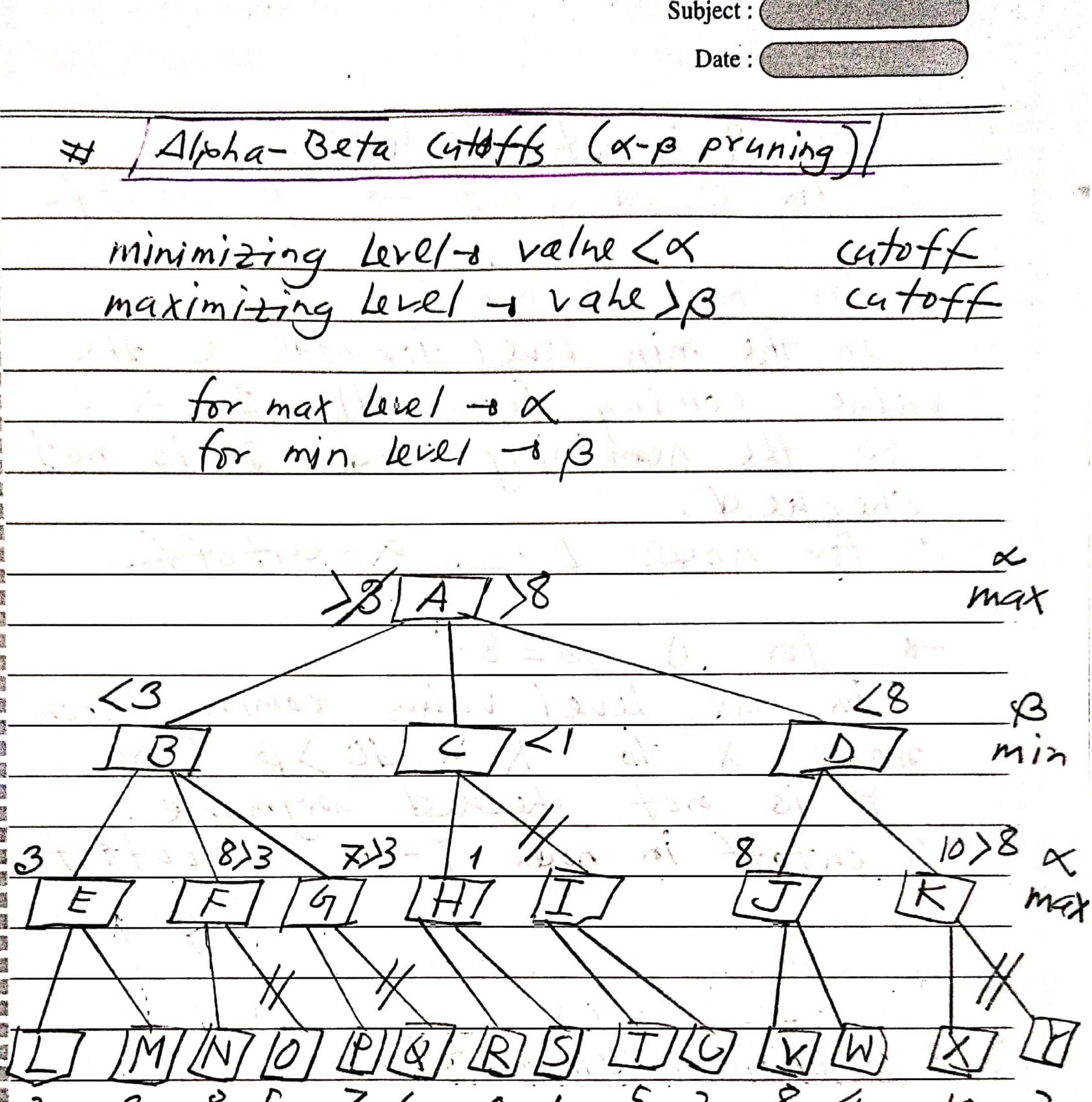
Alpha-Beta cutoffs (α-β pruning)

minimizing level → value < α cutoff
maximizing level → value > β cutoff

for max level → α
for min level → β



for
→ B β = 3. In max level for node F the value coming from N 8 > β. so the node O doesnot need to be checked.
Similarly value from P - 7 > β.

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so Q is not checked.

∴ For O and Q node → β-cut off.

→ For node A $\alpha = 3$

In the min Level for node C the value coming from H $1 < \alpha$.

So the remaining node I is not checked.

∴ for node I → α-cutoff.

→ for O $\beta = 8$.

In max level value coming from node X to K → $10 > \beta$ so Y is not checked anymore.

∴ catoff in node Y → β-cutoff.

Additional Refinements:

1. Waiting for Quiescence
2. Secondary search
3. Using Book moves
4. Alternatives to minimax.

A

Book

super