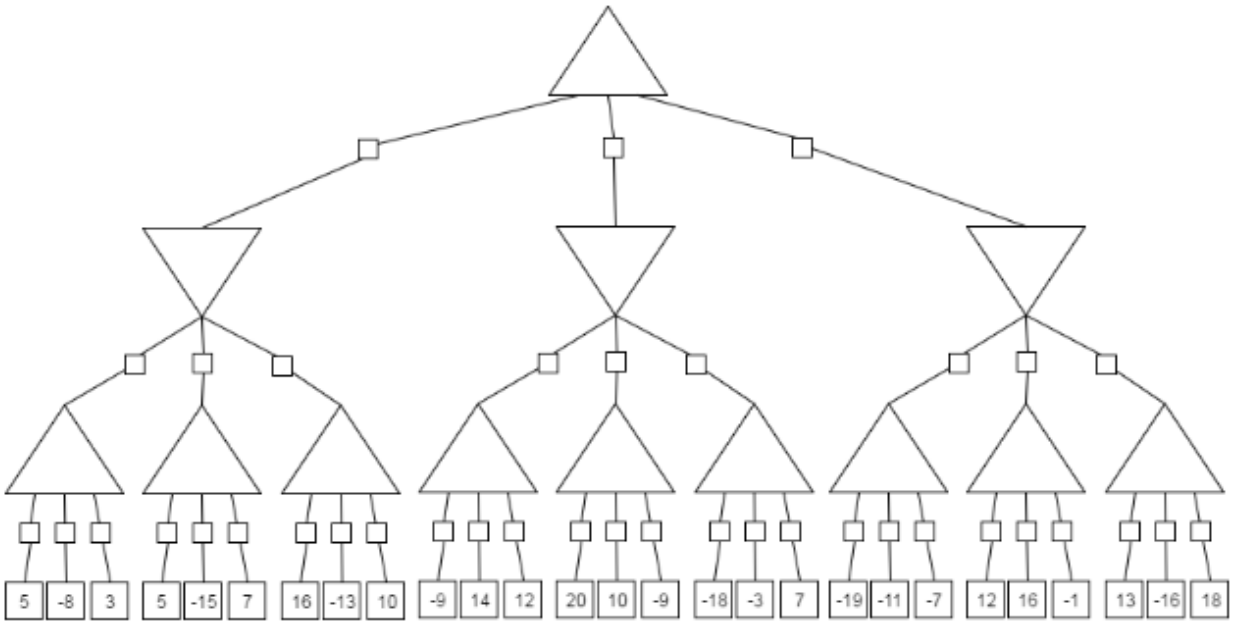
Midterm

Part 1 of 5 - Game Tree Search

Here (tree.png) is a game tree of depth 3 and breadth 3 with respective evaluation function outputs. Use the game tree to answer the following questions. Note that the whole tree must be considered for these questions. Also note that if an entire branch would be checked off, there is no need to check off all of the nodes in the subsequent depth levels.

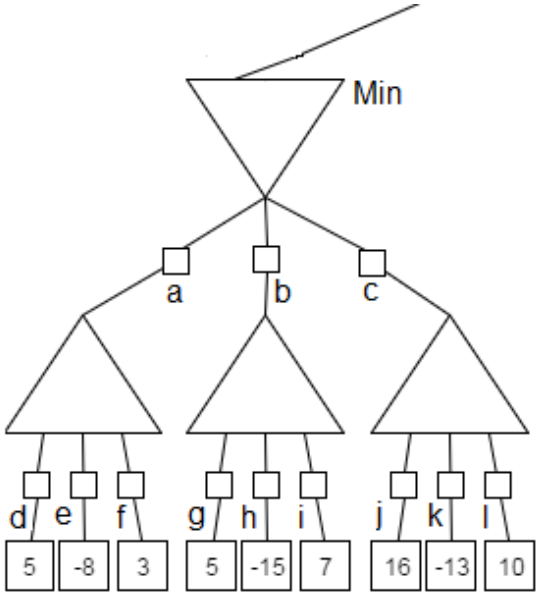
Attachments



Question 1 of 33

0.0 Points

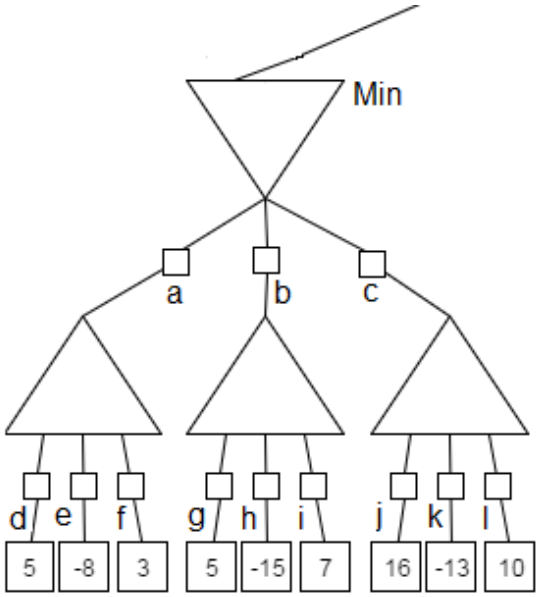
Which nodes of (subtree1.png) should be pruned by alpha-beta search?:



- [ ] A. A
- [ ] B. B
- [ ] C. C
- [ ] D. D
- [ ] E. E
- [ ] F. F

- [ ] G. G
- [x] H. H
- [x] I. I
- [ ] J. J
- [x] K. K
- [x] L. L

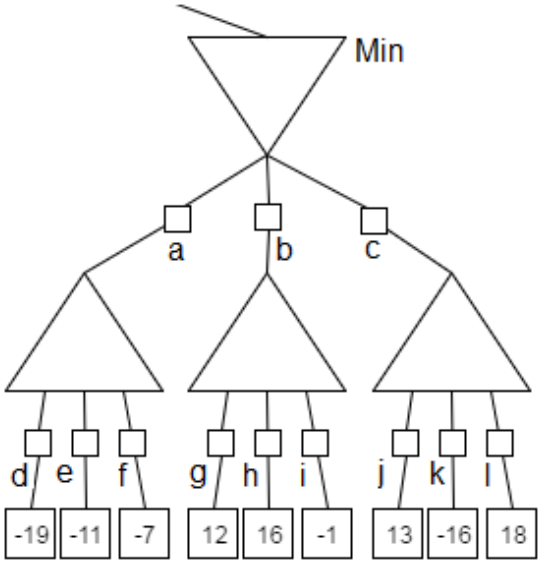
Question 2 of 33 0.0 Points



In the given subtree, what will be the final value in "Min"? 5

Question 3 of 33 0.0 Points

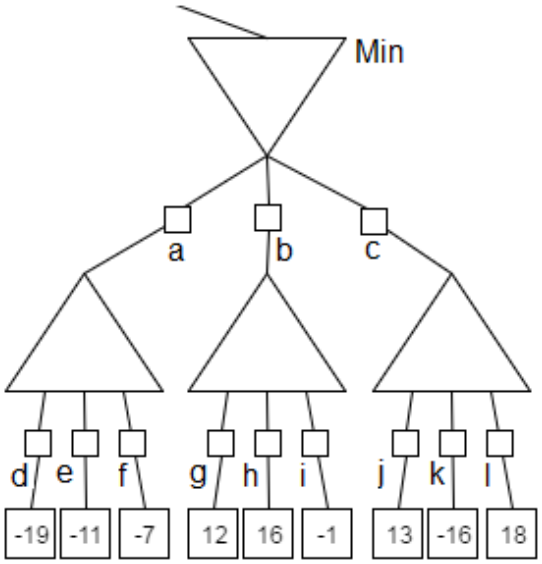
In (subtree2.png), which nodes would be pruned by alpha-beta?



- [ ] A. A
- [x] B. B
- [x] C. C
- [ ] D. D
- [ ] E. E

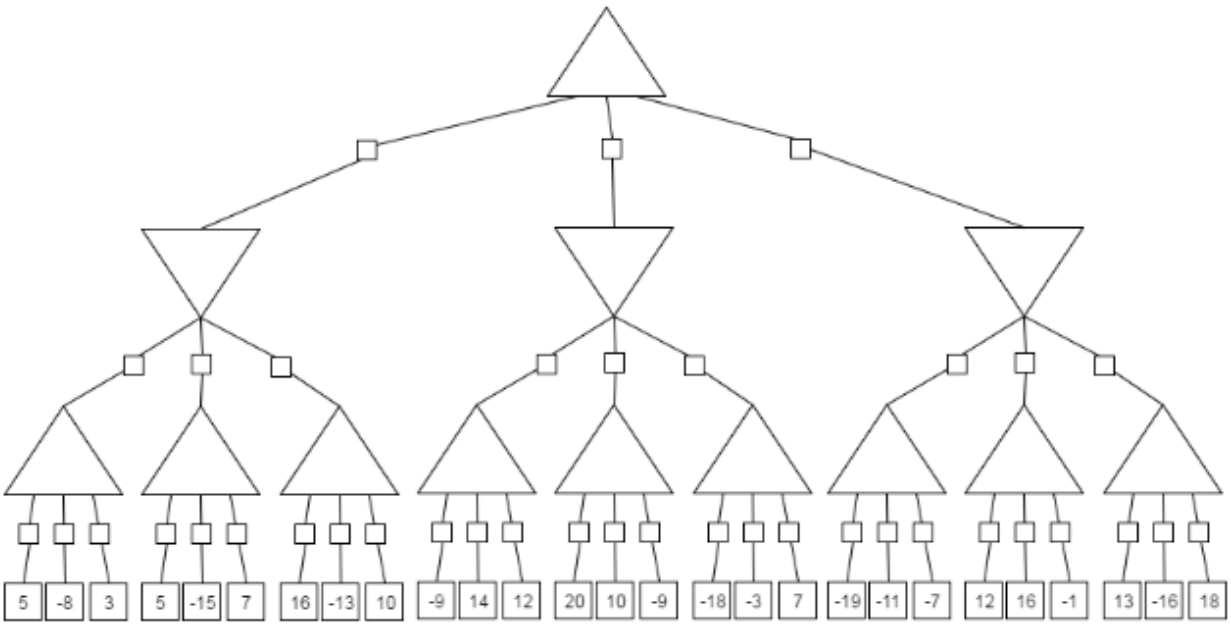
- [ ] F. F
- [ ] G. G
- [ ] H. H
- [ ] I. I
- [ ] J. J
- [ ] K. K
- [ ] L. L

Question 4 of 33 0.0 Points



In the given subtree, what will be the final value in "Min"? -7

Question 5 of 33 0.0 Points



What is the final output of the game tree? 7

Question 6 of 33 0.0 Points

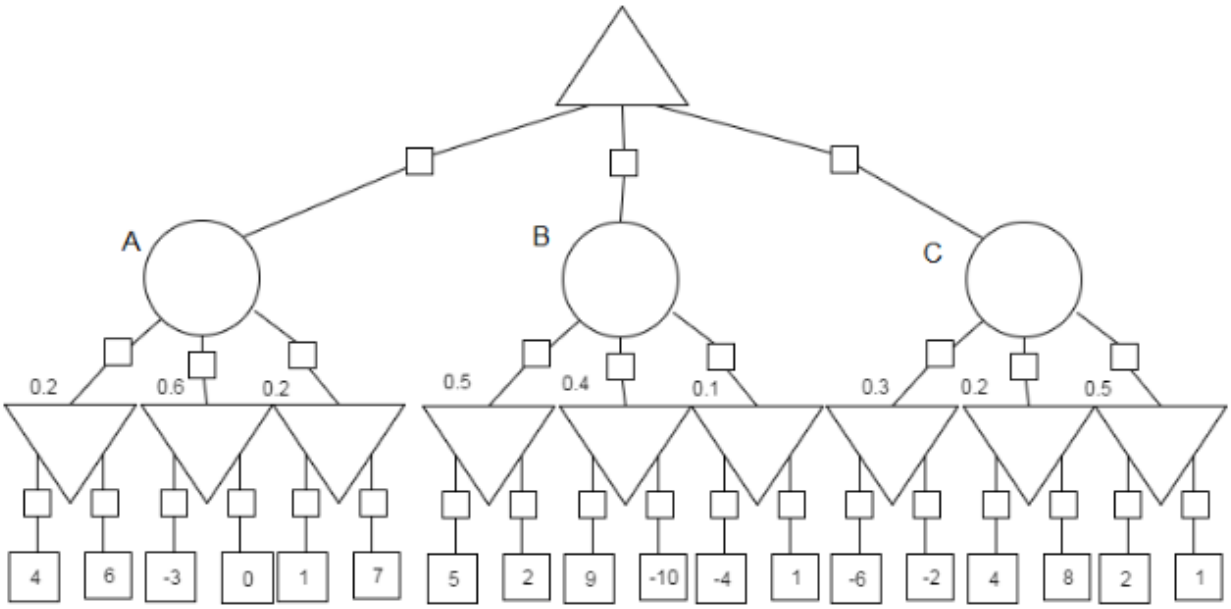
In total, how many nodes were pruned? 8

Question 7 of 33

0.0 Points

In the provided expectiminimax tree (expectimax.png), with an evaluation function bounded between [-10, 10], what are the values of nodes A, B, and C? If any nodes are pruned, use an inequality operator as necessary. Please provide your answers in the following format:

A: ____
B: ____
C: ____



(Maximum number of characters: 60000)

Source
Style
Format
Font
Size

A: -0.8
B: <= -2
C: -0.5

See work in attached google drive link: https://drive.google.com/open?id=0B2Shy51eMGmFZzJHclFsOHVMYm8 (starting page 2)

Question 8 of 33

0.0 Points

Explain how the evaluation function for Queen's Isolation changes for a 3-player variation. You may use pseudocode to help clarify your explanation. (hint: how would the output of the evaluation function change?)

(Maximum number of characters: 60000)

Show/Hide Rich-Text Editor

3 player variation of queen's isolation is the same as 2 player, but now 3 players want to be the last to move instead of 2. As an evaluation function, you take your moves minus the number of first opponent's moves minus the number of second opponent's moves.

Question 9 of 33

0.0 Points

One optimization for alpha-beta pruning includes reordering nodes to allow more pruning. Would this still be an effective strategy in a 3-player game? Why or why not? (Answers without justification receive no credit)

(Maximum number of characters: 60000)

Show/Hide Rich-Text Editor

No, this would not be an effective strategy in a 3-player game. Citing the class resource: http://www.cc.gatech.edu/~thad/6601-gradAI-fall2015/Korf_Multi-player-Alpha-beta-Pruning.pdf, the issue is that in the average case, the asymptotic branching factor of shallow pruning is b. In addition because there is a cost to reordering nodes, even if

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